

# YANKEE ATOMIC ELECTRIC COMPANY

Telephone 617 872-8100



1671 Worcester Road, Framingham, Massachusetts 01701

2.C.2.1  
FYR 81-101

June 30, 1981



United States Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: Mr. Dennis M. Crutchfield, Chief  
Operating Reactors Branch #5  
Division of Licensing

- References:
- (a) License No. DPR-3 (Docket No. 50-29)
  - (b) USNRC Letter to YAEC dated April 24, 1981
  - (c) YAEC Letter to USNRC dated May 7, 1980 (WYR 80-49)
  - (d) YAEC Letter to USNRC dated September 12, 1980 (WYR 80-106)
  - (e) YAEC Letter to USNRC dated October 15, 1980 (WYR 80-114)
  - (f) YAEC Letter to USNRC dated February 4, 1981 (FYR 81-18)

Subject: Yankee Seismic Evaluation Program

Dear Sir:

In response to Reference (b), we are submitting a revised description and schedule of our seismic evaluation program. This revision updates and supplements past schedules and program details submitted in References (c), (d), (e), and (f) to update and supplement prior information.

The revised seismic evaluation program for the Yankee Plant is broken into several phases, as shown in Figure 1 and as described below:

## Phase I

Phase I consists of identifying critical systems and structures, gathering information, constructing analytical models and conducting analyses on the as-built plant. As proposed in Reference (f), Phase I included just those systems and associated structures required to maintain the plant in a safe hot shutdown mode. However, subsequent to that submittal, staff positions were formulated to require that systems essential for cold shutdown be seismically analyzed. Since these systems were not included in the original scope, additional analysis will be necessary, thereby extending Phase I completion to March 31, 1982. A revised schedule of Phase I program milestones is contained in Attachment A. Attachment B provides a revised listing of those structures, systems and components to be evaluated in our program.

## Phase II

Phase II, to be conducted during the first quarter of 1982, will be an assessment of the Phase I results and a determination of whether or not upgrade of the plant is economically justified. This phase will consist of a

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review and evaluation of the seismic resistance of systems and structures to the composite spectrum. Areas that indicate potential need for improvement will be reviewed and cost estimates for modification will be developed.

Phase II will also include our own integrated assessment of the overall plant. This evaluation will be based on the results of the Probabilistic Risk Assessment (PRA) study to be completed by December, 1981. The integrated assessment will permit the prioritization of any potentially significant safety improvements and suggest areas for possible action. Safety goal principles will be applied to the results of the PRA to determine the cost effectiveness of modifications as measured by meaningful risk reduction. The probabilistic evaluation will be combined with the seismic evaluation, and SEP reviews of other potential common mode events such as fires, floods, etc., in an overall integrated assessment of the plant highlighting those areas where meaningful plant improvements are possible with their associated costs. The results of this integrated assessment will determine whether to proceed with Phase III.

An important ingredient in the decision to proceed is final agreement by Yankee and NRC on an appropriate spectrum to be used for any seismic upgrade of the plant. Should the spectrum issue be favorably resolved in a timely fashion and should the decision to proceed be positive, design will commence on those high priority areas of the plant, identified in the Phase I seismic analysis, such that modifications, if any, could be made during the scheduled October, 1982 refueling.

### Phase III

Phase III will be initiated if a positive decision is reached in Phase II. Work included in this phase will consist of several activities:

1. continue design modifications on high priority areas identified in Phase II and implement modifications that are possible during the October 1982 refueling;
2. evaluation of block walls;
3. data collection for identified critical electrical, instrumentation and control equipment;
4. equipment qualifications by analyses, in-situ testing or a combination of both; and
5. analyses and/or qualification testing of miscellaneous equipment such as pumps, motors, reactor internals, fuel etc.

At this time it is not possible to project an absolute schedule for Phase III, however, it is reasonable to expect that Phase III will extend into 1983, and will take up to one year to complete.

Phase IV

Phase IV will be conducted upon completion of the analyses performed in Phase III. The purpose of Phase IV is to conduct (1) an overall assessment of all analyses, (2) to make final value judgements on need for modifications, consistent with our overall plant PRA, and (3) to make final determinations on economic feasibility. Phase IV is expected to take several months to complete.

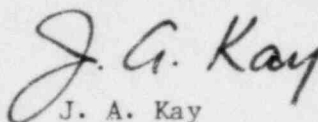
Phase V

Phase V will culminate the seismic evaluation program with design of modifications, if required, and implementation of those modifications. The schedule of this phase will potentially enable those modifications affecting plant operation to be implemented during the scheduled spring refueling outage in 1984. We expect that Phase V can be conducted concurrent with Phase III (as analyses permit) in developing potential design modifications for implementation during that outage. However, schedules for more substantial modifications, requiring long lead times for procurement of materials, may result in implementation of these modifications beyond that scheduled outage. Every attempt would be made to implement these potential modifications on a schedule consistent with the relative safety significance derived from the Probabilistic Risk Assessment.

We trust this information is satisfactory; however, if you have any questions, please contact us.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

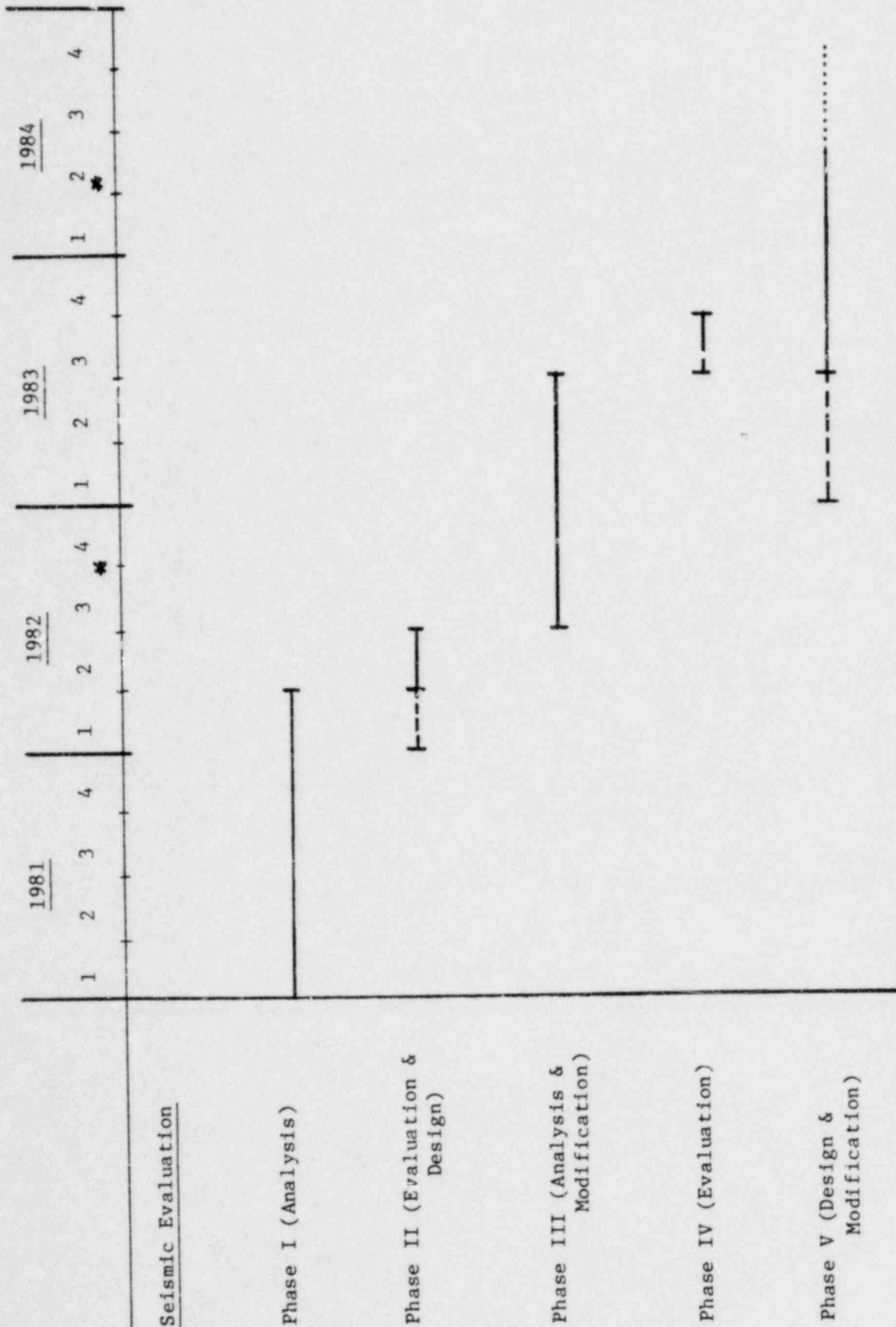


J. A. Kay  
Senior Engineer - Licensing

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Enclosures

FIGURE 1  
 OVERALL SEISMIC EVALUATION PROGRAM  
 QUARTERLY SCHEDULE



--- possible overlap in schedule  
 — "best estimate" schedule  
 \* start of refueling outage

Attachment A

Phase I Seismic Evaluation Program  
Schedule

<u>Milestones</u>	<u>Date</u>	<u>Status</u>
A. Action plan/criteria document complete	2/4/81	Completed
B. Analysis and evaluation of reactor buildup and Reactor Coolant Pressure Boundary complete	2/1/81	Completed
C. Analysis of other Category 1 buildings complete	3/10/81	Completed
D. Analysis and evaluation of safe shutdown systems complete	10/2/81	In progress
E. Structural evaluations complete	10/2/81	In progress
F. Analysis and evaluation of ECCS/ES systems complete	12/31/81	
G. Analysis and evaluation of systems required for cold shutdown capability complete	3/31/82	

Attachment B

Seismic Program Scope

A. The following piping systems are included in the scope of this evaluation (Phase I).

1. Main Steam
2. Feed Water
3. Reactor (Main) Coolant
4. Pressure Control and Relief
5. Charging and Volume Control
6. Safety Injection (including Accumulator)
7. Shut Down Coolant
8. Sample and Drain System
9. Primary Plant Purification
10. Fuel Transfer
11. Vapor Containment Heating System
12. Emergency Feedwater System
13. Component Cooling System
14. Service Water System
15. Spent Fuel Pool Makeup

B. The following structures are included in the scope of this evaluation (Phase I).

1. Concrete Reactor Support Structure
2. Vapor Container Structure
3. Diesel Generator Building and Accumulator Enclosure Portions
4. Turbine Building and Turbine Pedestal
5. Ion Exchange Building
6. Primary Auxiliary Building and Radioactive Pipe Tunnel
7. Screen Well and Pump House
8. Spent Fuel Pool and Spent Fuel Chute.

C. The following components are included in the scope of this evaluation (Phase III).

1. Reactor Vessel Internals
2. Reactor Core
3. Spent Fuel Racks
4. Power Supply Components
5. Instrumentation
6. Actuation System Components
7. Distribution System Components
8. Control Rod Drive System Components
9. Containment Fans