

# Bechtel Power Corporation

Engineers—Constructors

Fifty Beale Street

San Francisco, California

Mail Address: P.O. Box 3965, San Francisco, CA 94119



October 9, 1978

Mr. Boyce H. Grier  
Director, Region I  
U.S. Nuclear Regulatory Commission  
631 Park Avenue  
King of Prussia, PA 18406

Dear Mr. Grier:


Your office was advised, on August 18, 1978, in the final report of a reportable deficiency regarding Anchor/Darling tilting disc check valves procured for the Susquehanna Steam Electric Station, that the Bechtel Standard Specification for this item would be revised to prevent recurrence.

We have been advised by our client that you wish to know the scheduled date for such a revision. No specific date has been established for the revision of this generic document. Such documents are normally revised when sufficient substantive comments have accumulated to warrant the administrative expense of revision.

In the interim period, prior to such a revision, we have in place adequate mechanisms to assure that current and future projects are aware of such outstanding comments. First, all current projects have been advised of the specific deficiency and have been directed to take appropriate preventative or corrective action. Second, the index of standard specifications, distributed to cognizant Engineering personnel, carries a notation for this particular specification to the effect that comments on this specification are on file and should be consulted prior to project adoption of the specification. When the standard specification is revised to incorporate outstanding comments, the index will be revised accordingly.

We believe that the above description is responsive to the intent of your question. If additional information is desired, please contact the undersigned.

Very truly yours,

  
J. H. Blasingame  
Chief Mechanical Engineer  
Thermal Power Organization

DBH:bmv

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CENTRAL FILES



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
631 PARK AVENUE  
KING OF PRUSSIA, PENNSYLVANIA 19406

Docket Nos. 50-387  
50-388

SEP 22 1978

Pennsylvania Power & Light Company  
ATTN: Mr. Norman W. Curtis  
Vice President  
Engineering and Construction (N-4)  
2 North Ninth Street  
Allentown, Pennsylvania 18101

Gentlemen:

Subject: Seismic Qualification of Medium Voltage, Metal Clad,  
Safeguards Switchgear (Your letter of September 15, 1978)

Thank you for your letter, referenced above, which forwarded a final report pursuant to 10 CFR 50.55 (e) regarding the subject matter.

Your report will be reviewed and evaluated, and should we require additional information concerning this matter, we will contact you.

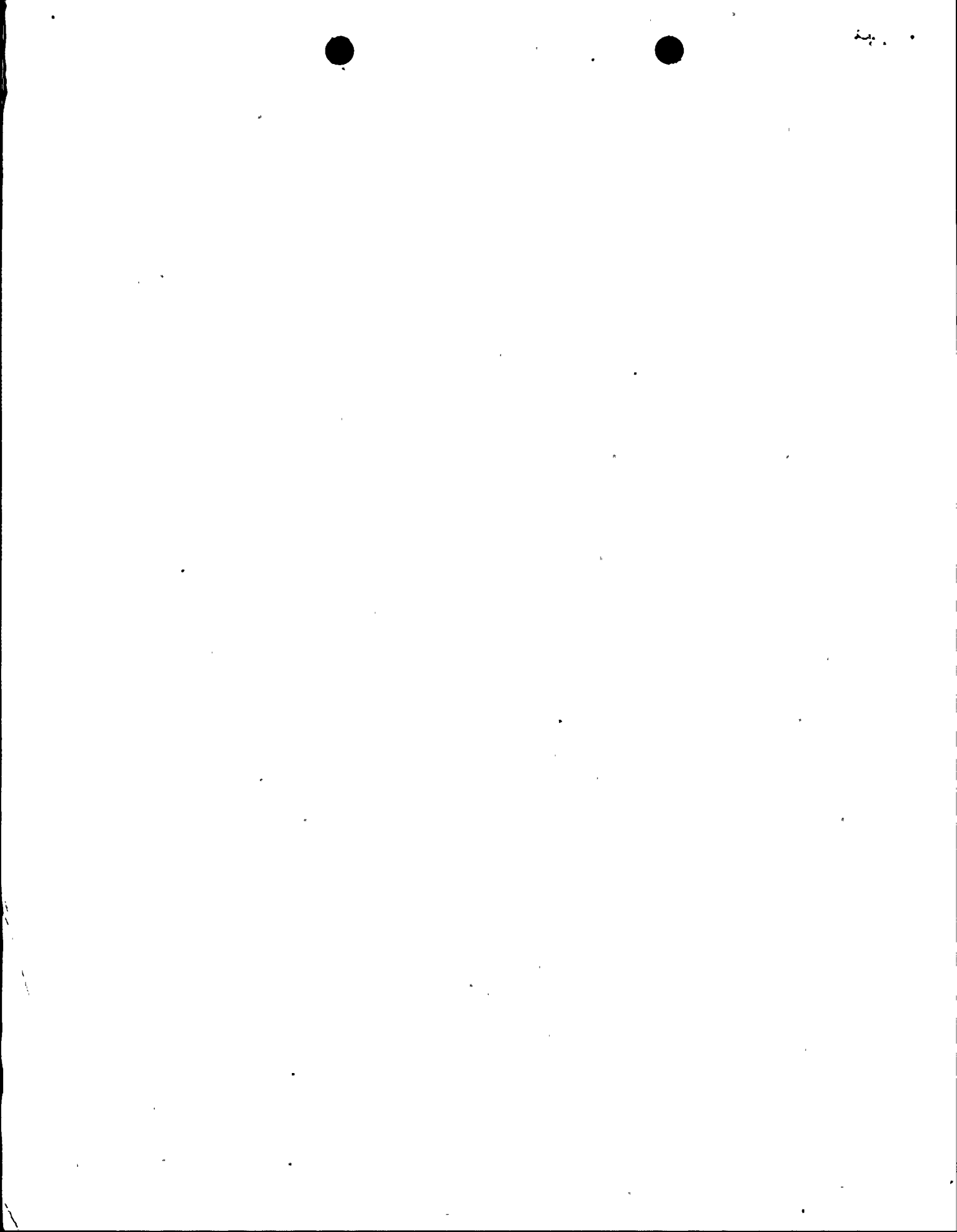
Your cooperation with us is appreciated.

Sincerely,

R. T. Carlson, Chief  
Reactor Construction and Engineering  
Support Branch

cc: A. R. Sabol, Manager, Nuclear Quality Assurance  
W. E. Barberich, Licensing Engineer

MA 1  
60



NORMAN W. CURTIS  
Vice President-Engineering & Construction  
821-5381

September 15, 1978

Mr. Boyce H. Grier  
Director, Region I  
U. S. Nuclear Regulatory Commission  
631 Park Avenue  
King of Prussia, Pennsylvania 17406

SUSQUEHANNA STEAM ELECTRIC STATION  
FINAL REPORT OF A DEFICIENCY IN SEISMIC QUALIFICATION OF  
MEDIUM VOLTAGE, METAL CLAD, SAFEGUARDS SWITCHGEAR  
DOCKET NO.: 50-387  
LICENSE NO: CPPER-101  
ER 100450  
PLA-289

FILE 840-4

Dear Mr. Grier:

This supplements PP&L letters PLA-246, dated April 17, 1978 and PLA-271, dated July 14, 1978, and provides a final report of the subject deficiency as required by 10CFR50.55(e).

Please advise should you require additional information.

Very truly yours,



N. W. Curtis  
Vice President-Engineering & Construction

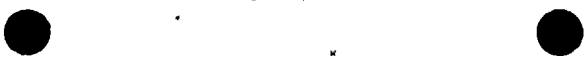
Attachment  
ARS:mcb

cc: Mr. J. G. Davis (15)  
Acting Director-Office of Inspection & Enforcement  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Mr. G. McDonald, Director (1)  
Office of Management Information & Program Control  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

September 15, 1978

cc: Mr. Robert M. Gallo  
U. S. Nuclear Regulatory Commission  
P.O. Box 52  
Shickshinny, Pennsylvania 18655



FINAL REPORT  
OF  
A DEFICIENCY IN  
SEISMIC QUALIFICATION OF  
MEDIUM VOLTAGE, METAL CLAD,  
SAFEGUARDS SWITCHGEAR  
FOR  
THE SUSQUEHANNA STEAM ELECTRIC STATION

Prepared By: D. P. Parsons 9/15/78  
D. P. Parsons  
SSES Electrical Group Supvr.

Approved By: A. M. Male 9/15/78  
A. M. Male  
Supervising Engineer-Design-Susquehanna

Reviewed: A. R. Sabol  
A. R. Sabol  
Manager-Nuclear Quality Assurance

PENNSYLVANIA POWER & LIGHT COMPANY  
ALLENTOWN, PENNSYLVANIA  
SEPTEMBER 15, 1978

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## INTRODUCTION

This report is prepared in accordance with the requirements described in Title 10, Code of Federal Regulations, Part 50, Section 50.55(e).

PP&L was advised, through its A/E (Bechtel) organization, that Westinghouse supplied, medium voltage, metal clad switchgear was not capable of withstanding the postulated seismic event for Susquehanna Plant. Bechtel was requested to review the situation and advise PP&L of its findings. On March 31, 1978 the NRC was informed that a deficiency, potentially reportable under 10CFR50.55(e), was being evaluated, and on April 17, 1978, following an engineering review, PP&L issued its Interim Report of the deficiency.

The deficiency was determined to be reportable under 10CFR50.55(e) for the following reasons:

1. The deficiency, were it to remain uncorrected, could have resulted in a safety hazard to the operation of the plant.
2. The deficiency represented a deficiency in final design as approved and released for fabrication and installation.
3. Eight safety-related switchgear units had been shipped and accepted for installation before the deficiency was discovered.

## DESCRIPTION OF DEFICIENCY

The Susquehanna Plant was supplied eight deficient safety related medium voltage switchgear units by Westinghouse. Four of these switchgear units supply power directly to 4kv safety related equipment, pump motors and load centers, which are used to mitigate the effects of an accident in Unit 1.

Likewise, four switchgear units are used as the supply for 4kv safety related loads on Unit 2.

Each switchgear unit contains three potential transformer circuits, one of the circuits consists of two potential transformers connected in an open delta. The other two circuits each contain one potential transformer used to sense single phase potential. The potential transformers are used to obtain 120 volt potential indication for use with relays on the switchgear units.

The Medium Voltage Metal Clad Switchgear (Safeguards) Specification (8856-E-109) requires the equipment to meet seismic requirements of Project Specification 8856-G-10, IEEE Standard No. 344, and to remain functional, both; during and after an OBE or DBE.

Westinghouse advised Bechtel on January 24, 1978 that the potential transformer secondary disconnecting contact assemblies on equipment similar to that supplied for Susquehanna had failed to withstand recent seismic tests. Westinghouse further stated that, under seismic conditions, it is possible that the slip-fit secondary contacts could be dislodged from their normal positions resulting in open or short circuiting of the secondary circuits. Westinghouse requested that Bechtel evaluate the condition to determine if it would constitute a safety hazard.

Westinghouse confirmed that there were no failures of potential transformer circuits during the original seismic qualification tests. However, these circuits were subsequently redesigned and the new design was analytically qualified. Actual seismic tests on switchgear units incorporating the new design resulted in the potential transformer circuit failures which are the subject of this report.

Westinghouse also confirmed that the seismic qualification of all other components in these assemblies remain valid.

#### ANALYSIS OF SAFETY IMPLICATIONS

The engineering evaluation determined that the open or short circuiting of any of the secondary contacts could result in incorrect operation of a switchgear unit. It was concluded that the worst condition results from the loss of all three potential transformer circuits on each switchgear bus.

Under this condition, the two incoming bus feeders from the safeguard transformers (one from each offsite source) would be automatically disconnected from each switchgear bus and the diesel generator power source connected restoring power to the bus.

A LOCA occurring during or after the postulated seismic event would initiate a closing signal to the motor feeder breakers of the shutdown loads, i.e. RHR and Core Spray Motors. These feeder breakers would close and immediately trip due to the false undervoltage indication as sensed by the undervoltage relay. The circuit breakers would be unable to close again because of the permanent undervoltage trip signal imposed on them. The above analysis assumes that the failures concurrently occur on all redundant switchgear buses.

Based upon the evaluation of Bechtel Engineering, it is concluded that this condition of not being able to supply power to the shutdown loads under a LOCA condition constitutes a safety hazard to the operation of the plant and represents a deficiency in final design.

## CORRECTIVE ACTION

### Action Taken to Control Deficient Items

The actions taken by Bechtel prior to the submittal of the interim report of the deficiency by PP&L are documented in PLA-246 dated April 17, 1978.

In addition to the measures previously identified, and in the interest of obtaining documented evidence of Bechtel Project Engineering's evaluation of the condition's cause, corrective action required, and reportability under 10CFR50.55(e), Bechtel QA generated Management Corrective Action Request No. 1-22 dated March 28, 1978.

### Corrective Action to Control Resolution of the Deficiencies

Westinghouse has supplied modification kits which provide for eliminating the stationary, secondary disconnecting contact assemblies from the potential transformer circuits. Twenty-four (24) (three kits for each of the eight safety-related switchgear units) potential transformer secondary field modification kits (Westinghouse Style No. 628F14G01) have been provided.

These modification kits have been installed by Bechtel field electricians per the instructions on Westinghouse drawing 628F146. These changes were made under the supervision of the Westinghouse Engineering Service Personnel.

The modification consists of hard wiring the secondary movable contact to a terminal block via a wiring harness. The PT secondary circuits are then connected to the field side of the terminal block. The secondary stationary contacts are removed entirely, thus eliminating the source of the seismic failure.

Westinghouse has seismically qualified the potential transformers with the modified secondary contact arrangement. Documented evidence of this qualification has been provided to Bechtel through a revision to the original qualification report.

#### CONCLUSIONS

Modifications have been made to all the Westinghouse safety-related, medium voltage switchgear units containing potential transformers and purchased under P.O. 8856-E-109AC for Susquehanna Steam Electric Station. The Bechtel generated Nonconformance Report (NCR No. 2514) will not be closed out until Bechtel Quality Control has performed the attendant inspections and has verified that the modification kits were installed according to design requirements.

The modified switchgear units are qualified to meet the postulated seismic event for Susquehanna and documentation of this seismic qualification has been received and will be reviewed by Bechtel Engineering. Bechtel's acceptance of this documentation will result in an acceptably documented revision to the Westinghouse Seismic Qualification Report.

The switchgear units, as presently modified, are compatible with purchase order, PSAR and FSAR requirements.

