Portland General Electric Company

June 25, 1981

Trojan Nuclear Plant
Docket 50-344
License NPF-1

Director of Nuclear Reactor Regulation
ATTN: Mr. Robert A. Clark, Chief
Operating Reactors Branch No. 3
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir:

In accordance with Paragraph 2.C. (11) of Facility Operating License No. NPF-1, all fuel assemblies subject to cross-flow baffle jetting were visually inspected at the end of core cycle 3 at the Trojan Nuclear Plant. In addition, the final FSAR-required visual examination was performed for the initially loaded (cycle 1) fuel assemblies that were also in the cycle 3 core. No significant degradation was detected in either of the inspections. A more detailed description of the examination methods and the corresponding results are in the attached "Preliminary Report on Trojan EOC-3 Fuel Examination", which is based on information supplied by Westinghouse who performed the inspection and prepared a preliminary report under contract to EPRI.

Sincerely,

Bart D. Withers
Vice President
Nuclear

Attachment

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

A001
S1/1

121 S.W. Salmon Street Portland, Oregon 97204

ATTACHMENT to PGE to NRC LETTER DATED JUNE 25, 1981

Preliminary Report on Trojan EOC-3 Fuel Examination

1. Examinations Performed

1.1 Binocular Visual Examination

Nineteen (19) of the 67 total fuel assemblies from core I that were also in core III were examined during core unloading to assess their condition. Examinations were performed on 15 of the 62 region 3 assemblies, both region 1 assemblies and one of the three region 2 assemblies (see attached Table 1 for specific assemblies).

1.2 TV Visual Examinations

1.2.1 Baffle Joint Fuel Assemblies

Twelve (12) fuel assemblies occupying exterior or exterior/interior baffle joint locations in cycle 3 were examined for evidence of baffle jetting flow damage (see attached Table 1 for specific assemblies).

1.2.2 EPRI Program Fuel Assemblies

Fourteen (14) fuel assemblies were examined (one region 1 and one region 2 not in core III; five region 3, five region 4 and two region 5 that were in core III) at high and/or low magnification and pre-and post- crud sampling to assess their condition and crud distribution (see attached Table 1 for specific assemblies).

1.2.3 Other Fuel Assemblies

Two (2) other assemblies (one region 3 and one region 5) were examined on all four faces because of a report of high load indications during their removal from the core (see attached Table 1 for specific assemblies). In addition, all of the fuel assemblies from core I that were also in core III were visually examined routinely with the underwater TV stations set up in the Containment and Fuel Building upender areas.

1.3 Crud Sampling

Selected rods from twelve (12) fuel assemblies (one region 1 and one region 2 not in core III; one region 2, four region 3, three region 4 and two region 5 that were in core III) were sampled to determine crud thickness and chemical and radiochemical composition (see attached Table 1 for specific assemblies).

1.4 Zirc Oxide Thickness Measurements

Selected rods from eight (8) fuel assemblies (one region 1 and one region 2 not in core III; three region 3, two region 4 and one region 5) were measured to assess the degree of zirc clad waterside corrosion (see attached Table 1 for specific assemblies).

1.5 Assembly Length Measurements

Cursory length measurements were made in four region 3 assemblies from core III (see attached Table 1 for specific assemblies).

1.6 Assembly Grid Width Measurements

The bottom (No. 1) grid of one region 1 assembly (A41) not in core III was measured to assess the accuracy capability of the Television Visual Measuring System when used to measure grid width.

1.7 Removable Rod Examinations from C-44

Eight (8) selected removable rods from removable rod assembly C-44 were removed, examined and returned to the same locations after examination. Specific examinations included:

a) Breakaway and withdrawal force measurements to assess grid spring force relaxation.

b) Grid cell friction force measurements in four selected cells to further quantify grid spring force relaxation.

c) High magnification TV visual examinations before and after cleaning to assess rod integrity, appearance and crud distribution.

d) Profilimetry, after cleaning to assess clad creepdown.

2.0 Examination Results

Preliminary results of the examinations based upon onsite observations are as follows:

2.1 Of the 12 baffle assemblies examined only one rod, rod No. 3 on face 2, between grids 1 and 2 from the bottom of assembly E43, which occupied core baffle position B-4 in cycle 3, showed evidence of being affected by baffle joint jet flow. This rod was bowed to the left toward rod No. 2 with a channel closure between rods 2 and 3 which might be $\geq$ 50%. The rod was not bowed anywhere else along its length nor had it grown longer than adjacent rods. The rod did not appear damaged or fretted, and continued use of the assembly should

pose no problems. The three solid stainless steel rods in assemblies E15 (face 2, rods 14, 15, 16) and E05 (face 1, rods 2, 3, 4), which occupied baffle positions B-12 and M-2 respectively in cycle 3, where baffle joint flow induced damage was found in cycle 2, were examined in detail and found to be in excellent condition, almost indistinguishable from adjacent zirc rods except for their greater length and modified end plugs. Assembly E05 was also examined thoroughly on all four faces because of reportedly higher than normal loads during removal from the core. However, no anomalies or atypical appearance was observed during the examination.

2.2 Assembly C03 was also examined in detail because of reportedly higher than normal loads during removal from the core. This assembly also showed no anomalies or atypical appearance.

2.3 Rod bow on all of the assemblies examined was generally minor. Most channel closures observed were less than 50% of nominal and no two rods were touching.

2.4 Fuel assembly structural integrity was excellent for all assemblies. There was no evidence of fuel assembly bow or twist, grid, thimble tube, rod or nozzle damage and no depressed nozzle holddown springs.

2.5 Rod growth was apparent in some region 3 assemblies where growth had occurred toward the bottom nozzle (non-uniform bottom gaps, fairly uniform top gaps); however, there was still significant gap space between rod and bottom plate.

2.6 A qualitive assessment of crud deposition is as follows:

Region 5 F/A's: Uniformly lustrous, suggesting little or no crud deposition during cycle 3.

Region 4 F/A's: Uniformly light crud over the assemblies.

Region 3, 2 and 1 F/A's: Moderate above grid 6, light with some moderate areas below grid 6.

2.7 Region 3 fuel assembly growth, based upon the cursory measurement performed, was approximately 100 mils which is not abnormal.

2.8 An assessment of oxide thickness indicates none or very light oxide ranging from 0 to 3 microns on one region 5, 0 to 5 microns on two region 4, and 0 to 10 microns on three region 3 fuel assemblies (more precise values will require detailed analysis of the data).

2.9 Examination and measurement of the eight (8) removable fuel rods from C-44 indicates that they are in excellent condition.

There were no anomalies observed, and crud was moderate to light from top to bottom, breakaway and withdrawal forces were typical for three cycle assemblies averaging approximately 30 lbs and 5 lbs respectively, rod clad creepdown obtained from the profilametry data was also typical averaging about 2 mils. Again, these results are based upon cursory review and more precise values will require detailed analysis of the data.

TABLE 1

TROJAN EOC-3 FUEL ASSEMBLY EXAMINATIONS

EPRI EXAMS

F/A No.	Baffle Side TV (1)	Binocular Visual (2)	Low MAG TV (3)	High MAG TV (4)	Crud Sample	Post Crud TV(5)	Oxide Meas.	F/A Length	F/A Grid Width	Other TV(18)
A24		X								
A37		X								
A41(6)			X(7)		X	X	X		X(10)	
B04		X			X					
B30(8)			X(9)		X	X	X			
C01		X								
C03										X(3)(11)
C06			X					X		
C09		X								
C10		X								
C12		X								
C20		X								
C23		X								
C24		X								
C26			X		X	X	X	X		
C27		X								
C31		X	X	X	X	X	X			
C32		X								
C44(12)			X	X	X	X	X	X		
C46		X								
C48		X								
C49		X	X					X		
C57		X			X					
C61		X								
C64		X								
D32			X		X	X	X			
D33			X		X					
D41			X		X	X	X			
D49			X							
D50			X							
E02	X(14)									
E04	X(13)									
E05	X(13)(15)									X(3)(11)
E08	X(13)									
E12	X(14)									
E15	X(13)(16)									
E29	X(13)									
E35			X		X					
E43	X(13)(17)									
E47	X(13)									
E51	X(13)									
E53	X(14)									
E56	X(14)									
E60			X		X	X	X			

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FOOTNOTES TO TABLE 1

(1) Four rods full screen, sides(s) next to baffle only

(2) All four faces examined in SFP during core unloading

(3) All four faces examined, two passes per face, 9 rods full screen

(4) Left to right across each face above and below each grid and at grid mid-points, 3 rods full screen

(5) During oxide thickness measurements, rod being measured only

(6) Assembly discharges at EOC-1

(7) Exam of rods sampled for crud at EOC-1 only

(8) Assembly discharged at EOC-2

(9) Exam of rods sampled for crud at EOC-2 only

(10) All four faces of grid 1 only

(11) High load upon removal from core -- no damage found

(12) Removable rod assembly

(13) F/A next to exterior baffle joint in cycle 3 (one face next to baffle)

(14) F/A next to exterior and interior baffle joint in cycle 3 (two faces next to baffle with one of these faces next to an exterior and interior joint)

(15) Next to joint where assembly damage was found in cycle 2, rods 2, 3, 4, face 1, solid stainless steel

(16) Next to joint where assembly damage was found in cycle 2, rods 14, 15, 16, face 2 solid stainless steel

(17) Rod No. 3, face 2 (next to baffle joint), between grids 1 and 2 bowed left

(18) All of the fuel assemblies from core I that were also in core III were visually examined routinely with the underwater TV stations set up in the Containment and Fuel Building upender areas

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TABLE 2

TROJAN EOC-3 REMOVABLE FUEL ROD EXAMINATIONS

(From Removable Rod Assembly C-44)

F/R No.	LOC. IN C-44(1)	Breakaway/ Withdrawal Force	Grid Cell Friction Force	High MAG.TV	Profilometry(2)(3)
917	J10	X	X	X	X
918	H8	X	X	X	X
922	I5	X		X	X
924	E9	X	X	X	X
925	J8	X		X	X
930	H10	X		X	X
937	M9	X	X	X	X
940	I13	X		X	X

(1) All rods were returned to the same location after examination

(2) All rods were brush cleaned prior to profilometry to remove loose crud

(3) All rods were also high MAG TV examined during profilometry (after cleaning)