Analytical Service Unit Trending Chart and Lab Report Generator

Analytical Services Unit (ASU) is an accredited analytical laboratory operating independently at Queen’s in the School of Environmental Studies and it is located in the basement of the Biosciences Complex (for more information go to the website: [www.queensu.ca/asu](http://www.queensu.ca/asu)). The laboratory serves the academic community and other institutions, government and the broader local community, and is often involved in research and projects especially in the Canadian arctic. The lab receives mostly soil and water samples, and to a lesser extent plant, tissue and sometimes more curious materials such as cosmetics and wine. The laboratory tests for a wide variety of contaminants (such as heavy metals, petroleum hydrocarbons, PCBs, pesticides) and it employs a variety of analytical instruments to carry out these tests. A programming project that would be helpful for the lab would be one that approximates some components of what is commonly known as LIMS (Laboratory Information Management System). Most large commercial laboratories have LIMS and in their case these typically track all samples received (using bar code generation and scanners) as they go through various stages of preparation and analysis; the system can pick up data from analyses, perform calculations and quality control functions, generate test reports and invoices for clients, and in some cases LIMs even include all the document management for the laboratory (for methods and standard operating procedures).

Our ambitions for this project are less grand: we would be delighted if one or two components of this kind of system were available for us. We would like to start with a quality control function – specifically taking data from analyses to generate trending charts for control samples. A control sample is essentially one with a known concentration that is termed the target concentration. When analyses are performed on a group of samples that include a control sample, the result for the control sample (that is, how close it is to the target concentration) gives the analyst an idea of how good the results are for all the other samples. There are limits and acceptance criteria that are noted as well as trends over time. Charting gives a good visual picture of the day-to-day performance of the test and allows the analyst make corrections before results become unreliable. There are actually many different types of control samples (spikes, blanks, duplicates, certified reference materials etc). This means a lot of charts! Currently we use Excel to laboriously input the data manually. We would like to have a system that automatically takes the results from various platforms (either the instruments directly or a calculation spreadsheet) to generate these charts. Also we are hoping that if results data are being accessed to generate charts for certain types of samples it would not be much of a stretch to access the same results data to generate the laboratory test reports for the full analysis that we would send to clients.

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