

ITT Industries

AUTOMOTIVE
DEFENSE & ELECTRONICS
FLUID TECHNOLOGY

ITT Barton
800 E. Turnbull Canyon Rd.
P.O. Box 1582
City of Industry, CA 91749-1882
Tel: (818) 961-2547
Fax: (818) 233-7241
Email: ittbarton@fluids.itind.com

December 13, 1996

South Carolina Electric and Gas
P.O. Box 88
Jenkinsville, South Carolina, 29065

Attention: Mr. Mike Fowlkes
Manager, Licensing

Subject: 10CFR21 Notification on Model 763 Wire Failures

Dear Mr. Fowlkes,

Attached is our engineering input regarding the subject failure. ITT Barton has committed to supplying SCE&G as well as the NRC with periodical updates regarding our evaluation and eventual corrective action.

ITT Barton is compiling a listing of all impacted customers who will be notified directly of the problem consistent with the requirements of 10CFR21.

This information is supplementary to the 10CFR21 Notification filed by the V.C. Summer Nuclear Station (Docket Number C5000395) in their Licensing Event Report (LER) Number 96-007, Rev. 1 submitted to the U.S. Nuclear Regulatory by South Carolina Electric and Gas letter number RC-96-0249 dated October 18, 1996.

ITT Barton is continuing the investigation and understanding of the situation and intends to identify a suitable repair which can be implemented in the field. If you have additional questions, please do not hesitate to contact the undersigned.

Regards,

Ted Holdredge
Quality Manager
ITT Industries
ITT Barton
Phone: (818) 961-2547

9703060253 961213
PDR ADOCK 05000395
S PDR

060048

Check us out on IndustryNet at: <http://www.industry.net/itt/barton>



10 CFR PART 21 NOTIFICATION

(December 13, 1996)

This Notification is provided as supplementary information to the 10 CFR Part 21 Notification filed by the V. C. Summer Nuclear Station (Docket Number 05000395) in their Licensing Event Report (LER) Number 96-007, Rev. 1 submitted to the U.S. Nuclear Regulatory Commission by South Carolina Electric and Gas letter number RC-96-0249 dated October 18, 1996.

ITT Barton supplies Model 763 and 763A Gage Pressure Electronic Transmitters to the commercial nuclear power industry for use in safety related applications. More than 2000 Model 763 and 763A transmitters have been manufactured by ITT Barton. We have recently discovered a situation that we believe represents a substantial safety hazard in some of these instruments that we have manufactured. Until this time, all previously reported instances of strain gage lead wire failures in Model 763 and 763A transmitters (4 instances in the past ten years) were determined to have been caused as a result of mechanical damage to the very small wires during calibration efforts. We now believe, based on evaluation of the three additional recently failed transmitters at V. C. Summer, that some of these reported problems may have involved wire embrittlement which occurs during the wire soldering operation.

Wire embrittlement can occur during the soldering of the seven strand #40AWG copper leads that connect the variable resistance strain gages to the remainder of the electronic circuit. This embrittlement involves a metallurgical reaction between the copper wire and the tin based solder used to make the connections. This reaction is common to the soldering of copper using tin based solders and involves the formation of an intermetallic phase of material (usually Cu_6Sn_5 or Cu_3Sn) formed at the solid-liquid interface. While a thin layer of this intermetallic compound is considered necessary to form the metallurgical bond, as the thickness of the layer increases, copper is consumed and the mechanical integrity of the joint is reduced. The dynamics of the intermetallic material growth are influenced by a number of factors which include the amount of tin and other elements in the solder, the soldering temperature and the duration of the heat exposure. This wire embrittlement process does not progressively worsen over time.

ITT Barton is concerned that instruments with excessive wire embrittlement may now be in use for safety related applications which may fail when subjected to high vibrational stresses which could be experienced during nuclear power plant design basis events. While each solder joint is subjected to significant mechanical stress during the instrument assembly process, historical evidence indicates that this alone may not be adequate to ensure that any unit is capable of surviving the design basis events. It is not known to us how much residual strength may exist in the soldered connections of concern. We believe that the root cause of the problem is the decrease in the wire flexibility caused by a reduction in the copper cross-sectional area due to variations in the soldering process. ITT Barton believes that the situation can be remedied by the use of additional external mechanical support for the wires at the point of failure. This belief is based on the fact that there are no known failures of the S/G lead wires where external mechanical support for the connection is provided, including the opposite end of the wires of concern in the Model 763 and 763A transmitters (wires supported by the application of RTV material), or other instruments that use the same wire with additional coatings/features that afford extra mechanical support.

ITT Barton is presently investigating our understanding of the situation and intends to identify a suitable repair which can be implemented in the field. We'll keep you informed of our progress. If you have any questions please contact Theodore Holdredge, Quality Assurance Manager, at (818) 961-2547 Ext. 363.

cc:

U.S. Nuclear Regulatory

Re: (V.C. Summer Nuclear Station

Docket Number 05000395

Licensing Event Report Number 96-007, Rev. 1
dated October 18, 1996.)

D. Evans, General Manager, ITT Barton

R. Krechmery, Director of Engineering, ITT Barton

A. Lussier, Director of Operations, ITT Barton

M. Larson, ITT Barton Nuclear & Government Product Engineering

J. Incontri, ITT Barton Director of Marketing

S. Noji, ITT Barton Consumer Affairs

Robert Justice, South Carolina Electric and Gas