



Nuclear Sensors & Process Instrumentation

Round Rock, Texas, USA / www.ultra-nspi.com

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October 8, 2013

10CFR21

ATTN: Document Control Clerk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-001

Subject: 10CFR21 Final Report – Linear Indications/Cracks in Flange Forging, Model N-E13DM Pressure Transmitter

- References:
1. 10CFR21 Interim Report – Linear Indications/Cracks in Flange Forging, Model N-E13DM Pressure Transmitter, June 28, 2013, Log # 2013-37-00.
 2. 10CFR21 Second Interim Report – Linear Indications/Cracks in Flange Forging, Model N-E13DM Pressure Transmitter, August 28, 2013, Log # 2013-37-01.

Ultra Electronics, NSPI, in conjunction with Omaha Public Power District (OPPD), Fort Calhoun Station FC-1-5 Plant, recently identified the existence of linear indications/cracks in the body flange forging on a model N-E13DM pressure transmitter. Ultra Electronics, NSPI has concluded a 10CFR21 investigation to document the root cause for the indications/cracks and provide an engineering evaluation of the reported condition.

Evaluations and tests have been conducted that confirmed that new or installed N-E13DM pressure transmitters are able to perform their intended safety functions. Ultra Electronics, NSPI has determined that no substantial safety hazard exists as a result of the reported condition.

Regards,

Adam Gaither
Vice President, Engineering
Ultra Electronics, NSPI

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Enclosure

10CFR-21 Investigation of Linear Indications/Cracks in Flange Forgings of the Model N-E13DM Pressure Transmitter

DESCRIPTION OF DEFICIENCY

Linear indications/cracks were discovered in the flange forging on three N-E13DM pressure transmitters recently supplied by Ultra Electronics, NSPI to Omaha Public Power District (OPPD), Fort Calhoun Station FC-1-5 Plant. These transmitters with the identified indications had been received by Fort Calhoun but were not installed. Ultra Electronics, NSPI determined that one crack identified by OPPD penetrated the forging beyond the minimum design wall thickness and initiated a 10CFR-21 investigation.

CAUSE OF DEFICIENCY

Ultra Electronics, NSPI conducted thermal and seismic testing to determine if the indications/cracks will propagate during its 20 year qualified life, and engaged a third party metallurgical research laboratory to evaluate the forgings for a root cause analysis. The following includes a list of significant findings from the 10CFR-21 investigation.

- The crack that penetrated the forging beyond the minimum design wall thickness was formed along inclusions in the material. The forging process likely caused the material to separate along these inclusions.
- The indications in other forgings appeared to be entrapped material; strings of oxide inclusions or slag formed during the casting process. These indications were located in areas of high stress and are typical forging imperfections referred to as cold-shuts or laps. These are not cracks.
- The forging die was worn out and needed to be replaced. This worn die was identified as the cause of the laps and other surface irregularities. These surface irregularities were removed by the forging vendor using a grinder.

SAFETY IMPLICATIONS

Thermal and seismic testing to the service conditions expected in the 20 year qualified life of an N-E13DM transmitter demonstrated that the identified indications/cracks on a suspect forging



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did not change size or propagate. As a result of evaluations and testing described previously, Ultra Electronics, NSPI has determined that no substantial safety hazards or impacts to safety-related systems, structures or components were identified regarding this issue.

CORRECTIVE ACTIONS

Starting on 6/19/2013, corrective and preventative actions were initiated to contain possible safety issues:

- Additional receiving inspections were implemented that rejected forgings with grinding below the surface normal or cracks of any kind.
- A new forging die was ordered and ownership of the die transferred to the forging vendor to ensure that it will be maintained correctly in the future.

With these actions, Ultra Electronics, NSPI is confident that this investigation can be closed and there are no safety issues to report.