CANBERRA

March 31, 2016

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

cc:
Terry Jackson, Chief
Quality Vendor Inspection Branch-1
Division of Construction Inspection
and Operational Programs
Office of New Reactors

Subject: Reply to a Notice of Nonconformance, Request for additional information

Docket No: 99901461
Reference NRC Inspection Report No. 99901461/2015-201
Nonconformance 99901461/2015-201-03

Dear Sir/Madam:

Canberra Industries Inc., CT has reviewed your request for additional information regarding nonconformance 99901461/2015-201-03 and is enclosing responses to said request.

Should there be any questions or need for additional information, CANBERRA will be pleased to provide the same. I may be contacted by phone at (203) 639-2209, or by email at michael.byram@canberra.com.

Sincerely yours,

Canberra Industries Inc.

Michael R Byram
Manager Quality Assurance, North America

Attachment: Response to request for additional information

Distribution: JB Koehl, Doug Bellfy, Audrey Carmichael, John Tamburro, Xavier Humel, James Wrobel, Dominique Grandemange, Shelia Webb, Bertrand Duban

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NRD

NRC request for additional information:

We have reviewed your letter and found that it is not fully responsive to addressing NON 99901461/2015-201-03.

Specifically:

1. Your response to NON 99901461/2015-201-03 states, in part, that the alternate method utilized for temperature measurement by Canberra was not identical with recommended test equipment specifications by the manufacturer of the wave solder machine (WSM). The response then describes an evaluation of the effect on Canberra components and corrective steps taken related to solder temperature measurement. However, the response did not note if the evaluation included other WSM manufacturer test equipment recommendations. Several additional operational parameters were identified as critical to the proper operation of the WSM in Section 2b of the inspection report, including, but not limited to, temperature of the Preheat Stages 1, 2, and 3; circuit board belt transit speed; and solder wave depth on the circuit board.

Please describe how Canberra has evaluated any additional critical parameters effecting WSM performance. Additionally, please describe the extent-of-condition review to determine the potential adverse impact of using alternatives to manufacturer recommendations on other solder machines or during other solder procedures effecting safety-related components. The inspectors are specifically interested in control of any induced latent failure modes that could affect seismic and other qualifications not detected by the Canberra post soldering inspection process.

Canberra response to NON 99901461/2015-201-03, request for additional information:

"Critical" Operational Parameters:

Solder Pot Temperature:

Reviewed and validated through internal CAR 1511-MB613462. Canberra response to NRC dated January 21st, 2016. Reference ML16054A028.

Preheat temperatures 1,2 and 3:

The preheating system consists of far-infrared ceramic heaters (full convection heating is optional) and a Philips quartz cesium lamp which are enclosed in a preheating tunnel. The zones are controlled by a Siemens PLC and Siemens temperature controller. It has 3 individually controlled preheating zones plus a thermal compensation zone which reduces the temperature drop between the preheat zones and the solder wave. PID controlled SSR's (Solid State Relays) is used to control the Voltage of the pre-heaters to accurately achieve the set temperatures.

PID automatic control is used for the operation of the preheating system. The heating plates inside the tunnel heat up to the desired preset temperature, with a temperature error not more than ±5°C. Additionally a closed loop conveyer system is used for an accurate speed.

Preheat zones are equipped with audible and visual alarm so as to check the deviation between the preset temperature and real-time temperature at any moment.

Probes, independent of the PID controlled SSR's, monitor actual temperatures in each section. If the preheat temperature exceeds ±6°C from the PID controlled SSR set points the machine will provide an audible alarm to the operator.

Based on the controls currently in place (PID controlled SSR's) and the secondary monitoring (independent probes) it was determined that adequate measures were in place to control and monitor the preheat temperatures.

Conclusion: No further action required to monitor preheat temperatures.

Circuit board transit speed:

The tachometer is a rotary encoder which detects the speed of the conveyer. It is connected to the Siemans control unit which will calculate the actual speed of the conveyer and determine the current position of the PCB. This will control the correct timings to turn on the spray fluxer and the solder waves.

The tachometer works independently from the control unit with regards to actual set speeds of the belt. It monitors and provides real time feedback to the control unit for timing purposes of the spray fluxer and the solder waves.

A belt speed variance, monitored by the tachometer, will trigger a "Conveyer Speed Error" indication when the actual speed exceeds the control unit set value by more than ± 0.15m/min. This will provide an audible alarm to the operator and visual display to the monitor. The combination of the control unit and monitoring tachometer provide assurance the PCB board does not remain within the temperature profile for too little or too long of a period of time allowing for an accurate ramp up/ramp down temperatures.

Based on the controls currently in place (control unit) and the secondary monitoring (tachometer it was determined that adequate measures were in place to control and monitor the circuit board transit speed.

Conclusion: No further action required to monitor preheat temperatures.

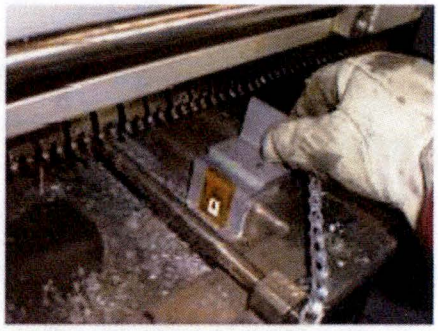
Solder wave Depth:

Wave depth is maintained at a constant level through three variables, wave pot height, wave pot solder level, and conveyer angle.

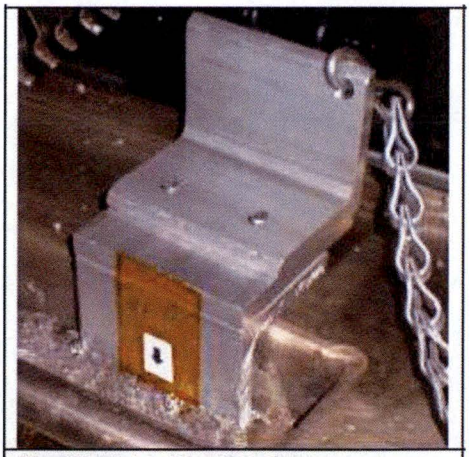
Wave pot height of the pot is determined and set by the manufacture and is maintained permanently in a single position. It is considered a constant and plays no role in wave height variation.

The wave pot solder level is maintained and verified for each production run as required per Canberra work instructions "Wave Solder Operating Instructions & Daily Maintenance"

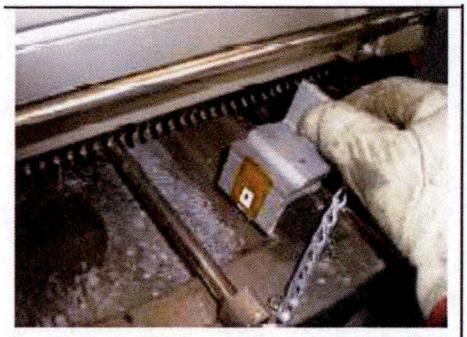
The following excerpts provide guidance to the operator for proper adjustments of wave pot solder level.



With a gloved hand install the solder level fixture as shown on either front side of the solder pot.



Verify the solder level at a minimum is at the bottom of the solder level fixture. If not, add solder to the pot accordingly.



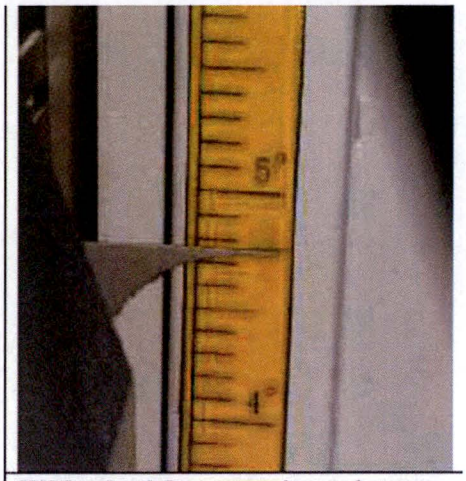
With a gloved hand remove the solder level fixture from the solder pot.

These steps as defined by Canberra work instruction "Wave Solder Operating Instructions & Daily Maintenance" maintain proper wave pot solder levels to ensure proper operation.

The conveyer level is adjustable and is the final variable in establishing the correct wave height to provide proper operation. These are also defined and verified for each production batch.

The following excerpts provide guidance to the operator for proper adjustments of wave pot solder level.

While wearing the smock & gloves, use the wheel to the right of the solder pot. Adjust the conveyor as shown in the next picture.



With wheel from previous picture adjust height of the conveyor to the mark as shown.

The scale and the indicator are permanently affixed to the enclosure of the wave solder machine. This allows for sustained repeatability through production batches.

Based on the controls currently in place (fixed solder pot height, continuous verification of solder pot levels and mechanical adjustment of conveyer angle and visual verification through indicator and scale) it was determined that adequate measures were in place to control and monitor the wave solder height.

Conclusion: No further action required to wave solder height.

Solder chemical quality:

A Canberra review of the solder chemical analysis shows the sample to be within the WSM manufacturer's recommendations. Concurrence was stated within the NRC report page 7 section 2B.

The manufactured recommended practices for the wave solder machine were reviewed and compared to Canberra Operational and preventative maintenance instructions to verify suitability.

All items reviewed were determined to be adequately controlled and in line with Manncorp AE400-D5 User manual Ver. 1.0

Please Note: The Manncorp AE400-D5 wave solder machine is the only WSM utilized in the Canberra facility.

Additionally Quality assurance has conducted a review of tools utilized in other special processes utilized within the Canberra facility.

All reviews of associated operating and preventative maintenance instructions for solder irons, crimping tools and stripping tools were conducted and found to be effectively implemented in line with manufacturer's suggested practices.

Summary:

We consider finding NON 99901461/2015-201-03 to be an isolated incident and have not identified any systemic issues regarding operating and preventative maintenance instructions which may affect product quality as it relates to safety related items.

The extent of condition has been verified through the information provided within this document. Canberra has assessed that no further actions are required at this time but will continue monitoring the effectiveness of the procedures and work instructions through the established Internal audit program.