The Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico is scheduled to open for receipt of transuranic (TRU) waste from various DOE sites by the end of 1997. The Inorganic Elemental Analysis Group of Los Alamos National Laboratory has prepared and delivered several different sets of working reference materials (WRMs) to 8 DOE sites. These WRMs were prepared by blending quantities of PuO_2, Am_2O_3, or UO_3 with diatomaceous earth. The blends were encapsulated in stainless steel or zircalloy cylinders. The WRMs are being measured as blind controls in neutron and gamma based non-destructive assay (NDA) instruments. The measurement data must pass established Performance Demonstration Program (PDP) criteria in order to certify the NDA systems for measuring the nuclear content in the waste drums before shipping to WIPP. The analytical characterizations of the nuclear materials include particle size distribution, Pu/Am/U assay, isotopic distribution, trace inorganic impurities analyses, and blend homogeneity assessment will be discussed. Quality control on the fabrication and welding of stainless steel cylinders, verification measurements on each finished WRM, and final certification (including mass of Pu and Am, total alpha activity, and uncertainty calculations) of the WRMs will also be presented.

97-40 DETERMINATION OF TRACE ELEMENTS IN HUMAN HEAD HAIR BY NEUTRON ACTIVATION ANALYSIS. M. Saiki, M. B. A. Vasconcellos, L. J. De Arauz, R. Fulfaro. Instituto de Pesquisas Energéticas e Nucleares - IPEN-CNEN/SP - CP 11.049 - CEP 05422-970 - São Paulo - SP - BRAZIL

Hair analyses have become popular for routine clinical diagnosis of toxic and essential elements in the human body and they have been performed in commercial laboratories using different analytical methods. Therefore for routine analysis of hair, it is important to evaluate the precision, the accuracy and the detection limit of the method in order to demonstrate the validation of the results. Also it is of great interest to get a well defined normal range for elemental concentrations obtained from hair of healthy individuals, which is not available for the Brazilian population. In this work, instrumental neutron activation analysis was applied in hair analysis from a group of patients of a medical clinic and from a control group. Hair samples were cut, washed and irradiated at the IEA-R1 nuclear reactor for short and long irradiations at the thermal neutron flux of 10^{12} n cm^{-2} s^{-1}. The gamma ray activities of samples and standards were measured using GMX20190 Ge detector coupled to an ADCAM 918 multichannel buffer. The elements Al, As, Br, Ca, Cd, Cl, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Sb, Sc, Se, V and Zn were analyzed. Comparisons were made between the results obtained for two groups of individuals and also with the normal range values presented by commercial laboratories. Precision and accuracy of the results were evaluated by analyzing GBW09101 Human Hair and NIES N° 5 Human Hair reference materials.

97-41 THE DEVELOPMENT OF A THERMAL NEUTRON ACTIVATION (TNA) SYSTEM AS A CONFIRMATORY NON-METALLIC LAND MINE DETECTOR. T.Cousins*, T.A.Jones, J.R.Brisson, J.E.McFee[1], T.J.Jamieson[2], E.J.Waller[2], F.J.LeMay[2], H.Ing[3], C.E.Clifford[3] and B.Selkirk[3]. Defence Research Establishment Ottawa, Ottawa, Ontario, CANADA .[1] Defence Research Establishment Suffield, P.O.Box 4000, Medicine Hat, Alberta, CANADA . [2] Science Applications International Corporation (SAIC Canada) 60 Queen St, Suite 702, Ottawa, Ontario, CANADA.[3] Bubble Technology Industries, Highway 17, Box 100, Chalk River, Ontario, CANADA

In order to detect and locate buried landmines for peacekeeping, the Canadian Department of National Defence (DND), under the Improved Landmine Detection Project, is developing a vehicle-mounted, two-phase mine detection system. The first phase constitutes a suite of detectors used to indicate the possibility of a mine at a particular location (to ± 1 foot in accuracy). In the second phase a thermal neutron activation (TNA) system is used to confirm the presence of explosives via detection of the 10.83 MeV gamma-ray associated with Nitrogen decay. The TNA system developed for this uses a 100 mgram ^{252}Cf neutron source surrounded by four 3" x 3" NaI(Tl) detectors. Combining the use of state-of-the art