UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket 50-344
PORTLAND GENERAL ELECTRIC COMPANY, et al	)	(Control Building Proceeding)
	)	
(Trojan Nuclear Plant)	)	

AFFIDAVIT OF DONALD J. BROEHL
REGARDING LICENSEE EVENT REPORT 80-07

1. I am employed by Portland General Electric Company (PGE or Licensee) as Assistant Vice President, Generation Engineering-Construction. I supervise the Generation Engineering-Construction Division which consists of the Generation Engineering, Generation Licensing & Analysis and General Construction Departments, each of which has responsibilities related to the reviews, investigations and evaluations performed by PGE in connection with Licensee Event Reports (LERs) 79-15 and 80-07.

2. In the course of performing evaluations related to LER 79-15, Licensee's engineers determined that the potential existed for an ambiguous interpretation of design drawing details which describe the connection of the top of the south wall of the Auxiliary Building (adjacent to column line 55 between column lines F and N) to the floor slab at Elevation 93 ft. The wall and the non-typical configuration of the top-of-wall interface are described in more detail in Attachment 1 to LER 80-07, a copy of which is attached hereto. An inspection of the top-of-wall interface in the field showed that

the intended connection had not been implemented. Licensee has attributed the cause of this occurrence to a misinterpretation of the design drawings and typical details by the construction contractor.

3. The corrective action designed to restore the structural capability of the Auxiliary Building wall where the initial deficiency was identified, involved making a positive connection between the wall and floor slab with grouted reinforcing steel, and between the wall and adjacent structural steel with through-bolts and structural steel shapes. This corrective action was completed on June 6, 1980.

4. Following identification of this deficiency related to the south wall of the Auxiliary Building Licensee initiated an engineering review to determine whether similar deficiencies existed elsewhere in the Plant. The review identified from design drawings similar non-typical top-of-wall interface conditions where connection requirements were not specifically detailed in the design drawings and where application of typical details could be subject to misinterpretation. Field examinations of all such interface conditions were then performed to determine whether the proper connections had been implemented. The scope of the review was then expanded to include field examinations of the top-of-wall interface connections of other masonry walls in the Plant to provide assurance that no other incomplete connections exist. Pursuant to these reviews the top-of-wall interface conditions were examined in the field at all locations where physically possible except for specific areas of high radiation. These examinations included both sides of the wall and in some cases involved destructive examination. Areas not specifically examined were limited to the interior faces of the filter and demineralizer compartments

and the spent resin storage tank room. Since these walls were inspected to assure radiation shielding competency prior to initial start-up, and since we examined the external faces, we determined that the additional radiation exposure to personnel to examine interior faces was not warranted in light of the very low probability that unsatisfactory conditions exist in these locations. We did not physically examine the exterior face of the north wall of the Auxiliary Building, which is not accessible due to the close proximity of the building siding, but we were able to determine that appropriate connections exist by examination of construction photographs. In addition to the above-described reviews, Licensee requested Bechtel Power Corporation (Bechtel) to perform a document review of Field Change Requests made during the construction of the Plant in order to confirm that the design drawings and typical details for the Plant reflect the designs which were approved for construction. These reviews were completed on June 13, 1980. They are described in Supplement 1 to LER 80-07, a copy of which is attached hereto.

5. These field examinations and expanded reviews identified a number of nonconformances between the connection design details and the field conditions. The majority of such nonconformances involved minor defects in workmanship at the top of masonry wall connections for which dry pack grouting was not fully completed. These defects were largely cosmetic. Although such defects had no structural or safety significance, they have been corrected by the addition of grout in order to make the connection complete in accordance with the design drawings and typical details.

6. The foregoing reviews and examination identified five walls having nonconformances of potential safety significance, as to four of which corrective action is being taken. Three of these

walls are in the Fuel Building and two are in the Auxiliary Building.

7. Three of the five nonconformances related to incomplete construction. Two of these (Item Nos. 1 and 2 in Supplement 1 to LER 80-07) involved incomplete grouting from the top of the masonry unit to the floor slab, and they have been corrected by the completion of such grouting. The third one (Item No. 5 in Supplement 1 to LER 80-07) was an approved Field Change Request that was not implemented. Corrective action for this nonconformance, which is scheduled for completion on June 18, 1980, consists of providing steel angles on both sides of the wall and through-bolting the angles across the wall cross-section.

8. The fourth nonconformance (Item No. 3 in Supplement 1 to LER 80-07) related to an interference between reinforcing dowels from the slab above and a steel beam supporting the floor. The connection was found to be acceptable as constructed, but since it could be restored to full capacity with a reasonable effort, corrective action will be provided. This corrective action, which is scheduled for completion on June 18, 1980, consists of welding dowels to the bottom flange of the beam and grouting the dowel pockets.

9. The fifth nonconformance (Item No. 4 in Supplement 1 to LER 80-07) was at a non-typical interface on a minor shear wall in the Fuel Building where the design drawings and typical details may have been misinterpreted with the result that the assumed design interface conditions were not implemented. As stated in Paragraph 3d of the accompanying affidavit of Dr. White, the wall has been evaluated and found to have adequate capacity to withstand SSE out-of-plane loads and its own SSE in-plane inertia loads, but not see the SSE in-plane

loads predicted by the STARDYNE analyses,which would instead be resisted by adjacent elements. Since this wall is a north-south wall adjacent to the reinforced concrete CVCS holdup tank enclosure, any limited shear capacity that it provided (previously estimated as 204 kips) would only be a trivial addition to that provided by the holdup tank and spent fuel pool structures. For this reason, corrective action for this wall, which would be very difficult to perform, would not be purposeful or warranted. The wall will not be considered to contribute to the seismic resistance of the Complex.

10. In addition to the nonconformances described above in the course of its investigation Licensee determined that a portion of the N-line wall in the Control Building that was modeled as a lintel above the doorway into the counting room at Elevation 45 ft is a penetration for ventilating ducts for the counting room. The impact of this opening on the seismic capability of this wall is described in Dr. White's affidavit. Since the wall was constructed as designed and is capable of resisting an SSE event in its as-built condition no correction action is necessary.

11. The results of the engineering evaluations of the foregoing conditions are described in Dr. White's affidavit which concludes, among other things, that the reductions in capacity are insignificant and the effects on distribution of loads and on floor response spectra, are negligible.

12. All of the above-described corrective actions are scheduled for completion by June 18, 1980, and in any event, will be

completed prior to the resumption of power operations.

I, Donald J. Broehl, being first duly sworn, state that I have reviewed the foregoing affidavit, and that the statements contained therein are true and correct to the best of my knowledge and belief.

Donald J. Broehl

STATE OF OREGON)
) ss.
County of Multnomah)

SUBSCRIBED AND SWORN TO before me this 16th day of June 1980.

Notary Public of Oregon

My Commission Expires: 11/8/82

LER 80-07
Attachment 1

Design Description of Wall on Column Line 55

The south wall of the Auxiliary Building along column line 55 and between Elevations 45 ft. and 61 ft. is of composite construction with reinforced concrete core between two wythes of reinforced grouted masonry. This portion of the wall, which encases the structural steel framing system, was considered as a shear wall in the original design and, accordingly, the reinforcing steel arrangement was shown on the Civil drawings. The upper elevations of the wall from Elevations 61 ft. to 93 ft. were not considered as a shear wall in the original design of the Control-Auxiliary-Fuel Building Complex and are of 12-inch thick standard weight reinforced grouted masonry. This single wythe wall is different from other walls in the Complex in that it is offset with respect to the steel framing system, and therefore the reinforcing steel in the wall is not interrupted at intersecting column lines and floor elevations. Details on the Civil drawings show the dowels for the slab-wall connections at Elevation 61 ft. and Elevation 77 ft. along column line 55. The detail of the connection on the Civil drawings does not show how the slab-wall connection at Elevation 93 ft. is to be made. To determine this, one must refer to the typical details and notes on Architectural drawings which specify that all concrete block walls which extend from floor slab to floor slab shall be connected by dowels to match the wall reinforcement.

In the particular connection at Elevation 93 ft. this interface had an interference with a 10-in. steel siding support channel at the base of the insulated siding from above and an adjacent structural steel floor beam. The nature of this structural framing detail coupled with the absence of a specific dowel detail on the Civil drawing caused the ambiguity that we believe led to the non-conformance.

As-Built Condition of 12-in. Masonry Wall on Column Line 55, Between F and N, at the Elevation 93 ft. Slab Interface

The as-built configuration of the 12-in. masonry wall interface with the Elevation 93 ft. reinforced concrete slab and adjacent steel elements is shown in Figure A1. The masonry wall was constructed after the structural steel framing, reinforced concrete slab, and siding support framing were completed. The interference of the 10-in. siding support channel with the continuation of the masonry wythe is apparent from Figure A1.

Detailed inspection of the interface could not be performed from either inside or outside of the Auxiliary Building without special techniques because of the difficult access. However, with use of mirrors and remote camera photographs, the as-built condition at the top of the wall was determined. For [illegible]h of the wall from about 3 ft. west of column line L to about [illegible] west of column line F (approximately 56 ft.) it was observed that the wall masonry was terminated at the standard course dimension which is approximately 3-1/2 in. below the bottom of the siding support channel. No reinforcing steel dowels were observed projecting down from the reinforced concrete slab to match with the masonry reinforcing spacing, no masonry reinforcing projected above the top of the masonry, and no lateral ties were observed between the masonry and adjacent structural steel beam. The top-of-wall closure was finished to the underside of the siding support channel with cut sections of masonry block mortared to the top of the wall and finished on the exterior with mortar.

For the length of wall from about 3 ft. west of column line L to column line N (approximately 16 ft.), the containment airlock access slab extends over the masonry wall. In this length of wall, the existence of reinforcing steel dowels from the slab into the wall was confirmed by visual observation after removal of some of the mortar with a pneumatic chipping tool.

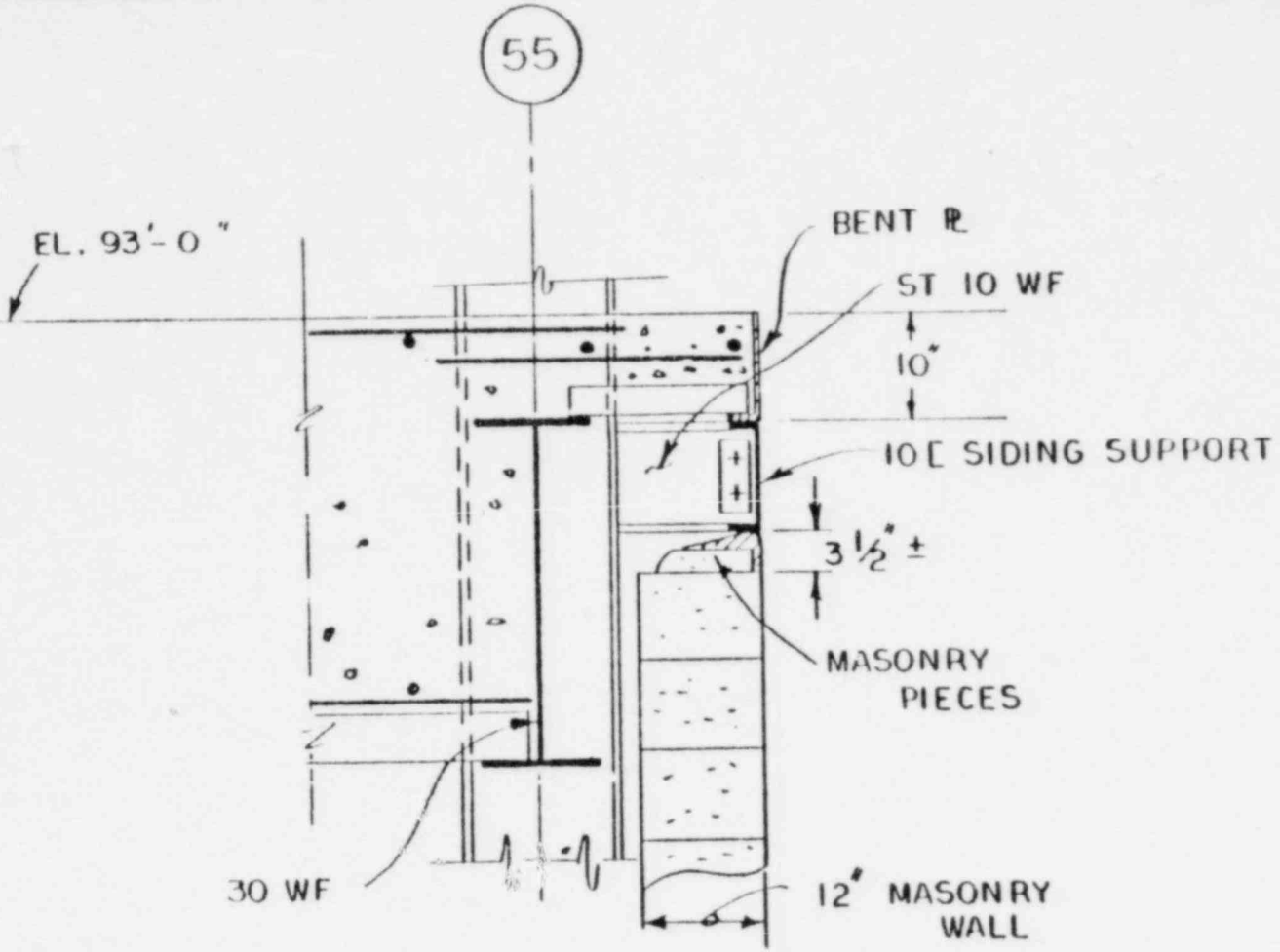
55
EL. 93'-0"
BENT PL
ST 10 WF
10"
10 C SIDING SUPPORT
3 1/2" ±
MASONRY PIECES
30 WF
12" MASONRY WALL

FIGURE A1