OSART Good Practices
CHEMISTRY
Laboratories, Equipment and Instruments

Dukovany 1/4, Czech Republic

Mission Date; 5-22 November, 2001

Comprehensive quality control information system is effectively used to plan, perform, track and evaluate quality control related laboratory activities and some other chemistry duties. This system allows to the performing of the following functions:
- Recording of non-standardized samples.
- Recording of analytical procedures.
- Recording of calibration results.
- Calculation of analytical errors.
- Automatic recording of calibration and check results of laboratory pipetting equipment by direct communication with analytical balances.
- Quality control charts calculation and displaying.
- Recording of issued protocols.
- Recording of standards and laboratory chemicals storage and consumption with expiration time alerts.
- Recording of instrument handbooks and logbooks.
- Recording of shift reports.
- Recording of walk down, audit and assessment inconsistencies.
- Functional dependences of different chemistry and other relevant parameters.

Pickering, Canada

Mission Date; 9-26 Feb., 2004

Chemistry and Environmental Management Software (CEM)
The Chemistry and Environmental Management (CEM) computer application was developed by Ontario Power Generation to provide a common platform for Chemistry Laboratory information management across all nuclear stations in the company. In addition to data management features, CEM is unique in that it has task scheduling capability.
Several key strengths of the CEM software are highlighted below:
WORK MANAGEMENT
Prior to the introduction of CEM, task scheduling was accomplished through Microsoft Excel Spreadsheets that could not be easily modified depending on the various system operating states. Changes to the layout of the schedule were cumbersome, the system was relatively inflexible, and there was a higher potential for improper scheduling. CEM allows the user to select the proper operating state for the system and will automatically update the schedule.

EVENT TRACKING
Out of specification conditions are flagged on input. The time out of specification is recorded along with any pertinent notes. Resampling is generated in the schedule for tracking the condition on incoming shifts, thus minimizing the potential impact of the event on performance trending.

ENVIRONMENTAL COMPLIANCE
As the CEM programme continues to develop, more functionality is being added in the area of environmental monitoring. By replacing the older software, these changes represent a marked improvement. The custom software will reduce the chances of missed or late reporting, and will keep the data in an organized and interpretable format.

TRENDING AND ANALYSIS
Built into the CEM programme are many reports allowing quick and easy access to useful information. System trends, event reports, and shift summaries are only a few examples of the types of summaries that can be generated. Without the need to independently trend system information, transposition errors are removed; all results are reviewed and verified prior to entry; and accurate and representative information is assured.

St. Laurent, France

Mission Date; 27 Nov. - 14 Dec., 2006

Using the sample hatch system to transport samples out of the nuclear auxiliary building from one radio-chemical laboratory inside to the other which is outside the RCA.

The sampling system of the radioactive samples is located in the nuclear auxiliary building. The analysis of the samples takes place in the radiochemical laboratory outside of the auxiliary building. What is usually found in other French NPPs, is that the person taking the sample had to leave the auxiliary building using the necessary exiting requirements (removing protective clothing etc) and leaving the RCA.
Using a sample hatch to get samples out of the nuclear auxiliary building: Samples from the radiological controlled area for analysis in the hot laboratory pass through a hatch. They are stored in a sealed container which will serve to transport them from the hatch to the laboratory.
-the laboratory works in line with the requirements of the corporate DI82 guidelines while ensuring sample integrity
-samples are secured in the container and placed in the hatch while waiting to be taken to the hot laboratory
-time saving in case of quick analysis (some samples must be analysed precisely one hour after sampling).
-hatch and container contamination is checked on a monthly basis

The laboratory no longer depends on a contractor to get the samples out. During shutdown phases when sample flow is very high (up to one sampling every thirty minutes) a person no longer needs to wait at the exit door of the RCA.

Loviisa, Finland

Mission Date; 3-21 Aug, 2007

Actuation of control room alarm in case of safety showers usage.

If a person is affected by hydrazine on him, he must rinse abundantly the chemical residue out of his skin and eyes using the closest emergency shower and eye washing equipment as soon as possible. There comes a collected alarm from the hydrazine station to the control room when someone is using the emergency shower. There are two such emergency showers in the room for hydrazine dilution and these will trigger an alarm.

If an alarm comes to the control room, an operator must promptly leave from the control room to reach the hydrazine station to check what the reason for the alarm is and help the potential injured person.

Shift supervisor alarms fire brigade to the scene of accident. The fire brigade takes care of the first aid and the transportation of the injured person to the medical care if the injuries require that.

Tihange, Belgium

Mission Date; 5-23 May, 2007

Calibration of micro-pipettes.

The micro-pipette calibration has been implemented after operating experience feedback from Tihange 3. Deviation in the tritium activity readings was noticed when the analysis showed that the reading error was due to a deviation in the volume dispensed by the micro-pipette.

The use of poorly calibrated micro-pipettes can have a significant impact on the quality and accuracy of certain readings which require small sampling volume such as β, γa and tritium metering.

The testing of pipettes is done according to the ISO 8655 standard, by following the CH123 procedure (Pipette calibration instrument: Sartorius 235P-SD scales and Picasso software).

The management of micro-pipettes is described in the CHIRAD/00/039 procedure:
- The micro-pipettes are stored and managed in the common laboratory.
- The unit laboratories have to contact the common laboratory in order to obtain a micro-pipette.
- Each micro-pipette is checked before being released.
- Those micro-pipettes which are in use are checked every 6 months by the common laboratory. In the case of any non-conformity, they are recalibrated according to the manufacturer's instructions.
- The calibration certificates are put in records in the common laboratory.
- The micro-pipettes which are validated are (re)sent to the laboratories and a label is affixed:
  - L1-Valid >"Expiry date" for Unit 1's laboratory,
  - L2-Valid >"Expiry date" for Unit 2's laboratory,
  - L3-Valid >"Expiry date" for Unit 3's laboratory,
  - L0-Valid >"Expiry date" for the common laboratory.

In conclusion, the implementation of this micro-pipette calibration control system provides quality monitoring of the micro-pipettes and supports the quality of analyses.

Mihama 3, Japan

Mission Date; 15 Jan.- 5 Feb., 2009

Use of cation selective membrane in cation conductivity measurement loop.

To detect sea water in-leakage from condenser, cation conductivity meters have been installed in the condenser hot well, condensate pump outlet and steam generators blowdown. Cations were removed by cation resin in the past but currently the resin columns were replaced by a cation selective membrane.

Based on satisfactory results obtained from one year tests, the method application has been released for continuous monitoring of cation conductivity of the above mentioned secondary side water system. The advantage of this method consists on continuous operation and reduced work for the chemistry personnel in respect of maintenance activities.