

D m B

SNUPPS

Standardized Nuclear Unit
Power Plant System

5 Choke Cherry Road
Rockville, Maryland 20850
(301) 869-8010

April 13, 1984

SLNRC 84-065 FILE: 0491.10.2
SUBJ: Final Report: Field Run Cables
for Solenoid Valves (SDR 84-02)

Mr. James G. Keppler
Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Mr. John T. Collins
Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
Suite 1000, Parkway Central Plaza
Arlington, Texas 76012

Docket Nos. STN 50-482 and STN 50-483

Gentlemen:

Pursuant to the requirements of 10CFR50.55(e) Messrs. J. Konklin of NRC Region III and W. Johnson of NRC Region IV were informed via telecon on March 15, 1984, of a design deficiency in the selection of field run cable to Valcor solenoid valves. This deficiency is generic in nature and, as such, is applicable to Callaway and Wolf Creek plants. A written report on the deficiency is enclosed.

The enclosed report should be considered the final report on this matter. NRC will be informed of any significant developments, should they occur. Please do not hesitate to contact the undersigned or R. P. White of my staff should there be any questions concerning this report.

Very truly yours,

8404260045 840413
PDR ADOCK 05000482
S PDR


S. O. Seiken
QA Manager

RPW/bds/lbl
Enclosure

cc: D. F. Schnell	UE
G. L. Koester	KGE
D. T. McPhee	KCPL
W. S. Schum	NRC/WC
J. H. Neisler	NRC/CAL
B. H. Little	NRC/CAL
R. C. DeYoung	NRC/IE: HQ
J. E. Konklin	NRC/IE: III
Record	

APR 18 1984

IE27

10 CFR 50.55(e) REPORT
ON
FIELD WIRING DEFICIENCIES TO VALCOR
SOLENOID VALVES INSTALLED AT THE SNUPPS UNITS

BECHTEL POWER CORPORATION

Gaithersburg, Maryland

April 9, 1984

10 CFR 50.55(e) REPORT ON FIELD WIRING TO VALCOR SOLENOID VALVES

TABLE OF CONTENTS

- 1.0 INTRODUCTION
- 2.0 DESCRIPTION OF PROBLEM
- 3.0 SAFETY IMPACT
- 4.0 CAUSE OF DEFICIENCY
- 5.0 CORRECTIVE ACTION

1.0 INTRODUCTION

In accordance with the requirements of 10CFR50.55(e), this final report provides a summary of the deficiency related to improperly rated field wiring to Valcor solenoid valves installed at the Callaway and Wolf Creek jobsites.

This deficiency was initially reported by SNUPPS to Mr. J. Konklin and Mr. W. Johnson, NRC Regions III and IV respectively, by telephone on March 15, 1984. This deficiency has also been reported by Bechtel under 10CFR21 to Mr. C. E. Rossi, USNRC, on March 19, 1984.

This deficiency was first identified in the course of unrelated rework on one of the affected valves at which time degradation of an attached conductor was noted.

2.0 DESCRIPTION OF PROBLEM

Callaway NCR 2SN-9748-ET documented a deficiency involving degraded insulation on field cabling used to connect Valcor solenoid valves. Valcor solenoid valves are supplied with a terminal block internal to the valve body. The incoming field cables are connected directly to this terminal block. Investigation of the valve qualification documents revealed that the ambient temperatures inside the valve body can approach a maximum of 250-280°F when the valves are energized for an extended period of time. The actual ambient temperatures inside the valve body will vary for each valve depending upon the length of time the valve is energized and the fluid or air temperature of the associated piping system. The incoming field cable used to connect the valves into the plant control system has an insulation temperature rating of 90°C (194°F). Use of the 90°C rated field cabling in the high ambient temperature encountered inside the valve body will cause the cable insulation to degrade prematurely resulting in failure of the cable insulation which can ultimately compromise the safety function of the valve. This deficiency exists for both the Wolf Creek and Callaway Generating Stations.

3.0 SAFETY IMPACT

A total of 37 Class 1E valves supplied by Valcor at each jobsite are affected by this deficiency. An additional 6 non-class 1E valves are also affected. The valves are used in the following safety related systems:

- Containment Hydrogen Control
- Nuclear Sampling
- Steam Generator Blowdown
- Residual Heat Removal
- Containment Purge
- Fuel Building HVAC

Failure of the cable insulation due to temperatures above its design capabilities could prevent these valves from performing their safety function.

4.0 CAUSE OF DEFICIENCY

This deficiency resulted from a unique solenoid valve configuration wherein the incoming field cables are terminated inside a totally enclosed valve body housing a large energized solenoid. The configuration is such that the terminal boards are located within the valve body and above the solenoid. No means is provided to dissipate the heat generated by the solenoid. Valcor supplied drawings depicting valve and wiring details provided no information concerning the high ambient temperatures inside the valve body. The normal solenoid valve application is to have vendor supplied pigtailed routed from the valve body to a remotely located splice box. In such typical applications, the field wiring would not be subjected to the high ambient temperatures. The Architect Engineer did not recognize that high ambient temperatures would be encountered which could compromise the capability of the field run cabling and consequently did not utilize high temperature wire in the wiring design.

5.0 CORRECTIVE ACTION

Design changes have been implemented to replace the field wiring with qualified high temperature wiring with 200°C (392°F) rated insulation. The high temperature wire is used as a jumper from the terminal block inside the valve body to a splice box located approximately 5 to 10 feet remote from the valve. The incoming field cable is spliced into the high temperature wire in the splice box thus preventing the field cable from encountering the high temperatures inside the valve body. The necessary wiring changes will be installed at each jobsite prior to the time that the valves are required for their operational modes. The project is presently evaluating solenoid valves of other manufacturers utilized in the SNUPPS design to insure that other valves are not subject to the same deficiency. If additional solenoid valves are discovered to have the same deficiency, appropriate corrective action will be taken and a supplemental report issued.