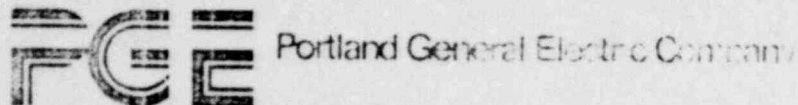


no *DM* - see act
C. Trammell NRC



Docket 50-344

POOR ORIGINAL

November 19, 1979

Trojan Nuclear Plant
Pipe Support and Wall Reviews

JWL-499-79

Mr. Lynn Frank, Director
State of Oregon
Department of Energy
Labor & Industries Bldg., Room 111
Salem, OR 97310

Dear Mr. Frank:

On December 8, 1979, engineers from Portland General Electric Company met with Bill Dixon of your staff to provide information on the history and current status of pipe support and structural inspections and analyses for the Trojan Nuclear Plant, as requested in your letter dated November 1, 1979.

A meeting agenda, consisting of a matrix of subjects that were discussed in conjunction with the items requested in your letter, is included as Attachment 1 to this letter. Meeting minutes that outline PGE's presentation and responses to questions posed by Mr. Dixon are included as Attachment 2.

It is my understanding that the meeting conducted on November 8, together with the attachments to this letter, constitutes a suitable response to your request for information on this subject. Please let me know if additional information or clarification is required.

Sincerely,

J. W. Lentsch
Manager of Generation Licensing & Analysis
Generation Engineering-Construction Division

JWL/4sa5A6
Attachments

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5/11

7912050

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ATTACHMENT 1

Control Building Interim Operation

IE Bulletin 79-02

1. What attribute reviewed/investigated?
2. Scope of review or inspection
3. Results with respect to structural adequacy
4. Corrective action taken
5. Did review duplicate other work? If so, why?
6. What aspects of pipe supports and walls have not been reviewed or inspected?
7. Schedule for further reviews or inspections

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ATTACHMENT 2

November 8, 1979
Meeting Minutes
PGE/ODOE
Response to ODOE Letter
Dated 11/1/79

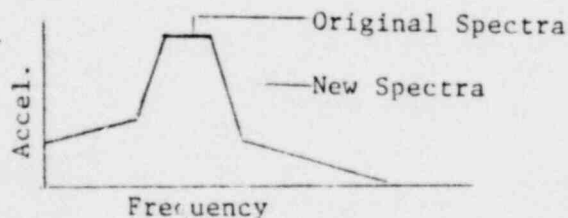
Attendees:

Bill Dixon
J. W. Lentsch
S. E. Hoag
R. Johnson
T. E. Bushnell
L. W. Erickson

Control Building Interim Operation

1. A finite element analysis was performed to determine a new seismic & response spectra for the current structures. This analysis represents a more complex and realistic model than the stick model used for the original Plant design.

Safety systems in the Control/Auxiliary/Fuel Building complex above Elevation 45 ft were reanalyzed. Piping stresses were reanalyzed for the new seismic spectra; walls to which pipe supports attach were assumed to withstand the support loadings. SSE was assumed. FSAR/code allowable criteria were used to evaluate the adequacy of pipe supports. Stresses in both pipes and supports were examined.



3. Added or modified supports to get within code allowable stresses, in & some cases the piping was overstressed; in some, the supports were
4. overstressed.

√35 new supports were added
√100 supports were modified

Wall strengths were examined for the modified and new supports that were added.

5. No duplication of other work.

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6. Not applicable.
- &
- 7.

IE Bulletin 79-02

1. Inspection and analysis of pipe and equipment anchor bolts, including base plate interactions.
2. Field inspection of a sampling of anchor bolts. Visual examination and torque tests of bolts. Included about 20 percent of anchor bolts inside and outside Containment for safety systems.

Torque/tension factors for friction correction:

- 20 percent of pullout values for concrete
- 40 percent of pullout values for masonry.

Torque reading taken as-found; then bolts were loosened and retorqued:

Design value $\sqrt{2-3}$ times test load (2 concrete, 3 masonry). Details to be provided in mid-November 79-02 response.

Interactions between base plates/anchor bolts - done by analysis in engineering office. Fixed when interaction ratio >1 .

Wall strengths were not examined under Bulletin 79-02. Wall strengths were examined by PGE where safety factors were below allowable requiring fixes. Block wall problem was identified during these analyses.

3. Seven supports had safety factor <2 (including SA-83) - all have been corrected except for one that will be fixed prior to operation.
4. Principal solution has been to install larger bolts, usually of wedge type.

About 50 anchor bolts with safety factor <5 ; these will be modified in longer term. Have until next refueling.

Analysis - covered all supports - 1650 supports ($\sqrt{5.5}$ $\frac{\text{bolts}}{\text{supports}}$)

Field tests - 1608 bolts tested/7947 bolts total.

5. No duplication of other work.
6. Covered under LER 79-15.

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7. Analyses to be completed in mid-November 1979. Field tests have been completed.

IE Bulletin 79-14

1. Originated from Stone and Webster seismic issue at five operating & plants. Conducted field inspections of locations, materials,
2. pipe configurations, clearances, functions, and compliance with design.

Done on a system basis. Main purpose was to validate previous seismic analyses.

Included all systems that were analysed by computer. Didn't specifically look at wall strengths during the field walkdowns or analyses.

Did not examine structural adequacy. Wall strengths were examined if a problem was found and modifications were necessary. Not a detailed examination though.

Walkdowns have been completed outside Containment.

Walkdowns have been completed for 2-loops and one train of redundant trains inside Containment.

Field evaluations have been essentially completed for completed walkdowns.

Bechtel verification of walkdown results and seismic analyses are not yet complete. This work will resume when Bechtel's analyses of walls is completed, due to manpower shortages (stress analysts).

3. Containment spray system - problem with support was found in the course of 79-14 inspections - had slipped off a sliding pedestal -
4. was not a 79-14 item. The missing support did not render the CSS system inoperable. CSS problem does not appear to be generic in nature, or reflective of a major QA deficiency. This support has been modified.

A missing support on the Auxiliary Feedwater System did not render that system inoperable. A new support has been added.

About 10,000 manhours of field work have been expended, not counting Bechtel engineering.

5. Duplicated some previous work:

Control Building, 79-02, valve weights, seismic analysis code verification.

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6. Remainder of field work to be done during 1980 refueling; Bechtel analyses to resume after completion of structural work.

LER 79-15 (Block Wall Problem)

1. Arose during 79-02 work; primarily a concern with thin block walls.
&
2. Includes block walls 16-in. and less with attached safety piping in all buildings.

A supplemental response to LER 79-15 will be transmitted to NRC next week; SA-83 has been fixed.

Main effort has been to solve potential problems rather than to perform operability analyses. Schedule for as-found operability analyses is uncertain - will have to wait until design packages are in field to start.

Have to walkdown the <16-in. walls to determine which pipes are attached to them. Have not, to date, found any problems that impact on operability of systems needed for cold shutdown (Mode 5).

3. See LER 79-15 -- As of last Saturday:

&

4. 82 supports with problems:

 About 50 percent can be through-bolted.

 About 50 percent require modification to unload wall.

Support SA-83 had anchor bolt safety factor ~ 1.4 . Bolts probably would not pull out during SSE; however, localized damage to block walls might be expected due to exceeding yield stress of rebar in walls.

SA-83 analysis indicated greater than 100 percent of piping yield stress. Other connected piping would probably have yielded and relieved stress on SA-83. Conservative LOCA thermal loads were assumed.

As of 11/8:

 95 supports with problems; 47 supports require modification to unload wall; 36 to be through-bolted; 12 under evaluation. Will all be fixed prior to startup.

5. Some overlay of work performed under 79-14.
6. Scope and criteria for inspection of other walls are under development (see LER 79-15); to be defined by next week.

Cause of problem is unknown at this time but is under investigation by PGE/Bechtel.

Control Building Modifications

1. New response spectra was generated for modified Control Building & complex; have reanalyzed piping - modifications are underway
2. (started during summer refueling outage). Includes all SCI systems above Elevation 45 ft, per Regulatory Guide 1.29, Rev. 3.
3. 155 modifications total - four had wall/structural problems similar to that encountered under LER 79-15.

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