LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

LLNL-TR-643073

Analyses: Environmental Monitoring Well ER-20-5 #1 Pu data

M. Zavarin

August 29, 2013

Disclaimer

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Lawrence Livermore National Laboratory

August 28, 2013

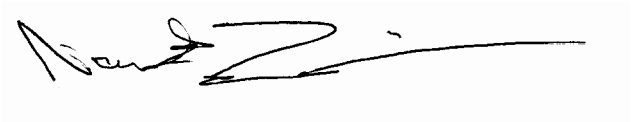
To: Bill Wilborn

From: Environmental Radiochemistry Group, Lawrence Livermore National Laboratory

RE: Analyses: Environmental Monitoring Well ER-20-5 #1 Pu data

This report updates the results of Pu measurements of groundwater samples from well ER-20-5#1 collected on April 26, 2011. These analyses were not completed when the original well report was issued. Pu analytical results for this sample are compiled in Table 1. Laboratory analytical protocols are fully described in the LLNL Standard Operating Procedures written in support of the UGTA Project (LLNL, 2004).

Plutonium was analyzed and isotope ratios (not reported here) were consistent with the identification of Benham as the source, as described in Kersting et al., 1999. The activities in 2011 have decreased slightly since 2004. Importantly, activities are more than one order of magnitude below the MCL for Pu.



Mavrik Zavarin, Project Manager
Underground Test Area

References

Kersting, A.B., Efurd, D.W., Finnegan, D.L., Rokop, D.J., Smith, D.K., and Thompson, J.L. (1999) Migration of plutonium in groundwater at the Nevada Test Site. Nature, 397: 56-59.

LLNL (2004) Analytical Measurements: Standard Operating Procedures, Underground Test Area Project. Chemical Biology and Nuclear Science Division, Lawrence Livermore National Laboratory, 30 June 2004.

Bowen, S.M., D.L. Finnegan, J.L. Thompson, C.M. Miller, P.L. Baca, L.F. Olivas, C.G. Geoffrion, D.K. Smith, W. Goishi, B.K. Esser, J.W. Meadows, N. Namboodiri, and J.F. Wild. 2001. Nevada Test Site Radionuclide Inventory, 1951 – 1992. Los Alamos National Laboratory, Los Alamos, NM, LA-13859-MS.

Prepared by LLNL under Contract DE-AC52-07NA27344.

Table 1: Analytical results for groundwater from well ER-20-5 #1.

Sample Date	30 Nov 2004 [b]	26 Apr 2011 [b]
^{239,240}Pu, <20nm (pg/kg)		1.137
^{239,240}Pu, <100nm (pg/kg)		2.281
^{239,240}Pu, 20-100nm (pg/kg)		1.194
^{239,240}Pu, >100nm (pg/kg)		2.473
^{239,240}Pu total (pg/kg)	6.4	4.001
^{239,240}Pu, <20nm (pCi/kg), calculated		0.0828
^{239,240}Pu, <100nm (pCi/kg), calculated		0.1660
^{239,240}Pu, 20-100nm (pCi/kg), calculated		0.0869
^{239,240}Pu, >100nm (pCi/kg), calculated		0.1800
^{239,240}Pu total (pCi/kg), calculated	0.47	0.2912

[b] ^{239,240}Pu activity is calculated based on an assumed 240/239 ratio of 0.07. This ratio is the unclassified cumulative atom ratio of 240/239 for all underground nuclear tests reported in Bowen et al. (2001).

Report Distribution

Bill Wilborn (paper, electronic)
Environmental Management Operations
M/S 505
NNSA/NFO
P.O. Box 98518
232 Energy Way
N. Las Vegas, Nevada 89193
wilborn@nv.doe.gov

George H. Juniel (electronic)
NSTec
JunielGH@nv.doe.gov

David L. Finnegan (electronic)
Los Alamos National Laboratory
dlf@lanl.gov

Sarah Roberts (electronic)
Lawrence Livermore National Laboratory
Roberts28@llnl.gov

Christie Miller (electronic)
Navarro-Intera, LLC
christie.Miller@nv.doe.gov

Irene Farnham (electronic)
Navarro-Intera, LLC
Irene.Farnham@nv.doe.gov

Bimal Mukhopadhyay (electronic)
Environmental Management Operations
NNSA/NFO
Bimal.Mukhopadhyay@nv.doe.gov

Ken Ortego (electronic)
NSTec
ORTEGOPK@nv.doe.gov

Naomi Becker (electronic)
Los Alamos National Laboratory
nmb@lanl.gov

Chuck Russell (electronic)
Desert Research Institute
chuck.russell@dri.edu

Andrew Tompson (electronic)
Lawrence Livermore National Laboratory
afbt@llnl.gov

Gayle Pawloski (electronic)
Lawrence Livermore National Laboratory
pawloski1@llnl.gov

Sam Marutzky (electronic)
Navarro-Intera, LLC
Sam.Marutzky@nv.doe.gov

Robert Graves (electronic)
United States Geological Survey
rggraves@usgs.gov