

### Level 3

#### **(a) Chronology of events**

#### **Philippine Research Reactor (PRR-1)**

#### **Chronology of Events**

26 Aug 1963	First criticality of PRR-1.
26 Oct 1964	First operation at 1 MW <sub>th</sub> .
24 Oct 1984	Last day of operation with the plate core.
23 Jan 1985	Permission granted to convert TRIGA to 3 MW <sub>th</sub> .
Aug 1987	TRIGA conversion is completed.
30 Mar 1988	PRR-1 successfully restarted and tested up to 3 MW <sub>th</sub> with the new TRIGA core.
18 Apr 1988	Major water leak appears in pool.
07 Jul 1988	Divider gate repaired; a prerequisite for repairing the leak.
14 Oct 1988	Divider gate cannot hold back water. Another approach to pool dewatering needed.
25 Apr 1989	Other parts of the reactor also need repair, including reactor ventilation system, water storage tanks, electrical power supply and reactor building paintwork.
Mar 1989	Procurement process begins for raw materials and tools.
02 Jan 1990	Raw materials and tools for pool repair (not including the lead bricks) are available. Installation of a collapsible work tower / scaffolding in the pool.
05 Mar 1990	Repair of the ventilation system of the reactor building is assigned to the Mechanical Engineering Section of the NSTD.
17 Apr 1991	Transfer of all movable radioactive material from the pool to the holding tanks in the low-power section of reactor. The pool is still half-full of water. Several graphite elements were found to have perforated casings which must be replaced.
29 Apr 1991	Radiation levels inside the pool are still so high that additional shielding is necessary. The reactor core box was found not to be watertight.
13 Jun 1991	Lead shielding of the holding tanks are installed inside the pool.
23 Aug 1991	Polyethylene water container shielding is installed around the holding tanks.
12 Sep 1991	Pool dewatering limits reached. Less than an inch of water remains.
19 Sep 1991	Lead shielding is installed around the core box.
25 Sep 1991	Reactor people descend to the bottom of the nearly dry reactor pool.
03 Oct 1991	Scaffolding is fully installed inside pool.
07 Oct 1991	The joint of the thermal column is in bad condition. Craters and pinholes are found in the aluminium liner. No penetration of liner detected, but widespread corrosion.
25 Oct 1991	Samples of the aluminium liner showed large craters being close to breakthrough.
28 Nov 1991	Ultrasonic testing showed no great change of liner thickness.
02 Jun 1992	Practicality of completing PRR-1 repair and resuming reactor operation in a now urbanised area assessed.
02 Sep 1992	Start of leak repair.

30 Sep 1992	Funding of 40 aluminium plates for the new liner layer and for 22 graphite reflector elements is in place.
05 Nov 1992	Comprehensive rehabilitation work plan is proposed.
20 Jan 1993	Reactor fuel and other radioactive materials have to be removed from the pool for the repair.
29 Apr 1994	Contractor finishes the construction of the spent fuel storage tank and the water storage tank.
10 May 1995	Construction of a new drainage system for the reactor contracted. Old system is clogged.
10 May 1995	Refurbishing of electrical controls of the crane in the reactor building contracted.
17 May 1995	Installation of air conditioning system salvaged from the ARC building in the reactor building contracted.
20 Jul 1995	A worker is accidentally electrocuted and killed in connection with the repair of the ventilation system.
24 Jul 1995	Summary of work to be done to complete the rehabilitation of the reactor requested. The Safety Analysis Report (SAR) is to be reviewed and revised in 3 months. No independent regulator in place.
Oct 1995	Regulatory programme for PNRI-owned facilities is circulated for comments.
Dec 1995	A contractor is given the job of providing and installing a 500KW diesel generator to provide emergency power to the reactor building.
24 May 1996	Construction of the new drainage system finished.
09 Jul 1996	Construction of the new ventilation system finished.
10 Sep 1996	Electrical controls of the crane in the reactor building refurbished.
05 Nov 1996	Transfer of radioactive materials to the fuel storage tank started.
09 Nov 1996	New 500kW diesel generator installed.
07 Jan 1997	All radioactive materials transferred to the spent fuel storage tank. The pool is cleaned and cleared in preparation of the liner repair.
05 Aug 1997	Liner repair finished and leak testing started.
29 Oct 1997	Submission of leak testing report. A few minor leaks caused by weld defects were fixed. The original leak is gone. A new and even larger leak found in the casing of the thermal column.
May 1998	Reactor Safety Advisory Commission recommends continuation of repair, including the construction of a new core box, the preparation of a SAR and the extension of the lease of the site.
16 Jun 1998	Design work on a new core box authorised.
14 Mar 1999	Spent PRR-1 fuel shipped back to the U.S.A. at U.S. expense under retrieval programme for nuclear material of U.S. origin. Shipment does not include TRIGA fuel which was operated for only 5 hours before the pool liner leak.
1999 – 2000	Design work continues, but funds for implementation are not available. Earthquake safety of the reactor considered. This would greatly increase the costs.
20 Aug 2002	Completion of repair will cost at least 600 million pesos. PRR-1 will only be useful if repair is finished within five years. It is decided to terminate the repair of the PRR-1 and decommission the reactor.