Environmental facilities for ageing studies and equipment qualification facility

As a part of Equipment Qualification (EQ) programme, accelerated thermal and radiation ageing tests of electrical, electronic & process equipments and cables are ongoing activities in RSD. Accelerated thermal ageing tests are to be carried out at different temperature levels. It is useful in Testing and analyzing the trend of ageing to evaluate the degree of ageing to assess the life/residual life-span of the materials by carrying out accelerated thermal ageing studies. Various facilities have been designed, developed and are in operation to carry out (i) thermal ageing (under accelerated conditions), (ii) radiation ageing and (iii) LOCA /MSLB environment qualification studies of C&I components, equipment and cables.

Temperature ranges: Ambient to 300 deg. C, Provision is to monitor on-line performance test parameters of items being tested inside the test chambers

Figure 1: Thermal Ageing Facility

In LOCA/MSLB environment qualification studies, C&I components/ equipment and cables are subjected to high pressure and high temperature that simulates the environment the components are likely to encounter, if at all LOCA/ MSLB occurs. LOCA/MSLB qualification studies of C&I components of NPPs are carried out in LOCA simulation test facility.

Maximum steam temperature and pressure achievable inside the LOCA chamber are 150 deg Cel and 3.4 kg(g) (50 psig) respectively (v) Main Steam Line Break qualification studies of C&I components and equipment - 171deg C and 32 psig.

Figure 2: LOCA chamber for equipment qualification

Gamma Radiation Test Facility will provide the better control on gamma radiation dose rates during the irradiation of C&I components, equipment and materials. The Gamma Chamber-5000 is a compact self-shielded cobalt-60 gamma irradiator. The desired gamma dose rate within the irradiation volume for the intended use is 0.1 Mrad/hr. Radiation field is provided by a set of stationary cobalt-60 sources placed in a cylindrical cage.

Figure 3: Radiation Test Facility

Ageing Studies Condition Monitoring Lab.

Nuclear Power Plants (NPPs) contain myriads of electrical cables (insulated with some form of polymeric insulation) of various sizes and voltage ratings. To study the cable degradation by measuring parameters such as Percentage elongations-at-break (E-at-B), Oxidation Induction Time (OIT), weight loss in thermo-gravimetric analysis and Indenter Modulus (IM), various condition monitoring equipments are available, such as Universal Testing Machine (UTM), Differential Scanning Calorimeter (DSC), etc.

Figure 4: Tensile test facility

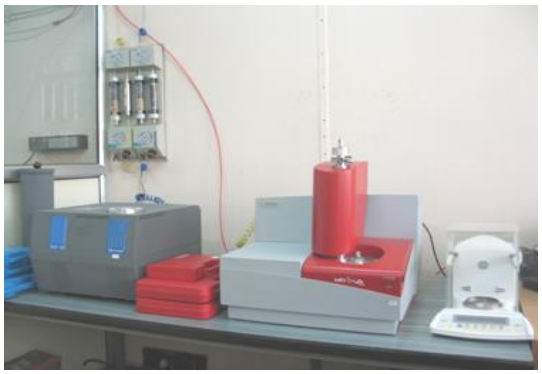

Figure 5 : Differential Scanning Calorimeter