

50-269
72-4



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

April 8, 1997

Mr. J. W. Hampton
Vice President
Duke Power Company
Oconee Nuclear Plant
P.O. Box 1439
Seneca, SC 27679

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - NRC BULLETIN NO. 96-04,
"CHEMICAL, GALVANIC, OR OTHER REACTIONS IN SPENT FUEL STORAGE AND
TRANSPORTATION CASKS"

Dear Mr. Hampton:

This refers to your response dated August 19, 1996, to Nuclear Regulatory Commission Bulletin No. 96-04, "Chemical, Galvanic, or Other Reactions in Spent Fuel Storage and Transportation Casks." Your submittal incorporated information prepared by VECTRA Technologies, Inc. (VECTRA) in response to the bulletin. By letter dated March 24, 1997, NRC notified VECTRA that their response to the bulletin lacked sufficient information for NRC to confirm VECTRA's conclusion that hydrogen generated during loading and unloading activities would not exceed the lower flammable limit. Therefore, we also believe that your submittal lacks the same information.

A notable concern is that VECTRA's August 16, 1996, submittal utilized a "transfer resistance factor," to adjust test data to account for: (1) the hydrogen retained in the dry shielded canister water column due to diffusion transport resistance, and (2) hydrogen lost through the open vent. This conversion factor was developed based on single samples taken during the loading of two different casks. The staff does not believe sufficient information was obtained to accurately determine a conversion factor of this type. This is of concern because your staff used VECTRA's unclear and incomplete information as the basis for implementing procedural enhancements to minimize potentially hazardous conditions during cask loading and unloading.

Additionally, your August 19, 1996, submittal lacked sufficient detail for the staff to determine if hydrogen concentrations could accurately be detected and whether adequate actions would be taken to minimize hazardous conditions.

NRC FILE CENTER COPY

9704140054 970408
PDR ADDCK 05000269
G PDR

Mr. J. W. Hampton

- 2 -

Specifically, your submittal did not address monitoring hydrogen concentrations during welding and cutting evolutions nor provide the specific hydrogen concentration at which corrective actions, if necessary, would be implemented.

The staff acknowledges that approximately 60 NUHOMS canisters, at four different reactor sites, have been loaded and welded without any type of ignition indications or incidents. Thus, the staff does not have a safety issue, at this time, regarding the use of the NUHOMS system. However, the technical analyses and engineering work submitted in response to NRC Bulletin No. 96-04 lacked a sufficient technical basis to support your conclusion that the hydrogen generated would not exceed the lower flammable limit.

Enclosed is a request for additional information related to your submittal. If you have questions regarding this matter, please contact me at (301) 415-8538.

Sincerely,

Original signed by /s/

Timothy J. Kobetz, Project Manager
Spent Fuel Licensing Section
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Dockets 72-4, 50-269/270/287

Enclosure: Request for Additional Information

cc: NUHOM's Owners Group
Nuclear Energy Institute
Service List

Distribution: w/encl.

Docket 72-4	NRC File Center	PUBLIC	NMSS r/f	SFPO r/f
Dockets 50-269/270/287	SShankman	CHaughney	WKane	Region II
DLaBarge, NRR	JDavis, NRR	KBattige	VTharpe(2)	MBailey
BReckley, NRR	WGloersen, RII			

* See attached concurrences

OFC	SFPO * <i>u</i>	E	NRR *	E	SFPO *	E	SFPO	E		
NAME	TKobetz:dd:vt		ESullivan		FSturz		ELeeds <i>fe</i>			
DATE	4/7/97		4/11/97		4/11/97		4/8/97			

C = COVER

E = COVER & ENCLOSURE

N = NO COPY

OFFICIAL RECORD COPY

G:\nuhoms24\721004g1.oco

4/8/97 :dd

110055

11007
11

Oconee Nuclear Station
Units 1, 2, and 3

cc:

Mr. Paul R. Newton
Legal Department (PB05E)
Duke Power Company
422 South Church Street
Charlotte, North Carolina 28242-0001

J. Michael McGarry, III, Esquire
Winston and Strawn
1400 L Street, NW.
Washington, DC 20005

Mr. Robert B. Borsum
Framatome Technologies
Suite 525
1700 Rockville Pike
Rockville, Maryland 20852-1631

Manager, LIS
NUS Corporation
2650 McCormick Drive, 3rd Floor
Clearwater, Florida 34619-1035

Senior Resident Inspector
U. S. Nuclear Regulatory Commission
Route 2, Box 610
Seneca, South Carolina 29678

Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Max Batavia, Chief
Bureau of Radiological Health
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

County Supervisor of Oconee County
Walhalla, South Carolina 29621

Mr. Dayne H. Brown, Director
Division of Radiation Protection
North Carolina Department of
Environment, Health and
Natural Resources
P. O. Box 27687
Raleigh, North Carolina 27611-7687

Mr. J. E. Burchfield, Jr.
Compliance Manager
Duke Power Company
Oconee Nuclear Site
P. O. Box 1439
Seneca, South Carolina 29679

Ms. Karen E. Long
Assistant Attorney General
North Carolina Department of
Justice
P. O. Box 629
Raleigh, North Carolina 27602

Mr. G. A. Copp
Licensing - EC050
Duke Power Company
526 South Church Street
Charlotte, North Carolina 28242-0001

Nuhois Owners Group (72-1004)

Mr. John P. Stetz
Vice President - Nuclear,
Davis Besse
Centierior Service Company
c/o Toledo Edison Company
5501 North State Route 2
Oak Harbor, OH 43449

GPU Nuclear Corporation
Mr Michael B. Roche
Vice President and Director
Oyster Creek Nuclear Station
P. O. Box 388
Route 9 South
Forked River, NJ 08731-0388

Mr. Robert G. Byram
Senior Vice President - Nuclear
Pennsylvania Power and Light
Company
2 North Ninth Street
Allentown, PA 19101

Mr. William S. Orser
Executive Vice President
Nuclear Generation [Brunswick]
Carolina Power and Light Company
P. O. Box 10420
Southport, NC 28461

Mr. Charles H. Cruse
Vice President - Nuclear Energy
Calvert Cliffs Nuclear Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

Mr. William B. Orser
Executive Vice President
Nuclear Generation
H. B. Robinson 2
P. O. Box 1551
Raleigh, NC 27602

Mr. J. W. Hampton
Vice President
Duke Power Company
Oconee Nuclear Site
P. O. Box 1439
Seneca, SC 29679

Mr. James R. Shetler
Deputy Assistant General Manager
- Nuclear
Sacramento Municipal Utility
District
6201 S Street
P. O. Box 15830
Sacramento, CA 95813

Mr. Jan Hagers
DEPARTMENT OF ENERGY
TMI/FSV Licensing Project Manager
Idaho Operations Office
785 Doe Place
Idaho Falls, ID 83403

REQUEST FOR ADDITIONAL INFORMATION (RAI) ON
THE OCONEE NUCLEAR PLANT RESPONSE TO
NUCLEAR REGULATORY BULLETIN NO. 96-04

1. Provide justification that sufficient data was obtained from field experience and testing to support the methodology and calculations used in the computer simulation. The justification should support your conclusions for pressurized water reactor (PWR) fuel storage. In addition, provide the methodology and calculations used in the computer simulation.

This request is based on, but not limited to, the following information:

- VECTRA used data from only four canisters (Oconee dry shielded canisters (DSCs) Nos. 37 through 40), loaded with PWR fuel, to justify that hydrogen concentrations will not reach the flammability limit. In addition, the hydrogen samples were not taken by continuously monitoring the levels during the loading of DSCs 37 through 40. Therefore, they may not be representative of the highest hydrogen concentrations obtained during cask loading.
- In the VECTRA August 16, 1996, submittal, a "transfer resistance factor" was used to calculate the amount of hydrogen generated in the DSC air space. However, this conversion factor was developed based on single samples taken during the loading of two different casks. The staff does not believe sufficient information was obtained to accurately determine a conversion factor of this type. Furthermore, when the transfer resistance factor is not used to adjust test data, the hydrogen levels produced exceed the lower flammability limit. It appears that the conversion factor was also used by the computer simulation discussed in VECTRA's October 18, 1996, submittal.
- The test methods and computer modeling used to obtain and evaluate data are vague and not presented in a manner that supports the final conclusions.
 - Some tests are terminated at approximately 165°F even though the hydrogen production rate appears to still be increasing. The computer simulations were performed at temperatures below 160°F. Therefore, the tests and computer simulations may not bound all conditions.
 - There is no discussion of the maximum achievable hydrogen concentrations derived from the tests or computer simulations. All that is stated is that "H₂ concentrations remain below the 4% flammability limit for water temperatures below 160°F."

2. Provide justification that a sufficient safety margin exists between the amount of hydrogen generated prior to welding and the lower flammability limit.

Data taken during the loading of the four Ocone casks indicated that, in a flame sprayed aluminum and boric acid environment, hydrogen levels could be generated in excess of 50% of the lower flammable limit. However, there is no discussion of the recommended margin of safety that should exist between the amount of hydrogen produced and the lower flammability limit. The staff has previously accepted a 0.4% limit of hydrogen generation, which is 10% of the lower flammability limit.

3. Describe the methods used to monitor and control hydrogen during welding, grinding, or cutting operations associated with loading or unloading activities.
4. Provide the specific hydrogen concentration at which time the procedural steps would implement corrective actions to minimize hazardous conditions.

As stated in RAI Question No. 2, VECTRA's responses to NRC Bulletin No. 96-04 did not contain a discussion of the recommended margin of safety that should exist between the amount of hydrogen produced and the flammability limit. The staff has previously accepted a 0.4% limit of hydrogen generation, which is 10% of the lower flammability limit.