

MAY 05 1994

Mr. Dwight E. Shelor, Associate Director
for Systems and Compliance
Office of Civilian Radioactive Waste Management
U. S. Department of Energy, RW-30
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Shelor:

SUBJECT: MINUTES FROM THE MARCH 30-31, 1994, BURNUP CREDIT
TECHNICAL EXCHANGE

I am enclosing the minutes from the March 30-31, 1994 technical exchange on burnup credit. The purpose of the exchange was to discuss DOE's activities related to investigating burnup credit for spent fuel casks and multi-purpose canisters, and to discuss the questions that were raised by the NRC during the February 10, 1994, technical exchange.

At the close of the exchange, the NRC and DOE agreed to meet for future technical exchanges on burnup credit issues. DOE will contact the NRC to schedule the next technical exchange, which will focus on the content of a topical report on burnup credit for storage and transport casks containing spent pressurized water reactor fuel.

If you have any questions on the minutes, please contact Marissa Bailey of my staff at (301) 504-2181.

Sincerely,
LS/

Charles J. Haughney, Chief
Storage and Transport Systems Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

Enclosure: As stated

cc: Attached List

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DATE	<i>4/24/94</i>		<i>4/28/94</i>		<i>5/4/94</i>		<i>5/5/94</i>		<i>1</i>	<i>194</i>

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Mr. Dwight E. Shelor, Associate Director

cc: R. Loux, State of Nevada
T. J. Hickey, Nevada Legislative Committee
J. Meder, Nevada Legislative Counsel Bureau
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B. Mettam, Inyo County, CA
V. Poe, Mineral County, NV
F. Mariani, White Pine County, NV
R. Williams, Lander County, NV
L. Fiorenzi, Eureka County, NV
J. Hoffman, Esmeralda County, NV
C. Schank, Churchill County, NV
L. Bradshaw, Nye County, NV

**Minutes from the March 30-31, 1994, Technical Exchange #3
on Burnup Credit**

On March 30 and 31, 1994, staff from the Nuclear Regulatory Commission (NRC) and the Office of Civilian Radioactive Waste Management (OCRWM), Department of Energy (DOE), met to discuss burnup credit for spent fuel casks and containers. In particular, the discussions focused on the comments and questions raised by the NRC during the February 10, 1994, technical exchange. The March technical exchange was conducted in two parts. The first day focused on burnup credit for storage and transportation. The second day focused on burnup credit for disposal. Attachment 1 is a list of the attendees, Attachment 2 is the technical exchange agenda, and Attachment 3 is a copy of the presentation slides.

The first day of the exchange began with a brief introduction during which DOE stated that this technical exchange was not a formal meeting. DOE also acknowledged that NRC's comments would not be considered as complete, as part of an NRC review, or as programmatic direction. NRC stated that it viewed this technical exchange as a pre-application meeting.

After the introduction, DOE gave an overview of the burnup credit topics in storage and transportation. DOE stated that burnup credit will increase the capacity of storage and transport casks, thus reducing the number of shipments required. DOE also stated that burnup credit may be necessary for demonstrating the criticality safety of spent fuel during long-term disposal.

During the overview, DOE stated that it plans to submit up to three topical reports on burnup credit. The first topical report will be on burnup credit for storage and transport casks containing spent pressurized water reactor (PWR) fuel. DOE expects to submit the first topical report in September 1994. The second topical report will be on burnup credit for disposal of spent PWR and boiling water reactor (BWR) fuel. DOE plans to submit the second report during the 1995-1996 time-frame. The third topical report, which will discuss burnup credit for storage and transport of spent BWR fuel, will be developed if needed. Currently, however, DOE does not expect to take burnup credit for storage and transport of spent BWR fuel. DOE stated that the intent of the topical reports is to provide the basis for approval of specific spent fuel cask designs requiring burnup credit. The topical reports will include the method for evaluating burnup credit and reduced stored energy, and an example of how the method is to be applied. Back-up reports on the detailed technical/scientific data supporting the individual sub-processes will also be provided. NRC stated that the topical reports should be clear and detailed enough that it can be referenced in the specific applications. NRC and DOE agreed that the next technical exchange should focus on the content of the first topical report.

Enclosure

Following the storage/transportation overview, a Sandia National Laboratories (SNL) representative gave a presentation on the code validation approach. The SNL representative also gave a presentation on burnup dependent factors, which included a discussion on issues related to fission product poisons and the axial burnup distribution. Then, the SNL representative and a Duke Engineering representative gave presentations on code benchmarking using reactor and other critical experiments. This included a discussion on the applicability of reactor criticals to spent fuel casks. DOE then gave a brief discussion on a possible loading process for burnup credit casks. The loading procedures include the use of a burnup credit curve that is cask-design specific. Also, utility records will be used to identify the burnup, initial enrichment, and minimum cooling time of a fuel assembly. The records would be verified with assembly measurements. The Duke Engineering representative then gave a presentation on the utilities' burnup accountability system. Then, another SNL representative gave a presentation on assembly burnup measurements using the FORK system. During this presentation, NRC suggested that the criticality analyses for burnup credit casks consider inadvertently loading one fresh fuel assembly in the cask. DOE stated that it would explore this issue.

The first day of the exchange was closed with a summary of the storage and transportation topics. DOE suggested the following topics be discussed in future meetings: benchmarking and the need to quantify the differences between casks conditions and existing criticality experiments; verification of reactor records; designing against possible misloading of one fresh fuel assembly into a burnup credit cask; and the content of the first topical report.

The second day of the meeting began with an overview, given by the DOE, of the burnup credit topics in disposal. A B&W Fuel Company (BWFC) representative then gave a presentation on DOE's time-phased approach for criticality control. Then, another BWFC representative gave a presentation on the criticality evaluations for disposal. The criticality evaluation would be based on a design basis fuel assembly and spent fuel assembly isotopics. The evaluation would also consider the change in fuel assembly reactivity over time. The first BWFC representative also discussed the type of materials that are being considered for the waste package system. Finally, a third BWFC representative gave a summary of the disposal topics. During the summary, the BWFC representative stated that burnup credit may be essential to show the criticality safety of spent fuel during long-term disposal. During the presentations on disposal, the NRC stated that burnup credit for disposal will be a performance assessment factor.

The technical exchange was concluded with a meeting wrap-up. During the meeting wrap-up, DOE presented direct responses to some of the questions raised by the NRC during the February 10, 1994, technical exchange. NRC stated that many of its questions on burnup credit may be eliminated with an appropriate benchmark experiment. NRC suggested that DOE should consider performing benchmark experiments for conditions that closely resemble spent fuel casks. DOE stated that it would first qualitatively and quantitatively

assess the available benchmark experiments before it determines whether new benchmark experiments are needed. DOE then recounted the topics that should be discussed in future technical exchanges, including the storage/transport topical report. DOE stated that it would present an outline of the topical report to the NRC in approximately one month. DOE and the NRC agreed that the next technical exchange would be scheduled after the NRC has received the outline.

Cass R. Chappell

Cass R. Chappell, Section Leader
Cask Certification Section
Storage and Transport Systems Branch
Division of Industrial and
Medical Nuclear Safety, NMSS
U. S. Nuclear Regulatory Commission

Priscilla Bunton 4/26/94

Priscilla Bunton
Regulatory Integration Branch
Office of Civilian Radioactive
Waste Management
U. S. Department of Energy

**JOINT NRC/DOE BURNUP CREDIT
TECHNICAL EXCHANGE #3
March 30-31, 1994**

List of Attendees

DOE

BUNTON, PRISCILLA 202-586-8365
CARLSON, JIM 202-586-5321
GOMBERG, STEVE 202-586-6497
LAKE, BILL 202-586-2840
SMITH, MACKAYE 702-794-1933

CNWR

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EPRI

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LAWRENCE LIVERMORE NATIONAL LAB

CARLSON, ROGER 510-422-1084

M&O

BWFC -

BENTON, HUGH 702-794-1891
DOERING, THOMAS 702-794-1857
THOMAS, DANIEL 702-794-1984

DUKE ENGINEERING -

ASHE, KEN 702-794-7665
MORGAN, ROBERT 703-204-8863
THORNTON, JIM 704-382-3029
SAWYER, TONYA 704-382-3139

E.R. JOHNSON -

RAHIMI, MERAJ 703-204-8928

NRC

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WELLER, RICK 301-504-3458
WHITE, BERNIE 301-504-2455
WILSON, ROBERT 301-504-2126
WITHEE, CARL 301-504-2358

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SMITH, STEVE 703-514-2506

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(CONSULTANT)

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**AGENDA FOR JOINT NRC/OCKWM
BURNUP CREDIT TECHNICAL EXCHANGE #3
MARCH 30-31, 1994
BETHESDA, HOLIDAY INN**

March 30, 1994

8:00 am - 8:15 am WELCOME

8:15 am - 8:45 am OVERVIEW OF STORAGE/TRANSPORTATION TOPICS

8:45 am - 9:30 am VALIDATION APPROACH

9:30 am - 9:45 am BREAK

9:45 am - 10:30 am BENCHMARKING USING REACTOR RESTART CRITICALS

10:30 am - 12:00 pm BURNUP DEPENDENT FACTORS

- A Fission products**
- B End-effects**

12:00 pm - 1:30 pm LUNCH

1:30 pm - 3:30 pm LOADING VERIFICATION PROCESS

- A Procedure overview**
- B Burnup Verification Meter**

3:30 pm - 3:45 pm BREAK

3:45 pm - 4:30 pm SUMMARY OF STORAGE/TRANSPORTATION TOPICS

**AGENDA FOR JOINT NRC/OCRWM
BURNUP CREDIT TECHNICAL EXCHANGE #3
MARCH 30-31, 1994
BETHESDA, HOLIDAY INN**

March 31, 1994

8:30 am - 9:00 am OVERVIEW OF DISPOSAL TOPICS

9:00 am - 9:45 am TIME PHASED APPROACH FOR CRITICALITY CONTROL

9:45 am -10:00 am BREAK

10:00 am - 11:30 am EVALUATIONS

A Design basis fuel

B Isotopics

C Materials

11:30 am - 12:00 pm SUMMARY OF DISPOSAL TOPICS

12:00 pm - 1:30 pm LUNCH

1:30 pm - 2:30 pm MEETING WRAP-UP