

Distribution:  
Docket No. 50-320  
NRC PDR

IE (3)  
M-town Office

January 9, 1985

Docket No. 50-320

Mr. F. R. Standerfer  
Vice President/Director  
Three Mile Island Unit 2  
GPU Nuclear Corporation  
P.O. Box 480  
Middletown, PA 17057

Local PDR  
DCS  
TMI HQ R/F  
TMI Site R/F  
BJSnyder  
WDTravers  
TCPoindexter  
MMasnik  
RAWeller  
PGrant  
RCook  
CCowgill  
LChandler  
ACRS (16)  
HRDenton

Dear Mr. Standerfer:

We have reviewed your letters dated January 8, 1985 and December 14, 1984, on the Polar Crane Main Hoist Brakes and Hand Release Mechanism which requested that the polar crane be released for unrestricted use within the limits of its current load rating (170 tons).

Our reviews focused on your letters dated January 8, 1985, December 19, December 14, October 18, October 12, October 8 and October 5, 1984. Our actions relative to this request are summarized in an attachment to this letter. This includes a discussion of the NRC's review of GPU documents and a summary of items found during two "hands-on" polar crane inspections performed by NRC personnel. We also note that following the removal of the hand release mechanisms from the main hoist brakes, you conducted a full no-load operability test on the crane to demonstrate acceptable crane performance under no-load conditions. We have reviewed the data related to this test and have determined that the crane functioned satisfactorily. Also included in our consideration of your request was a review of your recently modified monthly preventative maintenance inspection. Our respective staffs had previously discussed some of the information in the above documents on January 8, 1985, October 18 and October 11, 1984, at the TMI site.

We have determined that you have performed a thorough investigation of the circumstances surrounding the hand release mechanism for the main hoist brakes. Specifically your investigation into how and why the hand release mechanism was installed was extensive. Secondly, our review of your preventative maintenance program concluded that you have significantly upgraded the monthly periodic examinations of the polar crane. Our separate in situ inspections included two containment entries by TMIPO personnel and a complete walkdown of the polar crane. No significant items that would affect the safe operation of the crane were identified during these inspections. The items that you have not completed as of the date of this letter are summarized in the enclosure and do not adversely affect the ability of the crane to operate in a safe manner.

OFFICE	TMIPDR	SL (4850):NRR	PD:TMIPDR	8501160223 850105 PDR ADOCK 05000320 P PDR		
SURNAME	TCPoindexter	RAWeller	BJSnyder			
DATE	1/9/85	1/9/85	1/9/85			

Mr. F. R. Standerfer

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Based on our review, we conclude that; (1) your investigation related to the hand release mechanism is complete and adequate, and (2) the crane has been demonstrated to be operable and safe to use for load conditions. Therefore, we approve your use of the reactor building polar crane up to the limits of its current load rating of 170 tons.

Sincerely,

Original signed by

**B. J. Snyder**

Bernard J. Snyder, Program Director  
Three Mile Island Program Office  
Office of Nuclear Reactor Regulation

Enclosure:  
As stated

cc: T. F. Demmitt  
R. E. Rogan  
S. Levin  
R. L. Freerman  
J. J. Byrne  
A. W. Miller  
Service Distribution List  
(see attached)

# TMI-2 SERVICE LIST

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

John F. Wolfe, Esq., Chairman,  
Administrative Judge  
3409 Shepherd St.  
Chevy Chase, MD. 20015

Dr. Oscar H. Paris  
Administrative Judge  
Atomic Safety and Licensing  
Board Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dr. Frederick H. Shon  
Administrative Judge  
Atomic Safety and Licensing  
Board Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Karin W. Carter  
Assistant Attorney General  
505 Executive House  
P.O. Box 2357  
Harrisburg, PA 17120

Dr. Judith H. Johnsrud  
Environmental Coalition on  
Nuclear Power  
433 Orlando Ave.  
State College, PA 16801

George F. Trowbridge, Esq.  
Shaw, Pittman, Potts and  
Trowbridge  
1800 M. St., NW.  
Washington, D.C. 20036

Atomic Safety and Licensing Board Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Atomic Safety and Licensing Appeal Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Secretary  
U.S. Nuclear Regulatory Commission  
ATTN: Chief, Docketing & Service Branch  
Washington, D.C. 20555

Mr. Larry Hochendoner  
Dauphin County Commissioner  
P.O. Box 1295  
Harrisburg, PA 17108-1295

John E. Minnich, Chairperson,  
Dauphin County Board of Commissioners  
Dauphin County Courthouse  
Front and Market Streets  
Harrisburg, PA 17101

Dauphin County Office of Emergency  
Preparedness  
Court House, Room 7  
Front & Market Streets  
Harrisburg, PA 17101

U.S. Environmental Protection Agency  
Region III Office  
ATTN: EIS Coordinator  
Curtis Building (Sixth Floor)  
6th & Walnut Streets  
Philadelphia, PA 19106

Thomas M. Gerusky, Director  
Bureau of Radiation Protection  
Department of Environmental Resources  
P.O. Box 2063  
Harrisburg, PA 17120

Don Kennedy  
Office of Environmental Planning  
Department of Environmental Resources  
P.O. Box 2063  
Harrisburg, PA 17120

Willis Bixby, Site Manager  
U.S. Department of Energy  
P.O. Box 88  
Middletown, PA 17057-0311

David J. McGoff  
Division of Three Mile Island Programs  
NE-23  
U.S. Department of Energy  
Washington, D.C. 20545

William Lochstet  
104 Davey Laboratory  
Pennsylvania State University  
University Park, PA 16802

Randy Myers, Editorial  
The Patriot  
812 Market St.  
Harrisburg, PA 17105

Robert B. Borsum  
Babcock & Wilcox  
Nuclear Power Generation Division  
Suite 220  
7910 Woodmount Ave.  
Bethesda, MD. 20814

Michael Churchhill, Esq.  
PILCOP  
1315 Walnut St., Suite 1632  
Philadelphia, PA 19107

Linda W. Little  
5000 Hermitage DR.  
Raleigh, NC 27612

Marvin I. Lewis  
6504 Bradford Terrace  
Philadelphia, PA 19149

Jane Lee  
183 Valley Rd.  
Etters, PA 17319

J.B. Liberman, Esquire  
Berlack, Israels, Liberman  
26 Broadway  
New York, NY 10004

Walter W. Cohen, Consumer Advocate  
Department of Justice  
Strawberry Square, 14th Floor  
Harrisburg, PA 17127

Edward O. Swartz  
Board of Supervisors  
Londonderry Township  
RFD #1 Geyers Church Rd.  
Middletown, PA 17057

Robert L. Knupp, Esquire  
Assistant Solicitor  
Knupp and Andrews  
P.O. Box P  
407 N. Front St.  
Harrisburg, PA 17108

John Levin, Esquire  
Pennsylvania Public Utilities Comm.  
P.O. Box 3265  
Harrisburg, PA 17120

Honorable Mark Cohen  
512 E-E Main Capital Building  
Harrisburg, PA 17120

Mr. Edwin Kintner  
Executive Vice President  
General Public Utilities Nuclear Corp.  
100 Interpace Parkway  
Parsippany, NJ 07054

SUMMARY OF EVENTS AND NRC STAFF'S REVIEW RELATIVE  
TO THE POLAR CRANE MAIN HOIST HAND RELEASE MECHANISM

I. Purpose of the Staff's Review

Because the hand release mechanism did affect the ability of one of the polar crane's redundant brakes to operate, the staff was concerned as to what other potentially unauthorized modifications have been made to the crane. After reviewing the above and other previously unreported modifications, the staff would determine if there were any health and safety consequences and act accordingly.

II. Chronology of Events

- |                    |  |
|--------------------|--|
| May 30-31, 1984    | - GPU Preventative Maintenance (PM) Inspection of Brake Assembly Reveals No Problems.  |
| August 16, 1984    | - Brake Found Inoperable by GPU Staffers.  |
| August 17, 1984    | - Brake Adjusted/Returned to Service.  |
| September 4, 1984  | - NRC: Section Leader, Technical Support (SLTS), Made Aware of a Polar Crane (PC) Brake Adjustment and Hand Release Mechanism Problem by GPU/Bechtel Personnel. Deputy Director, TMIPO, Briefed by SLTS. |
| September 5, 1984  | - SLTS Discussed w/Bechtel/GPU Personnel Photographs of Hand Release Mechanism.  |
| September 6, 1984  | - TMIPO - Project Manager Informed of Hand Release Mechanism and Brake Misadjustment Problem by GPU/Bechtel Personnel.   |
| September 6, 1984  | - GPU Director of Licensing Informed NRC About PC Brake Problems.  |
| September 6, 1984  | - Walkdown Inspection of Brake Assembly by GPU Reveals Additional Mechanical Problems.   |
| September 7, 1984  | - Deficiencies Corrected by GPU.   |
| September 10, 1984 | - GPU Polar Crane Review Group Convenes.   |
| September 12, 1984 | - GPU Director/VP, TMI-2, Informed TMIPO - Site That a Materials Non-Conformance Report (MNCR) Would be Issued on the Hand Release Mechanism.  |

- September 13, 1984 - Walkdown of Crane by GPU with U.S. Crane Representative.
- September 14, 1984 - Crane Taken Out of Service and MNCR Issued.
- September 17-21, 1984 - GPU Interview of Personnel Completed.
- September 20, 1984 - GPU TMI-2 Director and Deputy Met with TMIPO Director and Staff on PC. GPU Commits to providing a Letter to the NRC by October 1, 1984 Discussing the Problem and Proposing Corrective Actions.
- October 5, 1984 - GPU Initial Docketed Correspondence with NRC on Hand Release Mechanisms.
- October 8, 1984 - Polar Crane Review Group Report Forwarded to NRC.
- October 9, 1984 - NRC Requires that PC Not be Used for Lifting Without NRC Concurrence.
- October 10, 1984 - No Load Operability Test of Polar Crane Completed.
- October 11, 1984 - Discussions Between GPU and NRC on Polar Crane Issues.
- October 12, 1984 - GPU Submits Results of Inspection Package to NRC.
- October 17, 1984 - NRC Team Performs In-Containment Polar Crane Inspections.
- October 18, 1984 - Discussions Between GPU and NRC on Polar Crane Issues.
- October 18, 1984 - GPU Letter from TMI-2 Director Agreeing with PC Task Force Conclusion that the Hand Release Mechanism is a Replacement of an Unlike Kind Part on the Polar Crane.
- October 28, 1984 - NRC Permits GPU to Use the PC for Lifts Up to 5 Tons Using the 5-Ton Hoist Only.
- December 14, 1984 - GPU Letter - Final Report of PC Task Force Review.
- December 19, 1984 - GPU Letter Submitting Vibration Analysis for Main Hoist Brake.



- January 3, 1985 - NRC Team Performs In-Containment Polar Crane Inspection.
- January 8, 1985 - Discussions Between GPU and NRC on Polar Crane Issues.
- January 8, 1985 - GPU Letter - Request for Full Use of the Polar Crane.

### III. Review of Docketed GPU Materials

We have reviewed GPUN's letters dated January 8, 1985, December 19, December 14, October 18, October 12, October 8, and October 5, 1984. This correspondence in part relates to GPUNC's investigation into how the hand release mechanism was fabricated, designed, installed and used both during the refurbishment period and the period subsequent to the NRC's approval for the use of the crane for loads less than 170 tons. This is important to the staff because: (1) it is possible that unauthorized work or non-documented modifications that have not had adequate engineering or quality assurance reviews may have been made to the reactor building polar crane, and (2) the hand release mechanism was found in a condition that created the possibility of a failure of the remaining brake by a common mode.

### IV. Specific Staff Questions and Conclusions

The staff reviewed GPUNC documentation and held discussions with GPU to satisfy the following specific concerns:

Question 1. How was the hand release mechanism fabricated, installed and used?

Conclusion 1. GPU responded to this item in correspondence dated December 14, 1984, October 18, October 12, and October 5, 1984 and discussions October 11 and October 18, 1984. The design and fabrication for the mechanism was provided on Job Ticket CA 364 dated August 6, 1982. GPUNC could not locate nor had knowledge of any document that authorized the assembly of the device on the brake mechanism. The licensee's investigation and the staff's review of that investigation did not indicate that the mechanism had been used during polar crane operation. The hand release mechanisms have since been removed, eliminating the potential for a repeat of this problem.

Question 2. After installation, what caused the hand release mechanism to render the polar crane brakes inoperable?

Conclusion 2. Per GPU letters dated January 8, 1985 and December 19, 1984, the licensee confirmed that the most probable cause of the brake being incapacitated was the vibration of the hand release mechanism lock nut. The staff concurs with the licensee's conclusion.

Question 3. What effect did two jam nuts installed on the main hoist brake tie rod instead of one jam nut and one hex nut (per the manufacturer's instructions) have on the subject problem and the polar crane's operation in general?

Conclusion 3. The staff has concluded that by having two jam nuts instead of one jam nut and one hex nut on the polar crane main hoist brakes tie rod resulted in; (1) personnel being able to adjust the brakes without the proper tools, and (2) a possibility of the nuts loosening due to the normal operation of the crane. After reviewing the licensee's correspondence dated December 19, December 14, October 18, October 12, October 8, and October 5, 1984, we conclude that this inconsistency probably did not contribute to the subject brake becoming inoperable; however, there was an increased potential that the brakes would need recalibration more often as a result of the two jam nuts. The staff is satisfied with the licensee's corrective action which was to install the required combination of nuts. The staff's hands-on inspection verified the completion of this task.

Question 4. What effect did the improper setting on the outboard spring have on the operation of the polar crane and why was the setting not correctly adjusted?

Conclusion 4. The licensee provided an explanation of the improper outboard spring setting. In letters dated October 5 and October 8, 1984, they state that this was apparently a manufacturer's setting and it was probably not checked nor adjusted upon receipt on site. The licensee concluded that the out of calibration spring had minimal impact on safety because the pressure applied by the brake shoe to the drum was still adequate as verified by operability tests performed on the brake system prior to load testing. This issue was also discussed during NRC/GPU discussions on October 11 and 18, 1984. The licensee recommended a preventative maintenance (PM) program for the polar crane to provide early identification of discrepant conditions as soon as possible. The upgraded monthly PM inspection has been implemented and is satisfactory to the staff. The annual inspection is projected to be in place prior to the reactor vessel plenum removal. We endorse the licensee actions with respect to the above.

Question 5. Were any other modifications made to the polar crane without the proper engineering reviews?

Conclusion 5. In addition to physical inspections, the licensee performed an audit of all polar crane documents and found conditions as documented in a GPUNC letter dated December 14, 1984. That audit identified several items that fall into the category of modifications to the polar crane. The staff, however, has determined that these items as implemented are not significant and do not affect safe crane operation. The staff finds that the licensee has satisfactorily resolved all documentation and hardware problems known at this time except those stated below in Response 6. This acceptance is based on the TMIPD's review of documents referenced in the December 14, 1984 letter and two hands-on inspections performed by TMIPD personnel.

Question 6. What polar crane open items have not been completed to date and what is the potential impact on the ability of the polar crane to safely operate?

Conclusion 6. The remaining significant open items on the polar crane are as follows:

- 1) Annual polar crane PM inspection plan implementation
- 2) The completion of training of personnel on the operation and maintenance of the polar crane
- 3) The implementation of upgraded maintenance procedures
- 4) The continued cleanup and decontamination of the crane.

We agree with the licensee's determination that these open items will not impact the ability to operate the polar crane in a safe manner.