bc: Messrs. Williams/Lindblad, Goodwin, Durham, Heider, Yundt, Lentsch, Zimmerman, Christensen, Gaidos, Sullivan, L. Damon (Bechtel), L. Cunningham (W), L. Weislogel (PP&L), D. Axtell (EWEB), R. Nyland (BPA), M. Axelrad, C. Trammell, M. Malmros, LIS, Reading File, TNP:GOV REL F:NRC Chrono, PGE to IE Bulletins, TNP:GOV REL F:NRC,IE Bulletins

PGE Portland General Electric Company

Donald J Broehl Assistant Vice President

July 18, 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 please find an inspection report of the Trojan Nuclear Plant feedwater system piping, which is in response to the action item 2 in IE Bulletins 79-13 and 79-13, Revision 2 dated June 25 and October 16, 1979, respectively. This report, prepared based on results of the supplemental inspections conducted on feedwater and auxiliary feedwater piping during the spring 1980 refueling outage at the Trojan Nuclear Plant, is submitted to the NRC in accordance with the required response schedule (within 30 days upon completion of inspections). It should be noted that the PGE responses to the remaining action items in the subject IE Bulletins were already submitted to the NRC on July 19, 1979.

Sincerely,

/s/ D. J. Broehl

DJB/KM/4sa9A12
Attachment

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

Mr. Victor Stello, Director
Division of Operating Reactors
U. S. Nuclear Regulatory Commission

S. R. Christensen

J. W. Lentsch

A001 S/1

8007250413 Q

121 S.W. Salmon Street, Portland, Oregon 97204

ATTACHMENT

Trojan Nuclear Plant
Response to IE Bulletin 79-13, Revision 2, Item 2
Inspection of Feedwater System Piping

In accordance with the requirement of the supplemental inspection specified in the Action Item 2 in IE Bulletin 79-13, Revision 2, the volumetric (specifically radiographic and supplementary ultrasonic) examinations and visual examinations were conducted on feedwater system piping during the refueling outage for Cycle 3 operation in 1980. No cracking was found and the visual examination of the feedwater system piping supports and snubbers in Containment verified that the system is operable in accordance with design criteria.

As reported previously in the PGE letter to the NRC dated August 28, 1980, the nozzle-to-reducer welds had displayed a radiographic image of the area where a corner was formed by the counterbore and 15-degree transition to nominal pipe inside diameter. Steam generators A and B have a machined groove at this location. The nozzle-to-reducer weld for steam generator A, demonstrating the most distinct image, was extensively examined using radiographic angle exposures and ultrasonic techniques. There is no change in the appearance of the groove from the previous inspections conducted in July 1979. The ultrasonic technique applied is satisfactory for monitoring any increase in depth of the groove, should cracking ensue. This technique is based upon ASME Section V, Article 4, as modified by a factor determined experimentally utilizing a known size similar notch. All radiographic indications in steam generator feedwater piping A, B, C and D were further evaluated using ultrasound, visual inspection and penetrants where appropriate.

The only reportable indication found in the inspected sections of the feedwater system other than the nozzle-to-reducer welds was a surface linear discontinuity containing slag in steam generator feedwater line C (EBE-3-1-2) pipe to penetration weld. The discontinuity did not meet acceptance criteria of the construction code B31.7 (1969) Class 2 and was removed by blending the area with the surrounding material using a grinder. The blended area was examined with penetrants and an ultrasonic wall measurement made to ensure remaining design wall thickness. A weld repair was not required. This indication was reported to the NRC, Region V on May 9, 1980 (CPY-486-80).

The following paragraphs provide the conditions and results of the examinations.

I. Radiographic Examinations

A radiographic examination was performed on each steam generator feedwater nozzle-to-reducer weld, reducer-to-pipe elbow weld, all feedwater piping welds to the first support, feedwater line to Containment penetration welds and an area of at least one pipe diameter of the main feedwater line downstream at the auxiliary feedwater to main feedwater connection.

The techniques applied for the radiographic examinations were:

Source: Iridium 192, 89 to 98 curies, 0.141-in. right cylinder, lead collimator.

Source to film distance: 16-1/2 in. for nozzle-to-reducer, 14-1/2 in. for pipe welds.

Unsharpness factor: 0.01 in.

Penetrameters: ASME numbers 12, 15 and 17 depending on measured section thickness being radiographed.

Shim thickness: 0 to 0.05 in. depending on thickness of weld cover being radiographed.

Film and screens: Eastman Kodak type M, lead intensification screens, lead backscatter protection. /.005-M-.005-M-.010/.125. Double wall exposure, single wall viewing. Nominal single wall pipe thickness 0.594 to 0.840 in.

Acceptance Standard: ASME Section III NC 5320 and the construction code.

Examination Method Standard: ASME Section V, except that penetrameter sensitivity shall be to the 2T hole.

Sensitivity: 2-2T film side penetrameter.

Indication Characterization: Reshots, RT triangulation at 10 degrees and 20 degrees, UT per ASME Section XI and Section V, Article 4, UT wall thickness measurement.

Steam Generator A

The nozzle-to-reducer weld (EBB-3-1-5, Weld FW 145) showed a single linear indication on the inside surface of the reducer 1/2-in. from the weld root. The indication was located at the corner formed by the straight counterbore and the 15-degree machined transition to the reducer inside dimension. With the 0-degree position being at the top of the weld and proceeding clockwise with positions established looking at the steam generator, the indication extended clockwise from 180 degrees to 140 degrees. The indication was approximately 45 in. long out of a total circumference of 50 in. The greatest depth (through wall from ID surface) of the indication appeared to be from 345 degrees to the 18-degree position, gradually becoming shallower counterclockwise from 345 degrees to 180 degrees and clockwise from 18 degrees to 140 degrees. The area where the weld cover was ground flush with the nozzle and reducer outside surface during the summer 1979 examination (345-degree to 18-degree area) was radiographically triangulated, radiographs were compared with construction and spring 1979 radiographs under a 5 and 7 power lens and the indication was characterized ultrasonically. The appearance and indication remain the same as previously reported in the August 28, 1979 PGE letter to the NRC and no additional development has been identified. Based on an improved reproducible ultrasonic procedure, the monitoring indication dimensions yield an adjusted depth dimension value of 0.123 in.

No apparent defects were identified in the areas of reducer-to-elbow, pipe-to-penetration, elbow-to-pipe and pipe-to-pipe welds. Surface irregularity of the elbow-to-pipe and pipe-to-pipe welds also meet the code requirements.

Indications from mandrel marks, mill scale and possibly corrosion on main feedwater line downstream and adjacent to branch connection welds were investigated by radiographing calibration standards with similar surfaces and ultrasonically. These indications were found typical at this location on all feedwater lines. No defects were identified.

STEAM GENERATOR B

The nozzle-to-reducer weld (EBB-3-1 Weld 140) also showed linear indication at the corner formed by the counterbore and 15-degree machined transition on both the nozzle and reducer sides were the same in nature as in the steam generator A nozzle-to-reducer weld. These indications appeared to be slightly lighter and less pronounced than in steam generator A. All indications appeared to the same extent in the construction and summer 1979 radiographs and were acceptable. Surface irregularities also meet the code requirement.

No apparent defects were detected in the areas of reducer-to-elbow, pipe-to-penetration, elbow-to-pipe and pipe-to-pipe welds. Surface irregularities of those areas also meet the code requirements.

The main feedwater line downstream and adjacent to the branch connection weld showed no apparent defects.

STEAM GENERATOR C

The porosity and surface irregularities satisfies code requirements on nozzle-to-reducer, reducer-to-elbow, elbow-to-elbow, elbow-to-pipe and pipe-to-pipe welds. For pipe-to-penetration weld (EBE-3-1-2 Weld E), slag, porosity and surface irregularities meet code requirements except for a linear discontinuity of 1.875 in. length and 0.125 wide at the 260-degree position when facing towards the steam generator (0 degrees being at the top of the weld). The discontinuity containing slag is transverse to the weld, the linear axis of the discontinuity is on the pipe surface and the remainder ending in the weld. The appearance is of an arc being struck on the pipe and the weld rod dragged to the weld. The discontinuity was removed by grinding and blended with surrounding material. The blended area was penetrant and UT examined. Less than 0.1-in. depth material was removed. The weld now meets the code requirements.

The main feedwater line downstream and adjacent to the branch connection weld showed no apparent defects.

STEAM GENERATOR D

Nozzle-to-reducer, reducer-to-elbow, pipe-to-penetration, elbow-to-pipe and pipe-to-pipe welds showed no apparent defects with slag, porosity and surface irregularities being acceptable to the code requirements.

The main feedwater line downstream and adjacent to the branch connection weld also showed no apparent defects.

II. Ultrasonic Examinations

An ultrasonic examination was performed on the nozzle-to-reducer weld on the feedwater nozzle for steam generator A (FW-145 on EBB-3-1) which had shown the most distinct linear indication in radiographic examination. The examination technique essentials used were:

Test Instrument - Nortec 131D

Search Unit - 2.25 MHz, 1/2" diameter, 45°

5 MHz, 1/2" diameter, 45°

3.5 MHz, 3/8" x 3/8", 45°

Calibration Block - PGE Calibration Block POR-23

Couplant - Sonotrace 40 and Ultragel

Scans were made from both sides of the weld with the search unit on the OD surface. The weld was examined to detect longitudinal and transverse oriented indications using a 45-degree shear wave. The indication noted on the radiographs of FW-145 was examined to characterize the through wall dimension.

The weld was initially examined in June 1979 by Pittsburgh Testing Laboratories (PTL). In July 1979, a subsequent ultrasonic examination was performed by Westinghouse. The results of the June-July 1979 examinations were the same; the indication is on the ID surface and appeared to be between 0.08 and 0.10 in. through wall dimension. The indication appears to be a machined line with no radiographic or ultrasonic crack-like characteristics. In October 1979, a further examination was performed on FW-145 by an NDE Contractor, Lambert-MacGill-Thomas (LMT) and the indication at the same location was reported to be approximately 0.092-in. through wall dimension.

In May 1980, a follow-up examination was performed on FW-145 to further monitor and evaluate whether any significant changes had occurred in the size of the indication. The May 1980 examination was performed by PTL with the conditions being more suitable for performing the examination since the pipe was free of water, the metal temperature was below 100 degrees, lighting and access were satisfactory. The May 1980 examination results showed that the indication was approximately 0.123-in. through wall.

The ultrasonic data for the October 1979 and the May 1980 examinations were obtained and recorded in accordance with ASME Section V, Article 4, Appendix D. Use of Article 4 provides a procedure that can be used to evaluate ultrasonic data from a common base.

During the May 1980 examination data was obtained relative to the ultrasonic flaw sizing of the calibration standard used for these examinations. The calibration standard (POR-23) ID circumferential notch was evaluated as described in Article 4 and the data indicated a notch depth of 0.12-in. through wall. The notch was also physically measured by using impressions of the notch and measurements were taken with optical viewers. The optically measured depth was 0.078-in. through wall. Therefore, it can be demonstrated that the ultrasonic data recording procedures of Article 4 will oversize an indication of this particular configuration by approximately 54 percent. The raw data recorded during the October 1979 examination indicated that the through wall dimension was 0.142 in. Applying the 54-percent oversizing correction to the data indicates that the indication has an apparent through wall dimension of 0.092 in. The raw data recorded during the May 1980 examination indicated that the average through wall dimension was 0.19 in. Applying the 54-percent oversizing correction to the data indicates that the indication has an apparent through wall dimension of 0.123 in.

Comparison of the three sets of examination data concludes that the through wall dimension of the indication (0.10 in. for June/July 1979, 0.092 in. for October 1979, and 0.123 in. for May 1980) has exhibited no apparent growth. It should be recognized that the spread of data collected [0.10, 0.092, 0.123] is within the error band that can be expected from ultrasonic flaw characterization procedures.

III. Visual Examinations

A visual examination of all feedwater piping supports in Containment involved the following specific visual checks:

a) Grout and anchor bolt integrity

b) Welds

c) Spring support readings

d) Nut and bolt tightness

e) Snubber cold set

f) Pins and cotters

g) Clamp location (e.g., has any "walking" occurred)

h) Any signs of structural stress (e.g., bent steel)

i) Interference with adjacent structures or components

j) Presence of unusual cold load.

In addition, all snubbers were disconnected at one end and manually stroked to verify that lockup had not occurred. The piping was full of water at ambient temperature (i.e., 70°F) while the inspection was performed and the Plant had been in cold shutdown for 2-1/2 months prior to the visual inspections.

Generally, the visual examinations verified that the supports were in good condition. All conditions noted below were considered minor and have little or no effect on support operability. All conditions have been corrected as stated below.

Feedwater Loop A

No detrimental conditions were noted.

Feedwater Loop B

No detrimental conditions were noted. The following minor corrective actions were taken subsequent to the observations.

EBB-3-1-SS6:

This support is a mechanical snubber. The balljoint bushing was loose on the snubber tongue. The balljoint bushing was re-peened and re-installed.

EBB-3-1-H8:

This support consists of a spring cannister supporting the pipe from below while resting on a pipe clamp. The nuts on the pipe clamp were found to be loose and the cold set load was slightly high. The nuts on the pipe clamp were tightened and the cold set load was readjusted.

EBB-3-1-SS7:

This support is a mechanical snubber. The balljoint bushing was loose on the snubber tongue. The balljoint bushing was re-peened and re-installed.

EBB-3-1-H9:

This support consists of a spring cannister supporting the pipe from above while resting in a pipe clamp. The cold set load was slightly high and was readjusted.

EBB-3-1-H10:

This support consists of a spring cannister supporting the pipe from below while resting in a pipe clamp. The cold set load was slightly high and was readjusted.

Feedwater Loop C

No detrimental conditions were noted.

Feedwater Loop D

No detrimental conditions were noted. The following minor corrective actions were taken subsequent to the observations.

EBB-3-2-H6:

This support consists of a cannister supporting the pipe from below while resting in a pipe clamp. The pipe clamp stanchion pad was not seated square on the mating stanchion pad. The pipe clamp stanchion pad was readjusted to align the pad with the mating stanchion pad.

EBB-3-2-SS12:

This support is a mechanical snubber. The balljoint bushing was loose on the snubber tongue. The balljoint bushing was re-peened and re-installed.

EBB-3-2-SS13:

This support is a mechanical snubber. The balljoint bushing was loose on the snubber tongue. The balljoint bushing was re-peened and re-installed.

All springs are set at the cold load position and all mechanical snubbers (no hydraulic snubbers used) were successfully stroked by hand.