



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

DEC 15 1978

MEMORANDUM FOR: Stephen M. Sohinki  
Counsel for the NRC Staff  
Office of Executive Legal Director

FROM: John O'Brien  
Mechanical Engineering Research Branch

SUBJECT: NEW INFORMATION ON TURBINE MISSILE IMPACTS  
AGAINST STEEL TARGETS

In a memorandum to you dated November 15, 1976, I submitted a revised testimony indicating that for the Floating Nuclear Power Plant design overspeed turbine missiles would not perforate the 4.5 inch turbine missile shield and that destructive overspeed turbine missiles could perforate with velocities as high as 540 fps. This testimony was based on an application of the BRL formula endorsed in R.G. 115 to the turbine internals and casing.

Tests conducted recently by EPRI indicate that the BRL formula may be unconservative. Specifically, a missile weighing 3,365 pounds impacted a 5 inch thick missile shield at 485 fps and passed through with a velocity of 325 fps. The BRL formula indicates that a 3.7 inch thick shield should completely stop the missile.

The BRL formula evidently overestimated steel barrier resistance in this case. This is due in large measure to the fact that the BRL formula was developed for flat plates supported along four edges and not for the ring configuration supported along two edges as in the EPRI tests. Moreover, the BRL formula related to blunt nose missiles and not to the sharp nosed turbine missile segment tested and discussed above.

While the EPRI tests do not exactly simulate the real situation for the FNP, the use of the BRL formula is not supported by the limited data available and the effectiveness of the turbine missile shield now requires further evaluation. A copy of the EPRI report documenting these tests is enclosed.

*John O'Brien*

John O'Brien  
Mechanical Engineering Research Branch  
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Enclosure: As stated

See cc's next page

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