

# SOUTHWEST RESEARCH INSTITUTE®

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ENVIRONMENTAL, SAFETY AND QUALITY SYSTEMS

March 31, 2015

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

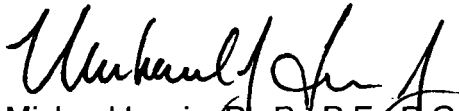
Subject: SwRI's Response to Nuclear Regulatory Commission Inspection  
Report No. 99900238/2014-201(NRC Docket 99900238)

Dear Mr. Jacobson:

Please find attached the responses to the issues addressed in the Nuclear Regulatory Commission's letter dated January 28, 2015 regarding the original responses provided by SwRI for the above referenced Inspection Report.

If you have any questions, please contact me at 210-522-3533 or [michael.lewis@swri.org](mailto:michael.lewis@swri.org).

Regards,



Michael Lewis, Ph.D., P.E., F.G.  
Executive Director, Environmental, Safety and Quality Systems

Attachment: Summary of Evaluations

Cc: Chief, Electrical Vendor Inspection Branch, Division of Construction Inspection and Operational Programs, Office of New Reactors



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IE09  
MRO

Reply to letter dated January 28, 2015 regarding Inspection Report No. 99900238/2014-201.

A summary of the evaluations performed to ensure that previously completed work conformed to the purchase requirements is provided below.

**Nonconformance 99900238/2014-201-01**

**Example 1**

All of the irradiation reports issued by SwRI since October 2012 were reviewed to determine 1) If the minimum assured dose was achieved and 2) If multiple items were involved, that each item received an appropriate dose.

- 1) The estimated total propagated uncertainty (TPU) was calculated using dosimeter measurement uncertainty, taking into account possible temperature uncertainties and positional/geometry uncertainties which included beam non-uniformity. The TPU was determined as the geometric mean of all the uncertainties. Temperature uncertainties were determined experimentally to be one sided (i.e. the temperature of the ion chamber always rises in the radiation field). This leads to a under estimation of the actual radiation field, however the error was propagated as if it was two sided. The positional/geometry error was determined from the Relative Standard Deviation (RSD) of the measurements taken, multiplied by a correction factor to account for the number and spacing of points taken for measurement. No reports were determined to be out of compliance.
- 2) For multiple items, an estimation of the actual positional dose rate was obtained for each item or area. The RSD of the scatter of each items dose rate was determined and this value was introduced into the TPU equation substituting for the dose uniformity term in 1. The calculated TPU was then compared to the margin added. All multiple item irradiations passed this test.

Based on this evaluation SwRI believes that previously reported work conformed and is valid as-reported.

**Example 2**

The Structural Engineering Department reviewed the nuclear safety-related projects relating to seismic testing that were performed in the laboratory during the past three years. In all cases the client specifically requested and was quoted for biaxial testing. For all tests the client provided site-specific seismic profiles that were already tailored for biaxial seismic testing. For these reasons, SwRI believes that the nuclear safety-related seismic testing reviewed is valid as-reported.

**Nonconformance 99900238/2014-201-02**

**Example 1**

Upon close inspection of the dosimetry equipment, it was discovered that both of older dosimetry systems had been specially modified by the factory sometime in the 1990's. One of the systems was

modified to have an upper range that was 2x higher than stock (2MR/hr) and the other one was modified for a 6x higher than stock range (6MR/hr).

All data was screened with these new upper limits in mind and the maximum data point was 1.481 MR/hr, well below the 2 MR/hr limit of the lower of the two modified probe assemblies. For this reason, SwRI believes that previously reported work conformed and is valid as-reported.

### **Example 2**

The Structural Engineering Department reviewed the six nuclear safety-related projects performed in our laboratory during the past three years; these projects involved seismic and/or vibration testing. The following reviews were conducted for these projects:

1. The controllers used for both vibration and seismic testing have been verified using independent measurements to ensure the shaker table provides the requisite input. In order to perform this verification a system test was performed with a known profile. A separate system analyzer was used to confirm that the table performed in accordance with the instruction provided by the controller. As there have been no changes to the process or to the source code this verification provides independent evidence that the system as used on previous projects was valid.
2. All of the monitoring and measurement equipment used during testing, including accelerometers, have stable calibration histories.

For these reasons, SwRI believes that the nuclear safety-related vibration and seismic testing reviewed is valid as-reported.