

15 % POWER UPRATE AT KKL: RADIOLOGICAL CONSEQUENCES

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Thermal power at KKL was uprated to 114.7% (3600 MW_{th}) of nominal power between 1998 and 2002 (this followed a +4.2% uprate in 1985 from original licensed thermal power of 3012 MW_{th}). A comprehensive radiological survey was performed to assess the effects of this extended power uprate (PU). The main items were:

- Since KKL is a Boiling Water Reactor, dose rates at steam affected components and subsequently in the environment are driven by the N-16 production rate in the core and transport times in systems. The effect of PU was modelled mathematically and verified by measurements.
- The behaviour of chemical elements as Fe, Co and radioactive nuclides in the water-steam-cycle was investigated. Steam moisture is the predominant process for the carry-over of activated corrosion products to the turbine and further components in the secondary systems. Outage dose rates in this area are a direct consequence of steam moisture variations.
- Co-60 is the main contributor to radiation exposure at KKL. The deposition of activated corrosion products like Co-60 and its radiation fields in reactor systems were also investigated. Exposure of plant staff and contractors due to plant operation and maintenance was tracked carefully.
- The impact of PU to gaseous and liquid discharges to the environment was assessed.
- PU needed some major plant modifications like replacement of the entire turbine and improvements of the condensate polishing plant. A large amount of radioactive scrap was generated, which was processed on site.