



## Arizona Nuclear Power Project

P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

RECEIVED  
NRC

1986 MAR 17 AM 11:55

March 11, 1986

ANPP-35502-EEVBJr/LAS/DRL-92511

REGION V

U. S. Nuclear Regulatory Commission  
Region V  
1450 Maria Lane - Suite 210  
Walnut Creek, California 94596-5368

Attention: Mr. D. F. Kirsch, Acting Director  
Division of Reactor Safety and Projects  
Palo Verde Nuclear Generating Station (PVNGS)  
Units 1, 2, 3  
Docket Nos. 50-528, 529, 530

Subject: Final Report - DER 85-42  
A 50.55(e) and 10CFR21 Reportable Condition Relating to  
Diesel Generator Fuel Rack Linkage  
File: 86-006-216; 86-056-026; D.4.33.2

Reference: (A) Telephone conversation between R. C. Sorenson and  
T. P. Siegfried on December 9, 1985 (DER 85-42 -  
Initial Reportability)  
(B) ANPP-34488, Dated January 8, 1986 (DER 85-42-Interim Report)  
(C) ANPP-34950, Dated February 7, 1986 (DER 85-42-Time Extension)

Dear Sir:

Attached, is our final written report of the Reportable Deficiency under  
10CFR50.55(e) referenced above. The 10CFR21 evaluation is also included.

Very truly yours,

E. E. Van Brunt, Jr.  
Executive Vice President  
Project Director

EEVBJr/DRL/ldf

Attachment(s)

cc: Page 2

8603260028 860311  
PDR ADOCK 05000528  
S PDR

11  
IE-27

DER 85-42 - Final Report  
Mr. D. F. Kirsch  
Acting Director  
ANPP-35502-EEVBJr/LAS/DRL-92.11  
March 11, 1986  
Page 2

cc: Richard DeYoung, Director  
Office of Inspection and Enforcement  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

A. C. Gehr (4141)  
R. P. Zimmerman (6241)

Records Center  
Institute of Nuclear Power Operations  
1100 Circle 75 Parkway - Suite 1500  
Atlanta, Georgia 30339

FINAL REPORT - DER 85-42  
DEFICIENCY EVALUATION 50.55 (e)  
ARIZONA NUCLEAR POWER PROJECT (ANPP)  
PVNGS UNITS 1, 2, 3

I. Description of Deficiency

Cooper Energy Service (CES) supplied the emergency diesel generator (DG) sets to PVNGS. The DG provides emergency power to equipment required for safe plant shutdown in the event of loss of preferred power. There are two DG sets per power plant; 1 for Train A and 1 for Train B. Each unit is required to start, come up to full rated speed, voltage, and frequency within 10 seconds. A Woodward governor controls the speed of the DG, through fuel rack linkage, by moving the fuel racks open or closed as required.

During testing, before fuel load, the Unit 2, Train B, DG started, oversped and tripped. NCR MG-2906 documented that the fuel rack linkage lever had moved out of adjustment which misaligned the fuel racks. This caused the diesel engine to operate sluggishly and consequently caused the trip.

EVALUATION

Fuel supply to the DG combustion cylinders is controlled by the Woodward governor through the fuel rack linkage to the fuel racks. CES fabrication drawing KSV 32-17, in the instruction manual, Bechtel Log No. M018-388, shows that the fuel rack linkage lever is clamped to the serrated Woodward governor shaft. This condition exists on all 6 DG units. This configuration is not a positive connection, thereby creating a potential for the lever to slip on the shaft, resulting in loss of adjustment of the fuel racks. However, CES drawing KSV 32-10 in Bechtel Log No. M018-117 shows that the lever is to be fully pinned to the shaft. Drawing KSV 32-10 is not intended to be used for maintenance and inspection of the DG sets. The actual "AS-BUILT" condition is a compromise between the two drawings such that a 1/8" allen head screw is installed in 4 units, a 5/16" set bolt in 1 unit, and a drilled and tapped 5/16" hole is present in 1 unit.

Inspection of this condition has identified the root cause to be attributed to the lack of resistance to slippage of the serrated governor shaft against the smooth surface of the lever clamp. The lack of serrations on the lever, a design deficiency, allowed it to slip on the shaft, causing the fuel linkage to move out of adjustment.

II. Analysis of Safety Implications

Slippage of the linkage lever will cause the fuel system to move out of adjustment; thereby, causing the diesel to respond to the start signal sluggishly, impair acceleration, and possibly cause overspeeding which will initiate an overspeed trip.

Based on the above, this condition is evaluated as reportable under the requirements of 10CFR50.55(e), since if this condition were to remain uncorrected it would represent a significant safety condition.

This project has also evaluated this condition as reportable under 10CFR21. This report addresses the reporting requirements of 10CFR21.21(b)(3) with

the exception of subpart (vi), regarding the number and location of such components to other facilities.

### III. Corrective Action

EER 85-DG-120 described the lever slippage problem in Unit 2 initially. The resolution was to replace the existing 5/16", Grade 5 bolt that was torqued to 7 ft.-lbs. with a 5/16", Grade B7 bolt torqued to 19 ft.-lbs.. Work Request 131217 was issued to perform the work in Unit 2 and has been completed. The work to install the bolts in Unit 1, Train A was performed under Work Order 125192 and Train B under Work Order 125194.

To ensure that the condition will not recur in Units 1, 2 or 3, a replacement lever has been designed with serrations in the clamp area that mesh with the serrations on the shaft. The existing 5/16", Grade B7 clamp bolt and nut will be replaced with a 3/8", Grade B7 bolt and nut torqued to 10 ft.-lbs.. This torque value was considered adequate since only a clamping force sufficient to maintain serration engagement is required. The existing design required a clamping force sufficient for the shaft serrations to "bite" into the inside of the lever clamp providing a grip against slippage. EER 85-DG-127 describes the design change and provides a manufacturing drawing. Manufacturing and installation will be performed by DCP 1FM-DG-064, 2FM-DG-064, and 3FM-DG-064. The work will be performed in Unit 3 prior to fuel load.

Calculation 13-MC-DG-201 (Reference 3) has determined that the above design will eliminate lever slippage and subsequent overspeed trips.

Drawing KSV 32-17 will be deleted from the Instruction Manual (M018-388). It will be replaced by Drawing KSV 32-10 which will be revised to reflect "AS BUILT". A detailed drawing of the lever has been logged into Drawing and Data Control under Log Number M018-538.

A copy of this report will be sent to CES for review of reportability under 10CFR21.

### REFERENCE

1. Construction NCR MG-2906
2. EER 85-DG-127
3. Calculation 13-MC-DG-201