

PHYSICAL SYSTEMS AND REGULATORY OVERSIGHT FOR THE PROTECTION AND OPERATION OF THE NIGERIA RESEARCH REACTOR

BY

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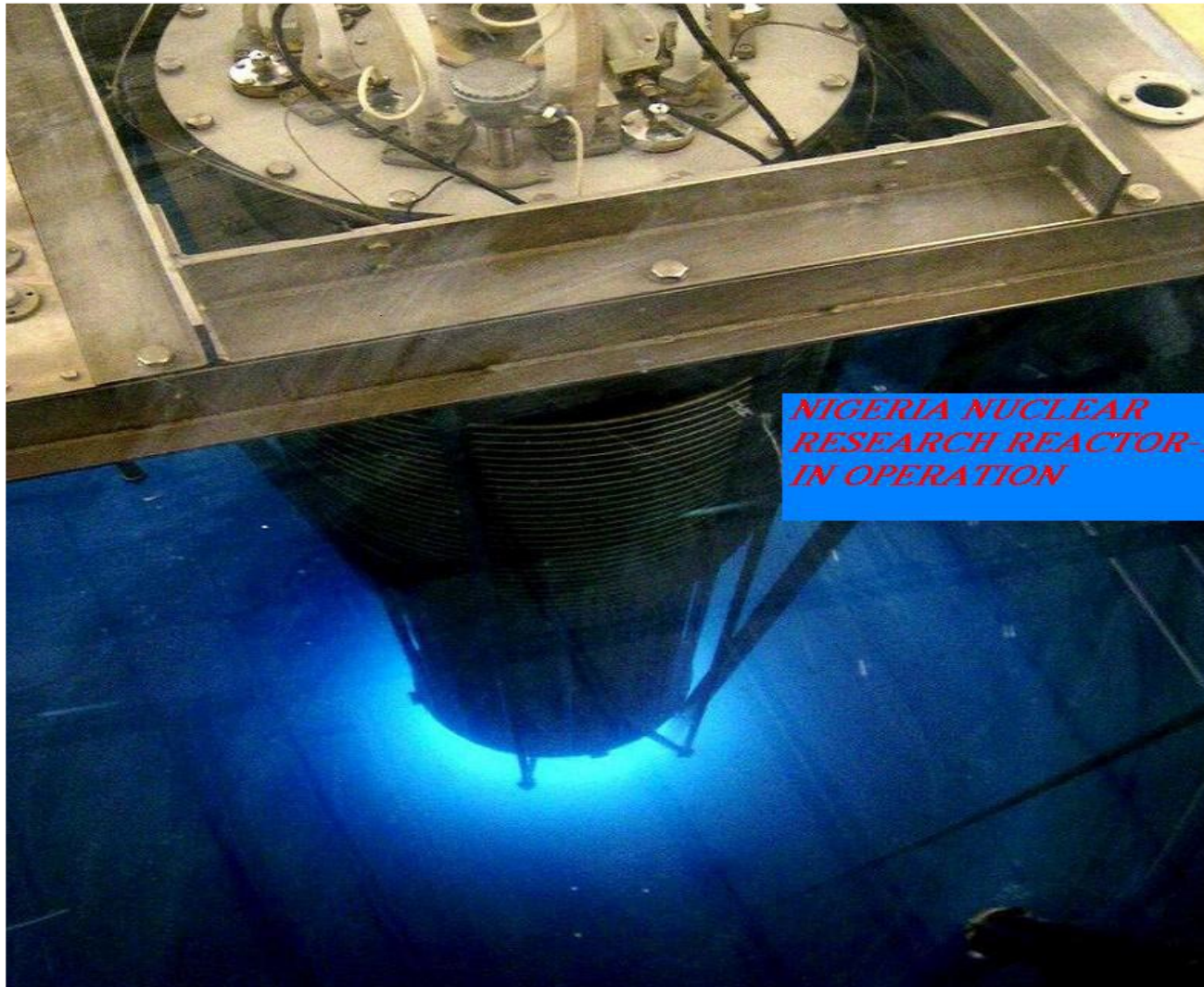
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TECHNICAL DETAILS

NIGERIA RESEARCH REACTOR-1(NIRR-1)

Reactor Type	Tank-in-Pool (MNSR)
Criticality Date	3rd Feb. 2004
Nominal Core Power	31 kW(th)
Max Neutron Flux	$1 \times 10^{12} \text{ cm}^{-2} \text{ s}^{-1}$
Coolant/Moderator	De-ionised Water
Reflector	Be (Annular, Top, Bottom)
Control Rod	1 Stainless Steel Clad Cd Absorber
Fuel Elements	347
Core (Shielding)	Shielded in stainless Steel lined pool water (Diameter 2.7m; Depth 6.5m)

THE NIGERIA RESEARCH REACTOR IN OPERATION



EMERGENCY PREPAREDNESS PROGRAMS (EPP)

- **Participation in IAEA organized Programs**
- **Emergency Preparedness Activities**
- **Emergency Response Programs (Drills)**
 - **Simulating Sabotage**
 - **Simulating Terrorist Attacks**

PHYSICAL PROTECTION REGIMES

Delay Barriers (Physical Structures)

Guard Interventions

Regulated Admission of Visitors

Nuclear Security Culture

Screening of Guests

Gate Passes to Visitors

Issuance of Badges to Employees

3-Stage Barrier Perimeter Fencing

PHYSICAL PROTECTION STRUCTURES

- **Reactor installed at a Protected Area**
- **Enclosed Zone with limited Access**
- **Constant Patrol**
- **24/7 surveillance by Guard Force**
 - **Armed Forces Support**
- **Central Alarm Activation System**
- **CCTV Monitoring System**
- **Graded Approach (Facility, Materials, Drills)**

EMERGENCY DRILLS

(OBJECTIVES)

◎ ON SITE RESPONSE

1. Assessment of Evacuating time to MUSTER POINT
2. Response & Attitude of Employees (Emergencies)
3. Human Reliability towards Emergencies

◎ OFF SITE RESPONSE

1. Arrival of Teams
(Time, Preparedness)
2. State Force (Police)
3. Medical Team

REGULATORY OVERSIGHT

1. ON SITE:

REACTOR SAFETY COMMITTEE

(NIGERIA ATOMIC ENERGY COMMISSION)

2. OFF SITE:

**NIGERIAN NUCLEAR REGULATORY
AUTHORITY (ACT 19 OF 1995)**

OVERSIGHT FUNCTIONS (ROLES)

REACTOR SAFETY COMMITTEE

**NIGERIA NUCLEAR
REGULATORY AUTHORITY**

**1. PERIODIC REVIEW OF
SAFETY ANALYSIS REPORT**

**2. ENSURING COMPLIANCE
ON SAFETY AND SECURITY**

**3. OPERATION WITHIN THE
LIMITS (OLC) ESTABLISHED**

**4. RECORDS (MATERIAL
AUDITING)**

**1. LICENSING OF FACILITY
AND OPERATORS**

2. REGULATORY OVERSIGHT

3. NUCLEAR MATERIAL ACCOUNTANCY

**4. (AGEING MANAGEMENT)
APPROVALS OF REPLACEMENT OF
STRUCTURES/SYSTEMS/COMPONENTS**

CONCLUDING REMARKS

- ◉ **CERT HAS OPERATED NIRR-1 FOR OVER THIRTEEN YEARS**
- ◉ **NO ACCIDENT NOR LOSS OF NUCLEAR MATERIALS**
- ◉ **PHYSICAL PROTECTION REGIMES ARE CONSTANTLY REVIEWED**
- ◉ **REGULATORY OVERSIGHT FUNCTIONS**
- ◉ **EMERGENCY PREPAREDNESS AND RESPONSE PROGRAMS –WELL ESTABLISHED**
- ◉ **HIGH PROSPECTS OF A FUTURE NATIONAL NUCLEAR POWER PROGRAMME**

ACKNOWLEDGEMENTS

- ◉ **GOVERNMENT OF THE FEDERAL REPUBLIC OF NIGERIA (NIRR-1)**
- ◉ **NIGERIA ATOMIC ENERGY COMMISSION**
- ◉ **NIGERIAN NUCLEAR REGULATORY AUTHORITY**
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THANK YOU