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Williamson

PRELIMINARY DRAFT

## SPECIAL REQUIREMENTS FOR EARTHQUAKE RESISTANT DESIGN

1. The general approach should be a systems analysis in which all components of a system which performs a critical function are evaluated for their shock resistance. This evaluation would apply to all features regardless of whether they are classified in structural, mechanical, electrical, or other categories. The design should insure that the integrity of a critical system is not jeopardized by a malfunction of other related systems.

2. It should be demonstrated that complete load paths are provided such that all forces can be carried through transmitting elements to those parts of the structure or soil where it is evident that the stresses are negligible. The adequacy of all such transmitting elements should be demonstrated.

3. Effects of differential movement should be properly accounted for in all cases such as conditions at penetrations, interfaces, and at interconnected equipment items capable of vibrating out of phase.

4. The design should properly account for the effect of seismically induced surges acting on fluid containers and elements therein.

5. Substantiation of shock resistance of equipment items could utilize one or more of the following, as appropriate to the case at hand.

(a) Performance history of such equipment under shock loadings.

(b) Review of drawings or prototypes representing typical components.

(c) Analysis based on conservative assumptions.

(d) Results of shock tests. Tests could be performed on the component itself or reference might be made to existing test data on components sufficiently similar to justify the use of such data.

(e) Dynamic analysis of the response to the shock input.

6. As a minimum, the shock input for design of equipment items should consist of the spectrum (with appropriate damping) representing the basic ground motion, in cases where it is apparent that the motion of

the supports is essentially that of the ground. Where the support motion differs appreciably from that of the ground, this fact should be accounted for in the analysis.

7. Section V D (pg. V-8) of the Preliminary Hazards Summary Report enumerates components considered to be in the category of Class I structures. It is considered essential that this enumeration be regarded as including components such as the following detailed items, along with associated supports, controls, instrumentation, and circuitry.

(a) Valves, penetrations and seals involved in the containment system.

(b) Power and water sources, pumps, prime movers and piping of the emergency cooling system.

(c) Motor-generator set, fuel supply and piping. One or more backup units should be seriously considered unless power sources of adequate capacity with equal or better reliability are available.

(d) Station battery power system.

(e) Liquid poison injection system.

(f) Core support structure.

(g) Reactor vessel supports.

(h) Control rods and drive system including piping and appurtenances and accumulators. Special attention should be paid to the functioning of the collet fingers in the control rod drives. It is also considered important that the rod drive control system be prevented from inadvertently permitting rod withdrawal, and that the scram dump valve and its controls be designed to fail in the dump mode. The fuel elements and control rods should receive a dynamic analysis.

(i) Reactor safety and control system.

(j) Fuel storage pool.

(k) Steam and feed water lines between reactor and turbine.

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