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December 18, 1992  
C311-92-2155

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

Gentlemen:

Subject: Three Mile Island Nuclear Station, Unit I (TMI-1)  
Operating License No. DPR-50  
Docket No. 50-289  
Response to Notice of Violation in Inspection Report 92-18

In accordance with 10 CFR 2.201, this letter transmits the GPU Nuclear response to the Notice of Violation identified in Enclosure 1 to Inspection Report 92-18. After a review of the matter, including a root cause determination completed after receipt of the violation, GPUN disagrees with the statement set forth in the Notice and denies that a violation occurred. Attachment 1 provides the basis supporting this position. GPUN further disagrees, in part, with the information presented in the underlying inspection report. Attachment 2 addresses the issues and the reasons for GPUN's disagreement.

Sincerely,

T. G. Broughton  
Vice President and Director, TMI-1

WGH

Attachment

cc: Administrator, Region I  
TMI-1 Senior Project Manager  
TMI Senior Resident Inspector

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GPU NUCLEAR CORPORATION

Three Mile Island Nuclear Station, Unit 1 (TMI-1)  
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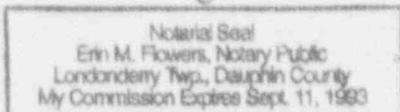
This letter is submitted in response to the Notice of Violation in Inspection Report 92-18, Routine Monthly Inspection of TMI-1 covering the period September 15, through October 26, 1992 dated November 14, 1992. All statements contained in this response have been reviewed, and all such statements made and matters set forth therein are true and correct to the best of my knowledge.

*T. G. Broughton*

T. G. Broughton  
Vice President and Director, TMI-1

Signed and sworn before me this  
18<sup>th</sup> day of December, 1992.

*Erin M. Flowers*



Member, Pennsylvania Association of Notaries

### Notice of Violation

Technical Specification 6.8.1.a requires that written procedures shall be established and implemented for the applicable procedures recommended in Appendix "A" of Regulatory Guide 1.33, revision 2, February 1978.

Appendix "A" of Regulatory Guide 1.33, revision 2, February 1978, step 9.a, states that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures.

Contrary to the above, the licensee failed to establish an adequate maintenance procedure to verify the free movement and to lubricate as necessary the emergency diesel generator (EDG) fuel racks and engine control linkage as recommended by the Fairbanks Morse vendor manual. This deficiency resulted in the inability of the 'B' EDG to achieve rated load on September 27, 1992.

This is a severity Level IV violation (Supplement I).

### GPUN Response to the Violation

GPUN disagrees with the statement set forth in the Notice. Further GPUN disagrees, in part, with the information presented in the underlying inspection report. Based on an understanding of the facts developed during our root cause determination which was completed after receipt of the violation, GPUN has concluded that the event did not occur as a result of an inadequacy in the emergency diesel generator (EDG) long term maintenance program caused by failure to incorporate vendor guidance in the procedure. Therefore, GPUN denies that a violation occurred.

In the Notice of Violation, NRC stated that the TMI-1 preventive maintenance procedure does not incorporate vendor (Colt) guidance for verifying free full rack movement and thus provides inadequate guidance. As a result the NRC has concluded that the licensee has failed to establish an adequate maintenance procedure in accordance with Technical Specification 6.8.1.a. GPUN contends that the existing procedure is adequate and in full compliance with Colt written instructions. Those instructions recommend that owners "check the injection pump racks and the engine control linkage to determine if all is free and working in good condition - lubricate as necessary."

GPUN also asserts that the Colt guidance (Item #8, Page 17, Revision 1, of Colt Instructions dated 07/18/86) quoted above, has been met monthly during engine testing at full load. The test, as performed by GPUN procedure, fully conforms with the manufacturer's recommendations and substantially exceeds the recommended frequency. GPUN questioned Colt regarding the acceptability of a load test to designed full load capability to verify that the fuel control linkage is free and in good working condition. Colt responded saying the

method was acceptable. The GPUN procedures are supported by appropriate detail from the vendor technical manual, Fairbanks Morse Tech Manual VM-TM-0191.

Data collected on Data Sheet 1 of 1301-8.2 during the pre-inspection engine operation is used to determine inspection requirements and is reviewed by the cognizant engineer and the vendor technical representative to recommend inspection areas not specified by the procedure. Check Sheet item 8.1.2.6 checks the fuel control governor linkage for tightness and proper transmission of motion. No deficiencies were identified for this check point during the pre-inspection run.

The maintenance actions performed were consistent with Data Sheet 1 and the recommendation in the vendor technical manual. The problem encountered was an unanticipated event occasioned by the apparent lack of adequate housekeeping during and/or after inspection of the cylinder liners. Grit displaced as a result of engine disassembly/reassembly during the cylinder inspection settled on the fuel control rods. The grit was not discovered during the closeout inspection and consequently was not removed prior to post maintenance testing. There was no failure to provide adequate instruction to maintenance personnel which could be attributed to a shortcoming of the maintenance procedure. Indeed, the opposite was true. In combination, the EDG maintenance procedure and vendor manual ensure adequate, technically correct guidance.

We note that the failure occurred during planned post maintenance testing before the unit was returned to service. The cause of the event was identified by GPUN personnel and corrected promptly. There was no safety significance since the failure occurred while the EDG was tagged out for maintenance.

#### Corrective Actions Taken and Results Achieved

The immediate corrective actions involved manually cycling the fuel control linkage and removal of the maintenance generated debris. Once free movement was re-established, maintenance personnel buffed both fuel control rods with crocus cloth, wiped them clean, and sprayed the interface between the fuel control rods and the engine block with WD-40. EG-Y-1B was restarted and successfully tested at full rated load.

The fuel injector control rods on both the operational diesel (EG-Y-1A) and the Station Blackout Diesel (EG-Y4) were checked for cleanliness and found clean. As a preventive measure, WD-40 lubricant was sprayed on the control rods at the engine block penetration. The action taken was in keeping with the convention that equipment lubrication, not specifically scheduled or identified as "as necessary" is left to the discretion of the mechanic.

Relevant maintenance procedures were reviewed to determine the need for inclusion of further vendor guidance on lubrication. Upon completion of the

view, it was determined that there was no apparent need to incorporate additional guidance relative to verifying the free movement of the control rods.

CG-Y-1B has been run successfully at full load several times since completion of the post maintenance testing. Thus, GPUN concludes that the maintenance actions taken were thorough, appropriate, and well controlled.

#### Corrective Action to Avoid Further Violations

Review of the event concluded that there was a need to prevent the intrusion of dirt into close tolerances such as those existing between the fuel control rods and the penetration through the engine block during maintenance activities. The subject will be discussed with maintenance personnel at shop meetings. The applicability of the procedure AP-1030 "Control of Access to System/Component Openings", Sections 4.3 and 4.4 to external equipment components will be stressed as well. We need assure that post maintenance housekeeping actions, commensurate with the work and components affected, are performed.

GPUN will complete the shop meeting discussions by January 15, 1993.

#### Date of Full Compliance

GPUN has been and remains in full compliance.

### Additional Information

GPUN has identified several statements in the body of the inspection report with which it disagrees and has addressed them below to correct the record.

### Background and Sequence of Events

The EG-Y-1B was blue-tagged out-of-service after successful completion of the pre-inspection run and remained in that status throughout the subject failure and until the satisfactory completion of all post maintenance testing. Post maintenance testing was being performed to assure that the engine would not be returned to service with some undetected fault. The engine was in its third and final post maintenance test run when it failed to achieve a fully rated load of 3Mw.

The post maintenance testing performed on EG-Y-1B following the annual inspection involved three separate engine runs. The first test was a low rpm, short duration run to ensure mechanical operability. The second test, slightly longer in duration and at a higher rpm, verified operational fluid levels. The final test was to be a full power 3Mw run. It was during this test that the EDG would not load beyond 2.75Mw.

Operators in the control room were on head phones and in radio communication with personnel in the EG-Y-1B cubicle. The control room operator attempted to reduce load on the engine but the engine did not respond because of the stuck linkage. The Lead Electrical Group Supervisor (LEGS), in the diesel cubicle, noted that the governor speed changer shaft was rotating but the speed indicating knob was not rotating. This was taken as an indication of governor clutch slippage by the LEGS and he applied slight pressure on the knob in the decrease direction. The knob began to rotate in the decrease direction and the breaker opened. The cause of the breaker trip was not the alleged failure to coordinate actions taken by the control room operator and LEGS, but was the reaction of the governor after the linkage was freed. The reduction in load did not occur until the fuel rack linkage became free. At that moment, the fuel available was less than that required for the load being carried which caused the EDG breaker to open on reverse power. The engine was shutdown normally. The reverse power breaker trip did not de-energize any bus or equipment or cause any operational difficulty.

Within a few minutes of the EDG breaker opening, several members of the plant staff arrived in the engine cubicle, including the Plant Engineering Director. Based on information provided by personnel at the scene, he inspected, by touch, the surfaces of each of the two common control rods at their entry into the engine block. Both rod surfaces revealed evidence of a gritty debris, some of which was removed by the act of touching the rods. Discussion with the Colt technical representative at the scene also raised a question about the freedom of movement of the fuel control linkage. The Colt technical

representative was asked to verify the degree of freedom of the fuel control linkage by disconnecting the governor link rod located between the speed control lever and the link lever. This action revealed that the link lever was not advancing the fuel injector control rods beyond an injector setting of about 7.0 (NOTE: A normal fully loaded injector position is approximately 8.0).

The Colt representative manually cycled the link lever several times. The motion overcame the binding of the linkage and freed the fuel injector control rods so that full rack movement was achieved. Subsequently, injector settings to the 8.0 - 9.0 position were attained. To ensure no further binding, maintenance personnel were directed to buff both fuel injector control rods with crocus cloth, wipe them clean, and spray WD-40 into the interface between the fuel injector control rods and the engine block. Following those actions, the governor link rod was reconnected and the engine restarted. It loaded promptly and satisfactorily to 3Mw. Personnel present concluded that the gritty debris apparently found its way into the tight clearance between the controls rods and the cylinder block wall during inspection of the cylinder liners. This resulted in the unanticipated binding of the fuel injector control rod linkage and prevented full travel. Once the debris was removed, the engine performed as designed.

#### Areas of Disagreement and Bases for the GPUN Position

- 1) The characterization of the conditions causing the failure to load, as contained in the Executive Summary of the Inspection Report, was correct. Therein, it was stated that " 'B' emergency diesel generator would not achieve rated load because dirt buildup would not allow free fuel rack movement." The description in Section 5.4 incorrectly characterized the inability to achieve full load as "the fuel injection pump racks did not move freely because the fuel rack had a thin film where it passed through the support bushing. After the film was removed and the rack was lubricated, the diesel operated properly." The specific issue raised here is whether the NRC Inspector's suggestion that a long term buildup of film, resulting from an inadequate maintenance program and failure to incorporate vendor guidance in the maintenance procedure, was the cause of the failure.

The summary description is more consistent with the GPUN conclusion that the cause of the failure to load was a direct result of a condition related to the maintenance performed while the EDG was out-of-service and not a result of failure of the long term maintenance program to assure reliable operation. When queried by GPUN as to whether a film buildup on the control rods could inhibit free and full travel, Colt responded that due to the close tolerances of the polished sliding fit where the control rods penetrate the cylinder block control end wall, a film could impede free movement. However, it was noted as highly unlikely that a film would buildup under the conditions which the TMI-1 EDG's are operated.

Evidence supports the GPUN conclusion that there was no film present on the fuel control rods during the various runs prior to removal of EG-Y-1B from service. EG-Y-1B had been successfully exercised immediately prior to engine shutdown during the pre-inspection power run at 3Mw. It was also operated daily during the period that the EG-Y-1A was out-of-service. The engine would not have repeatedly operated at full load without experiencing resistance to full fuel control rod travel. Since there was no indication of deteriorating performance, as evidenced by sluggish or erratic loading or something other than normal smooth governor control, the control rod linkage was considered to be fully operational and disassembly for inspection and manual cycling was not warranted.

The probable cause of the failure was an accumulation of grit on the control rods during engine cylinder liner maintenance. Full travel of the control rods through the engine block was prevented by the grit. The cylinder liner inspection, part of the annual inspection, required the removal and replacement of the upper piston insert and connecting rod and the lower piston and connecting rod in each of the three cylinders. As a consequence, the top covers were removed and debris apparently fell down on both the Control Side (CS) and Opposition Control Side (OCS) of the engine, finding its way on to the control rods.

- 2) The inspection report noted that "additional responsibility is on personnel conducting troubleshooting to fully discuss the planned actions ... proceed in a slow and deliberate manner" and that "direct communication ... may have prevented the sudden unloading of the diesel..." GPUN maintained appropriate control during diesel troubleshooting activities. The diesel breaker tripped on reverse current when the fuel rack linkage became free and engine speed rapidly dropped to match the reduced governor speed setting input by the control room operator. The cause was not the simultaneous action on the part of the operator and the LEGS at the diesel to decrease speed. The sequence of events during the troubleshooting, as previously described, established that the LEGS action was taken in response to the slipping governor clutch. The operator in the control room and the diesel operator in the diesel cubicle were in direct communication via headset. Radio communication was also established between the Shift Supervisor in the diesel cubicle and the control room.
- 3) The final paragraph of section 5.4 of the inspection report states that "This deficiency (failure to incorporate vendor guidance to verify free rack movement) could have rendered the diesel inoperable by preventing the diesel from attaining its rated load of 3.0 megawatts." The diesel run was part of the post maintenance testing being performed to assure that the engine would not be returned to service with some undetected fault. There was no safety significance since the failure occurred while the EDG was tagged out for maintenance.