

Plutonium result updated to “non-detect”

The Facts

On July 12, 2006, LANL collected a groundwater sample from Buckman Well #1 as part of routine quarterly sampling that is conducted by the Lab at three water-supply wells in the Buckman Well Field. This sampling is performed pursuant to a cooperative agreement with the City of Santa Fe.

The samples were sent to an independent laboratory, General Engineering Laboratories (GEL) in Charleston, South Carolina, for radiochemistry analysis. GEL’s data package from the July 2006 samples indicated that they detected plutonium-238 at a level about 3% of the DOE concentration guide for water ingestion.

However, after recent reviews of legacy data by LANL and further discussions with the analytical laboratory, GEL has confirmed that computer analyses of the results were incorrect. GEL now concludes that Pu-238 was *not present* in the sample from Buckman Well #1.

Furthermore, in the spectral analysis, the “signature” found in the sample result does not match the known signature of Pu-238. (See below.)

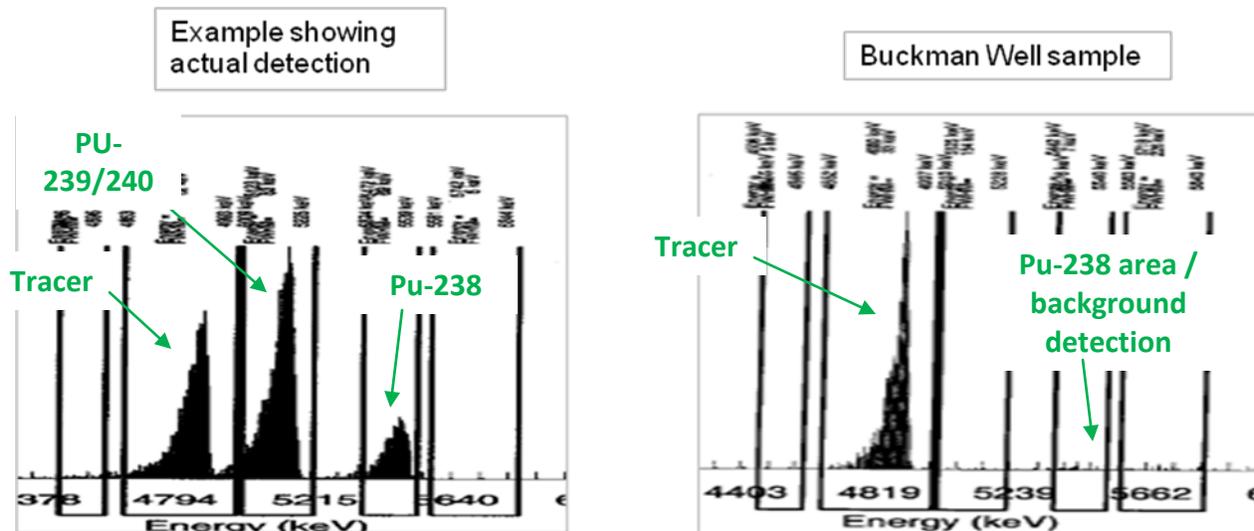


Figure 1: The example image on the left shows a plutonium tracer, a Pu-239/240 detection, and an actual Pu-238 reading. In the image on the right, the tracer appears, but the Pu-238 reading is missing.

The 2006 computer analysis was unable to evaluate the data fully because it used the total number of alpha radiation counts within a specified “region of interest” (the bracketed areas in the spectrograph), but the computer did not “zoom in” to the region with enough detail. Subsequent examination of the data by experts shows that the counts were the result of background radiation and were not from Pu-238.

Consequently, the results for the July 2006 analysis of Pu-238 has been formally updated and flagged in RACER, the public database of LANL environmental data, as “non-detect.”

Updates to RACER are common. Of 1.7 million records entered in 2010, changes in detection status occurred about 1,900 times. Of those updates,

- 1,200 were results rejected because they failed quality assurance validation,
- about 50 were revised up, from “reject” or “non-detect” to “detect,” and
- about 550 were revised down, from “detect” or “rejected” to “non-detect.”

There were no prior detections of Pu-238 in Buckman wells, nor have there been any since.

Questions and Answers:

What is RACER?

RACER is a publicly-available Internet database containing millions of results of environmental sampling and monitoring in and around Los Alamos National Laboratory. Data come from LANL and the New Mexico Environment Department. LANL sends data to RACER weekly. RACER is managed by the New Mexico Community Foundation. Any entity which contributes data to RACER has the ability to update or correct previous entries.

Why does LANL update RACER?

If subsequent analysis finds that an original data point was in error, the data must be updated, *whether the revision increases the value or decreases it*. Updates can occur after sample validation, or to correct a sample’s location, or to reject it for quality control issues, among other things. For more information about data quality in RACER, see

<http://racerdat.com/support/Data%20Quality.pdf>

Why was the computer analysis wrong?

Results that are so small are difficult to analyze and can be confused with background. Modern detection methods have established acceptable margins of error. Finally, computers don’t examine spectrographs, only the underlying numbers. Humans are much better at examining the shapes of the spectrographs and seeing differences in analytical signatures.

Does this have anything to do with the new Buckman Direct Diversion (BDD) Project?

No. The Buckman wells draw water from the *underground aquifer* and are located upriver of the BDD intake, which draws *river water*.

Is LANL required to inform anyone when a change is made to the RACER database? How will the public know that a change has been made?

A package of all new data and changes is sent to RACER administrators weekly. RACER does contain a “last modified” attribute, an aggregated total number of changes list, and the New Mexico Community Foundation closely watches changes. A clearer indicator of changes for individual results is planned for the next version of the system.

Who has LANL told about this?

We understand that the 2006 detection was of great interest to Lab stakeholders. We have briefed technical staff of the City of Santa Fe. We have also coordinated with the New Mexico Community Foundation and were invited to present the information at an NMCF public meeting on May 14, 2011 in Española.