



Arizona Nuclear Power Project

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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

Subject: Deficiency Evaluation Report (DER) 83-81
RE Gulfalloy Pipe
File: 85-019-026; D.4.33.2

References: 1) ANPP-31528, dated December 20, 1984
2) ANPP-30377, dated August 29, 1984 (Final Report)

Dear Sir:

Attached is revision one to our final written report of the subject deficiency. This revision provides additional information to the condition description and corrective action sections of the report.

Subsequent engineering review and evaluation confirmed that 100 percent witnessing of supplier NDE examinations is not required by the ASME Code, nor is it a licensing commitment. In addition, a review of procurement records for the applicable time period indicated that the project did not purchase any ASME III Class I materials which required NDE inspection, e.g., items one inch and larger. Therefore, the DER commitment and specification 13-PM-307 inspection requirements were deleted.

Very truly yours,

E. E. Van Brunt / ASK

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

EEVB/PJC/plk

cc: See Page Two

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cc: Richard DeYoung, Director
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FINAL REPORT - DER 83-81
DEFICIENCY EVALUATION 50.55(e)
ARIZONA NUCLEAR POWER PROJECT (ANPP)
PVNGS UNITS 1, 2, & 3

I. Description of Deficiency

During jobsite fabrication in the pipe fab shop, approximately twenty (20) feet of 3-inch schedule 160 stainless steel (SA376) pipe (manufactured by Babcock & Wilcox) was found to contain manufacturing defects which violate the minimum wall thickness requirements. The required nominal wall thickness is 0.438" and the required minimum wall thickness is 0.383". Actual measurements revealed deficient areas where the wall thickness was 0.374" to 0.376". This nonconforming condition was documented on NCR PY-7257.

An additional ultrasonic test (UT) was performed on the entire spool piece except for areas where tags or taping prohibited examination. This test revealed deficient areas where the wall thickness measured from 0.360" to 0.382".

A field investigation of the material procurement revealed that B & W fabricated only three 3" diameter spools, each approximately 22-feet long from Heat #M6233. These spools were sold to Hub, Inc. and then sold to Gulfalloy, Inc. BPC bought these three spools from Gulfalloy, Inc. No other 3" Schedule 160 pipe has been ordered for PVNGS by BPC.

An investigation to locate and test (UT) other pipe with the same heat number (#M6233) revealed the following:

Item No.	Unit	Installation Document	Length	Measured Minimum Wall	Acceptable?	Deficiency Documented With
1	1	PC2567	1'-9"	0.400"	Yes	N/A
2	1	PC3306	0'-8"	0.415"	Yes	N/A
3	1	PC6208	0'-6-5/8"	0.395"	Yes	N/A
4	2	PC6394	0'-9"	0.412"	Yes	N/A
5	2	PC7259	0'-8-3/4"	0.396"	Yes	N/A
6	2	MCN33124	0'-5-1/2"	0.235"	No	NCR PA7416
7	3	PC6054	1'-7-3/8"	0.196"	No	NCR PC7261
8	3	MCN55464	2'-0-3/8"	0.399"	Yes	N/A
9	3	MCN55195	2'-9"	0.234"	No	NCR PC7415
10	3	MCN55538	1'-1"	0.203"	No	Installation not accepted - piece was cut out.
11	Fab Shop	-	1'-6"	0.196"	No	Not installed
12	Laydown	N/A	22'-1-1/2"	0.409"	Yes	Not installed
13	Fab Shop	-	19'-10"	0.360"	No	NCR PY-7257
14	1	MCN2546	2'-9"	0.403"	Yes	N/A

The wall thicknesses were measured using the longitudinal wave method UT. Construction uses this method to determine the quality of a circumferential weld. However, the use of this method by the pipe manufacturer is not required by the ASME Code. Instead, the pipe manufacturer uses the shear wave method UT to determine the quality of its pipe.

The use of the shear wave method prevents identification of "inclusions". Inclusions (laminations, dissimilar metals, or "voids" within the wall thickness), are inherent anomalies which are acquired during pipe manufacturing.

A sample of the Item 10 piece was evaluated by Bechtel Materials and Quality Services Department (M&QS). An inclusion was identified and confirmed to be of the lamination type. This inclusion resulted in the minimum wall thickness reading obtained using the longitudinal wave method U.T.

The pipe from heat number M6233 not accounted for in the above tabulation is attributed to scrap created during fabrication of the various spool pieces.

II. Analysis of Safety Implications

The condition of Item No. 13 is evaluated as not reportable under the requirements of 10CFR50.55(e). A calculation (13-MC-ZZ-584) by Bechtel Engineering indicates an acceptable minimum wall for this particular application may be as low as 0.350"; therefore, if this pipe were to be installed, it would be acceptable. If the condition had remained undetected it would not represent a safety significant condition.

The condition of items 6, 7, 9, 10 and 11 is also evaluated as not reportable. The indication of minimum wall violations were a result of inclusions identified using the longitudinal wave method. The ASME III code does not specify inclusions by themselves as grounds for rejection without additional physical tests. The wall thickness of these pieces of pipe was physically measured using a micrometer. The measurements revealed that these pipes have actual acceptable wall thicknesses.

III. Corrective Action

(For description of items mentioned below, refer to table in Section I).

- A. Items 1 through 5, 8, 12 and 14 have been 100% ultrasonically examined for thickness, except where an installed pipe support or other physical characteristics prevented access. This examination was done using the Longitudinal Wave Method, with a Digital Instrument to read the actual wall thickness. The results are documented on the UT reports retained at the site. Upon review of these reports it can be concluded that the pipe wall thickness is acceptable and free of inclusions. Therefore, items 1 through 5, 8 and 14 will remain in place, and item 12 will be used as surplus for future installations.

- B. NCR's PA-7416, PC-7261 and PC-7415 were dispositioned to replace the piping which is believed to contain inclusions and was assumed to be unacceptable. The original piping, items 6, 7, and 9 are scrapped, refer to NCR No. PX-9637. New pieces from item 12 were cut and installed as their replacements.
- C. Uninstalled 3" Schedule 160 S.S. piping, items 10 and 11, with heat number M6233 are scrapped. Refer to NCR No. PX-9637.
- D. Item 13 was dispositioned to be returned to the vendor for replacement. However, pipe was returned to the pipe manufacturer for testing in May 1984. The testing confirmed that the 19'-10" piece of pipe had an actual minimum wall thickness reading of 0.360". This wall thickness is below the minimum Code requirements of 0.383" and therefore is considered rejectable by the piping manufacturer. This pipe was rejected and sent back to the pipe supplier. Refer to NCR No. PY-7257.
- E. After a thorough investigation by Field Piping Engineering it has been determined that only three spools measuring a total length of 66'-6 $\frac{1}{2}$ " were received on FMR FP-44969. Items 1 through 14 account for 58'-7 $\frac{1}{8}$ " (all installation records for 3" Dia. Schedule 160 S.S. pipe have been checked and no other pipe was found installed nor stored). The balance of the shipment (7'-11 $\frac{3}{8}$ ") is assumed to be scrapped during field fit-up and installation.
- F. The laminations found in items 6, 7, 9, 10 and 11 are considered an isolated incident. This conclusion is due to the fact that many Class 1 pipe welds at the PVNGS jobsite are examined by the procedure described in Section I, and no other findings of this nature have been discovered nor reported.
- G. A copy of this report will be provided to Gulfalloy, Inc. for their information only.