involves direct counting for solid samples and a simple $^{133}Ba(Ra)SO_4$ co-precipitation procedure for water samples followed by gamma counting. Analytical results received from the participating laboratories were subjected to data analysis and statistical evaluation using a ratio test, the *u*-test, range analysis and control chart analysis to validate the overall performance of the prescribed method. Relatively good precision and high accuracy of data were achieved when the participating laboratories followed the prescribed procedure closely. The consistency of results among laboratories was not correlated to the $^{226,228}Ra$ concentrations in the samples. Most of the results that failed the acceptance criteria were either due to the absence of geometric and secular equilibrium between ^{226}Ra and its signature decay daughters, or due to insufficient counting statistics when laboratories are working close to their detection limits. No significant bias or systematic errors were observed, except for produced water samples where results were biased high compared to the known values. An explanation for this observation is proposed. *This work was funded by a Work for Others project sponsored by American Petroleum Institute, GTI, and the Department of Energy under GTI Contract No. 2789. This work was 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.*

202 DECOMPOSTION OF U/Th BEARING MINERALS AND THE IMPLICATION TOWARDS ENVIRONMENTAL CLEAN UP. L.K. Selvig*[1,2], K.A. Lee[1,3], K. Inn[1].
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Minerals in the soils range from those that easily weathered to those, which are very resistant to the weathering processes. Many of these resistant minerals have a tendency to harbor uranium and thorium within their crystal structure. These "resistates" can contain as much as 15-20% of the total uranium and thorium present in the soil. What acid dissolution procedures can be employed to dissolve these mineral resistates? How much uranium and thorium are in reistates? Would the amount of uranium and thorium hidden in the resistates affect remiediation procedures? Is there a public health threat because of the amount of uranium and thorium harbored in resistates? To answer these questions seven resistate minerals were chosen. They were chosen based on chemical composition and commonality. Three of the minerals are classified as silicates, three are phosphates and one is an oxide. The minerals were crushed, powdered and put through an acid dissolution process. Samples were first treated with sulfuric acid followed by hydrofluoric- nitric- and perchloric. The effect of the different acids on the minerals varied with the sample. The phosphate minerals were affected most by sulfuric acid while the silicates were most affected by nitric acid and hydrofluoric acid. Uranium and thorium isotopes were isolated and their level of activity determined by alpha spectroscopy following electrodeposition. Powder x-ray diffraction patterns were analyzed before and after the acid treatment to determine the effects of the acids on the crystal structure of the minerals. Analysis and interpretation of the data may lead to a clearer understanding between resistates in the soil and the levels of uranium and thorium in the environment.

204 LONG-TERM ACCUMULATION OF URANIUM IN BONE MARROW AND THE ISSUE OF DEPLETED URANIUM IN THE BALCANS. J. D. T. Arruda-Neto[1,2], M.V. Manso Guevara[1], G.P. Nogueira[4],I. D. Taricano[2], M.Saiki[5], C.B.Zamboni[5], L.V. Bonamin[2], S.P.Camago[2], A.C. Cestari[2], A. Deppman[1], F. Garcia[8], A.N. Gouveia [1,6], F. Guzman[3], V.P. Likhachev[1], J. Mesa[1], O. Rodriguez[3] , [1]Physics Institute, University of São Paulo, P.O.Box 66318, São Paulo, SP, 05315-970, Brasil.[2]Laboratory of Toxicological Analysis/UNITOX, University of Santo Amaro/ UNISA, São Paulo, SP, Brasil.[3] High Institute of Nuclear Sciences and Technology, Havana, Cuba. [4]Faculty of Veterinary Medicine/ UNESP, Araçatuba, SP, Brasil. [5] Institute for Energetic and Nuclear Research/IPEN-CNEN, São Paulo, Brasil. [6] Biological Sciences Institute, University of São Paulo, SP, Brasil. [7]Laboratory of Viral Inmunology, Butantã Institute, São Paulo, SP, Brasil. [8] Santa Cruz State University, Ilheus, Bahia, BRASIL.

The accumulation and microdistribution of uranium in femoral shaft sections of Beagle dogs were determined by neutron activation analysis. The experiment started immediately after the weaning period, lasting till maturity. Two animal groups were fed daily with uranyl nitrate at concentrations of 20 and 100 μg per gram of food, respectively. It was found that, contrary to single, acute doses results, uranium is accumulated along the marrow, as much as in the bone. The crucial role played by this finding for the evaluation of radiobiological long-term risks is discussed, and the so-called Balcans Syndrome, associated with the spreading of depleted uranium (DU) in the environment, is addressed. It is demonstrated, by means of a biokinetical approach, that the long-term accumulation of uranium in the bone could be described by a finite convolution of single dose daily incorporation. In fact, after a chronic ingestion period of ~ 5 years, our biokinetical approach establishes that for each ppm ingested (1 μg of DU per gram of food) the accumulation in bone and bone marrow is equal to 1 μg of U per gram of biological material. The situation is shown to be two fold worst for young children, since they could receive greater exposure to DU when playing in or near DU impact sites, and because of the build up of uranium in the growing skeleton.

205 A PERFORMANCE STUDY OF XIA'S NEW SMALL LOW-POWER MICRODXP WITH A VARIETY OF DETECTORS. J. Wahl[*1], P. Franz[1], P. Grudberg[1], J. Harris[1], W. Warburton[1]. [1]X-Ray Instrumentation Associates, 8450 Central Ave, Newark, CA 94560, USA.

The microDXP is a new low-power, credit card sized, limited-feature set digital pulse processor produced by X-Ray Instrumentation Associates (XIA) targeting embedded and portable applications. The processor performs energy calculations and MCA storage (up to 8K bins) in an on-board DSP using one of several available peaking times and digitization rates. The microDXP has a very versatile input stage that allows connection to almost any detector type and a digital processor that allows for large variations in input pulse shapes while still retaining excellent energy resolution. We will report on the performance of the microDXP at low (2 kHz) and high-count rates (>200 kHz) using a variety of detectors including standard LN2 cooled silicon and germanium detectors, room temperature SDDs, proportional counters and scintillator detectors.

206 THE USE OF PULSED NEUTRONS FOR THE DETECTION OF EXPLOSIVES AND ILLICIT DRUGS .George Vourvopoulos, Science Applications International Corporation, 16701 West Bernardo Drive, San Diego, CA 92127 USA.

Explosives, narcotics, and other contraband materials contain various chemical elements such as H, C, N, O, etc. in quantities and ratios that differentiate them from each other and from other innocuous substances. Neutrons and γ-rays have the ability to penetrate through various materials to large depths. They are able to interrogate, in a non-intrusive manner, volumes ranging from suitcases to Sea-Land containers. Pulsed Fast/Thermal Neutron Analysis (PFTNA) is a neutron-based technique which utilizes the (n,n'γ), (n,pγ), and (n,γ) reactions to identify and quantify a large number of elements. This technique has been used for the development of two devices: PELAN, for the detection of explosives ranging from unexploded shells to landmines, chemical warfare agents, toxic materials, etc. and NELIS, a pallet inspection system for the detection of illicit drugs. Examples on the use of the systems, ranging from the identification of chemical warfare agents in Belgium to detecting drugs on board ships will be presented.

207 SETTING UP AND IMPLEMENTATION OF A GLOBAL ATMOSPHERIC RADIOACTIVITY MONITORING NETWORK FOR CTBT VERIFICATION PURPOSES. F. Padoani et al. International Monitoring Division, Comprehensive Nuclear-Test-Ban Treaty Organization, P.O. Box 1200, 1400 Vienna, AUSTRIA

The International Monitoring System is part of the global verification system of the Comprehensive Nuclear-Test-Ban Treaty and comprises an atmospheric radioactivity monitoring network of 80 particulate stations, of which 40 are to be equipped with noble-gas-detection capability. The network is supported by 16