Docket

PDR

MAR 22 1976

K. Goller, Assistant Director for Operating Reactors

RESPONSE TO CONTINUATION OF ORB-2-210 - MONTICELLO SPENT FUEL CASK DROP (TAR 3383)

PLANT NAME: Monticello
DOCKET NUMBER: 50-263
RESPONSIBLE BRANCH: ORB-2
PROJECT MANAGER: R. Snaider
REQUEST RECEIVED BY EEB: March 5, 1976
REQUESTED COMPLETION DATE: March 15, 1976
REVIEW STATUS: Complete

The consequences of dropping a spent fuel shipping cask down the equipment hatch have been found to be well within 10 CFR Part 100 guidelines (see attached). Some differences in initial inventories appear between these [illegible] those performed by the licensee. These differences appear to be the result of licensee's using the distribution of nuclides in spent fuel as presented in GESSAR and the staff's using accident source terms assigned to 90 days and 120 days. These differences do not affect our conclusion that the consequences would be small. The dropped cask was assumed not to violate the integrity of the reactor building and thus bypass the stack. This should be confirmed by the ORPM.

Original signed by
Dennis Eisenhut

D. Eisenhut, Assistant Director for
Operational Technology
Division of Operating Reactors
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc: V. Stello
D. Ziemann
R. Snaider
B. Grimes
E. Adensam
OT B/C's
OI&E
OELD

DISTRIBUTION:
Docket
NRR/Reading
EEB/Reading

OFFICE ▶	EEB/OT/DOR	EEB/OT/DOR	AD/OT/DOR			
SURNAME ▶	E.Adensam/vg	B.Grimes	D.Eisenhut			
DATE ▶	3/19/76	3/19/76	3/22/76			

Form AEC-318 (Rev. 9-53) AECM 0240 ☆ U. S. GOVERNMENT PRINTING OFFICE: 1974-526-166

ESTIMATES OF DOSE CONSEQUENCES FROM A SPENT FUEL CASK DROP AT MONTICELLO

A spent fuel cask containing two 7 x 7 spent fuel assemblies is assumed dropped down a hatchway in such a manner that the cask fails and all the fuel pins (rods) are ruptured. The cask is assumed to not violate the reactor building integrity. The gap activity of halogens and noble gases is assumed released in a puff to the standby gas treatment system filter and to the plant stack. Fumigation conditions are assumed. Table 1 itemizes all the assumptions made, and Table 2 presents the results. The initial activity in the fuel assemblies was calculated assuming peak equilibrium levels in the fuel except Kr85 which was calculated assuming a 3-year operating time at full power. No contribution due to decaying parents was assumed. The consequences estimated are well within the guidelines of 10 CFR Part 100.

TABLE 1

ASSUMPTIONS FOR SPENT FUEL CASK DROP

AT MONTICELLO

Power level	1670 Mwt
Operating time	3 years
Power peaking	1.5
Decay times	90 days; 120 days
Fraction in gaps:	
Kr-85	30%
All other noble gases	10%
Iodine	10%
Filter efficiency for iodine	90%
Number of rods damaged	98
Number of rods in core	23,716
Initial inventories at time of shutdown:	
I-131	25,080 ci/Mwt
Xe-131m	259.5 ci/Mwt
Xe-133	56,220 ci/Mwt
Kr-85	410.2 ci/Mwt
Breathing rate	3.47×10^{-4} m^3/sec
X/Q values, sec/m^3 (100 m stack)	
@500 m	2.0×10^{-4}
@ 1609m	7.8×10^{-5}

TABLE 2

ESTIMATED DOSE CONSEQUENCES

FROM A SPENT FUEL CASK DROP

AT MONTICELLO

Distance	Dose, rem		
	Thyroid	5 cm depth dose, γ*	7 mg/cm^2 skin dose, $\beta + \gamma$**
	at 120 days		
500 meters	8.9×10^{-3}	1.3×10^{-4}	1.07×10^{-2}
1609 meters	3.5×10^{-3}	5.2×10^{-5}	4.2×10^{-3}
	at 90 days		
500 meters	1.2×10^{-1}	1.5×10^{-4}	1.08×10^{-2}
1609 meters	4.6×10^{-2}	6.0×10^{-5}	4.2×10^{-3}

* Total body dose as defined in ICRP Publication 6, p. 19, 1969.

** 7 mg/cm^2 skin dose is similar to a surface skin dose except credit is given for a dead skin layer.