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October 28, 1986
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Office of Nuclear Reactor Regulation
Attn: J. F. Stolz, Director
PWR Projects Directorate No. 6
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Stolz:

Three Mile Island Nuclear Station Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Laboratory Analysis of Pulled Tubes

By letter dated February 19, 1986, GPU Nuclear Corporation informed you of our intention to remove portions of up to three tubes from the TMI-1 OTSG during the next refueling outage, designated 6R, as part of our ongoing evaluation of the TMI-1 OTSG's. On September 22, members of my staff met with representatives of the NRC to discuss our program for evaluation of the OTSG's during 6R, which includes the laboratory analysis of pulled tubes as well as eddy current examination.

The 6R eddy current inspection will be in accordance with Technical Specification 4.19 as augmented by the inspection plan outlined in TR-008, Rev. 3 "Assessment of TMI-1 Plant Safety for Return to Service After Steam Generator Repair", which was transmitted by letter dated September 14, 1983. We believe that the results of the eddy current examination will reconfirm our previous conclusions that primary side corrosion is not an ongoing phenomenon.

The results of the laboratory analysis are expected to confirm our previous conclusions with respect to the corrosion morphology; however, we do not expect that this laboratory analyses will differentiate between previous IGA/IGSAC or any newly formed IGA/IGSAC. The analysis will also provide further confirmation of the adequacy of the eddy current program. We have established the objectives of the laboratory analysis as: (1) correlation of field eddy current data with destructive analysis results; (2) further evaluation of eddy current sensitivity and accuracy by incorporation of the results into the process qualification data base; (3) determination of the extent and type of degradation in each tube; and (4) characterization of surface film oxide by microanalytical technique.

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In determining candidate tubes for analyses, GPUN identified tubes in one generator, OTSG A, which have exhibited indications above the fifteenth support plate during previous eddy current examinations. This initial screening identified nine candidate tubes. Historical data on these tubes from 1986 and 1984 eddy current examinations, as well as 1982 results, where available, are provided in the attached Table 1. GPUN believes that analysis of three tubes will provide sufficient information to confirm our previous evaluations, while limiting occupational exposures associated with the removal process and minimizing compromise to the generator associated with the removal of good tubes.

In determining the best candidates for analysis, GPUN used the following evaluation criteria:

1. IGA potential based on multiple indications in close proximity

2. "Grain dropout", as suggested by a decrease in throughwall with a corresponding increase in signal amplitude.

3. Relatively strong signals (voltage) and throughwall extent approaching the plugging limit.

4. Removal capability, based on dome height which dictates the maximum length of tube segment which can be removed without cutting. This criterion has ramifications in ALARA considerations as well as sample adequacy.

5. Indications detected by .540 Standard Differential probe but unconfirmed by 8 x 1 absolute probe.

Each of the nine candidates was evaluated in terms of these criteria, and ranked accordingly, as shown in Table 2. While none of the tubes individually satisfies all five selection criteria, the three selected tubes (A-141-3, A-8-45, A-35-83) do, in conjunction with one another.

These nine candidate tubes will undergo in-situ eddy current examination at the beginning of the outage, and the comparative ranking is subject to change based on this inspection. Also, since the removal of kinetically expanded tubes is a relatively new process, tubes other than the three preselected tubes may be removed if difficulties are experienced during the removal process.

GPUN also intends to perform a burst test on a portion of a tube removed from service to demonstrate the strength of the tube.

GPUN believes that our tube selection process and program for laboratory analysis are in accordance with the NRC comments provided by letter dated May 2, 1986.

Sincerely,

R. F. Wilson
Vice President
Technical Functions

RFW/SK/pa(4081f)

cc: R. Conte
J. Thoma

TABLE 1
OTSG A
TUBE PULL CANDIDATES FOR OUTAGE 6R

Row	Tube	Dome Height	Indication Axial Location	1986 .540 (Re-eval) %	V	1984 .540 (Re-eval) %	V	1982 .540 (Re-eval) %	V	1986 8x1 (Re-eval) Coils	Volts	1984 8x1 (Re-eval) Coils	Volts	1982 8x1 (Re-eval) Coils	Volts
8	45	24.6	15+39.5	26	1.7	26	1.8	S/N	.5	1	.9	1	.6	NA	
			15+36.8	33	.8	36	.9	NDD		2	.8	1	.9	NA	
			15+35.8	23	1.1	30	1.0	NDD		1	.5	1	.6	NA	
			15+33.5	<20	.7	S/N	.6	NDD		1	.2	1	.4	NA	
			15+30.7	<20	.7	26	.7	NDD		NDD		1	.5	NA	
			15+30.1	<20	.6	<20	.8	NDD		NDD		1	.4	NA	
18	84	15.8	15+41.9	23	1.3	23	1.8	S/N	.7	1	1.5	1 (1)	.3	NA	
			15+40.8	33	1.0	33	1.1	S/N	.4	1	.4	1	.5	NA	
			15+39.7	S/N	.6	NDD		S/N	.3	NDD		1	.5	NA	
			15+38.2	23	1.5	33	1.6	S/N	.5	1	1.3	1	.5	NA	
			15+36.7	S/N	.5	S/N	.7	S/N	.2	NDD		NDD		NA	
			15+35.9	26	.9	20	1.2	S/N	.4	1	.2	1	.4	NA	
			15+34.5	23	1.2	30	1.4	S/N	.5	1	.6	1	.6	NA	
			15+33.9	<20	.9	26	1.0	S/N	.3	NDD		NDD		NA	
			15+33.6	S/N	.5	NDD		NDD		NDD		NDD		NA	
			15+33.1	<20	1.3	30	1.4	S/N	.6	1	.3	1	.4	NA	
			15+32.6	<20	1.1	<20	1.2	S/N	.6	1	.5	1	.5	NA	
			15+31.7	<20	1.1	<20	1.4	S/N	.6	1	.2	1	.4	NA	
			15+31.3	<20	1.0	<20	1.3	S/N	.5	1	.6	1	.3	NA	

S/N Low Signal to Noise Ratio (< 3:1)
NDD No Detectable Discontinuities
IDC ID Chatter

TABLE 1
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TUBE PULL CANDIDATES FOR OUTAGE 6R

Row	Tube	Dome Height	Indication Axial Location	1986 .540 (Re-eval) %	1986 .540 (Re-eval) V	1984 .540 (Re-eval) %	1984 .540 (Re-eval) V	1982 .540 (Re-eval) %	1982 .540 (Re-eval) V	1986 8x1 (Re-eval) Coils	1986 8x1 (Re-eval) Volts	1984 8x1 (Re-eval) Coils	1984 8x1 (Re-eval) Volts	1982 8x1 (Re-eval) Coils	1982 8x1 (Re-eval) Volts
141	3	16.8	15+39.9	S/N	.6	S/N	.6	NDD		NDD		1	.2	NA	
			15+37.6	< 20	.7	< 20	.8	S/N	.4	NDD		1	.2	NA	
			15+36.9	26	1.0	23	1.0	S/N	.4	1	.3	1	.6	NA	
			15+35.8	33	1.0	36	1.1	S/N	.4	1	.5	1	.5	NA	
			15+34.3	30	1.6	33	1.7	NDD		1	.7	1	.7	NA	
			15+32.6	26	1.1	26	1.3	S/N	.3	NDD		1	.5	NA	
			15+32.1	S/N	.7	S/N	.7	NDD		1	.2	1	.4	NA	
			15+30.4	30	1.3	33	1.4	S/N	.4	1	(1) .4	1	.5	NA	
			15+27.6	< 20	.8	S/N	.8	S/N	.4	1	.4	NDD		NA	
			15+26.7	NDD		S/N	.6	NDD		NDD		NDD		NA	
			15+25.3	26	1.1	26	1.1	NDD		NDD		NDD		NA	
			15+22.7	S/N	.7	S/N	.8	NDD		1	.3	1	.4	NA	
			15+15.3	S/N	.8	S/N	.7	NDD		1	.3	1	.3	NA	
			15+15.0	S/N	.9	S/N	.9	NDD		1	.4	1	.4	NA	
			15+07.8	23	1.2	23	1.3	S/N	.5	1	.4	1	.7	NA	
			15+07.5	< 20	.8	23	.8	S/N	.3	1	.4	1	.5	NA	
			15+04.5	S/N	.7	S/N	.6	S/N	.2	1	.2	NDD		NA	

(1) 2-1 coil indications at this evaluation, not adjacent coils.

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Row	Tube	Dome Height	Indication Axial Location	1986 .540 (Re-eval) %	1986 .540 (Re-eval) V	1984 .540 (Re-eval) %	1984 .540 (Re-eval) V	1982 .540 (Re-eval) %	1982 .540 (Re-eval) V	1986 8x1 (Re-eval) Coils	1986 8x1 (Re-eval) Volts	1984 8x1 (Re-eval) Coils	1984 8x1 (Re-eval) Volts	1982 8x1 (Re-eval) Coils	1982 8x1 (Re-eval) Volts
5	3	15.8	15+43.9	23	1.5	23	1.5		NDD	1	.4	1	.4		N/A
			15+44.6	36	2.4	36	2.2	S/N	.3	1	.5	1	.3		N/A
60	126	21.6	15+02.0	DNG	.6	DNG	.6	DNG	.6		NDD		NDD		N/A
			15+12.5	S/N	.5	S/N	.5	S/N	.3		NDD		NDD		N/A
			15+13.5	S/N	.6	<20	.7	S/N	.4	1	.2	1	.2		N/A
107	120	14.4	15+44.8	<20	1.6	26	1.4	S/N	.4	1	.4	1	.2		N/A
107	2	17.2	15+33.4	<20	1.6	30	1.5	S/N	.3	1	.5	1	.8		N/A
			15+37.5	<20	1.4	20	1.4	S/N	.5	1	.4	1	.1		N/A

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Row	Tube	Dome Height	Indication Axial Location	1986 .540 (Re-eval) %	V	1984 .540 (Re-eval) %	V	1982 .540 (Re-eval) %	V	1986 8x1 (Re-eval) Coils	Volts	1984 8x1 (Re-eval) Coils	Volts	1982 8x1 (Re-eval) Coils	Volts
35	83	42.9	15+35.6	46	1.4	46	1.1	NDD		1	.6	1	.5	NA	
103	121	20.6	15+44.3	33	1.0	43	1.1	NDD		1	.8	1	1.0	NA	
			15+43.9	36	2.1	43	2.1	S/N	.7	1	1.1	1	1.2	NA	

TABLE 2

COMPARATIVE RANKING*
OTSG A
TUBE PULL CANDIDATES FOR OUTAGE 6R

TUBE NO.	IGA/MULTIPLE INDICATIONS	GRAIN DROPOUT	STRONG SIGNAL	EASE OF REMOVAL	SCREENED INDICATION/ UNCONFIRMED
A-141-3	Yes	Yes	Moderate	No	Yes
A-8-45	Yes	Possible	Moderate	Moderate	Possible
A-18-84	Yes	Possible	No	No	Yes
A-35-83	No	No	Yes	Yes	No
A-103-121	Moderate	Possible	No	No	No
A-107-2	Moderate	Yes	No	No	No
A-60-126	Yes	No	No	Moderate	No
A-107-120	No	Yes	No	No	No
A-5-3	Moderate	No	No	No	No

*In ranking the candidates, a "Yes" was assigned 2 points, a "No" was assigned 0 points, and other responses were assigned 1 point.