

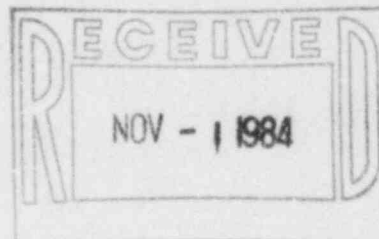
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October 31, 1984

W3P84-2960
Q-3-A35.07.61
3-A1.01.04

Mr. John T. Collins
Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011



Dear Mr. Collins:

Subject: Waterford 3 SES
Docket No. 50-382
SIGNIFICANT CONSTRUCTION DEFICIENCY NO. 61
"Linear Crack in Stainless Steel Tubing"
Final Report

- References:
1. LP&L letter W3P84-2581 dated September 18, 1984.
 2. NRR letter dated June 13, 1984 from D.G. Eisenhut to J.M. Cain (LP&L).
 3. LP&L letter W3P84-2820 dated October 4, 1984.

Reference 1 reopened the subject deficiency because of ongoing efforts associated with resolution of issues in reference 2. By reference 3 we informed you that LP&L anticipated submittal of the final report on SCD-61 by October 31.

Our review of the issues resolutions against the previously submitted final report SCD-61 has been completed and no modifications are needed. Attached as a resubmittal are two copies of the final report of SCD-61.

Very truly yours,

K.W. Cook
Nuclear Support & Licensing Manager

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KWC:GEW:sms

Attachment

cc: NRC, Director, Office of I&E (15 copies)
NRC, Director, Office of Management
G.W. Knighton, NRC-NRR
E.L. Blake
W.M. Stevenson
W.A. Cross
INPO Records Center (D.L. Gillispie)

IE-27

FINAL REPORT OF
SIGNIFICANT CONSTRUCTION DEFICIENCY NO. 61 R1
"LINEAR CRACK IN STAINLESS STEEL TUBING"

INTRODUCTION

This report is submitted pursuant to 10CFR50.55(e). It describes defects in 1/2" diameter stainless steel tubing SA213 Type 316. This tubing has been installed in some instrumentation lines at Louisiana Power & Light Company Waterford No. 3. This problem is considered reportable under the requirements of 10CFR50.55(e).

To the best of our knowledge, this problem has not been identified to the Nuclear Regulatory Commission pursuant to 10CFR21.

DESCRIPTION

Mercury Company of Norwood Incorporated discovered a 1 1/4 inch long defect (crack) which exhibited several branches during attempts to pressurize the line to instrument PT-RC-0173 for Hydrostatic Test M262 on the reactor vessel coolant instrument lines. This through wall defect was found in the 1/2" diameter stainless steel tubing material manufactured by Sandvik Corporation of Scranton, Pennsylvania.

The defective tube was sectioned and subjected to macroscopic and liquid penetrant examinations by Ebasco Services Incorporated. A second defect which did not penetrate the tube wall was found on the tube ID surface approximately eight (8) inches from the through wall defect. This defect and the through wall defect appeared to be manufacturing related and because of the safety class of the material Sandvik's manufacturing personnel were informed of the problem.

1. The chemical analysis and metallurgical samples indicate that the material complies with the requirements of SA 213 Type 316 with respect to composition, ferrite content, nonmetallic inclusion content and distribution. The analyses also indicates that no mixing of material heats occurred.
2. The cause of the defects was localized overheating of the billet material prior to extrusion of the tube hollow. This localized overheating resulted in partial melting and cracking of the billet material. During subsequent extrusion and cold forming operations the defective area was elongated resulting in the defects found in the material installed at the site.
3. Defects such as the two (2) found in the Waterford 3 Instrumentation Tubing caused by hot metal tears usually are of sufficient depth and exhibit such characteristic abruptness and raggedness as to be detectable by eddy current testing. This through wall defect should have been detected during production by hydrostatic testing.

SCD #61R1

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4. The production documentation for Heat 466023 Work Order 41952, which contained the defective tube, showed no rejects for hydrostatic testing (2500 psi on 5/9/81) or eddy current testing (performed on 5/11/81). Due to these facts the tube material from the suspect heat and work order were not considered to have been adequately tested for integrity.

SAFETY IMPLICATIONS

Tubing from Heat No. 466023, Work Order 41952, has been installed in the Reactor Coolant, Safety Injection, Emergency Diesel Generator System and other Safety Related Systems in which ASME Section III is applicable. These systems include Class IE instrument installations. Failure of a tube from this heat of material installed in a Class IE instrument loop may result in an inability of the loop to perform its safety function. Therefore, corrective action described herein is required for safe operation and shut down of the plant.

CORRECTIVE ACTION

Sandvik's metallurgical analysis of the defective material concluded that the defects were the result of a processing rather than a metallurgical composition problem and is considered a rare occurrence. An analysis and statistical review of the NDE failure rate at Sandvik's facilities was performed by Ebasco Quality Assurance and found to be acceptable.

A total of six thousand four hundred sixty-one (6,461) feet of tubing from heat number 466023 was received on site and issued to Mercury for use in safety related systems. Five hundred six (506) feet was hydrostatically tested to 1000 PSI or greater with no rejections. Mil Standard 105D "Sampling Procedure and Tables for Inspection by Attributes" was used as the basis for analysis of these results. Due to the application of the tubing in question, Table II B "Single Sampling Plans for Tightened Inspection" was selected to determine the Acceptable Quality Level (AQL) achieved by the sample size. An AQL of .040 was obtained.

An AQL of .040 provides a very high degree of confidence that the 1/2" stainless steel Sandvik tube from heat 466023, installed in safety related systems meets technical requirements, and is therefore acceptable as currently employed in the plant. Additional confidence is built by the fact that Sandvik tube in ASME safety class systems not tested at 1000 PSI or greater, was tested at the appropriate hydrostatic test pressures for its intended application without any defects being observed.

Nonconformance Report W3-3919 was initiated to track, document, and control the disposition for corrective action. Corrective action is completed and all documentation for Nonconformance Report W3-3919 has been reviewed and closed.

This report is submitted as the Final Report.