



Pennsylvania Power & Light Company

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August 19, 1983

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

SUSQUEHANNA STEAM ELECTRIC STATION
REPORT OF A DEFICIENCY INVOLVING
MISCELLANEOUS DEBRIS IN
CONTROL ROD DRIVE (CRD) GUIDE TUBES
ER 100508 FILE 821-10
PLA-1803

Dear Dr. Murley:

This letter serves to provide the Commission with a report on miscellaneous debris in several Unit #2 CRD guide tubes.

This deficiency was originally reported by telephone to Mr. E. C. McCabe of NRC Region I on July 22, 1983 by Mr. J. Saranga of PP&L.

The attachment to this letter contains the results of PP&L's investigation into the subject deficiency. Based upon the information provided in the attachment, PP&L considers this deficiency not to be a reportable condition under the provisions of 10CFR50.55(e) or 10CFR21.

We trust the Commission will find this report satisfactory.

Very truly yours,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

MHC:po

Attachment

IER7
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August 19, 1983

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PLA-1803
ER 100508 FILE 821-10

Copy to:

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Mr. G. McDonald, Director
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FINAL REPORT

SUBJECT:

Miscellaneous debris in several Unit 2 control rod drive (CRD) guide tubes.

DESCRIPTION:

During final installation of reactor internals, foreign material was found to be present in a CRD guide tube/blade assembly. As a result, an inspection of all 185 guide tubes was performed. It was discovered that 19 of the 185 guide tubes had debris in them. All the debris was located in the guide tubes on top of the velocity limiter section of the CRD blade. The debris consisted of grinding wheels (only found in 3 tubes) and such degradable materials as cloth, paper, string, and wood splinters.

CAUSE:

In an attempt to determine how the debris got into the guide tubes, investigations into the source of the grinding wheels and the time period of possible debris introduction to the guide tubes were conducted. The results of the investigation into the grinding wheels source revealed that wheels of the type found have not been purchased for use at SSES by any group performing work at SSES. Therefore, it is concluded the source of the grinding wheels is indeterminable.

The investigation into determining the time period of possible introduction of the debris into the tubes resulted in the conclusion that the debris was most likely introduced after the blades were installed into the guide tubes (as all the debris found in the tubes was found on top of the velocity limiter section of the control blades). Blade installation took 16 days (5/6/83 to 5/22/83). This installation activity included checking the guide tubes for debris prior to installation of the blades. Upon installation of the blades and at the conclusion of each work shift, the staging racks which were located on elevation 818 of the reactor building were covered with Visqueen. The racks were covered with Visqueen and sat on Elevation 818 until guide tube installation activities commenced 7/16/83 (completed on 7/18/83). During this installation activity, the debris was accidentally discovered. Therefore, the debris was probably introduced to the guide tubes after blade installation and before guide tube installation.

SAFETY IMPLICATIONS:

Two types of debris were found - degradable materials and grinding wheels. Based upon the nature of the degradable materials (described previously in Description), it is determined that they are not capable of adversely affecting the safe operation of the CRD assemblies, or cause damage to the reactor core.

The grinding wheels, however, could potentially restrict the movement of the control rods, thereby possibly affecting the safe operation of the CRD assemblies. Failure of the control rods to insert during a scram poses a concern from the standpoint of assuring sufficient shutdown reactivity to maintain reactor subcriticality following scram. Analyses, therefore, were performed to assess core shutdown margin assuming that all three control rods are stuck in their fully withdrawn position. The calculations indicate that no degradation of core shutdown margin would result and the Technical Specification requirements (Tech. Spec. 3/4.1.1) would easily be met. This is expected since the three affected control rods are radially dispersed in the core, thus resulting in relatively low reactivity worths.

The possibility that the debris could cause a control rod to become stuck during withdrawal was also considered. Assuming that a control rod becomes stuck and the control rod drive becomes decoupled, the control rod could at a later optimum moment drop out of the core. The consequences of this postulated event is a design basis for SSES Unit #2 and the analysis for it is presented in Susquehanna SES FSAR section 15.4.9, Control Rod Drop Accident Analysis.

The possibility of all three CRD blades getting stuck and dropping out of the core simultaneously was not considered as numerous system (Rod Sequence Control System and Rod Worth Minimizer) and operator failures are needed for this to occur.

If it is postulated that the grinding wheel debris exits the CRD tubes into the reactor vessel, their effects on the fuel would also be of concern. However, assuming the debris could make its way to the lower plenum region, passage through the lower tie plate would be improbable due to the size of the grinding wheels steel components. Therefore, any damage to the fuel rods would be unlikely. Furthermore, due to the small size of the metal debris, any flow blockage which may occur would be minimal and have an insignificant effect on fuel rod performance.

In light of the above, the miscellaneous debris found in the CRD guide tubes, would not, if they had gone undetected, have affected the safe operation of SSES Unit #2.

CORRECTIVE ACTIONS:

As previously discussed a 100% inspection was performed (on 7/19/83) upon identification of the debris in the tubes. This inspection was performed with the aid of flashlights, binoculars and a camera with a zoom lens (no pictures were taken). The inspection results were documented on General Electric Special Process Control Sheet (SPCS) number 219S-1, Rev. 0. All debris was removed by using an aluminum pole with approved nuclear grade tape. No damage was incurred by the presence of the foreign material.

Upon completion of the 100% inspection of 7/19/83, a third security guard was posted at the reactor vessel. This guard's duties were and are to monitor all activities performed in and around the reactor vessel during periods when physical work is being accomplished in the vessel.