

Equipment Malfunction the Cause of Anomalous Gamma Radiation Readings at the CEMP Station in Milford, Utah

After conducting a detailed analysis of pressurized ion chamber (PIC) data, gamma spectroscopy and gross alpha and beta analyses of particulate air filters, and diagnostic analysis of the PIC itself, it has been concluded with a high degree of certainty that anomalous gamma radiation readings recorded for brief periods during early July at the Milford, Utah, Community Environmental Monitoring Program (CEMP) station were a result of malfunction of the pressurized ion chamber (PIC). The abnormal readings began on July 5th, the day prior to Milford Flats wildfire, which started July 6th just north of the town of Milford, Utah. The Milford Flats fire was the largest in Utah history.

Analysis of air filters collected during the same period indicates no man-made radionuclides from past nuclear testing on the Nevada Test Site or from world-wide fallout. The complete [Report of Analysis: Milford and Delta, UT Air Filter Samples](#)ⁱ, details the results of gamma spectroscopy analyses carried out on the air filters. The report was prepared by scientists at the University of Nevada, Las Vegas who analyzed the air filter samples. In addition, gross alpha and beta analyses of the same filters, conducted by the commercial lab Test America of St. Louis, Missouri, showed activity levels consistent with normal background levels of weekly samples collected during 2006 and the first quarter of 2007. [Click here](#)ⁱⁱ to download a copy of this report, and [here](#)ⁱⁱⁱ for a comparison of activity levels of the Milford Flat fire samples with 2006 and early 2007 results.

Although the amount of particulate material on the filter samples was about twice as high as normal because of the fire, the gamma spectroscopy performed on the samples detected only naturally-occurring radionuclides. These include: Beryllium-7 (Be-7), a radioisotope formed in the upper atmosphere produced by interaction with cosmic rays; Potassium-40 (K-40); and Lead-212 (Pb-212), Lead-214 (Pb-214), and several other species derived from natural uranium and thorium decay series. Cesium-137 (Cs-137), a relatively long-lived gamma-emitting component of worldwide fallout, was not detectable in any of the filter samples analyzed.

PIC measurements and air particulate sample from the CEMP station at Delta, Utah, approximately 70 miles north of Milford, were also examined. The Delta PIC showed no elevated readings, although Delta also received smoke from the fire. Results of the analysis of air filter samples from Delta were similar to those from the Milford station. Results of the air filter analyses and detailed analysis of the data collected by the PIC at the Milford CEMP station indicated that equipment malfunction was the most likely cause of the readings. Diagnostic testing of the Milford PIC electronics carried out by Pacific Northwest National Laboratory (PNNL) identified severe warping of the 70-pin SIMM socket of the data acquisition board. See Figure 1. The socket may have been set wrong when the PIC was last serviced, although PNNL indicated that heat may have been a contributing cause.

On October 5, 2007, the Desert Research Institute, which manages the CEMP for the DOE, National Nuclear Security Administration Nevada Site Office, gave a presentation to the State of Utah Radiation Control Board detailing the occurrence of the anomalous gamma readings at Milford, as well as a summary of the analyses conducted, and the conclusion that equipment malfunction was identified as the cause of the readings. A [PDF file of the presentation](#)^{iv} is available on the CEMP website.

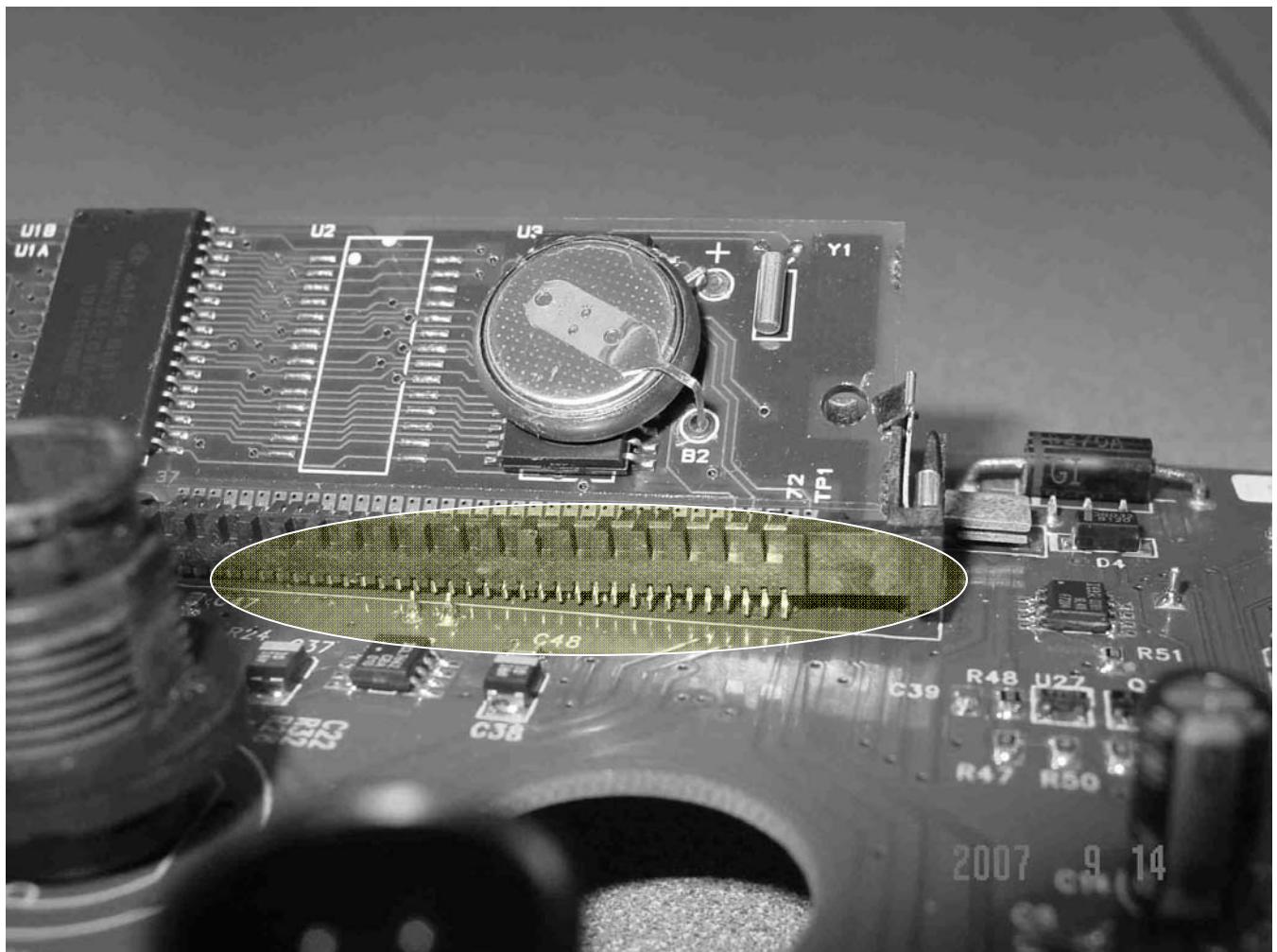


Figure 1 - Warping of the 70-pin SIMM socket

ⁱ http://www.cemp.dri.edu/CEMPREPORT_UTAHFIRES_Final.pdf

ⁱⁱ http://www.cemp.dri.edu/Test_America_Gross_Alpha_Beta.pdf

ⁱⁱⁱ http://www.cemp.dri.edu/Milford_CEMP_Gross_Alpha_Beta_Results.pdf

^{iv} http://www.cemp.dri.edu/DRI_Presentation_for_Utah_Radiation_Control_Board.pdf