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ENVIRONMENTAL SAMPLING INFORMATION

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One of the new safeguards strengthening measures implemented by the International Atomic Energy Agency (IAEA) is environmental sampling. The IAEA has developed an Environmental Sampling (ES) database to allow for the seamless integration of sample data from inspection operations, multiple analytical laboratories and safeguarded facilities. The ES database serves as a tool for analysts for cataloging sample information, analyzing data, investigating trends, monitoring quality assurance, tracking analysis progress, and producing documents.

Environmental sampling for Safeguards is based on the premise that every nuclear process, no matter how leak-tight, emits small amounts of process material to the environment. Analytical techniques exist that can detect and measure the extremely low levels of nuclear material which are indicative of the process from which they derive. In 1996, the IAEA began collecting environmental swipe samples from enrichment plants and facilities with hot cells. As of the end of 1999, swipe samples had been taken at 81 facilities to establish baseline signatures. Sample collection as part of routine verifications and complimentary access has started.

The ES database operates as an Oracle client/server application residing on a SUN Workstation Server that is accessed by client personal computers. The development of a central database has been completed with work centering on implementation of the client-side graphical user interface using Oracle Form 2000.

The user interface allows analysts to analyze information from an individual sample series, or investigate trends across multiple data series by country, facility-type, sample-type or any number of other conditions. The user is able to retrieve and export measurement data for the various analytical techniques employed by environmental sampling and analysis: Thermal Ionization Mass Spectrometry; Secondary Ion Mass Spectrometry; Scanning Electron Microscopy, High Resolution Gamma Spectrometry and Isotope Dilution Analysis.

The database features an interactive graphical function that plots the measurement data and permits on-screen changes to data points and plot parameters. Besides assisting in sample data analysis, the database also aids the user in evaluating quality control data and comparing sample measurement data to known standards and reference materials. The information in the database also allows the user to monitor analysis progress and generate laboratory performance metrics. Lastly,

the user can produce various reports and documents such as analytical instruction letters, status reports, data tables, and plots.

Current development efforts focus on the user-interface with an emphasis on improving search capability and reporting applications.