

ARIZONA



PUBLIC SERVICE COMPANY

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April 7, 1982

ANPP-20645-GHD/BSK

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

Attention: Mr. T. W. Bishop, Chief  
Reactor Construction and  
Engineering Support Branch

Subject: Final Report - DER 82-7  
A 50.55(e) Report Relating to Five Star Special "150"  
Grout Used in Unit 1 Containment Construction Opening  
File: 82-019-026  
D.4.33.2

Reference: (A) Telephone Conversation between J. Berdoin and  
J. Cook on March 3, 1982  
(B) Telephone Conversation between J. Eckhardt and  
G. H. Duckworth on April 6, 1982 (Time Extension)

Dear Sir:

Attached, is our final written report of the deficiency referenced above,  
which has been determined to be Not Reportable under the requirements of  
10CFR50.55(e).

Very truly yours,

E. E. Van Brunt, Jr.  
APS Vice President  
Nuclear Projects  
ANPP Project Director

EEVBJr/GHD:skc

Attachment

cc: See Attached Page 2



U. S. Nuclear Regulatory Commission  
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cc: Richard DeYoung, Director  
Office of Inspection and Enforcement  
U. S. Nuclear Regulatory Commission  
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FINAL REPORT - DER 82-7  
DEFICIENCY EVALUATION 50.55(e)  
ARIZONA PUBLIC SERVICE COMPANY (APS)  
PVNGS UNIT 1

I. Description of Deficiency

Five Star Special "150" Grout, Lot #VWJ 83080, was manufactured on August 30, 1980, and was received at the Palo Verde jobsite on September 3, 1980. It was used in seven placements (Table 1, Placements #1-#7) prior to obtaining the Preliminary Certification (Tests conducted per ASTM C109 and CRD 76) for the "150" grout. The Preliminary Certification for Lot #VWJ 83080 was received approximately September 26, 1980, with no apparent deficiency based upon the submitted seven-day results.

Final Certification for Lot #VWJ 83080 was received on the jobsite October 3, 1980. The cover letter indicated that the material met the minimum requirements of the U. S. Grout Corporation. Three subsequent placements using Five Star "150" Grout, Lot #VWJ 83080, were made (Table 1, Placements #8, #9 and #10) on October 3, 1980, February 19, 1981 and November 11, 1981.

On November 11, 1981, while obtaining compressive strength samples from the Unit 2 Radwaste Construction opening, partial placement 1R024 (Table 1, Placement #10), field lab personnel observed a significant amount of separation in the grout sample over a period of time. The grout sample segregated into two layers; the bottom portion was rather viscous, while the upper portion appeared diluted and watery in nature. Test samples were taken from the top and bottom portion of the special test block for comparison testing. The results (Table 1, Placement #11) from the "special" test indicated significant strength variation - whence Stop Work Notice No. 81-3 on use of Five Star "150" Grout was issued December 14, 1981.

The APS Quality Assurance Stop Work Notice No. 81-3 required the following actions: (a) identify all areas where "150" Grout was used, (b) investigate stratification by coring and testing the top areas placed with "150" Grout, and (c) remove "150" Grout from the approved list. All areas are identified on Table 1.

A test block 1.5' x 2.0' x 2.5' was made January 21, 1982 to simulate the largest placement of grout (Table 1, Placement #10) used on the jobsite. Note that at this time no bags of Lot #VWJ 83080 remained, and that the test used Lot #VWJ 01882. Cores were taken, top and bottom, and were tested at an age of six days. The results indicated approximately 1,680 psi difference between the top and bottom.

Nonconformance Report No. CR3179 was written January 22, 1982, initially against the radwaste partial placement 1R024 (the Containment construction opening was included later). The interim disposition was to take several top and bottom core samples and test for strength requirements. Cores were taken February 10, 1982, from the Radwaste Building Placement 1R024 and tested February 11, 1982. The results are as follows: Top Average = 4,970 psi; Bottom Average = 6,580 psi. This difference is due to the size of the placement which has a depth of three feet. The required strength is 4,000 psi for the Radwaste Building.

The Deficiency Evaluation Report was written February 19, 1982, indicating that Radwaste cores met the 4,000 psi requirement. The top of the Containment construction opening has since been tested to verify that the strength of the grout met the 6,000 psi strength criteria. The Containment construction opening (Table 1, Placement #1), which has a placement depth of fifteen inches, was cored at the uppermost portion where test results, to date, indicate that the weakest grout material would probably exist. The average test results of three top cores is 7,930 psi at an age of 547 days.

Note that all compressive strength tests (Table 1, Placements #1-#10), done in accordance with ASTM C109 (two-inch cubes), were all in excess of 5,000 psi at twenty-eight days with the average compressive strength at twenty-eight days equal to 6,890 psi.

## II. Analysis of Safety Implications

This condition is evaluated as Not Reportable. Based upon the test data accumulated and core samples taken, it is concluded that the largest grout placement (Radwaste 1R024) and the Containment construction opening placement have the required strength. For the remainder of the areas where "150" Grout was used and core samples not taken, it is our judgement that, due to their size, quantity, thickness of grout, time elapsed since placement, and their respective strength criteria, the strength of the grout is adequate. Had this condition remained undetected, it would not have represented a safety significant condition.

## III. Corrective Action

The following actions will be implemented to prevent recurrence:

1. The Work Plan Procedures (WPP/QCI) will be revised to require the Field Engineer to review the manufacturer's final certification and acknowledge his release prior to use of that batch of grout.

2. Remove Five Star Special "150" Grout from the approved list.
3. Limit the maximum depth of grout placement to six inches to minimize segregation.

TABLE 1

DER 82-7

## PLACEMENTS USING FIVE STAR "150" GROUT

Placement Number, Date	Length of Time & #1 days	Quantity of Water/Bag	28d, UNO Comp. Str. 2"x2"x2"	Cores Obtained by 3" Dia. Avg. Compressive Str. (psi)		Quantity Bags	Location of Lot # VWJ 83080 & Comments Lot # VWJ 83080 Manufactured 8/30/80
				Top	Bottom		
(1) 9/10/80	7	8	7480	7930 <sup>#2</sup>	-	250	U-1 Containment construction opening - El. 145'
(2) 9/11/80	8	9	7240	-	-	2	U-2 Control drill & grout rebar - 44 Panels - El. 178'
(3) 9/12/80	9	8	6100	-	-	2	U-2 Containment S-I tank leveline nut blackout - El. 105
(14) 9/15/80	12	8/9	6840/6130	-	-	10	U-2 Containment reactor vessel col. supports (voids left after 1st grouting) El. 78' - 2 Placements
(5) 9/16/80	13	7	7070	-	-	1	U-1 Fuel Bldg. stair-stringer - El. 140'
(6) 9/18/80	15	8	7900	-	-	15	U-1 Containment RCP supports 1B & 2B - El. 81'
(7) 9/24/80	21	8	7000	-	-	3	U-1 Radwaste wall penetration - El. 140'
(8) 10/03/80	30	8	7070	-	-	1	U-2 Turbine grouted anchor bolts - El. 112'
(9) 2/19/81	169	9	5710	-	-	27	U-1 Radwaste pipe chase - El. 114'
(10) 11/11/81	434	9	7300	4970 <sup>#3</sup>	6580 <sup>#3</sup>	30	U-2 Radwaste construction opening 1R024 - El. 152'
(11) 11/11/81	434	9	See Comments	-	-	-	Field lab special testing (Bucket sampled) cube samples - 2" x 2" x 2" at 28 days Comp; Top - 3480 Bot. - 8480
(12) 1/21/82	-	9	8480 <sup>#5</sup>	5960 <sup>#4</sup>	7590 <sup>#4</sup>	-	Test block - similar to #10 - used Lot # VWJ 01882 - cores taken.
						Sum 341 <sup>#6</sup>	

## Notes:

- #1 Length of time from receipt of material on jobsite - Received 9/03/80.
- #2 Avg. of 3 core samples, age tested = 547 days
- #3 Top Avg. of 4 cores, age tested = 92 days  
Bot. Avg. of 3 cores, age tested = 92 days.
- #4 Different Lot - Avg. of 3 cores, age tested = 6 days
- #5 Different Lot (Lot # VWJ 01882)
- #6 Total bags received - 510 bags: 510 - 341 = 169 bags  
The 169 bags were used as concrete spacers.