



TAMMUZ - 2

RESEARCH REACTOR

Prepared By:
ANWAR A. AHMED
(Project Manager)

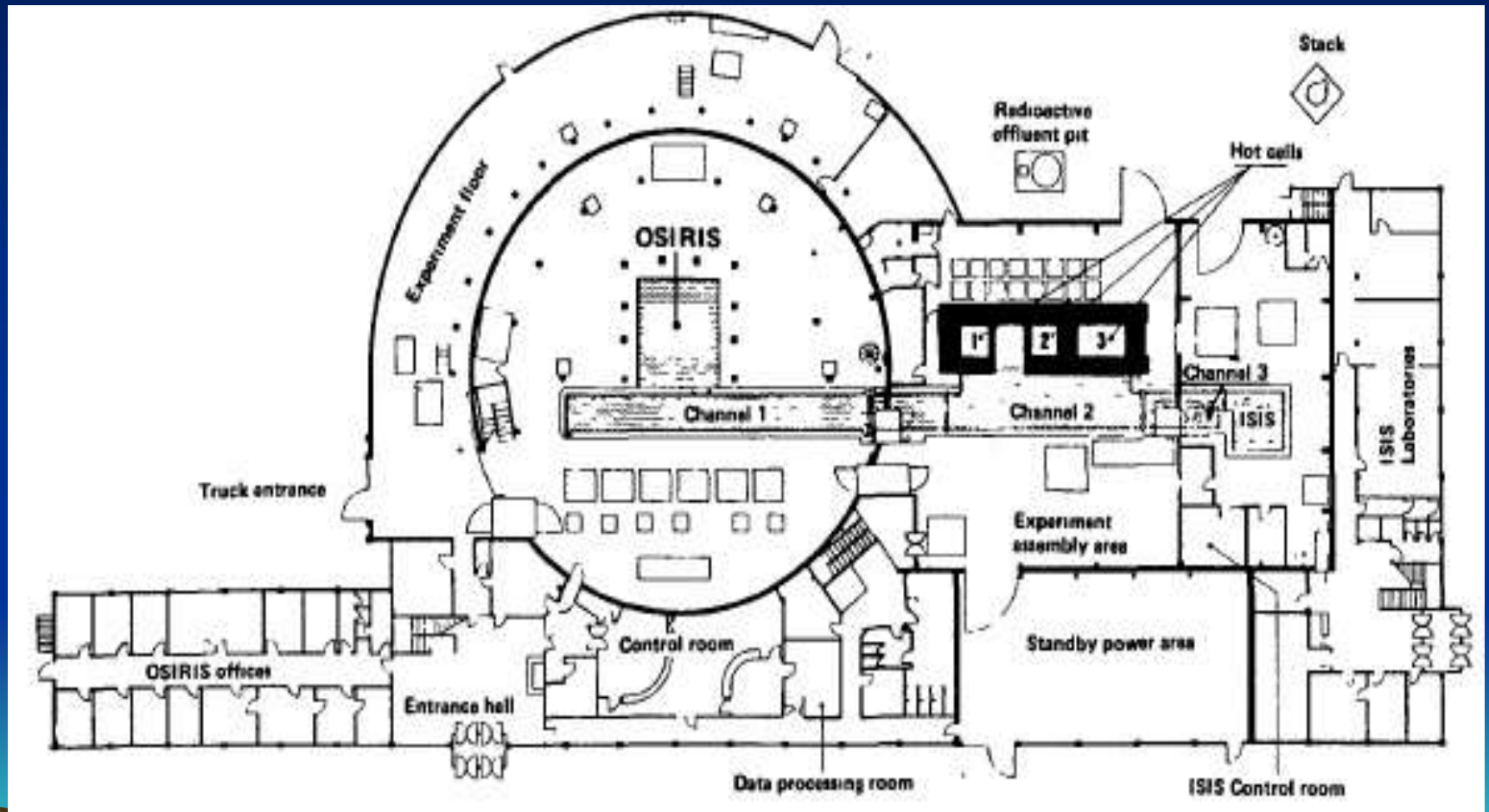
INTRODUCTION (I)

- ✓ The Tammuz – 2 Reactor and Hot cells is located at the Tuwaitha site 20 Km south of Baghdad .
- ✓ Tamuz-2 reactor is a pool type research reactor of 500 kW thermal power supplied by France.
- ✓ The Tamuz-2 reactor was mainly designed as neutronic mock-up for Tammuz-1 reactor.
- ✓ Tamuz-2 reactor links to Tammuz-1 reactor via water channels; Channel 3 goes from Tammuz-2 to Channel 2 which links to two Hot Cells (contaminated). Channel 1 links Channel 2 to Tammuz 1 but was isolated and should be clean.
- ✓ Tammuz-1 was destroyed by Israeli air-raid in 7 June 1981 prior to fuel load. As a result, the role of Tammuz-2 reactor was changed and it was used for training, neutronic radiography and for research purposes.
- ✓ The Tammuz – 2 Reactor was operated in 1981 and destroyed in 1991.

INTRODUCTION (II)

- ✓ Ruins still exist and are in danger of collapse: physically dangerous area.
- ✓ Huge of scrap and debris from destruction of this facility, as well as other buildings at Al-Twaitha site, are scattered across this site.
- ✓ Some of material contained within this site may be radioactively contaminated, or may contain other hazards.
- ✓ The expected wastes to be generated by the decommissioning activities are about 50 tons solid wastes and 35 m³ of liquid wastes.

Internal Layout of the OSIRIS-ISIS Research Reactor Complex



Objective

- Radiological protection of workers, general public and environment from harmful of radiation due to dismantling of Tammuz-2 Research Reactor, dose rate measurements ,contamination levels, and measurements of individual radionuclide's activities were implemented.

Map of Iraqi Nuclear sites





Reasons for Decommissioning

- End of facility operating mission.
- End of facility design life / technical obsolescence.
- Uneconomical or unsafe operation.
- Conclusion of Research program.
- Change in governmental policy.
- Others – Security issues , Accident , etc....
- (Destroyed... like Iraqi Reactors condition).

What is Decommissioning

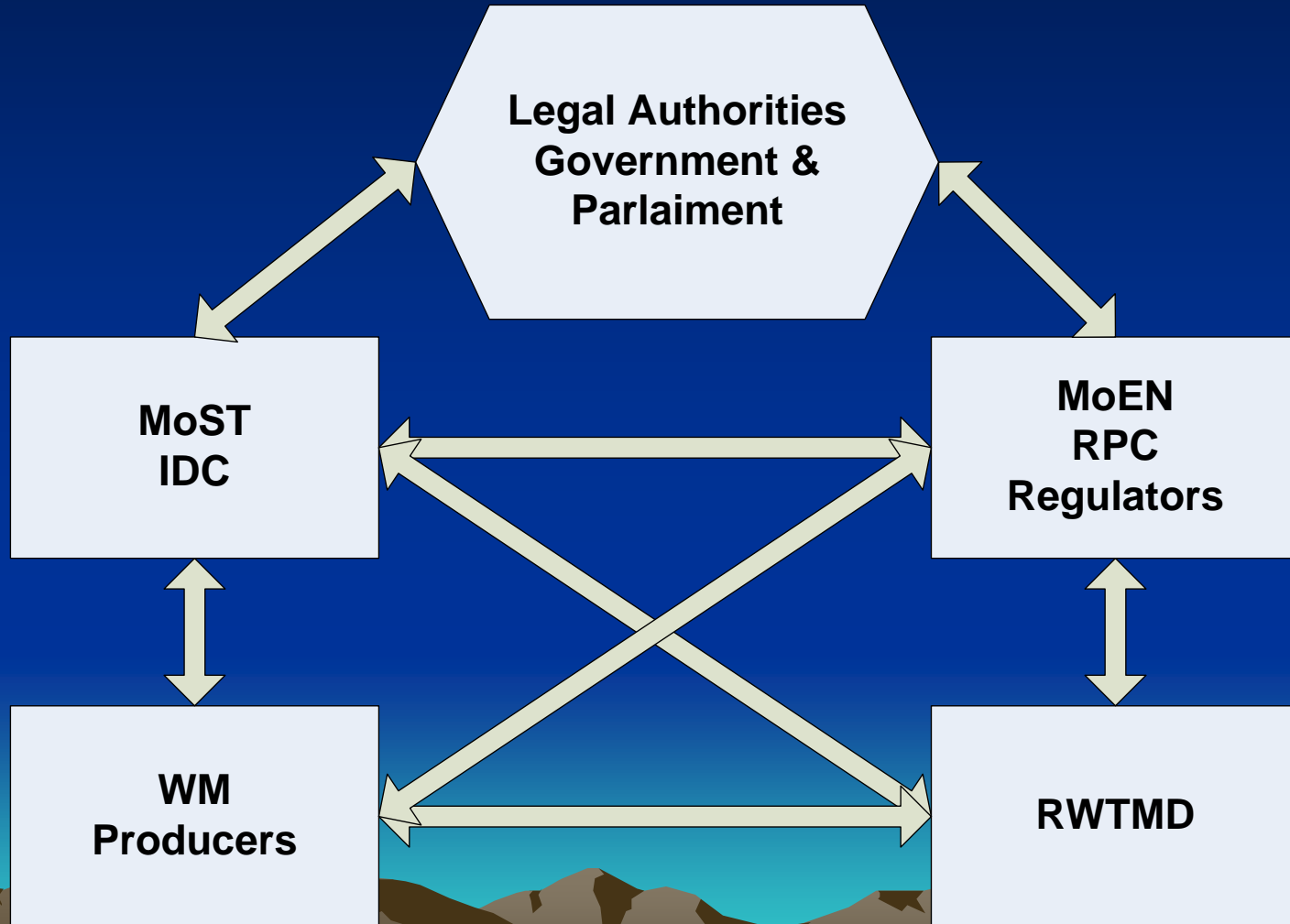
- Removing a facility or site safely from service and reducing radioactivity to a level that permits:
 1. Release of properly for unrestricted use and license termination.
 2. Release of properly under restricted conditions and license termination.
- Typically (for reactors) it dose not cover :
 1. Care and disposal of spent fuel **or**,
 2. Clean demolition.

Decommissioning Plan for Tammuz-2 Reactor (CONTENTS)

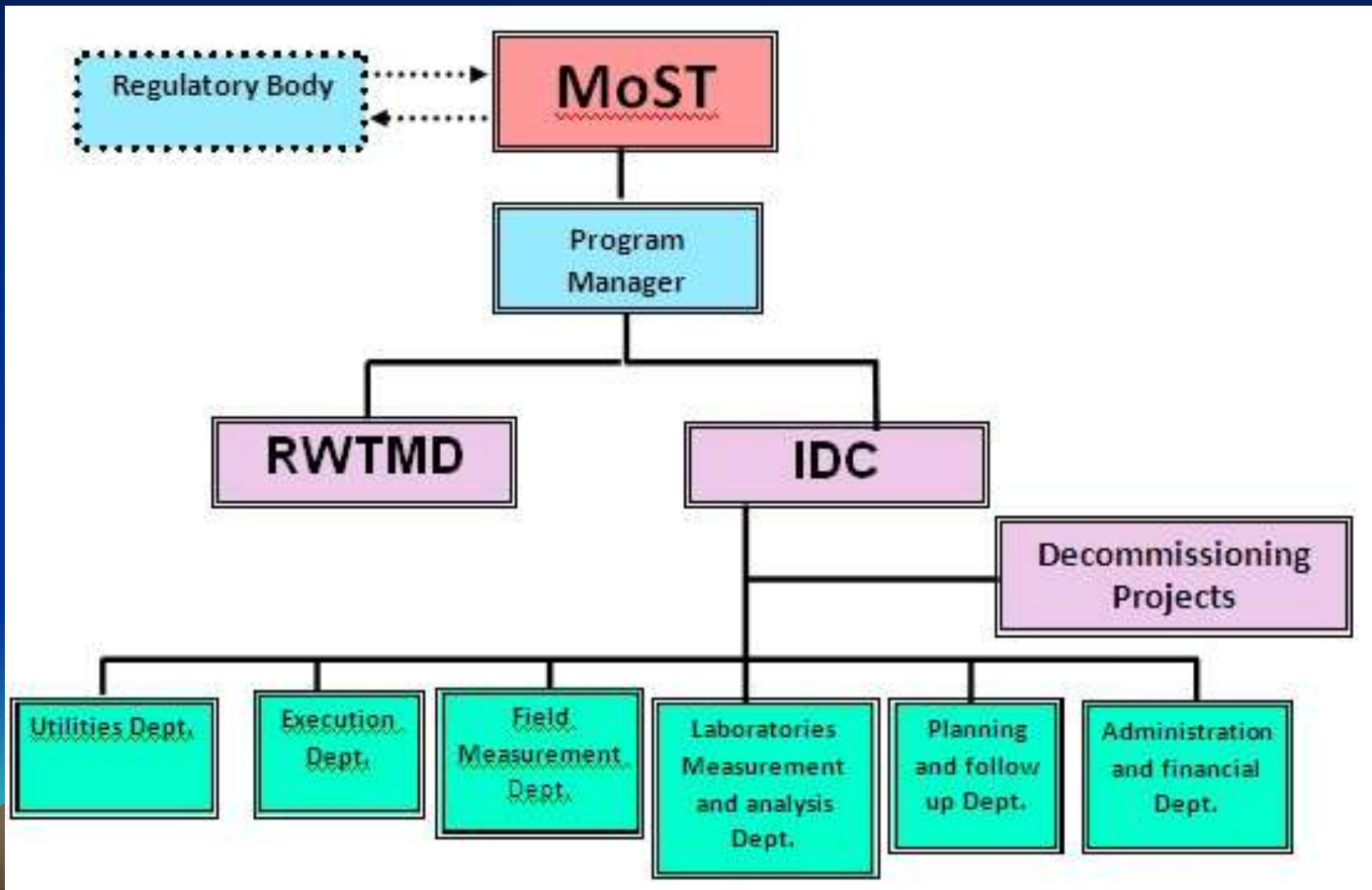
Decommissioning plan for Reactor TAMMUZ-2 contain 15
Chapter :-

- ✓ Decommissioning Strategy and End Points
- ✓ Project Management **Internal Layout of the OSIRIS-ISIS Research Reactor Complex**
- ✓ Decommissioning Activities
- ✓ Waste Management
- ✓ Cost Estimate and Funding Mechanism
- ✓ Safety Assessment
- ✓ Environmental Impact Assessment
- ✓ Quality Assurance
- ✓ Emergency Planning

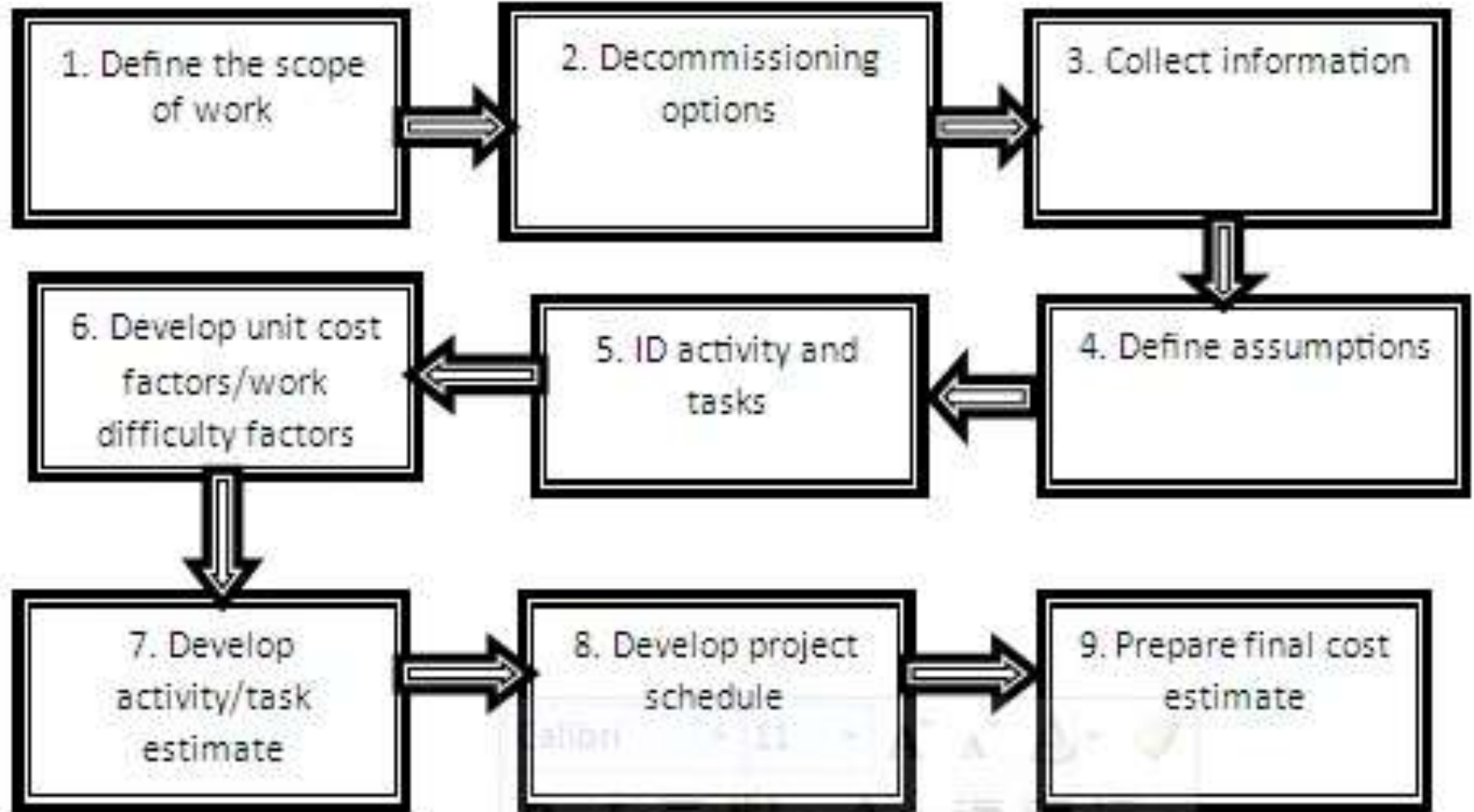
REGULATORY ORGANIZATION



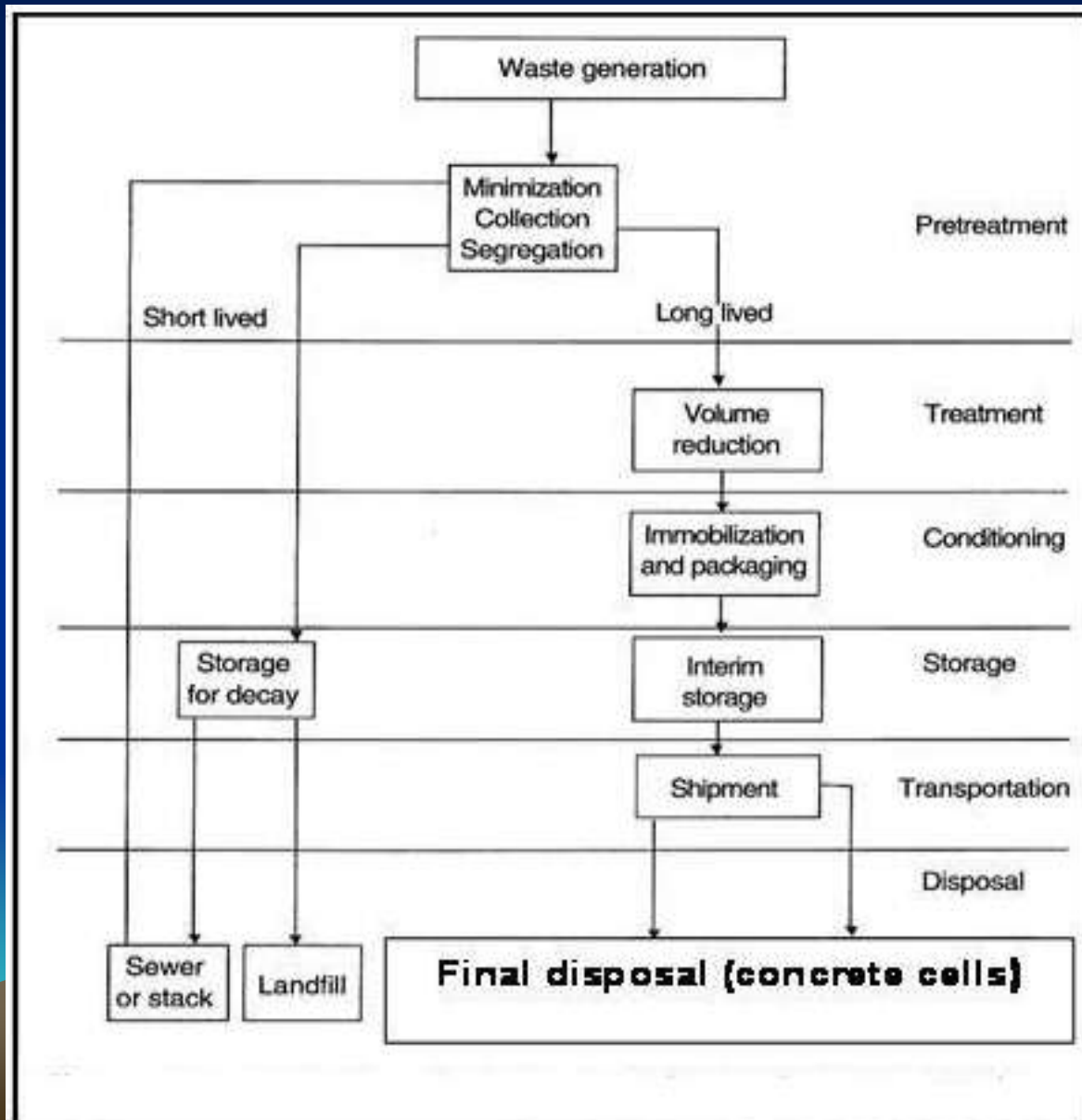
Project Management Organization for the Decommissioning of Tamuz-2 Reactor



Cost Estimation



Waste Management



Work Schedule

QA Program

Assessment/Oversight

This element group details the oversight activities that will be conducted to ensure proper implementation of the project plan. It also describes the assessments that will be conducted to identify and correct problems and describes minimum requirements for QA Reports to management and Final Project Reports.

Project Management and Objectives

This element group provides the purpose and background of the project and describes the project quality objectives. It also identifies the roles and responsibilities of project personnel, describes communication procedures, and details the proposed project schedule.



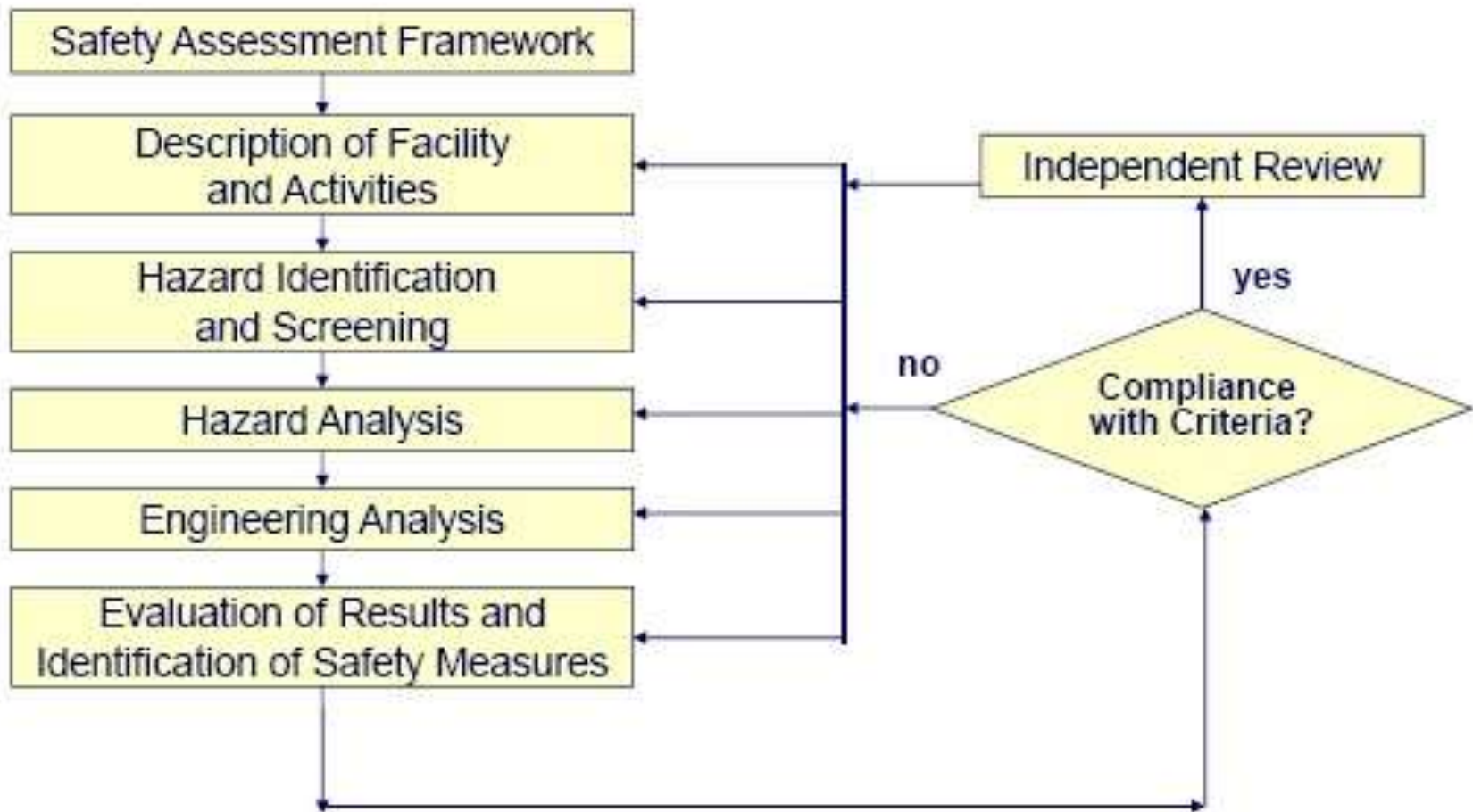
Data Validation and Usability

This element group details the review activities that will be performed to ensure that the collected data are scientifically defensible, of known quality, and can support project objectives. All environmental data collected by or for EPA NE must be reviewed and the limitations of those data determined prior to use.

Measurement/Data Acquisition

This element group describes the design and implementation of all measurement systems that will be used to collect data. It details sampling, data generation and documentation procedures. All quality control samples, including their frequency requirements, acceptance criteria, and corrective action procedures, associated with methods/procedures are documented. In addition, when previously collected data will be used, the acceptance criteria for those "secondary" data are described.

Safety Assessment Plan for the Decommissioning of Tamuz-2 Reactor



Progress in Tammuz-2 Decommissioning

- The decommissioning of Tammuz -2 research reactor stage -1 started on the January 2011, this include preparing and development of Decommissioning plan and Site preparation .

Decommissioning Stages of TAMMUZ -2 Facility

- **Stage-1:**
 - **Development of decommissioning plan.**
 - **Site preparation.**
 - **Site fencing**
 - **Site characterization.**
 - **Approval of decommissionin plan by regulator.**

Site Fencing





Decommissioning Stages of TAMMUZ -2 Facility

- **Stage-2:**
 - **Dismantling of unsafe structure.**
 - **Charactrization and segregation of rubble and scrap.**
 - **Waste relocation.**

Unsafe Structure





Decommissioning Stages of TAMMUZ -2 Facility

- **Stage-3:**
 - **Characterization of Tammuz-2 core, pool, channel 2 & 3 and the two hot-cells.**
 - **Dismantling of core and pool structure and the two channels 2 & 3.**
 - **Dismantling the two hot-cells.**
 - **Waste segregation and relocation**

The hot-cells





Decommissioning Stages of TAMMUZ -2 Facility

- **Stage-4:**

- **Characterization of Tammuz-2 basement.**
- **Dismantling of systems and equipment of level -4m.**
- **Waste segregation and relocation.**
- **Demolition the remaining of the buildings.**
- **Final survey and site release.**

The basement





Thanks for listening