The success attainable in k0-NAA using a relative low neutron fluxes reactor (about 1011 neutron.cm-2.s-1) - Triga Mark-I IPR-R1, CDTN/CNEN, Brazil - is to a large degree dependent on the detection sensitivity. In practice, carrying out investigations on essential and non-essential elements in just-fresh animal tissues (muscle, liver, kidney, blood and faeces), only concentrations of major elements could be obtained by virtue of their relative concentrations, higher than the limits of detection. Thus, to evidence more elements in level below the limit of detection, it is necessary to preconcentrate the biological matrices before applying $k_0$-NAA. Among nondestructive processes, the lyophilization has been chosen in the present study due to minimal losses of chemical elements as previously discussed by Zaichick (1997). After the process, the relative mass in biological matrices gives rise to 100%-300% amounts of each element. There is a remarkable achievement in $k_0$-NAA using preconcentrated biological matrices obtaining a great number of elements not evidenced in just-fresh analysis. Details will be presented.

**111** DETERMINATION OF HEAVY METALS AND OTHER TRACE ELEMENTS IN LAKE SEDIMENTS FROM A SEWAGE TREATMENT PLANT BY NEUTRON ACTIVATION ANALYSIS A. P. Ribeiro[1], A.M.G. Figueiredo[1*] and J.B. Sgolo[2] [1]Instituto de Pesquisas Energticas e Nucleares, Sao Paulo, Brazil. [2]Instituto de Geocincias, Universidade de Sao Paulo, Sao Paulo, BRAZIL.

The Sewage Treatment Plant (STP) in Barueri, Sao Paulo, Brazil, processes a significant part of sewages generated in Sao Paulo city. Due to economic and technical problems, all the residual sludges produced in the STP in Barueri from 1988 to 1996 were cumulatively disposed over the land, in piles and in open areas, deposited directly on the soil. The STP has two ponds, which were built to landscape the place. In the present work, instrumental neutron activation analysis (INAA) was used to determine metals (Ba, Co, Cr, Cs, Fe, Hf, Rb, Sc, Zn), semi-metals (As, Sb), actinides (U, Th) and rare earth elements (La, Ce, Nd, Sm, Eu, Tb, Yb and Lu) in bottom sediments from one of the ponds, in order to verify whether it was contaminated due to the wastes generated by the plant. The results obtained were compared to the concentration determined in a soil profile and in a sample of rock, in natura, representing the litologies of the region, and showed a homogeneous distribution of the elements all along the pond and indicated that only As, Cr and Zn can have their origin associated with the residues disposed around the pond.

**112** THE PREPARATION OF A SYNTHETIC-URINE MATRIX CONTAINING ULTRA-LOW CONCENTRATIONS OF URANIUM WITH VARYING ISOTOPIC RATIOS. J.S. Morton*, D.S. Sill, M.C. Verwolf. United States Department of Energy, Radiological and Environmental Sciences Laboratory, Idaho Falls, Idaho, 83402

The use of depleted uranium in various projectiles and as the vital component of protective battle armament has prompted an evaluation by various governmental bodies of the analytical capability employed to identify and quantify varying isotopic ratios of the element that may be present in urine. As the result of an international meeting held in Santa Fe, New Mexico, the technical criteria of a proposed study were designed to evaluate the capability of mass spectrometric instrumentation to quantify ultra-low concentrations of isotopic uranium in bioassay samples. At the proposed levels, the use of quantitative analytical radiochemical methods as a concentration and separation step is a necessity. The study requires that the emerging technologies have the capability of quantifying varying $^{235}U/^{238}U$ ratios at a concentration of 5 nanograms/L of urine. In order to prepare meaningful performance-test samples at these concentrations, the indigenous uranium must first be removed from the salts comprising the synthetic urine matrix. The Radiological and Environmental Sciences Laboratory (RESL) of the United States Department of Energy has developed the expertise and capability to prepare the unique test samples. The methods employed to produce synthetic-urine salts with a remaining concentration of indigenous uranium in the low picogram range will be discussed.

**113** THE USE OF Zr-Au-Lu ALLOY FOR CALIBRATING THE IRRADIATION FACILITY IN $k_0$-NAA AND FOR GENERAL NEUTRON SPECTRUM MONITORING. F. De Corte* and A. De Wispelaere.