Chapter 6. PLANNED ACTIVITIES TO IMPROVE SAFETY

Safety culture requires a questioning attitude and a search for excellence. Therefore, notwithstanding the good safety record, nuclear operators and regulators in Brazil are constantly working on safety improvements.

CNEN efforts to establish an internal quality management system may represent the biggest work to be carried out in the near future to keep up-to-date with current international practices (see 4.1.1). It is recognized that this is a multi-year project which is still in its starting stages. More human and financial resources will have to be allocated to the project in the next years.

In the area of legislation, at present a bill of law is under discussion establishing administrative and monetary penalties to all nuclear facilities and services in cases of non-compliance. This is expected to strengthen the enforcement powers of CNEN.

Angra 1 Authorization for Permanent Operation has established a series of required improvements to be performed by the operator, according to a realistic schedule. These include the development of a Plant Aging Management Programme and a Maintenance Efficiency Programme. Furthermore, regulation CNEN-NE 1.26[10] has established the requirement of a periodical safety review at every 10 years of operation; the next one is due in 2004. It is expected that this will be an opportunity to review past performance and to upgrade the plant according to current safety requirements, to the extent possible.

A Level 1 Probabilistic Safety Assessment of the Angra 2 power plant is scheduled to be initiated in the near future and concluded at most within four years. As far as Angra 1 power plant is concerned, a Level 2 PSA is also planned to be initiated soon.

Following Chapter 18 of the FSAR of Angra 2, a Human Factors Engineering Programme is being implemented in the power station organization. This programme is being conducted by a multidisciplinary team, that is analysing all the relevant events of the power plant lifetime following the nine areas of Human Factors Engineering (HFE) recommended in NUREG-0711. HFE analysis of accidental sequences and associated operator actuation times are being performed for the existing Angra 2 Main Control Room panel arrangement and will be extended also for the Angra 1 Plant Control Room.

In addition of the existing full scope simulator for the Angra 2 Plant, the installation at the site of a full scope simulator for Angra 1, to be completed in 2004, will allow a more frequent and comprehensive simulator training than it is possible now, when the Angra 1 operators simulator training has to be done abroad. The specifications for that simulator is ready and the international bidding is foreseen for the second semester of 2001.
A comprehensive Safety Culture improvement programme is under way at ELETRONUCLEAR, as well as a programme of Knowledge Management, through which the present company’s knowledge status and future needs are to be identified.

A study to establish ELETRONUCLEAR policy concerning radioactive wastes, including reduction of generation, reduction of volume, intermediate and final storage of low and medium level wastes is in development. Concerning intermediate storage the present storage facility is being expanded in a second block and a third intermediate storage facility is in the design process.

The replacement of Angra 1 two steam generators foreseen for 2005 will improve the plant margins and as a byproduct will provide a revised safety analysis, performed with newer methods and codes.

With respect to emergency planning, a task force has been formed to introduce a quality assurance programme for organizations involved in SIPRON, to the extent possible. In addition, formal agreements have been signed to provide the Angra Municipality and Rio de Janeiro State civil defenses with better infrastructure for public shelters, health care and other measures related to emergency preparedness. These include an agreement between ELETRONUCLEAR and the National Road Department (DNER) to improve the BR-101 federal highway passing through the Angra site, at a cost of circa 7 million US dollars to be provided by ELETRONUCLEAR. The works, already started, comprise restoration of 60 km of asphalt paving, of the road drainage and emergency lanes at the road sides, slope stabilization at the road hill side, building of crossings, underpasses and pedestrian passageways as well as elimination of three road bypasses.

In the same area of emergency preparedness, in order to provide an extra mechanism to monitor the environment, CNEN is installing an On-Line Radiation Monitoring System in the emergency planning zone (EPZ). The system is composed by thirteen Geiger Müller detectors disposed strategically around the Angra site. All data are locally collected and sent to the Institute of Radiation Protection and Dosimetry (IRD) by modem connection.