

OSART Good Practices

CHEMISTRY

Chemistry Operational History

Temelin 1/2, Czech Republic

Mission Date; 12 Feb.-1 Mar., 2001

A well organised and structured Chemistry Information System is used for effective control of the chemistry work.

The Chemistry Information System (CHEMIS) serves for providing information and support to managers and shift personnel in chemistry related questions in primary, secondary and auxiliary systems, systematic assessing of chemistry processes by using its database with displaying features and for planning and checking the laboratory work.

The system is accessible via the plant computer network with all its modules, including alarm modules in different operating conditions, chemistry performance indicators, diagrams for displaying results, trending and comparing results to limit values and reporting action level. The system is extensively used by main control room personnel for displaying chemical analyses and printing protocols of chemistry conditions.

Furthermore, the system enables specification of sampling and analyses to be done and proper archiving of analytical results.

The system is a really effective tool for organizing chemistry related work.

Zaporozhe, Ukraine

Mission Date; 6-23 Sept, 2004

To inform the chemistry status of system, in the control room, there are three kinds of chemistry performance indicator logbooks: primary, secondary, and steam generator blow-down. Many chemistry indicators are to be maintained and verified more than once per shift by means of telephone and then by registering in logbooks. Also online parameters are displayed on the monitors of the control room operators. This will contribute to the plant safe operation.

The sulphate content in the coolant increased after the power upgrade (100% to 108%). The new thermo hydraulic conditions caused a more oxidizing environment at the condensate clean up filters, and the strong cation exchange resins containing sulphuric functional groups were decomposed. Weak cation exchanger with carboxyl groups were tested and fulfilled all requirements for coating, waste handling, clean up function etc. This Low Sulphur Resin (LSR) was tested in a test rig and later on a real filter during operational conditions. It was concluded that the differential pressure increase was slower compared to normal resins and the particle separation was excellent. A draw-back of this type of resin is leakage of trimethyl amine from the anion resin, which is not captured in the weak cation resin bed, but leaks to the reactor coolant resulting in increased nitrate content.

However, nitrate ions are less harmful with respect to stress corrosion cracking as compared to sulphate ions.

In addition, the chemistry department has developed a test rig for simulating the coating of candle filters from the condensate clean up system. The test rig consists of sampling holder of Plexiglas, mixture vessel for resin, stirrer, coating pump, pump for sufficient flow for adhesion of the resins, flow meter, differential pressure meter, regulation valves and tubes for connection of air and water. The sampling holder has sufficient space for mounting filters of different sizes from the condensate cleanup system (CCS). The construction is built to simulate the real CCS. Mixture time, coating flow, amount of resins, flocking size and temperature are parameters that can be varied. The result of the coating is visually determined as the filter inside is seen through the Plexiglas. Observation of the size of the flock, sedimentation rate, adhesion of the resin and the distribution over the surface can be carefully evaluated. The coating of the filter can be optimized by pressure variations. Even small variations of the parameters strongly affect the result of the coating.