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March 3, 1992
LIC-92-078R

Commissioner James R. Curtiss
U. S. Nuclear Regulatory Commission
Mail Stop: 16 H3
Washington, DC 20555

Reference: Docket No. 50-285


Dear Commissioner Curtiss:

SUBJECT: Additional Information on NRC - Omaha Public Power District (OPPD)
Meeting Items

The enclosures contain additional information on topics we discussed during the February 7, 1992 meeting in your office. Enclosure 1 addresses safety system performance, expected radiation exposure during the thermal shield inspection and repair, and operator requalification training; Enclosure 2 addresses shutdown safety including the Nuclear Safety Review Group's review of the outage schedule.

If you should have any questions or require additional information, please do not hesitate to contact me.

Sincerely,



W. C. Jones
Senior Vice President

WCJ/sel

Enclosures

c: LeBoeuf, Lamb, Leiby & MacRae
D. L. Wigginton, NRC Senior Project Manager
S. D. Bloom, NRC Project Engineer
R. D. Martin, NRC Regional Administrator, Region IV
R. P. Mullikin, NRC Senior Resident Inspector
Document Control Desk

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ADDI

Topic: Safety System Performance for HPSI, AFW and Emergency AC Power Systems.

The performance indicators (as defined by INPO) for unavailability of the High Pressure Safety Injection (HPSI), Auxiliary Feedwater (AFW), and Emergency AC Power Systems are listed below.

<u>Indicator</u>	<u>1989 - 1991 Industry Median</u>	<u>1989 - 1991 Fort Calhoun Avg.</u>	<u>Fort Calhoun INPO Quartile</u>
HPSI	0.008	0.0008	1 [*]
AFW	0.015	0.008	2
Emer. AC Power	0.017	0.033	4

^{*}Best Quartile is 1

The 1991 performance indicators for Fort Calhoun only are listed below.

<u>Indicator</u>	<u>Fort Calhoun</u>	<u>Fort Calhoun INPO Quartile</u>
HPSI	0.00075	1
AFW	0.001	1
Emer. AC Power	0.033 (0.007) ¹	4 (2) ¹

¹Performance for period from September 1991 through December 1991.

In 1991, the HPSI performance indicator was lower (better) than the three year average and continues to be in the first quartile.

In 1991, the AFW performance indicator improved significantly over the three year average. AFW performance in 1991 would rate in the first quartile.

The Emergency AC Power System performance indicator is below industry median values and continues to be outside industry averages for 1991. However, the unavailability of the diesel generators during the last four months of 1991 improved and if it had been maintained for the full year, would have placed Emergency AC Power System performance in the second quartile. Proactive management of diesel generator outages and more formal requirements for initiating a diesel generator outage are responsible for this improvement.

Topic: Expected level of radiation exposure to inspect/repair thermal shield.

The thermal shield inspection and repair is estimated to result in ten (10) to fifteen (15) Man-Rem of exposure.

Topic: Requalification training during the outage.

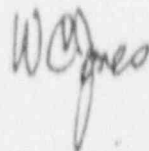
Operator requalification training is suspended only during actual refueling operations. Total time for refueling operations is approximately seven days. The use of all available operators during refueling operations provides continuous coverage and a valuable hands on training opportunity for an infrequently performed evolution.

Enclosure 1
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The emphasis of operator training during the remainder of the refueling outage is in two areas:

1. Early in the outage training is directed at reducing shutdown risk.
2. During the operator's requalification training week prior to startup, training is provided on modifications installed during the outage and on core physics of the reload.

OPPD NUCLEAR POLICY MANUAL

FUNCTION	Safety Assessment/Quality Verification	NUMBER	2.03
SUBJECT	Safety During Shutdown	DATE	December 20, 1991
SUPERSEDES		PAGE	1 OF 2
ISSUED BY	W. C. Jones	APPROVED BY	

The Omaha Public Power District (OPPD), as the owner and operator of Fort Calhoun Station, has established a nuclear policy to maintain and operate the facility with due regard for public and plant safety.

Awareness of shutdown concerns is a prerequisite to enhancing shutdown safety. Vulnerabilities that certain systems and components have under shutdown plant conditions can challenge safety during shutdown such as loss of AC power and loss of decay heat removal. During refueling outages maintenance and surveillance activities can require the simultaneous opening of primary systems and/or containment, cessation of shutdown cooling, disabling of electrical systems or components, and movement of heavy equipment. Industry analysis of shutdown events (NUMARC "Guidelines to Enhance Safety During Shutdown") has "concluded that improved outage planning and control is the most effective means of reducing the likelihood and consequences of events during shutdown. The coordination of these activities with the objective to manage risk and maintain key safety functions is essential and goes beyond compliance with technical specifications requirements during shutdown."

OPPD nuclear management will regularly and critically assess current practices for planning and conducting outages. OPPD management is dedicated to preventing such events by providing management attention; ensuring adequate training; demanding compliance with procedures; effecting detailed planning, coordination and execution of operations; and managing risk. While the scope of activities for an unplanned or forced outage is far less than that of a refueling outage, the same awareness of vulnerabilities during shutdown conditions is required to safely conduct the outage. In addition outage scopes will be closely controlled; schedules will be fully planned, reviewed, and approved; an independent safety analysis of approved refueling schedules will be conducted; and activities affecting nuclear safety will be performed according to the approved schedules. Changes to the schedule or activities that were the basis for the safety evaluation will be re-reviewed and approved by appropriate personnel.

During refueling outages at Fort Calhoun Station, system, train and equipment outages are scheduled according to the System Window concept. The System Window concept takes into account the redundancy of safety systems, electrical power distribution circuits and fire detection and protection requirements in order to ensure the Station's ability to maintain the reactor in a safe shutdown condition.

At times when reactor vessel water inventory is reduced and fuel is in the vessel both Diesel Generators will be available for operation (if needed) and at least two pumps and both Shutdown Cooling Heat Exchangers for decay heat removal will be available prior to reducing water level to less than 3 feet below the vessel flange. All planned evolutions that require this reduced inventory condition will be controlled administratively via plant procedures.

In addition, the outage shall be conducted in accordance with the following principles:

- ° The periods of high vulnerability should be minimized. The availability of on-site and off-site electrical power supplies shall be maximized, particularly during periods of increased vulnerability to fuel damage, such as during mid-loop operation or periods of high decay heat generation prior to refueling cavity flood.
- ° The availability of systems required to provide reactor vessel make-up water and decay heat removal capability, including contingency plans for alternate cooling methods, shall be carefully controlled consistent with decay heat generation rate.
- ° The integrity of fission product containment barriers shall be controlled, consistent with outage activities, to minimize potential for unintentional radioactive releases.
- ° Fuel handling operations shall be conducted carefully in strict compliance with procedures. Special emphasis will be given to precautions to prevent fuel and other core component mishandling or damage.

Omaha Public Power District

Fort Calhoun Station

1992 Refueling Outage Schedule Review

Performed by the

Nuclear Safety Review Group

December 23, 1991

Omaha Public Power District

Fort Calhoun Station

Nuclear Safety Review Group

The Nuclear Safety Review Group (NSRG) at the Fort Calhoun Station (FCS) is performing a review of the 1992 refueling outage schedule. The review consists of three distinct segments; a pre-outage schedule review, a schedule implementation review during the outage, and a post-outage effectiveness review of the schedule.

The pre-outage schedule review consisted of two NSRG personnel reviewing shutdown related procedures, required maintenance, Technical Specifications, industry documents on shutdown issues, and preliminary outage schedules. The focus of the NSRG's review is to maintain a safety margin and ensure key safety functions are met during the outage. The key safety functions used are; Reactivity Control, Power Availability, inventory Control, Pressure Control, Core Cooling, and Containment Integrity. Additionally, the NSRG reviewed Abnormal Operating Procedures (AOP) associated with the shutdown condition, to ensure available contingencies are in place.

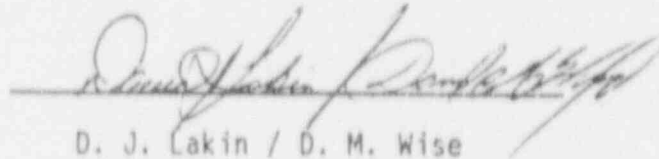
During the outage the NSRG is performing routine schedule reviews, reviews of schedule changes which affect the key safety functions, and assessments of shutdown risks. Additionally, the NSRG is working closely with the outage management team to ensure the key safety functions are being maintained.

Following the outage the NSRG will perform an evaluation of the outage to identify problems and provide this data to FCS management for future outages. The NSRG will then update its Outage Schedule Reviews procedure (NSRG-WP-1) to address identified problems for future reviews.

SRG Document Review

Document Reviewed: 1992 Refueling Outage Schedule

Reviewed By:


D. J. Lakin / D. M. Wise

Date: 12/23/91

References:

1. SECY-91-283, NRC Policy Issue, Evaluation of Shutdown and Low Power Risk Issues.
2. NUMARC 91-XX, Draft of Guidelines to Enhance Safety During Shutdown.
3. NUMARC 91-06, Guidelines for Industry Actions to Assess Shutdown Management.
4. INPO Outage Review Visit Comments.
5. INPO Letter to W. G. Gates, dated September 13, 1991, Guidance for Managing Shutdown Safety.
6. Cycle 14 Refueling Outage Schedule and Supplied Documents.
7. FCS P&IDs.
8. FCS Operating Procedures.
9. FCS Technical Specifications.
10. Standing Order M-104, Outage Planning and Execution.
11. Davis Besse Seventh Refueling Outage Safety Review, dated June 2, 1991.

Remarks:

A review of the 1992 outage schedule was originally planned by the NSRG following discussions at the 1990 ORSERG workshop in Seattle, Washington. During the summer of 1991, the Outage Scheduling Supervisor requested the NSRG to perform an independent review of the 1992 outage schedule. The NSRG initially reviewed existing FCS documentation to determine work required to be performed during refueling intervals.

A copy of the proposed outage schedule was provided to the NSRG in November, 1991. During the course of the NSRG's review, INPO arrived for an initial review of FCS's outage planning. The INPO team informed the NSRG about several items to evaluate from experiences at other plants. Two Licensed Operators were requested to assist the NSRG in the last week of the review and proved to be a valuable resource to perform a thorough review of the outage schedule. Additionally, the NSRG coordinated to assist Operations in their outage schedule review by providing information and details from our review. The outage scheduling group provided information to the NSRG on interpreting the outage schedule and provided assistance throughout the review.

Attempts were made to confirm and relay concerns in the schedule to the scheduling group for action as the concerns were identified. The concerns identified during this review by the NSRG and the Operators assisting in the review are summarized below.

Review Summary

During the review of the 1992 Refueling Outage Schedule, the assistance of INPO, Operations, and Engineering, provided information to enhance NSRG's review. The effectiveness of the NSRG review was improved by dividing the outage schedule into distinct areas. These areas were:

1. Plant Shutdown to Core Off-Load,
2. Core Off-Load,
3. Defueled (including SFP cooling),
4. Core Reload,
5. Core Reload to Plant Startup.

These areas were divided to specifically review key evolutions in each area.

These evolutions included:

1. Reduced Inventory to Dump S/G Tubes,
2. Containment Closure Capability,
3. Mid-loop Activities,
4. SFP Cooling during CCW and RW System Outages,
5. Fuel Movement,
6. Electrical Power Source Outages,
7. Decay Heat Removal Requirements,
8. Switchyard Activities.

In reviewing each of these areas and the associated evolutions, several concerns or problems were noted. Each concern or problem was discussed with a outage scheduling representative to convey the finding and determine the corrective actions to resolve the concern or problem. Unless stated otherwise, most of the concerns or problems were resolved to the satisfaction of the NSRG in schedule changes or proposals for changes. A few concerns or problems identified by the NSRG and the Operators are outside of the outage scheduling groups responsibility, however, the information was taken and provided to the appropriate personnel by the Outage Scheduling Supervisor. There is only one concern with respect to SFP cooling while the core is in the SFP that is still being resolved. This specific concern was noted by both the Operators and the NSRG.

A summary of the concerns or problems in the outage schedule is provided below. Included under each concern or problem is the resolution taken or proposed.

1. In the original schedule, both the 161 KV offsite power supply, and the Emergency Diesel Generator (D-1), were scheduled to be out of service during the reduced inventory period to dump S/G tubes. (CLOSED)
 - this was resolved by revising the logic for starting the D-1 outage to ensure that the S/G tube dumping evolution is complete prior to allowing D-1 to be taken out of service.
2. The Equipment Hatch opening and closing sequence was not coordinated for the evolution of RV head installation and S/G sludge lancing. (CLOSED)
 - this was resolved by rescheduling sludge lancing to coincide with S/G eddy current testing while the reactor is defueled.

3. The ERF outage is scheduled during the reduction of RV level for Nozzle Dam installation. (CLOSED)

- discussions with the Operators resolved this concern because redundant indications are available on the control boards for reducing RV level.

4. Switchyard work is not defined or coordinated to minimize the potential for losing offsite power. (CLOSED)

- this concern was resolved by the use of a liaison from the station to coordinate switchyard work with the Control Room. Additionally, the proposal to maintain outage scheduling representatives available to review work prior to the Control Room authorization will add another level to the defense in depth approach.

5. 125 VDC battery replacement is not currently in the outage schedule. (OPEN)

- this concern remains open as the affects of when the replacement occurs during the outage can not be determined. The Outage Scheduling Supervisor is aware of the need to incorporate the replacement into the schedule, however no firm date has been provided as to the arrival date of the new batteries. The NSRG will review schedule revisions and evaluate the addition of the battery replacement to the outage schedule.

6. The main condensers are scheduled to be out of service for approximately one month during the outage. (OPEN)

- this concern was discovered by the Operators and centers around the need the process waste (monitor tank discharges) during the outage. This concern was relayed to the outage group for resolution. The NSRG will review schedule revisions and coordinate with the outage group for resolution to this concern.

7. Island bus 3C-4C outage will take power away from the Auxiliary Boiler, which can affect containment purge, and the Water Plant, which will affect backup cooling to the air compressors. (CLOSED)

- this concern was resolved by the Outage Scheduling Supervisor who checked with System Engineering and that a Temporary Modification can be installed to supply power to the equipment of the concern. Additionally, Mr. D. J. Bannister of operations is verifying the Temporary Modification is referenced on the work order for 3C-4C.

8. The schedule has containment purge beginning in January, approximately 3 weeks before shutdown. (OPEN)

- this concern centers around the date when purge is to begin. Containment Purge is scheduled to begin while the station is still at power, which is inconsistent with the Technical Specifications. The Outage Scheduling Supervisor was made aware of the concern for resolution. The NSRG will review schedule revisions for changes to resolve this concern.

9. SFP Cooling with the core offloaded and CCW and RW Systems out of service.(OPEN)
- this concern centers around the ability to maintain cooling for the SFP with the core offloaded and both CCW and RW being out of service. The major concern is the inavailability of CCW with the core in the SFP. There are no plans, at this time, for alternate cooling of the SFP with the plate heat exchanger. Mr. D. J. Bannister of Operations, the Outage Scheduling Supervisor, and the Special Services Engineer are working on plans to interrupt a 10 year hydrostatic test of the CCW System and restore cooling. The plans are to let the SFP temperature cycle from the low end of the operating band to the upper end, restore cooling to reduce the temperature to the low end and repeat this until the hydrostatic test is complete. The Operators and the NSRG reviewers feel this is not the best method to provide adequate cooling. The basis for the concern is if the temperature is at the upper end of the operating band and a loss of power occurs, the upper limit for the SFP can be exceeded. The NSRG and the Operators suggest some sort of alternate cooling be established to maintain SFP temperature. The plate heat exchanger and piping are onsite, however a heat exchanger is needed. The Operators provided several options; 1) obtain chillers as done in the past, 2) obtain an old heat exchanger and provide fire water as cooling medium, 3) use the alternate SFP cooling connections and cool SDC with RW. Discussions with the Outage

Scheduling Supervisor included the possibility of staggering the RW and CCW outages. This option would allow the use of the containment coolers to heat the containment and cool the SFP with the RW system out of service. The NSRG will continue to review the outage schedule and discuss resolution of this concern with the outage group and operations.

10. The Circulating Water Pump Outages are not scheduled to begin until after shutdown. Consider starting these pump outages earlier by taking one out while still on line. (CLOSED)

- the Outage Scheduling Supervisor informed the Operators and the NSRG of work requiring an instrument air outage in the Intake Structure which will affect all the Circulating Water Pumps.

11. Inspection/repair of the Oil Lift Check Valves needs to be moved until the turbine is off the turning gear. (CLOSED)

- this concern was noted and the outage group was already aware of the conflict. Schedule revisions are being incorporated to correct the concern.

12. Several PMOs were identified that could be done online rather than waiting until the outage. (CLOSED)

- these identified items were relayed to the Outage Scheduling Supervisor for resolution. The outage group will evaluate the work and determine if action needs to be taken or not.

13. Several concerns involving containment integrity at reduced inventory were also identified by the Operators. (OPEN)

- these concerns were relayed to Mr. D. J. Bannister for resolution with the Supervisor, Operations. These concerns included the use of plywood taped to the S/G safety valve openings, and the ability of the Operators to track penetration work during reduced inventory for containment integrity. The NSRG will review these concerns with Mr. Bannister and the Operators for resolution

14. The nozzle dams were a concern to the Operators because refresher training is needed and operations checks should be shiftly verse daily. (OPEN)

- these concerns were relayed to Mr. D. J. Bannister for resolution with the Supervisor, Operations. The NSRG will review these concerns with Operations for resolution.

15. Instrument Air is scheduled to be out of service during core offload when needed for fuel handling equipment. (OPEN)

- this concern was relayed to the Outage Scheduling Supervisor for resolution. The NSRG will review revisions to the schedule for resolution.

LERs for the last two refueling outages were reviewed by the operators and several suggestions were forwarded to the Supervisor, Operations by Mr. D. J. Bannister for consideration. These suggestions included:

1. Limiting access to CB-20 when in reduced inventory or limited power situations.
2. Stricter controls on relay testing during shift turnover.
3. Review MM-RR-0314 and RC-3 for implementation of corrective actions of LER 90-13 and 89-004 respectively.
4. Controls on Radiography to minimize inadvertent ESF actuations.
5. Minimize abnormal 480 VAC configurations to prevent overcurrent conditions.
6. Stricter controls on scaffolding to prevent interference with equipment operation.
7. Stricter controls on relay work in confined spaces to prevent inadvertent actuations.

Several additional suggestions were raised during this review by the Operators and the NSRG. These suggestions were forwarded to Mr. D. J. Bannister and the Outage Scheduling Supervisor for resolution.

1. Closing of the Control Room Window during critical evolutions (i.e. filling cavity, reducing vessel level for reduced inventory operation, etc.).
2. Controls to prevent inadvertent releases from TPCW, CCW, S/Gs, etc. during maintenance when these systems are open.

3. Establishment of a laydown area other than the switchyard. Consider old trailer city area, inside fence near warehouse, or parking lot east of Administration Building.
4. Identify temporary power supplies to containment for ground isolation purposes.
5. Development of a prejob briefing checklist.
6. Control of crane activities outside of plant near power lines during reduced inventory or limited power periods.
7. Double verification of procedures for refueling SDC alignments, and fill/drain procedures for loss of inventory/dilution/flooding considerations.
8. Maintain approximately 40" in SIRWT for emergency Boric Acid flow path with SI pumps when fuel is in the core.
9. Do not allow work on or near critical equipment important to operation during mid-loop conditions.
10. Establish a status board for minimum equipment required during the refueling outage for use in the Control Room.

The NSRG will continue to monitor the outage schedule on a routine basis throughout the outage. Additionally, the NSRG will continue to work with the outage group in reviewing revisions to the schedule prior to the start of the outage.

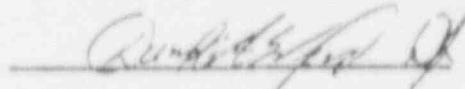
c: R. L. Andrews W. G. Gates S. K. Gambhir T. L. Patterson J. W. Tills
J. W. Chase D. R. Trausch R. P. Clemens D. J. Bannister W. W. Orr

SRG Document Review

Document Reviewed: Follow-up to SRG-91-609

Document Subject: 1992 Refueling Outage Schedule

Reviewed By:


D. M. Wise

Date: 1/31/92

Remarks:

This review is a follow-up to Document Review SRG-91-609, 1992 Outage Schedule Review, which was initially completed on 12/23/91. The initial report identified 15 items classified as concerns/problems with the outage schedule. Each of these concerns are listed below and updates are provided for each open item. Two of the 15 items remain open.

Review Summary

The following is an updated status of these concerns/problems.

1. In the original schedule, both the 161 KV offsite power supply, and the Emergency Diesel Generator (D-1), were scheduled to be out of service during the reduced inventory period to dump S/G tubes. (CLOSED)
 - this was resolved by revising the logic for starting the D-1 outage to ensure that the S/G tube dumping evolution is complete prior to allowing D-1 to be taken out of service.

2. The Equipment Hatch opening and closing sequence was not coordinated for the evolution of RV head installation and S/G sludge lancing. (CLOSED)
 - this was resolved by rescheduling sludge lancing to coincide with S/G eddy current testing while the reactor is defueled

3. The ERF outage is scheduled during the reduction of RV level for Nozzle Dam installation. (CLOSED)
 - discussions with the Operators resolved this concern because redundant indications are available on the control boards for reducing RV level.

4. Switchyard work is not defined or coordinated to minimize the potential for losing offsite power. (CLOSED)
 - this concern was resolved by the use of a liaison from the station to coordinate switchyard work with the Control Room and the Outage Control Center. Additionally, the proposal to maintain outage scheduling representatives available to review work prior to the Control Room authorization will add another level to the defense in depth approach.

5. 125 VDC battery replacement is not currently in the outage schedule. (OPEN)

- this concern remains open as the affects of when the replacement occurs during the outage can not be determined. The Outage Scheduling Supervisor is aware of the need to incorporate the replacement into the schedule, however no firm date has been provided as to the arrival date of the new batteries. The NSRG will review schedule revisions and evaluate the addition of the battery replacement to the outage schedule.

(Update) Battery #1 is scheduled for replacement during the period of 2/17/82 through 2/29/92. Battery #2 is scheduled for replacement during the period of 3/31/92 through 4/12/92. This concern is now considered as (CLOSED).

6. The main condensers are scheduled to be out of service for approximately one month during the outage. (OPEN)

- this concern was discovered by the Operators and centers around the need to process waste (monitor tank discharges) during the outage. This concern was relayed to the outage group for resolution. The NSRG will review schedule revisions and coordinate with the outage group for resolution to this concern.

(Update) CW pump work will require Instrument Air to be isolated in the Intake Structure. The OCC and Operations will coordinate this concern during the outage. (CLOSED)

7. Island bus 3C-4C outage will take power away from the Auxiliary Boiler, which can affect containment purge, and the Water Plant, which will affect backup cooling to the air compressors. (CLOSED)

- this concern was resolved by the Outage Scheduling Supervisor who checked with System Engineering and that a Temporary Modification can be installed to supply power to the equipment of the concern. Additionally, Mr. D. J. Bannister of operations is verifying the Temporary Modification is referenced on the work order for 3C-4C.

8. The schedule has containment purge beginning in January, approximately 3 weeks before shutdown. (OPEN)

- this concern centers around the date when purge is to begin. Containment Purge is scheduled to begin while the station is still at power, which is inconsistent with the Technical Specifications. The Outage Scheduling Supervisor was made aware of the concern for resolution. The NSRG will review schedule revisions for changes to resolve this concern.

(Update) Containment purge is now scheduled as part of the plant shutdown. This concern is now considered as (CLOSED).

9. SFP Cooling with the core offloaded and CCW and RW Systems out of service. (OPEN)

- this concern centers around the ability to maintain cooling for the SFP with the core offloaded and both CCW and RW being out of service. The major concern is the inavailability of CCW with the core in the SFP. There are no plans, at this time, for alternate cooling of the SFP with the plate heat exchanger. Mr. D. J. Bannister of Operations, the Outage Scheduling Supervisor, and the Special Services Engineer are working on plans to interrupt a 10 year hydrostatic test of the CCW System and restore cooling. The plans are to let the SFP temperature cycle from the low end of the operating band to the upper end, restore cooling to reduce the temperature to the low end and repeat this until the hydrostatic test is complete. The Operators and the NSRG reviewers feel this is not the best method to provide adequate cooling. The basis for the concern is if the temperature is at the upper end of the operating band and a loss of power occurs, the upper limit for the SFP can be exceeded. The NSRG and the Operators suggest some sort of alternate cooling be established to maintain SFP temperature. The plate heat exchanger and piping are onsite, however a heat exchanger is needed. The Operators provided several options; 1) obtain chillers as done in the past, 2) obtain an old heat exchanger and provide fire water as cooling medium, 3) use the alternate SFP cooling connections and cool SDC with RW. Discussions with the Outage

Scheduling Supervisor included the possibility of staggering the RW and CCW outages. This option would allow the use of the containment coolers to heat the containment and cool the SFP with the RW system out of service. The NSRG will continue to review the outage schedule and discuss resolution of this concern with the outage group and operations.

(Update) Engineering Analysis EAR No. 91-1J5, Spent Fuel Pool Temperature Rising During CCW-RW Outage was performed. Also, a pre-job briefing will be held prior to starting the hydrostatic test on CCW. This pre-job briefing will include contingency plans for what to do if problems occur which delay the return to service of the CCW system. In addition, but separate from this concern, it has been decided that an additional diesel generator will be brought on site during this outage. It will be rated for 2.2 MW which is very close to the 2.4 MW rating of one of the in-house diesel generators, and will be available as a power source in the unlikely event of a Station Blackout.

The NSRG considers these actions as enhancement to safety which reduce the original concern. However, we recommend that for future outages, where this concern occurs in the schedule, that option 1, 2, or 3 as stated above be used. The NSRG will monitor this activity during the outage to ensure contingencies are defined and sufficient controls are in place to minimize the time the CCW system is out of service. (CLOSED)

10. The Circulating Water Pump Outages are not scheduled to begin until after shutdown. Consider starting these pump outages earlier by taking one out while still on line. (CLOSED)

- the Outage Scheduling Supervisor informed the Operators and the NSRG of work requiring an instrument air outage in the Intake Structure which will affect all the Circulating Water Pumps and working the CW pumps early will not affect the system window during the outage.

11. Inspection/repair of the Oil Lift Check Valves needs to be moved until the turbine is off the turning gear. (CLOSED)

- this concern was noted and the outage group was already aware of the conflict. Schedule revisions are being incorporated to correct the concern.

12. Several PMOs were identified that could be done on-line rather than waiting until the outage. (CLOSED)

- these identified items were relayed to the Outage Scheduling Supervisor for resolution. The outage group will evaluate the work and determine if action needs to be taken or not.

13. Several concerns involving containment integrity at reduced inventory were also identified by the Operators. (OPEN)

- these concerns were relayed to Mr. D. J. Bannister for resolution with the Supervisor, Operations. These concerns included the use of plywood taped to the S/G safety valve openings, and the ability of the Operators to track penetration work during reduced inventory for containment integrity. The NSRG will review these concerns with Mr. Bannister and the Operators for resolution.

(Update) This concern was discussed by Operations Management, however, no changes to the schedule or procedures will be made to address this concern for the current refueling outage. Mr. Bannister researched this issue and noted that the use of plywood and tape to cover openings is standard practice throughout maintenance procedures. A global change to this practice will require an evaluation by plant management and a revised policy statement for temporary closure of Containment openings in future outages. This concern will remain (OPEN).

14. The nozzle dams were a concern to the Operators because refresher training is needed and operations checks should be shiftly verse daily.

- these concerns were relayed to Mr. D. J. Bannister for resolution with the Supervisor, Operations. The NSRG will review these concerns with Operations for resolution.

(Update) Training has been completed for all appropriate personnel. (CLOSED)

15. Instrument Air is scheduled to be out of service during core offload when needed for fuel handling equipment. (OPEN)

- this concern was relayed to the Outage Scheduling Supervisor for resolution. The NSRG will review revisions to the schedule for resolution.

(Update) The system window for instrument air as listed on the 1/31/92 printing of the schedule is still a concern. This has been discussed with the Outage Manager and a resolution is expected soon. (OPEN)

c: R. L. Andrews	J. W. Chase
W. G. Gates	D. R. Trausch
S. K. Gambhir	R. P. Clemens
T. L. Patterson	D. J. Bannister
J. W. Tills	W. W. Orr

Memorandum

Date: February 4, 1992

FC-OP-0029-92

From: R.P. Clemens/L.T. Kusek

To: T. L. Patterson

Subj: NSRG Safety Review of Schedule Changes (CID-910894/04)

Per previous discussion on the subject, this memo should document the process whereby safety-significant changes to the 1992 Refueling/Maintenance Outage schedule will be reviewed by the NSRG.

During a refueling outage, numerous factors can cause schedule changes. These factors include emergent work, deferral of schedule activities, changing resource availabilities, revised work estimates, activity changes, etc. In most of these cases, no safety significance arises from these changes. However, some screening methodology must be developed to describe the tolerance level or sensitivity at which a detailed review by the NSRG will be required.

The original outage schedule was developed based on the System Window concept. All work requiring a piece of safety-related equipment to be inoperable is scheduled to be performed during the appropriate System Window. System Windows were developed to ensure necessary equipment availability to maintain the key safety functions. Any emergent work or activity changes to the schedule that are within the defined System Window fall within the scope of the previously performed review of the schedule by the NSRG.

The changes to the schedule that could impact this previous safety review are those that would: (1) cause logic changes to the System Windows; (2) require a safety-related component to be taken out-of-service outside of its established System Window; (3) increase the duration of a reduced inventory condition with fuel in the vessel (for the 1992 outage, these evolutions are (a) drain-down to mid-loop for steam generator tube-dump; (b) drain-down to three feet below head flange for reactor head detensioning and removal; and (c) drain-down for reactor head replacement and re-tensioning); and (4) impact AC power availability (this includes 161KV system outage; 345KV system outage; DG-1 and DG-2 outages).

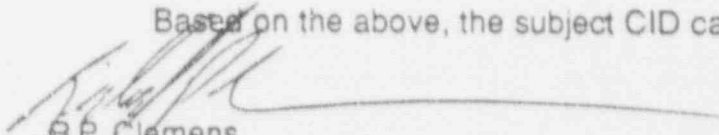
Any schedule changes falling into any of the above categories will require review for safety implementation and subsequent concurrence by the NSRG. The Supervisor, Outage Projects (or his alternate) or any cognizant member of the Outage Management Team will notify the NSRG of such proposed schedule changes and subsequent concurrence will be required. This concurrence need not be in writing prior to the change, however, documentation (in the form of a cosigned memo) should be provided as soon as practical.

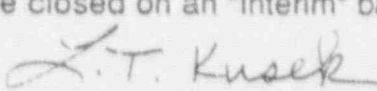
The above will provide the basis to assure that the same level of review performed on the original schedule is provided for any safety-significant schedule changes. This action should also provide the interim closure to CID-910894/04, "Guidelines for Industry Action to Assess Shutdown Management." This recommendation states:

Consistent with the criteria established per Section 3.1, Guideline 3, that defines the level of review and approval authority for emergent schedule changes, safety significant changes should be reviewed by the same process used to review the original schedule.

Develop of formalized policies to implement the above practices will be completed prior to the 1993 refueling outage. In the interim, these practices will be followed.

Based on the above, the subject CID can be closed on an "Interim" basis.


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Supervisor, Outage Projects


L.T. Kusek
Manager, NSRG

cc: J.W. Chase
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Fort Calhoun Station

Unit No. 1

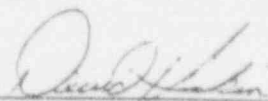
NUCLEAR SAFETY REVIEW GROUP

NSRG-WP-1

WORK PROCEDURE

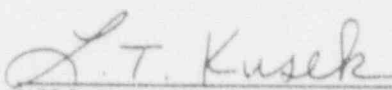
Title: OUTAGE SCHEDULE REVIEWS

PREPARED:



NSRG Specialist; D. J. Lakin

APPROVED:



NSRG Manager; L. T. Kusek

ISSUED: 2/6/92

RO

Outage Schedule Reviews

1.0 Purpose

The purpose of this work procedure is to identify the activities which affect or could affect Nuclear Safety at the Fort Calhoun Station (FCS) during an outage period.

2.0 References

- 2.1 Nuclear Policy 2.03, Safety During Shutdown
- 2.2 NUMARC 91-06, Guidelines for Industry Actions to Assess Shutdown Management
 - 2.2.1 Checklist items marked by an asterisk (*) identify closure action for Licensing commitments.
- 2.3 Standing Order M-104, Outage Planning and Execution
- 2.4 SECY-91-283, NRC Policy Issue, Evaluation of Shutdown and Low Power Risk Issues
- 2.5 INPO Letter to W. G. Gates, dated September 13, 1991, Guidance for Managing Shutdown Safety
- 2.6 Procedure NSRG-3, Reviews and Investigations

3.0 Procedure

Using attachments 1) Pre-outage Review Checklist, 2) Outage Period Review Checklist, and/or 3) Post-outage Review Checklist as guidelines for the minimum review requirements, conduct a review of the outage activities.

Pre-Outage Review Checklist

I. Outage Requirements Review (preliminary information for review)

- A. Technical Specification Required Testing
- B. Maintenance Work Orders Requiring Outage
- C. Outage Preventive Maintenance Orders
- D. Outage Related Modifications
- E. Special Evolutions During Outage

II. Outage Schedule Review

* A. Identify the high risk evolutions during outage.

- 1. Reduced Inventory Operations
- 2. Cold Shutdown with RCS intact
- 3. Reduced Electrical Power Sources (including system operations and switchyard work)
- 4. Reduced Core Cooling Capabilities
- 5. Containment Integrity Capability
- 6. Reduced Boration Capability
- 7. Reduced RCS Make-up Capability

* B. Identify the Systems, Structures and Components required during each high risk evolution, including available backups.

- 1. Electrical Power Sources
- 2. Redundant Decay Heat Removal
- 3. Capability of Containment Integrity
- 4. Redundant SFP Cooling
- 5. Cooling Water System Availability
- 6. RCS Makeup Capability
- 7. Auxiliary Building Ventilation

* C. Identify the activities which affect the high risk evolutions.

- 1. Maintenance Work Orders
- 2. Modifications
- 3. Preventative Maintenance Orders
- 4. Switchyard/Relay Testing
- 5. Calibrations
- 6. Surveillance Testing
- 7. Post Maintenance Testing

* D. Compare the System Windows and their associated activities to ensure the key safety functions are maintained.

- 1. Reactivity Control
- 2. Power Availability
- 3. Inventory Control
- 4. Pressure Control
- 5. Core Cooling
- 6. Containment Integrity

- E. Coordinate with the Supervisor - Operations for assistance in the review with two licensed operators.
- F. Develop a tour/activities chart for the outage to identify major evolutions and areas of high activity, including the scheduled dates of the evolutions/activities.

Outage Period Review Checklist

- * 1. Tour areas of high activity periodically (i.e., Outage Tour/Activities Chart).
- * 2. Observe selected activities involving high risk evolutions (i.e., Outage Tour/Activities Chart).
- * 3. Review outage schedule changes on a routine basis.
- * 4. Perform Shutdown Plant Risk Assessments on a periodic basis (from the plant status as determined both in the Outage Control Center (OCC) and the Control Room).
- 5. Review System and Component Windows to ensure timely closure.
- 6. Review activities and effectiveness of the Outage Control Center.
- 7. Observe coordination of liaisons with the Control Room.
- * 8. Review high risk activities for contingencies prior to commencement of the activity.
- * 9. Review outage schedule changes on a periodic basis for scope changes affecting shutdown risk.

Post-Outage Review Checklist

1. Compile outage review documents to identify pitfalls during the outage.
2. Conduct a post-outage review meeting with NSRG members on observed problems during the outage.
3. Conduct an exit meeting with the plant staff on the overall assessment of the outage.
4. Provide a post-outage review report to the plant staff and Outage Planning Department.
5. Revise the checklists of NSRG-WP-1 to incorporate outage problems encountered.