



LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

Measurements of Plutonium Activity Concentrations and $^{240}\text{Pu}/^{239}\text{Pu}$ Atom Ratios in Brown Algae (*Fucus distichus*) Collected from the Littoral Zone of Amchitka Island using Accelerator Mass Spectrometry (AMS).

Terry Hamilton, Doug Dasher, Tom Brown, Alfredo Marchetti,
Roger Martinelli and Steven Kehl

Lawrence Livermore National Laboratory
PO Box 808, Livermore, CA 94551-0808, U.S.A

November 2005

For submission to:
Methods and Applications of Radioanalytical Chemistry
MARC VII
Kailua-Kona, Hawaii, USA
April 3-7 2006

DISCLAIMER

This document was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor the University of California nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or the University of California, and shall not be used for advertising or product endorsement purposes.

Work performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under Contract No. W-7405-Eng-48.

Measurements of Plutonium Activity Concentrations and $^{240}\text{Pu}/^{239}\text{Pu}$ atom ratios in Brown Algae (*Fucus distichus*) Collected from the Littoral Zone of Amchitka Island using Accelerator Mass Spectrometry (AMS).

Terry Hamilton, Doug Dasher, Tom Brown, Alfredo Marchetti, Roger Martinelli and Steven Kehl

Lawrence Livermore National Laboratory
PO Box 808, Livermore, CA 94551-0808, U.S.A.

Plutonium-239 (^{239}Pu) and plutonium-240 (^{240}Pu) activity concentrations and $^{240}\text{Pu}/^{239}\text{Pu}$ atom ratios are reported for Brown Algae (*Fucus distichus*) collected from the littoral zone of Amchitka Island (Alaska) and at a control site on the Alaskan peninsula. Plutonium isotope measurements were performed in replicate using Accelerator Mass Spectrometry (AMS). The average $^{240}\text{Pu}/^{239}\text{Pu}$ atom ratio observed in dried *Fucus d.* collected from Amchitka Island was 0.227 ± 0.007 ($n=5$) and compares with the expected $^{240}\text{Pu}/^{239}\text{Pu}$ atom ratio in integrated worldwide fallout deposition in the Northern Hemisphere of 0.1805 ± 0.0057 . In general, the characteristically high $^{240}\text{Pu}/^{239}\text{Pu}$ content of *Fucus d.* analyzed in this study appear to indicate the presence of a discernible basin-wide secondary source of plutonium entering the marine environment and is not necessarily linked to the underground nuclear test program on Amchitka Island (1965-71).

Work performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under Contract No. W-7405-Eng-48.

**Methods and Applications of Radioanalytical Chemistry
MARC VII
Kailua-Kona, Hawaii, USA
April 3-7 2006**

University of California
Lawrence Livermore National Laboratory
Technical Information Department
Livermore, CA 94551

