computer capabilities are adequate. Back-up calculations are performed to verify the accuracy of all important calculations.

However, **KKL** has experienced a number of fuel Failures were experienced since the fifth cycle. KKL shut down the reactor during the tenth cycle to locate and remove damaged fuel so that radiation dose rates from reactor systems and release rates to the environment could be reduced. Causes identified included debris fretting, possible cladding defects from fabrication and possible pellet-clad interaction (PCI) defects.

The following measures have been taken to reduce the risk of fuel failures during Operation:

- Reduction of debris in coolant circuit; a debris reduction procedure has been drafted, but is not. yet approved;
- Careful planning of the fuel loading pattern for the eleventh cycle and following cycles to prevent large changes of power density in local areas of the fuel;
- Reduction of power increase rate to less than 1% per hour;
- Sipping all fuel elements during each outage to identify and remove leaking fuel pins from the core;
- Investigation of possible improvements in the design and production of new fuel.

Discussions with staff members about the foreign material exclusion programme revealed a common perception that the purpose of the programme was the control of parts and tools in the vicinity of open reactor systems and equipment. A stronger emphasis on the exclusion of small pieces of debris, of the type that can be carried into the reactor core and cause fuel fretting damage, could lead to better control and the reduction or elimination of fuel failures due to debris.

(1) **Recommendation:** The draft procedure for foreign material exclusion should be approved and implemented. Staff members involved in maintenance or other work on open reactor and steam plant fluid systems should be thoroughly trained in the requirements for foreign material exclusion, with emphasis on small debris.

5.6 Fuel Handling

No fuel activities were performed during the mission. Reviews of documentation (procedures, reports and records) and fuel handling tools and equipment indicate that fuel handling is well controlled. The spent fuel storage capacity is large enough for the plant to operate to the year 2000. **KKL** has contracts for reprocessing with COGEMA and British Nuclear Fuels Limited.