50-456/440/458/461

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 2, 1998

LICENSEE: CLEVELAND ELECTRIC ILLUMINATING COMPANY
ENTERGY OPERATIONS, INC.
ILLINOIS POWER COMPANY

FACILITY: CLINTON POWER STATION
GRAND GULF NUCLEAR STATION, UNIT 1
PERRY NUCLEAR POWER PLANT, UNITS 1 AND 2
RIVER BEND STATION

SUBJECT: MEETING SUMMARY OF SEPTEMBER 9, 1998, MEETING TO DISCUSS THE PLANNED JOINT PROPOSALS ON CONTAINMENT REQUIREMENTS TO MITIGATE FUEL HANDLING ACCIDENTS DURING REFUELING

INTRODUCTION

A meeting was conducted on Wednesday, September 9, 1998, between the Nuclear Regulatory Commission (NRC) staff and the licensees for the Grand Gulf Nuclear Station, Unit 1 (GGNS), Perry Nuclear Power Plant, Units 1 and 2 (PNPP), and River Bend Station (RBS). All of these plants are General Electric BWR/6 plants and are in a joint effort to propose Technical Specifications (TSs) to reduce the requirements on secondary containment integrity during refueling. Although Illinois Power Company, the licensee for Clinton Power Station, did not attend the meeting, it is particpating in the licensees' joint effort. The meeting was held at the request of the licensees to brief NRC on the licensees' plans for submitting proposed TSs to reduce containment requirements to mitigate the fuel handling accident during refueling outages. The notice for the meeting was issued on August 28, 1998.

Attachment 1 is the list of attendees, and Attachment 2 is the handout provided by the licensee at the meeting. Each page of Attachment 2 consists of two slides from the presentation, except for page 12 which is a copy of the first page from Regulatory Guide 1.21 on measuring, evaluating, and reporting radioactivity in solid wastes and releases of radioactive materials in liquid and gaseous effluents from light-water-cooled nuclear power plants. The staff did not provide any handout at the meeting.

DF01

BACKGROUND

The joint effort to reduce TSs for secondary containment integrity during refueling resulted in submittals being made by the licensees in 1994 through 1996 that proposed changes to the TSs for the plants. At the end of 1996, the NRC staff placed the review of the plant submittals on-hold because the work being done to finalize the draft shutdown rule was expected to address the same issues in the review of the licensees' submittals. The lead licensee for the proposed changes to the plant TSs was Entergy Operations, Inc. for GGNS. Letters dated May 24, 1996, and July 16, 1997, were sent to Entergy Operations, Inc. for GGNS explaining

that the staff review would remain on-hold until the shutdown rule was finalized. Because the rule has been canceled, the licensees have stated that they want the staff to complete the review of their proposals.

MEETING

The agenda and purpose of the meeting are provided in pages 1 and 2 of Attachment 2.

The licensees' briefly discussed the background of the previous submittals to the NRC and the review not completed as of December 1995. The licensees listed two amendments issued for GGNS and RBS in 1996 on technical specifications that were a part of the licensees overall proposals to the staff.

The licensees' proposals were based on the design basis accident (DBA) for the fuel handling accident (FHA) over the core inside containment. The FHA was discussed and the slides on the FHA are in pages 5 and 6 of Attachment 2. The methodology and overview for developing the proposed changes to the plant TSs are in pages 7 and 8. The safety aspects of the proposed changes are in pages 11 through 13.

The applicable regulatory requirements for the DBA and the criteria for what should be in the plant TSs for the "primary success path" for the FHA were presented by the licensees. These are shown in pages 14 through 18 of Attachment 2. The licensees stated that Criterion 3 of the Commission's final policy statement for the improved TSs was that the TSs should only include those structures, systems, and components that are part of the primary success path of the safety analysis and should not include backup and diverse equipment. The licensees stated that their current plant TSs, which are all the Improved TSs, go beyond this criterion for the FHA inside containment.

The licensees stated that their proposed changes to the plant TSs are in a proposed change to the Improved Standard Technical Specifications for BWR/6s (i.e., NUREG-1434, "Standard Technical Specifications General Electric Plants, BWR/6s," Revision 1, dated April 1995) through the NRC/Nuclear Energy Institute's Technical Specifications Task Force (TSTF) and all of their plants have been converted to the Improved Technical Specifications. The changes discussed in this meeting are TSTF-51. The licensees also stated that the Perry plant should be the lead plant because it has a refueling outage scheduled to begin in April 1999.

The staff stated that the licensees submittals must clearly articulate the defense-in-depth remaining for the reduced technical specifications that they would propose and not simply rely on the Commission's final policy statement.

The licensee completed its presentation and the meeting was closed.

Jack N. Donohew, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-416, 50-458, 50-461, and 50-440

Attachments: As stated

cc w/atts: See next page

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OFC	PM/PD4-1	LA/PD4-1	PM/PD4-1	PM/PD3-3	D/PD4-1
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COPY	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO

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LIST OF ATTENDEES AT MEETING OF JUNE 25, 1998

GRAND GULF BULLETIN 96-03 ECCS SUCTION STRAINER

NAME	AFFILIATION
J. Donohew	NRC/NRR/PDIV-1
E. Adensam	NRC/NRR/DRPW
D. Wigginton	NRC/NRR/PDIV-1
D. Pickett	NRC/NRR/PDIII-3
R. Fretz	NRC/NRR/PDIV-1
C. Berlinger	NRC/NRR/SCSB
R. Lobel	NRC/NRR/SCSB
R. Emch	NRC/NRR/PERB
T. Tjader	NRC/NRR/TSB
G. Hubbard	NRC/NRR/SPLB
D. Jackson	NRC/NRR/SPLB
M. Shuaibi	NRC/NRR/SRXB
K. Hughey	EOI - Grand Gulf
B. Ford	EOI - Grand Gulf
B. Burmeister	EOI - River Bend
B. Ferrell	CEI - Perry Nuclear Power Plant
W. Barber	McGraw Hill

where:

CEI	=	Cleveland Electric Illuminating Company
EOI	=	Entergy Operations, Inc.
NRC	=	Nuclear Regulatory Commission
NRR	=	Office of Nuclear Reactor Regulation
PDX-Y	=	Project Directorate X-Y
PERB	=	Emergency Preparedness and Radiation Protection Branch
SCSB	=	Containment Systems and Severe Accident Branch
SPLB	=	Plant Systems Branch
SRXB	=	Reactor Systems Branch
TSB	=	Technical Specifications Branch

ATTACHMENT 1

Containment Requirements to Mitigate Fuel Handling Accidents

September 9, 1998

Agenda

- Background
- Analyses
- Requested Change
- Safety
- Regulatory Requirements
- Summary

ATTACHMENT 2

Background

Meeting Purpose

- Resolve the containment requirements during fuel movement issue as a group of BWR 6s
- Discuss the technical, safety, and regulatory basis for the requested change
- Time is right to resolve the issue
  - Extended period of time the issue has been open
  - resolution of shutdown rule
  - Approval of the change for permanently shutdown plants
  - Draft NUREG 1625

Introduction

- Requested change has been open for a significant period of time (>4.5 years) without technical issues being identified
- Main Staff concern voiced (affect of shutdown rule) has been resolved without affecting requested change
- Expected to save over $500K over the life of the plant at GGNS
- Expected to save RBS and PNPP approximately 600K each per outage including critical path time
- Change increases safety
- Piecemeal approach is not resource effective

FHA Request Timeline

• GGNS submitted original TS change	11/94
• BWR 6s met with staff (NRC request)	7/95
• GGNS revised request to reflect meeting	8/95
• RBS submitted TS change	8/95
• PNPP submitted TS change	11/95
• BWR 6s (and others) met with staff	1/96
• RBS and PNPP receive approval to have primary containment airlock open	2/96

FHA Request Timeline

- Change to TS NUREGs submitted by Industry (NRC request) — 3/96
- GGNS requests review prior to RFO8 — 5/96
- NRC identifies they are unable to compete review but that the review should be complete by 9/97 — 6/96
- GGNS meets with the Staff to discuss onetime TS change to allow repairs — 7/96
- Staff grants onetime GGNS TS change — 10/96
- Draft NUREG-1625 proposed similar requirements and identified approval for Trojan — 3/98

Analyses

Current License Basis FHA Analysis

- Two analyzed events
  - Fuel Handling Accident in the Auxiliary Building UFSAR Section 15.7.4
  - Fuel handling accident in the primary containment UFSAR Section 15.7.6
- The secondary containment (i.e., auxiliary building and enclosure building) working in conjunction with the SGT System limit the radiological consequences (per SRP 15.7.4 guidelines) to well within the 10CFR100.11 limits (i.e., 75 rem thyroid and 6 rem whole body).

Reanalyzed FHA

- Does not credit the active engineered safety feature (ESF) systems (e.g., auxiliary building and enclosure building integrity, isolation of the containment and fuel handling area ventilation systems, and the SGT System) that are currently credited in the UFSAR analyses to reduce the consequences of the analyzed events
- Otherwise assumptions are consistent with the analysis presented in UFSAR Sections 15.7.4 and 15.7.6
- Demonstrated that the dose limitations of SRP 15.7.4 are satisfied for decay periods of 12 days or more without credit for the ESF systems

Analysis Summary

- Following radioactive decay, ESF Systems are not required during a fuel handling accident to maintain calculated doses less than the regulatory guidance (e.g., 75 rem thyroid offsite and 30 rem thyroid control room).
- The results of these analysis were submitted November 9, 1994 and discussed in subsequent meetings.
- Staff has performed independent calculations.
- Calculations formed the basis for the onetime TS change approval.
- The acceptability of the calculations is not an issue between the licensee and the Staff.

Requested Change

Methodology for Developing the Requested Changes

- Follows the guidance of the Rulemaking on TS Improvement, by focusing the TS requirements on those systems necessary to mitigate postulated events
- Recognizes that radioactive decay is an effective means of mitigating an FHA
- Recognizes that the only CORE ALTERATION postulated to result in fuel damage is an FHA
- Retains the requirement for OPERABILITY of systems used to mitigate the dose consequences of an FHA during the time frame the analysis takes credit for their functioning

Overview of Proposed Technical Specification

- Retains the requirement for OPERABILITY of systems used to mitigate the dose consequences of an FHA during the time frame the analysis takes credit for their functioning
- Does not alter the TS requirements concerning operations with potential for draining the reactor vessel
- Does not alter the TS requirements for protection from criticality events
- Does not alter the TS requirements for decay heat removal

Details of Proposed Change

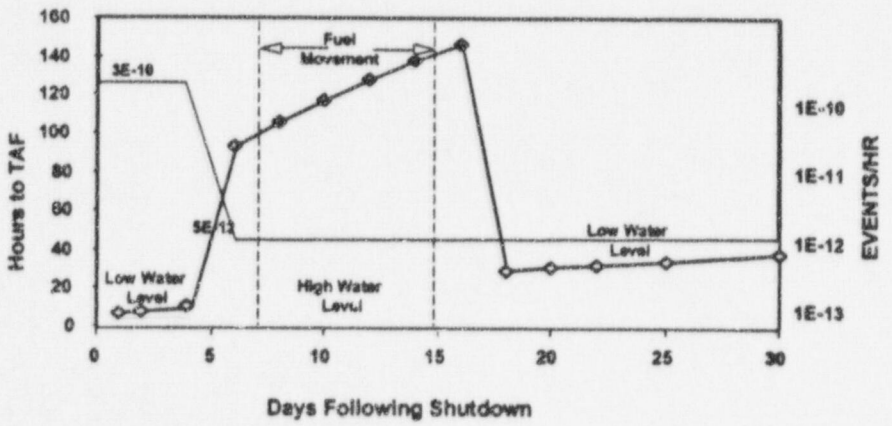
- Requires dose mitigation systems to be OPERABLE when handling "recently irradiated fuel assemblies"
- Removes the requirement for dose mitigation systems to be OPERABLE during CORE ALTERATIONS
- Provides Bases discussions describing the relevant limit

Safety Aspects of the Proposed Change

Overall Outage Safety

- Outage Tech Specs are based on specific events (e.g. FHA, draindown) not overall shutdown safety considerations
- As a result, current Tech Specs force some outage activities into relatively higher risk periods
- Proposed changes result in overall outage safety gain
  - flexibility to schedule activities when mitigate resources most available
  - fuel movement conducted during relatively lower risk periods

Relationship of Fuel Handling to Water Level and Shutdown Risk



Decay Time and Water Level

- Original analyses assumed 24 hours decay time
- Enforcing a decay period is a more reliable "defense in depth" mechanism than traditional physical barriers
- Decay is an appropriate means of mitigating the effects of a fuel handling accident, substituting for less reliable features
- Similarly, water level is a "defense in depth" barrier not usually applied to other accident classes, and is specifically controlled in Tech Specs for the fuel handling accident
- Decay and water level are performing the "defense in depth" containment function of dose mitigation

Dose

- Licensing basis dose calculations meet regulatory safety guidance (i.e., SRP acceptance criteria) and are well below regulatory requirements
- Independent NRC calculations concur
- Realistic fuel handling accident estimates are 1-3 orders of magnitude lower

Risk Perspective

- From Grand Gulf shutdown risk studies

	Fuel Handling Accident	Core Damage Event
Frequency(/RY)	7×10^{-5}	1×10^{-6}
Release (Ci) (I-131 equivalent)	81	3.35×10^{6}
Risk (Ci/RY)	.006	3.35

Safety focus should be on shifting activities to low probability CDF periods

Containment Closure

- Closure will mitigate a realistic fuel handling accident release
- BWR6s each have commitments to plans and administrative controls to ensure containment closure
- Design differences lead to differences in the meaning of "closure"
  - Grand Gulf/Clinton - secondary containment (primary containment hatch closure not required during shutdown)
  - River Bend/Perry - primary containment
- GDCs, Part 20 and ODCM require releases to be monitored and controlled
- Proposed industry maintenance rule guidance requires closure capability to be available

Revision 1
June 1974

U.S. ATOMIC ENERGY COMMISSION

REGULATORY GUIDE

DIRECTORATE OF REGULATORY STANDARDS

REGULATORY GUIDE 1.21

MEASURING, EVALUATING, AND REPORTING RADIOACTIVITY IN SOLID WASTES AND RELEASES OF RADIOACTIVE MATERIALS IN LIQUID AND GASEOUS EFFLUENTS FROM LIGHT-WATER-COOLED NUCLEAR POWER PLANTS

A. INTRODUCTION

General Design Criterion 60, "Control of releases of radioactive materials to the environment," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Licensing of Production and Utilization Facilities," requires that the nuclear power plant design include means to control the release of radioactive materials in gaseous and liquid effluents and to handle radioactive solid wastes produced during normal reactor operation, including anticipated operational occurrences.

General Design Criterion 64, "Monitoring radioactivity releases," requires that nuclear power plant designs provide means for monitoring effluent discharge paths for radioactivity that may be released from normal operations, including anticipated operational occurrences, and from postulated accidents.

Section 20.106, "Concentrations in effluents to unrestricted areas," of 10 CFR Part 20, "Standards for Protection Against Radiation," provides that a licensee shall not release to an unrestricted area, radioactive materials in concentrations which exceed limits specified in 10 CFR Part 20 or as otherwise authorized in a license issued by the Commission. Section 20.201, "Surveys," of 10 CFR Part 20 further requires that a licensee conduct surveys of concentrations of radioactive materials as necessary to demonstrate compliance with AEC regulations.

Paragraph (a)(2) of §50.36a, "Technical specifications on effluents from nuclear power reactors," of 10 CFR Part 50 provides that technical specifications for each license will include a requirement that the licensee submit a report to the Commission within 60 days after January 1 and July 1 of each year which specifies the quantity of each of the principal radionuclides released to unrestricted areas in liquid and in gaseous effluents during the previous 6 months of operation, and such other information as may be required by the Commission to estimate maximum potential annual radiation doses to the public resulting from effluent releases.

Paragraph (c) of §20.1, "Purpose," of 10 CFR Part 20 states that every reasonable effort should be made by AEC licensees to maintain radiation exposure, and releases of radioactive materials in effluents to unrestricted areas, as far below the limits specified in Part 20 as practicable, i.e., as low as is practicably achievable, taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety and in relation to the utilization of atomic energy in the public interest.

This guide describes programs acceptable to the Regulatory staff for measuring, reporting, and evaluating releases of radioactive materials in liquid and gaseous effluents and guidelines for classifying and reporting the categories and curie content of solid wastes. Other programs for the reporting of operating information, including abnormal occurrences, are presented in Regulatory Guide 1.16, "Reporting of Operating Information." In some cases, specific programs should be supplemented because of individual plant design features or other factors. The need for supplemental or modified programs will be determined on a case-by-case basis.

The Advisory Committee on Reactor Safeguards has been consulted concerning this guide and has concurred in the regulatory position.

USAEC REGULATORY GUIDES

Regulatory Guides are issued to describe and make available to the public methods acceptable to the AEC Regulatory staff of implementing specific parts of the Commission's regulations, to delineate techniques used by the staff in evaluating specific problems or postulated accidents, or to provide guidance to applicants. Regulatory Guides are not substitutes for regulations and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

Published guides will be revised periodically, as appropriate, to accommodate comments and to reflect new information or experience.

Copies of published guides may be obtained by request indicating the divisions desired to the U.S. Atomic Energy Commission, Washington, D.C. 20545, Attention: Director of Regulatory Standards. Comments and suggestions for improvements in these guides are encouraged and should be sent to the Secretary of the Commission, U.S. Atomic Energy Commission, Washington, D.C. 20545, Attention: Chief, Public Proceedings Staff.

The guides are issued in the following ten broad divisions:

1. Power Reactors
2. Research and Test Reactors
3. Fuels and Materials Facilities
4. Environmental and Siting
5. Materials and Plant Protection
6. Products
7. Transportation
8. Occupational Health
9. Antitrust Review
10. General

Safety Conclusions

- Proposed changes lead to a net outage safety benefit - reduction in activity during relatively higher risk periods
- Fuel handling accident safety criteria are all met
- Fuel handling accident "defense in depth" barriers are different (but as effective) as barriers for other accident classes

Regulatory Requirements

Applicable Regulatory Requirements

- 10 CFR 100
  - Limits offsite doses to < 300 rem thyroid
- 10 CFR 50.36
  - Requires Technical Specifications be established and maintained and identifies the requirements to be included
- Standard Review Plan 15.7.4
  - Limits offsite doses to well within the 10CFR100.11 limits (i.e., 75 rem thyroid and 6 rem whole body).

Why Criteria Were Developed for the Technical Specifications

The Technical Specifications had become so controlling of all aspects of plant operation that unneeded requirements in the Technical Specifications were diverting both staff and licensee attention from the more important requirements to the extent that the excessive requirements have *"resulted in an adverse but unquantifiable impact on safety"*.

10 CFR 50.36 Criteria For Technical Specifications

Criterion 1: Instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary

Criterion 2: A process variable that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier

Criterion 3: An SSC that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier

Criterion 4: A structure, system, or component which operating experience or PSA has shown to be significant to public health and safety

10 CFR 50.36 Rulemaking

"If a technical specification provision does not meet any of the first three criteria, and if the current PRA knowledge or operating experience does not identify the structure, system, or component as risk significant, the NRC staff will not preclude relocating such technical specifications."

Technical Specification Improvement Criterion 3

A structure system, or component that is part of the primary success path and which functions or actuates to mitigate a Design Basis Accident or Transient that either *assumes the failure* of or presents a challenge to the integrity of a *fission product barrier*.

The Final Policy Statement Concerning Criterion 3

The primary success path of a safety sequence analysis consists of the combination and sequences of equipment needed to operate (including consideration for single failure criteria), so that the plant response to the DBA and Transients limits the consequences of these events to *within the appropriate acceptance criteria*. It is the intent of this criteria to capture into the TS only those SSCs that are part of the primary success path of the safety analysis... The primary success path does not include backup and diverse equipment...

Staff Position on "Appropriate Acceptance Criteria"

- The definition of "*appropriate acceptance criteria*" was clearly discussed in T. E. Murley's letter dated May 9, 1988. This letter transmitted the results of the staff's review of the Owners Groups' application of the TS selection criteria and formed the basis for the issued Improved Standard TS.
- Enclosure Section 2.(6) states:

  "Accordingly, the SRP limits should be used to define the equipment in the primary success path for mitigating accidents and transients when developing the new STS."

Permanently Shutdown Plants

- Draft NUREG 1625 identifies that TS Containment requirements are not required when dose analysis no longer credits their functioning.
- Permanently shutdown plants have been licensed allowing fuel movement without TS Containment requirements.

Comparison to Similar Changes Approved by the NRC

- Generic PWR effort to reduce containment requirements during fuel handling.
- Approved changes include plants relying on operator actions and the ability to restore containment to protect small fraction dose limit.
- Permanently shutdown plants have been licensed allowing fuel movement without TS Containment requirements.
- BWR 6 proposal retains all OPERABILITY requirements for equipment during the time frames that the equipment is needed to protect small fraction dose limit.

Regulatory Requirements Summary

- Requested changes are in accordance with established Staff positions
- Retains the requirement for OPERABILITY of systems used to mitigate the dose consequences of an FHA during the time frame the analysis takes credit for their functioning
- Allows plant staff to schedule activities during most cost effective and least risky time frames

Summary

Summary

- Overall level of safety improves through implementation of the proposed changes
- Defense in depth is preserved
- Requested changes are in accordance with the Technical Specification Improvement Rule
- Retains the requirement for OPERABILITY of systems used to mitigate the dose consequences of an FHA during the time frame the analysis takes credit for their functioning
- Regulatory requirements are met