

## ANALYSIS OF THE RESPONSE TO A SEISMIC EVENT OF MOORED FLOATING NUCLEAR PLANTS

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### SUMMARY

This paper describes the seismic analysis of a Floating Nuclear Plant moored within a protective barrier.

Seismic analysis of the moored floating nuclear plant was performed using sub-structuring. This approach allows detailed finite element models to be produced for each major plant structure; the stiffness, mass and damping matrices for each sub-structure are then reduced to a set of "master"-degrees-of-freedom, chosen at interfaces, equipment supports and floor levels of interest. These sub-structures are assembled to describe the entire plant assembly.

Seismic input to the idealized plant and sea water is induced through the sea-bed and non-linear mooring system in the form of tri-axial displacement-time histories. A transient dynamic analysis is performed to produce time history response of the master degrees-of-freedom which can be converted to Spectral Density plots for use in equipment design.

Detailed analysis is produced by imposing the response at the master degrees-of-freedom to the detailed mathematical models.

The analysis described includes the results of a preliminary two-dimensional analysis of the plant and sea water intended to investigate both critical parameters in the response to vertical excitation through the sea water and justify simplified mechanical devices to represent the sea water.

The paper describes the degree of analytical refinement that can be achieved through judicious use of existing techniques and mathematical tools.