NRC FORM 366 (7-77)

U. S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

CONTROL BLOCK: [| | | | | |] (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 | P A T M I 1 (2) LICENSEE CODE | 0 0 - 0 0 0 0 0 - 0 0 (3) LICENSE NUMBER | 4 1 1 1 1 (4) LICENSE TYPE | (5) CAT

CON'T 01 | REPORT SOURCE L (6) | 0 5 0 0 0 2 8 9 (7) DOCKET NUMBER | 1 0 2 5 8 3 (8) EVENT DATE | 0 1 0 4 8 4 (9) REPORT DATE

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

02 While is cold shutdown, cracking was observed on the molded rubber seat ring of
03 containment purge isolation valve AH-V1B. The valve seats did not fail to perform
04 their containment isolation function. Public health and safety remain unaffected.
05 Not reportable per Technical Specifications.
06
07
08

09	SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP. SUBCODE	VALVE SUBCODE
	S C (11)	B (12)	B (13)	V A L V E X (14)	B (15)	D (16)

(17) LER/RO REPORT NUMBER	EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
	8 3	—	0 4 1	/	9 9	X	—	0

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS (22)	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
X (18)	A (19)	Z (20)	Z (21)	0 0 0 0	Y (23)	Y (24)	A (25)	P 3 4 0 (26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

10 Root cause was that there was insufficient adhesion between the plies of the seat
11 material. The cracked seat segment was replaced in AH-V1B. Monthly inspections are
12 now being performed (normal frequency is yearly). The seats of all four purge valves
13 will be replaced and leak tested when new material is received from Vendor.
14

15	FACILITY STATUS	% POWER	OTHER STATUS (30)	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION (32)
	X (28)	0 0 0 (29)	NRC Order	B (31)	Routine Inspection

16	ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY (35)	LOCATION OF RELEASE (36)
	Z (33)	Z (34)	N/A	N/A

PERSONNEL EXPOSURES

17	NUMBER	TYPE	DESCRIPTION (39)
	0 0 0 (37)	Z (38)	N/A

PERSONNEL INJURIES

18	NUMBER	DESCRIPTION (41)
	0 0 0 (40)	N/A

LOSS OF OR DAMAGE TO FACILITY (43)

19	TYPE	DESCRIPTION
	Z (42)	N/A

8402030356 840104
PDR ADOCK 05000289
S PDR

IE22

PUBLICITY

20	ISSUED	DESCRIPTION (45)	NRC USE ONLY
	N (44)	N/A	

NAME OF PREPARER C. J. Stephenson PHONE: (717) 948-8554

GPO 917-926

LER 83-041

99X SPECIAL LER REPORT

CRACKING OF RB PURGE VALVE SEATS

I. CURRENT ACTIVITIES AT THE TIME OF THE OCCURRENCE

TMI Unit I was in long term cold shutdown pending approval to operate.

II. CIRCUMSTANCES LEADING TO THE OCCURRENCE

Refer to Plant Engineering Letter 3310-83-243 attached.

III. DESCRIPTION

In August 1983, cracking was found on the rubber seat rings of AH-V1B. A segment of the seat ring was sent to the valve vendor (Pratt Co.) for analysis. The response to GPUN on October 25, 1983, was that the seat material delaminated between plies. The vendor could not determine if the seat material would have cracked to such an extent in usage that it would have leaked. If such progressive damage were to occur it would have been as a result of repeated cycling of the valve. It would not occur while the valve was maintained closed.

Leakage problems on purge valve seats at TMI have never been attributable to seat aging or cracking. The seats have, however, been replaced several times due to visible damage.

The vendor (Pratt Co.) notified Mr. Owen Merill, NRC Operations Officer, per telecon on October 25, 1983 that he considered the seat material delamination 10 CFR 21 reportable occurrence. Then the vendor followed up with a written report to Mr. James Keppler, Director - Office of Inspection and Enforcement on October 28, 1983 (attached copy).

IV. RESULTANT EVENTS

The TMI Unit 1 valve seats did not fail to perform their containment isolation function. Nor would such failure be expected soon even if the faulty seats were to remain installed. There was, therefore, no threat to the health and safety of the public due to the cracking of the seat material.

V. PREVIOUS EVENTS OF A SIMILAR NATURE

See attached letter 3310-83-243 from GPUN to Pratt Co. Similar cracking occurred on the previously installed seats and they were replaced as a result.

VI. ROOT CAUSE

Per the valve vendor (Pratt Co.) and the seat material manufacturer (Buffalo Weaving and Belting) there was insufficient adhesion between the plies of the seat material.

VII. IMMEDIATE CORRECTIVE ACTION

The cracked seat segment was replaced in AH-V1B. Further immediate corrective action was not considered necessary or desirable pending the receipt of new

VII. (Continued)

seat material. Monthly inspections are being performed to verify integrity of the seat material (normal surveillence frequency is yearly). The vendor is developing and testing an improved seat fabrication process at this time.

VIII. LONG TERM CORRECTIVE ACTION

The seats in all four purge valves will be replaced and leak tested when new material is received from the vendor. Future inspections for this type of cracking will not be necessary provided that the new material is not made of separate plies.

IX. COMPONENT FAILURE DATA

48" - Pratt Model R1A Butterfly Valve with Limitorque Actuator
Pratt Order No. 7-3094 (valve)
GPUN P.O. 111726 (faulty molded ethylene propylene seat material)

GPU Nuclear

GPU Nuclear
P.O. Box 480
Route 441 South
Middletown, Pennsylvania 17057
717 948-8300-8144
TELEX 842-386

3310-83-243

September 13, 1983

Henry Pratt Company
401 South Highland Avenue
Aurora, Illinois 60507

Attn: Harold E. Parks
Supervisor, Field Service

Subject: Reactor Building Purge Butterfly Valves

Dear Mr. Parks:

Our 48" Model R-1-A Pratt butterfly valves in Reactor Building Purge service experienced cracking of the ethylene propylene seats less than 18 months after they were installed in May 1981. Samples of the cracked material were analyzed by Pratt Company with the determination that the vendor who molded the seats used excessive mold release agent. It was also determined that the cracks were not likely to propagate and that the seats would not therefore have been expected to fail in use.

Pratt then supplied new seat material for all four purge valves without charge. Now we have discovered cracking on the newest material after about six months in service.

Following is a history of the purge valve seat problems:

(Buna N) 1. 1968 - (AH-V1A/1B/1C/1D) - Valves purchased with Buna N (Hycar) rubber seats. Frequent small seat leaks occurred and were very difficult to eliminate.

(Extruded EPT) 2. March 1978 - (AH-V1B) - Replaced Buna N rubber seats with Extruded Ethylene Propylene (P.O. 27086) per Pratt Company recommendation. Ethylene Propylene was considered better for nuclear service. We had great difficulty expanding the new seats sufficiently to obtain a reliable leak tight seal. A number of segment screw heads were damaged during the effort. Area temperature was approximately 60°F during installation. Extruded EPT material was approximately .036 inch thinner than original Buna N material thereby giving a significantly larger gap prior to tightening the seats.

- continued -

(Buna N) 3. June 1979 - (AH-V1A/1C/1D) - Fine circumferential cracking was discovered in the area where the disc seals on the Buna N seat. This cracking did not affect valve seat integrity or leakage.

(Extruded EPT) 4. July 1980 - (AH-V1D) - Vendor tech. representative assisted in installing Extruded EPT seat material (P.O. 59324). He experienced no problem tightening the seats though plant maintenance had earlier failed to be able to do so when area temperature was approximately 70°F. The vendor representative suggested we consider shimming under the seat segments to close up the large starting gap and make tightening easier. Shimming was not done at this time. Area temperature was 85°F when the vendor installed the seat in AH-V1D.

(Molded EPT #1) 5. October 1980 - Purchased Molded EPT seat material (P.O. 87377). Pratt Company says molded material has more consistent dimensions than extruded material. Seats were shipped directly from Buffalo Weaving and Belting to TMI.

(Molded EPT #1) 6. May 1981 - (AH-V1A/1B/1C/1D) - Installed Molded EPT seats in all four purge valves. Still had difficulty in tightening seats to close gap. Experimented with use of .030 inch thick EPT electrical tape as a shim under the seat segments in AH-V1A. This allowed relatively easy tightening to obtain leak tightness.

(Molded EPT #1) 7. November 1982 - (AH-V1D) - Discovered long/deep circumferential cracking along the narrowed inner corner of the anvil seat cross-section. Cracking was not only on the side which the disc hits in closing. Over-tightening was not suspected since we tightened no more than necessary to obtain consistent leak tightness. No cracking was found on AH-V1B seats. AH-V1C and AH-V1A were not checked at this time.

(Molded EPT #1) 8. January 1983 - (AH-V1D) - The Pratt Company Chemist inspected cracked seat material which was returned by GPUN. He determined that the molding process used excessive mold release agent. Pratt then supplied new Molded EPT seat material for all four valves free of charge. This was shipped directly from Buffalo Weaving and Belting to TMI. (P.O. 111726)

(Molded EPT #2)

(Molded EPT #2) 9. March 1983 - (AH-V1A/1B/1C/1D) - New Molded EPT seal material installed in all four valves (P.O. 111726). Used one .030 inch layer of EPT electrical tape under the seat segments to close up the large starting gap.

(Molded EPT #2) 10. August 1983 - (AH-V1B) - Long/deep crack found on Molded EPT seat

segment at same location on the cross-section as in November 1982. Other valve seats were not checked at this time.

Although the seat cracking is not apparently related to the many recurring leakage problems we have experienced, it is, nevertheless, cause for concern. We request your continued assistance in resolving the issue. Per your request we are shipping a cracked seat segment (from AH-V1B) back to your attention.

Please notify us as-soon-as-possible of your findings and recommended action.

Sincerely,

Ronald L. Summers
Engineer Senior I, TMI-1

RLS:gh
Attachments ( )
cc: R. O. Bailey, Lead Mechanical Engineer, TMI-1 DOB
J. J. Colitz, Plant Engineering Director, TMI-1
J. H. Correa, Pressure Components Engineer, Tech. Functions, Parsippany
F. S. Giacobbe, Manager - Materials Engr./Fail. Anal., Tech. Functions, Parsippany
M. A. Nelson, Engineer Senior II, TMI-1
T. Richter, Pressure Components Manager, Tech. Functions, Parsippany
M. J. Ross, Manager, Plant Operations, TMI-1
D. M. Shovlin, Manager, Plant Maintenance, TMI-1
R. J. Toole, Operations and Maintenance Director, TMI-1
R. C. Troutman, Planning and Scheduling Manager, Maintenance, TMI-1
R. L. Summers Writer's File
CARIRS

VALVE SEAT INSPECTION

AH-VI D (outside supply valve)

DATE 11/8/82

BY

SEATS PURCHASED June 1980 PO# 87177/87345

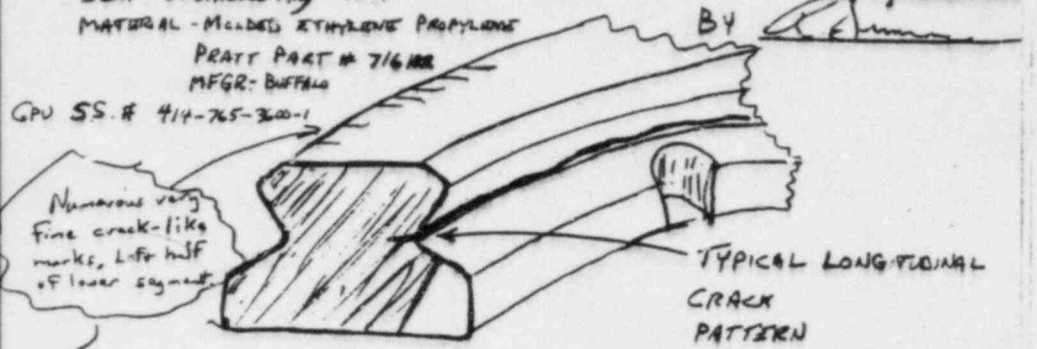
SEAT INSTALLED May 1981

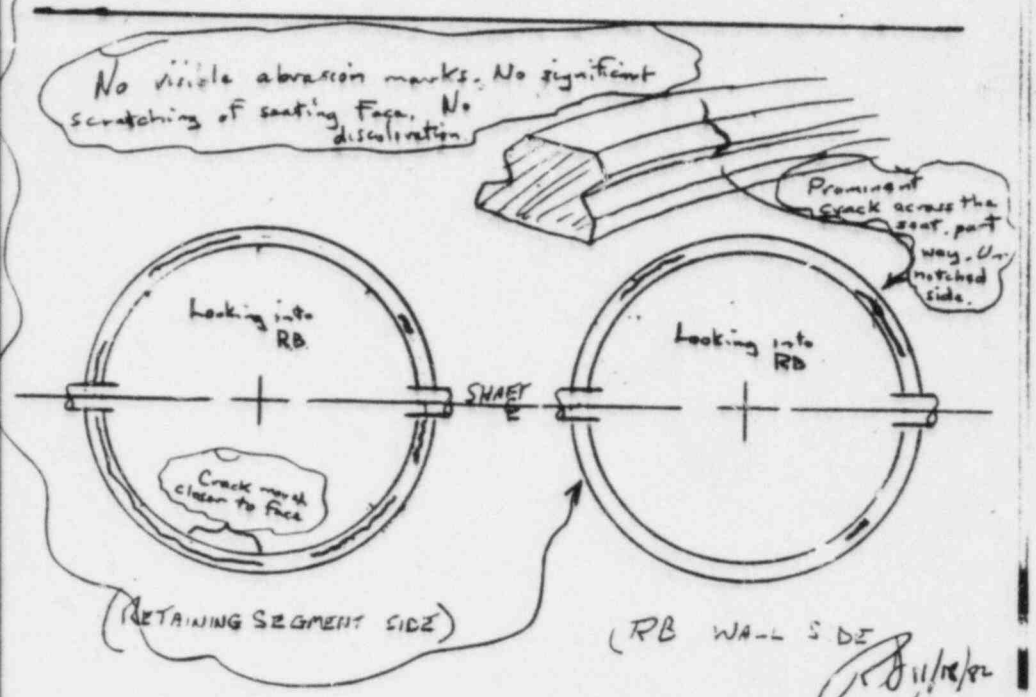
MATERIAL - MOLDED ETHYLENE PROPYLENE

PRATT PART # 7/6 HRR

MFGR: BUFFALO

GPU SS. # 414-765-300-1





11/8/82

VALVE SEAT INSPECTION

AH-VIB (inside exhaust valve)

DATE August 1983

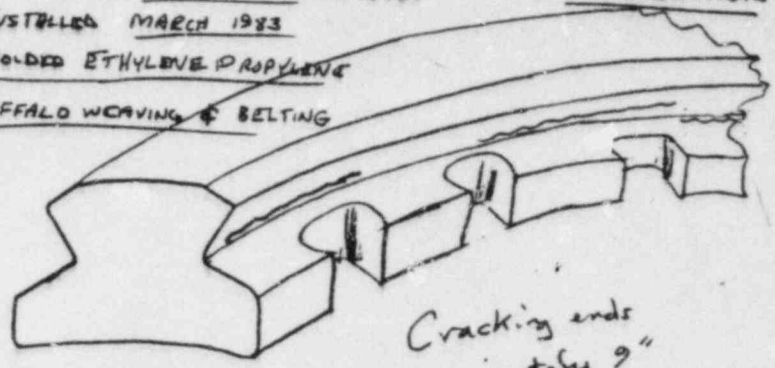
BY R.L. Summers

SEATS PURCHASED JAN 1983 - PO 111726

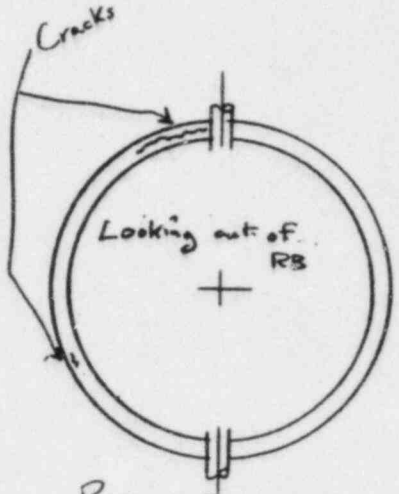
INSTALLED MARCH 1983

MAT'L - MOLDED ETHYLENE PROPYLENE

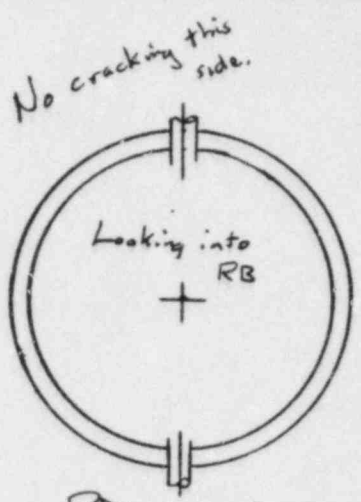
MFGR - BUFFALO WEAVING & BELTING



Cracking ends approximately 9" from end. One 3/8" long crack approx. 24" from other end



RETAINING SEGMENT SIDE



RB. WALL SIDE

9/13/83

TELEPHONE 312-844-6000 · TELEX 72-0434

PRATT

HENRY PRATT COMPANY

creative engineering for fluid systems

401 SOUTH HIGHLAND AVENUE · AURORA, ILLINOIS 60507

October 28, 1983

Nuclear Regulatory Commission
Region 3 Office
799 Roosevelt Road
Glen Ellyn, IL 60137

Attention: Mr. James G. Keppler, Director
Office of Inspection and Enforcement

Subject: Reporting under 10CFR, Part 21, Section 206
of Energy Reorganization Act of 1974

Dear Mr. Kepler:

Subsequent to a telephone report made to Mr. Owen Merrill, NRC Operations Officer, Bethesda (202-951-0550) on October 25, 1983 at 4:58 p.m. and Mr. Pelke of your office on October 26, 1983 at 8:40 a.m. by the writer, this letter is presented in triplicate, with the following:

Project Involved:

GPU Nuclear
Three Mile Island Nuclear Plant - Unit #1

Basic Component:

48"-R1A Containment Purge Valve (Tag No. AH-V1B)

Commercial Grade Item Description:

Replacement R1A rubber valve seat furnished for above equipment. The rubber seat material was manufactured by Buffalo Weaving and Belting Co., 260 Chandler St., Buffalo, NY 14207, during February 1983 for the Henry Pratt Company and supplied to TMI-1.

Equipment Identification:

Valve originally furnished on Pratt Order No. 7-3094, Metropolitan Edison P.O. 96692 during 1971.

Date on which the information on potential defect was obtained:

Received verbal report from Buffalo Weaving and Belting Company regarding seat cracking evaluation on October 24, 1983, and written report on October 25, 1983. Findings of the concurrent Pratt and Buffalo Weaving and Belting evaluations were verbally reported to TMI-1, R. O. Barley, Lead Mechanical Engineer on October 25, 1983.

PRATT

How potential defect was detected:

TMI-1 found cracks on one side of one replacement R1A-#2 anvil seat at the area of the reduced "V" section after they were in service for about six months during a routine inspection. A portion of the valve seat was returned to Pratt by TMI-1 for evaluation of the cracks. Pratt sectioned the seat portion through the crack and forwarded a section to the manufacturer of the molded rubber seat, Buffalo Weaving and Belting Co. for their concurrent evaluation.

Nature of potential defect and safety hazard:

The valve seat did not fail or leak in service. Evaluation of the returned seat portion showed it could be caused to partially delaminate under testing due to insufficient adhesion between two plys of horizontally applied 1/4" preform sheet. This seat material had been furnished as replacement because previously one valve seat had exhibited similar cracking after 18 months in service. Evaluation of the previously supplied seat material found that the cracks could not be propagated during evaluation or caused to delaminate and was not considered to be a potential defect.

It is not known whether the portion of the valve seat which was delaminated by pulling it apart during evaluation testing could have failed with continued service; however, the possibility exists that a portion of the valve seat if separated could leak or be cut off by the valve disc. We do not have the information necessary to determine the potential safety hazard this would present. If the valves were left in the closed position, no possibility of seat failure would be expected.

Corrective Action:

Buffalo Weaving and Belting will produce molded EPT (EPDM) anvil seats using an extruded preform in the future. This would be expected to preclude the possibility of delamination between plys as no plys would be used. Samples are currently being produced for evaluation prior to supplying replacements. Such replacement valve seats will be furnished to TMI-1.

Other utilities receiving a copy of this letter are instructed to examine valve seats at next scheduled inspection and to replace the seats if any indication of this condition is found.

Number and location of Model R1A valves used in Nuclear Containment Service:

The following includes such valves to the best of our knowledge:

PRATT

Model RlA:

Utility	Plant Location	Valve Quant. & Size	Pratt Order #
Commonwealth Edison	Zion 1&2	8-42"	7-3794-1
Rochester Gas & Electric	Ginna 1	4-48"	7-2179-1
		8-42"	7-2179-2&3
Metropolitan Edison	TMI-1	4-48"	7-3094-1
Florida Power & Light	Turkey Point 3&4	4-48"	7-3071
		4-54"	7-3071
Duke Power	Oconee	18-48"	7-2955
			7-2956

Additional Comments:

We have also listed below utilities using a later model offset anvil seat purge valve identified as NRlA. A sample of the latest NRlA seat material produced in 1980 by Buffalo Weaving and Belting was examined and found to show no evidence of this condition. Additionally no reported incidents regarding defects have been received from utilities with NRlA valves.

Model NRlA:

Utility	Plant Location	Valve Quant. & Size	Pratt Order #
Metropolitan Edison	TMI-2	8-36"	7-4112
Arkansas Power & Light	Arkansas Nuclear 1	4-54"	7-3661
Wisconsin Public Svc.	Kewaunee 1&2	4-36"	7-4019
Northern States Power	Prairie Island 1&2	8-36"	7-4091, 4092
Baltimore Gas & Electric	Calvert Cliffs 1&2	8-48"	7-4054
Florida Power & Light	Crystal River	4-48"	7-3915
Northeast Utilities	Millstone	1-30"	D-0054-4
		4-42"	D-0054-3
Florida Power & Light	St. Lucie #2	2-30"	D-0096-3
Consumers Power	Midland 1&2	8-48"	D-0097-1&2
Tennessee Valley Authority	Sequoyah 1&2	8-26"	D-0012
Toledo Edison	Davis-Besse	4-48"	D-0004
Alabama Power	Farley 1&2	8-48"	D-000647
Florida Power & Light	St. Lucie 2	11-48"	D-0066
Florida Power & Light	St. Lucie 1	6-48"	7-4491

Very truly yours,

A. K. Wilson

A. K. Wilson
Vice President
Manager of Engineering

AKW/np
CC: F. Schwenk
R. A. Amundsen
G. A. Kurkjian
B. R. Cummins
Buffalo Weaving & Belting

Pratt Industries

PRATT

Additional CC: To the attention of Quality Assurance Manager
Commonwealth Edison/Zion Nuclear Plant 1&2
Rochester Gas & Electric/Ginna Nuclear Station 1
Metropolitan Edison/Three Mile Island Nuclear Plant 1
Florida Power & Light/Turkey Point 3&4
Duke Power Co./Oconee Nuclear Plant
Metropolitan Edison/Three Mile Island Nuclear Plant 2
Arkansas Power & Light/Arkansas Nuclear Power Plant 1
Wisconsin Public Service/Kewaunee Nuclear Plant 1&2
Baltimore Gas & Electric/Calvert Cliffs Nuclear Plant 1&2
Northern States Power/Prairie Island Nuclear Plant 1&2
Florida Power & Light/Crystal River Nuclear Plant 3
Northeast Utilities/Millstone Nuclear Plant
Florida Power & Light/St. Lucie Nuclear Plant 2
Consumers Power/Midland Nuclear Plant 1&2
Tennessee Valley Authority/Sequoyah Nuclear Power Plant 1&2
Toledo Edison/Davis-Besse
Alabama Power/Farley Nuclear Plant 1&2
Florida Power & Light/St. Lucie Nuclear Plant 2
Florida Power & Light/St. Lucie Nuclear Plant 1
GPU Nuclear Plant

Pratt Industries

GPU Nuclear

GPU Nuclear Corporation
Post Office Box 480
Route 441 South
Middletown, Pennsylvania 17057-0191
717 944-7621
TELEX 84-2386
Writer's Direct Dial Number:

January 4, 1984
5211-83-373

Dr. T. E. Murley
Region I, Regional Administrator
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
LER 83-041/99X-0

This letter transmits Licensee Event Report (LER) 83-041/99X-0 which deals with cracking found on rubber seat ring of a Reactor Building Purge Isolation Valve. This is not reportable per our Technical Specifications, but is being provided due to the safety significance of the Purge Isolation Valves and current regulatory, industry and public interest in recent industry experience with these valves. The public health and safety were not affected.

Sincerely,

H. D. Hukill
Director, TMI-1

HDH:CJS:vjf

Enclosure

cc: R. Conte
J. Van Vliet
Document Management Banch

IE22
1/1