Spectro-chemical analysis of trace impurities such as B, Cd, Mn, Co, Ni, Cr and Mg present in reactor grade Uranium fuel samples: A service to QAD and UED

Atomic and Molecular Physics Division provides quality control assurance service to the other divisions like QAD and UED of this centre. A large number of reactor grade natural U samples in metal and in oxide form received from QAD and UED respectively were analysed on regular basis for B, Cd, Mn, Co, Ni, Cr and Mg impurities. A carrier distillation technique has been employed for the trace analysis with DC Arc Atomic Emission Spectrometer (See Fig. 1). U samples mixed with 3% AgCl carrier containing 2% Co and ground in the mortar to the fine powder. 120 mg charge of set of standards and samples have been loaded in duplicate using graphite electrodes.

Fig. 1. DC Arc Atomic Emission Spectrometer

These standards and samples arced in the arc assembly at 8 Amp DC for 35 seconds. An exposure data produced from the DC discharge was recorded on PMT and stored in PC. Calibration curves plotted using blank subtracted (Element/ Ga) ratio vs concentration of the standards. The net counts of (Element/ Ga) ratio of the samples read using the calibration curves and the impurity values in PPM reported to the respective Divisions.