



# ***EXTENDED SHUTDOWN L.5.3 B***

*A. Francis DiMeglio*

## ***Argonne National Laboratory***



*A U.S. Department of Energy  
Office of Science Laboratory  
Operated by The University of Chicago*



66

## **EXTENDED SHUTDOWN FROM THE CODE**

If unusual and compelling circumstances make it necessary for a research reactor to enter into or to continue in a state of extended shutdown, the operating organization should, as appropriate, prepare and implement a technical preservation programme to maintain the safety of the reactor and the reactor fuel, to be approved by the regulatory body. The programme should include:

- (a) arrangements for ensuring that the reactor core remains subcritical, noting that if appropriate arrangements exist for storing the fuel safely, it is preferable to unload the core; \*
- (b) procedures and measures to disconnect, dismantle and preserve the systems that are to be taken out of operation or temporarily dismantled; \*
- (c) modifications of the safety analysis report and the operational limits and conditions; \*
- (d) arrangements for dealing with the fuel and radioactive waste in the research reactor;
- (e) regular surveillance and periodic inspection, testing and maintenance activities to ensure that the safety performance of structures, systems and components does not degrade;
- (f) revised emergency planning arrangements; and
- (g) staffing requirements to undertake the tasks necessary to keep the research reactor in a safe condition and to maintain knowledge about the research reactor.

\* included in requirements document, DS 272

# **SOURCE MATERIAL**

**SAFETY CONSIDERATIONS FOR RESEARCH  
REACTORS IN EXTENDED SHUTDOWN, IAEA,  
TECDOC-1387, JANUARY 2004**

## **EXTENDED SHUTDOWN (CONTINUED)**

### **FOR LIMITED (AND USUALLY KNOWN) DURATION**

CONTINUE TO MEET ALL REQUIREMENTS OF OPERATING ORGANIZATION

MAY REQUIRE REGULATORY RELIEF IF THERE ARE LIMITATIONS ON ABILITY TO OPERATE THE REACTOR  
E.G., CERTIFICATION OF LICENSED STAFF

### **MOTHBALLING**

PLACE THE FACILITY IN A CONDITION OF PRESERVATION TO PREVENT DEGRADATION

CORE USUALLY INLOADED

SAFETY LEVEL OF FACILITY MAINTAINED

## **REGULATORY ASPECTS OF EXTENDED SHUTDOWN**

IN MOST COUNTRIES, REGULATIONS DO NOT SPECIFICALLY ADDRESS EXTENDED SHUTDOWN

MANY REGULATORY BODIES MAY NOT EVEN RECOGNIZE SUCH AN “OPERATING MODE”

IT IS UNREALISTIC TO EXPECT NEW, AD HOC, REGULATIONS TO BE PROMULGATED FOR ONE SPECIFIC REACTOR

OPERATING ORGANIZATION MUST DETERMINE A SENSIBLE METHOD TO REMAIN SHUTDOWN WHILE POSSESSING FUEL AND STILL MEET ALL REQUIREMENTS FOR SAFETY WITHIN EXISTING REGULATIONS

# **EXTENDED SHUTDOWN PLAN**

**MEASURES TO PREVENT CRITICALITY**

**LIST SYSTEMS TO BE TAKEN OUT OF OPERATION OR  
DISMANTLED**

**PROCEDURES TO DISCONNECT, DISMANTLE AND PRESERVE  
THESE SYSTEMS**

**DETERMINE STAFFING REQUIREMENTS**

**MAINTENANCE OF CERTIFICATION OF LICENSED  
PERSONNEL**

**DETERMINE REQUIREMENTS FOR MAINTENANCE AND  
PERIODIC TESTING**

**ADAPTATION OF DRAWINGS, PROCEDURES, ETC.**

**MODIFICATION OF EMERGENCY PLAN AND PROCEDURES**

**SECURITY ARRANGEMENTS**

**MODIFICATION OF SAR AND OLCS**