



Portland General Electric Company

Donald J. Broekel Assistant Vice President



September 26, 1980

Trojan Nuclear Plant
Docket 50-344
License NPF-1

Mr. R. H. Engelken, Director
U. S. Nuclear Regulatory Commission
Region V
Suite 202, Walnut Creek Plaza
1990 N. California Blvd.
Walnut Creek, CA 94596

Dear Sir:

Attached for your information is an evaluation of a nonconformance similar to those described in Supplement 1 to LER 80-07 transmitted by my letter dated June 16, 1980. As indicated in that evaluation, the wall panels described satisfy SSE criteria. However, corrective action is being taken to comply with the 0.15g OBE criteria. The corrective action is expected to be completed by early November.

Sincerely,

c: Mr. Lynn Frank, Director
State of Oregon
Department of Energy

Mr. R. A. Clark, Chief
Operating Reactors Branch No. 3
Division of Licensing
U. S. Nuclear Regulatory Commission

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ATTACHMENT 1

1. Background

Masonry wall modifications per LER 79-15, October 31, 1980 scheduled compliance (letter Broehl to Engelken, June 28, 1980) include bracing of 16-in. double wythe masonry wall panels in the Auxiliary Building on column line 46 between column lines E and F and from elevation 61 ft to 77 ft and 77 ft to 93 ft. For this modification work, scaffolding was installed and metal siding panels were penetrated for access to the exterior of the wall panels as required. Such access permitted inspection of the exterior of the entire wall on column line 46 between column lines D and N from elevation 61 ft to 77 ft and 77 ft to 93 ft. Inspections were performed by both PGE and Bechtel engineering personnel. Certain nonconformances or potential nonconforming conditions were identified as described below.

2. Nonconformances or Potential Nonconformances Identified

Engineering inspections of the 16-in. standard weight double wythe masonry wall on column line 46 between column lines D and N and from elevation 61 ft to 77 ft and 77 ft to 93 ft identified the following nonconformances or potential nonconforming conditions:

- 2.1 Between column lines D and E (approximately 19 ft of wall) below elevation 93 ft the outer wythe of masonry terminates approximately 4 in. below the soffit of the slab (Q-deck), the masonry vertical rebar terminates about 1 in. below the slab, and no dowels down from the slab into the outer masonry wythe were observed.

The incomplete outer wythe wall topping is a nonconformance with the design drawings. The lack of rebar dowels down from the slab into the outer masonry wythe is also an apparent nonconformance with design drawing details.

- 2.2 Between column lines E and N (approximately 96 ft of wall) below elevation 93 ft, metal detector scanning together with isolated visual observations (small areas of masonry removed for inspection) indicate that the outer wythe masonry vertical rebar terminates below the slab soffit, and dowels from the slab down into the outer masonry wythe may not be present. Some areas of floor beam masonry encasement (behind the facing) are not completely filled with grout or mortar, although the outer wythe is typically completed to the soffit of the slab above. Between column lines H and L, where access is possible from inside the building, visual inspections indicate that there are no rebar dowels down from the elevation 93-ft slab into the inner wythe masonry.

The grout or mortar void areas in the floor beam masonry encasement represent local incomplete construction and the lack of dowels down from the slab is an apparent nonconformance with design drawing details.

- 2.3 Between column lines F and N (approximately 77 ft of wall) below elevation 77 ft where inspections were made, the outer wythe masonry reinforcing steel was observed to continue into the floor beam encasement but terminate approximately 1 in. below the slab soffit. No dowels extending down from the slab at elevation 77 ft into the outer masonry wythe were observed. Inspection for dowels up from the elevation 61-ft slab for these wall panels has confirmed that such dowels exist.

The wall panels from elevation 61 ft to 77 ft on column line 46 between column lines F and N were not part of the original plant design but were added in the latter stages of the plant construction (1973) in response to NRC tornado protection criteria established for Trojan at that time. The slab at elevation 77 ft was already in place. Hence, any doweling down from elevation 77 ft for these wall panels would have had to have been drilled-in in some manner or provided by welding anchors to the floor beam bottom flange. Documentation has not yet been found to establish the design intent at that time, so it has not been determined if a nonconformance exists.

3. Structural Evaluations

With consideration of identified nonconformances and potential nonconformances, described in 2 above, structural evaluations of both in-plane and out-of-plane capacities relative to SSE load demands have been performed by Bechtel for all masonry wall panels on column line 46 between column lines D and N between elevation 61 ft to 77 ft and 77 ft to 93 ft. For these evaluations, the following bases were used:

- a. No reliance was placed on outer masonry wythe contact with the slab soffit at elevation 93 ft for the wall panel between column lines D and E from elevation 77 ft to 93 ft.
- b. No reliance was placed on the existence of reinforcing steel dowels extending down from the elevation 93-ft slab between column lines D and N for either masonry wythe of wall panels between elevations 77 ft and 93 ft.
- c. No reliance was placed on the existence of reinforcing steel dowels extending down from the elevation 77-ft slab between column lines F and N for either masonry wythe of wall panels between elevations 61 ft and 77 ft.

Results of the structural evaluations are summarized as follows:

- (1) The wall on column line 46 was not intended in the original design to be a shear wall, and it is not a major contributor to the overall lateral load resistance capability of the Control-Auxiliary-Fuel Building complex. Adjacent walls running in the east-west direction between elevation 61 ft to elevation 93 ft (ie, parallel to the wall on column line 46) have adequate capacity to resist the entire in-plane load demand (SSE) on column line 46 in addition to their own load demands. This evaluation appropriately used loads developed in the Control Building Interim Operation phase. The capacities of adjacent walls were determined by the current criteria used for the Control Building Modification licensing phase (PGE-1020).

In-plane SSE loads can be resisted by the wall on column line 46 using the in-filled panel concept (shear transfer mobilized through steel frame-masonry wall panel interaction in bearing). Although this mode of resistance was not previously relied upon in the Control Building Modification licensing phase, this means of shear transfer has been recognized by the engineering profession as a realistic mode of behavior.

- (2) With regard to out-of-plane loading conditions, the wall panels on column line 46 can develop capacities consistent with the current LER 79-15 criteria (letter, Broehl to Engelken, June 28, 1980).

In summary, structural evaluations have shown that the wall on column line 46 has the capability to withstand both in-plane and out-of-plane SSE loading conditions acceptably.

4. Recommended Corrective Action

The recommended corrective action is to repair all wall panels on column line 46 between column lines D and N and from elevation 61 ft to 77 ft and 77 ft to 93 ft as required to meet load demands with modes of resistance consistent with PGE 1020 criteria for in-plane loads.