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Maintenance at HIFAR

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Objectives

- Overview of HIFAR
- HIFAR Utilisation and Maintenance
- Shutdown Planning
- Future Direction

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HIFAR

- HIFAR – HIgh Flux Australian Reactor
- Heavy Water Cooled and Moderated Tank Reactor
- First Criticality on January 26th 1958
- 10MW (Thermal) Operation 1960

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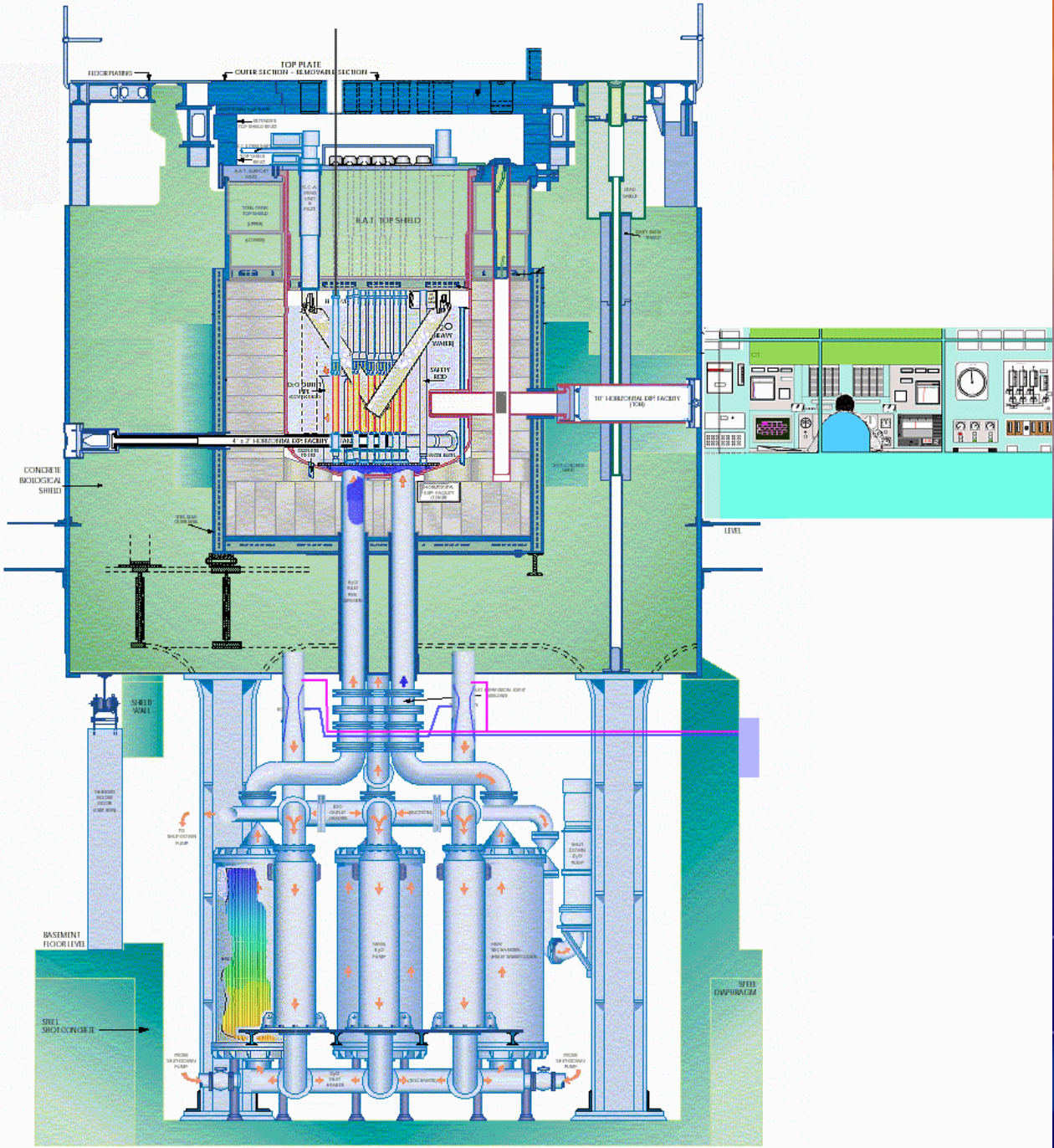
HIFAR

- 15 year Design Life
- HIFAR Refurbishment in late 1980's
- Number of specific plant upgrades since mainly in instrumentation.


TOP PLATE
OUTER SECTION - REMOVABLE SECTION
R.A.T. TOP SHIELD
CONCRETE BIOLOGICAL SHIELD
SHIELD WALL
BASEMENT FLOOR LEVEL
STEEL SHOT CONCRETE
STEEL DIAPHRAGM

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HIFAR Utilisation

- 1960's - Materials Test Reactor
- 1970's – 80's ???
- 1980's – Today
  - Nuclear Science and Research
  - Isotope Production (Medical/Industrial)
  - NTD Silicon Irradiation

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KPI's for 2004/5.

- Availability 89%/yr
- Unplanned Capability Loss Factor 2% per yr
- Unplanned Automatic Shutdowns < 3 per yr
- Staff Safety Radiation Dose < 1.7 mSv
- Staff Safety Lost time injuries 0

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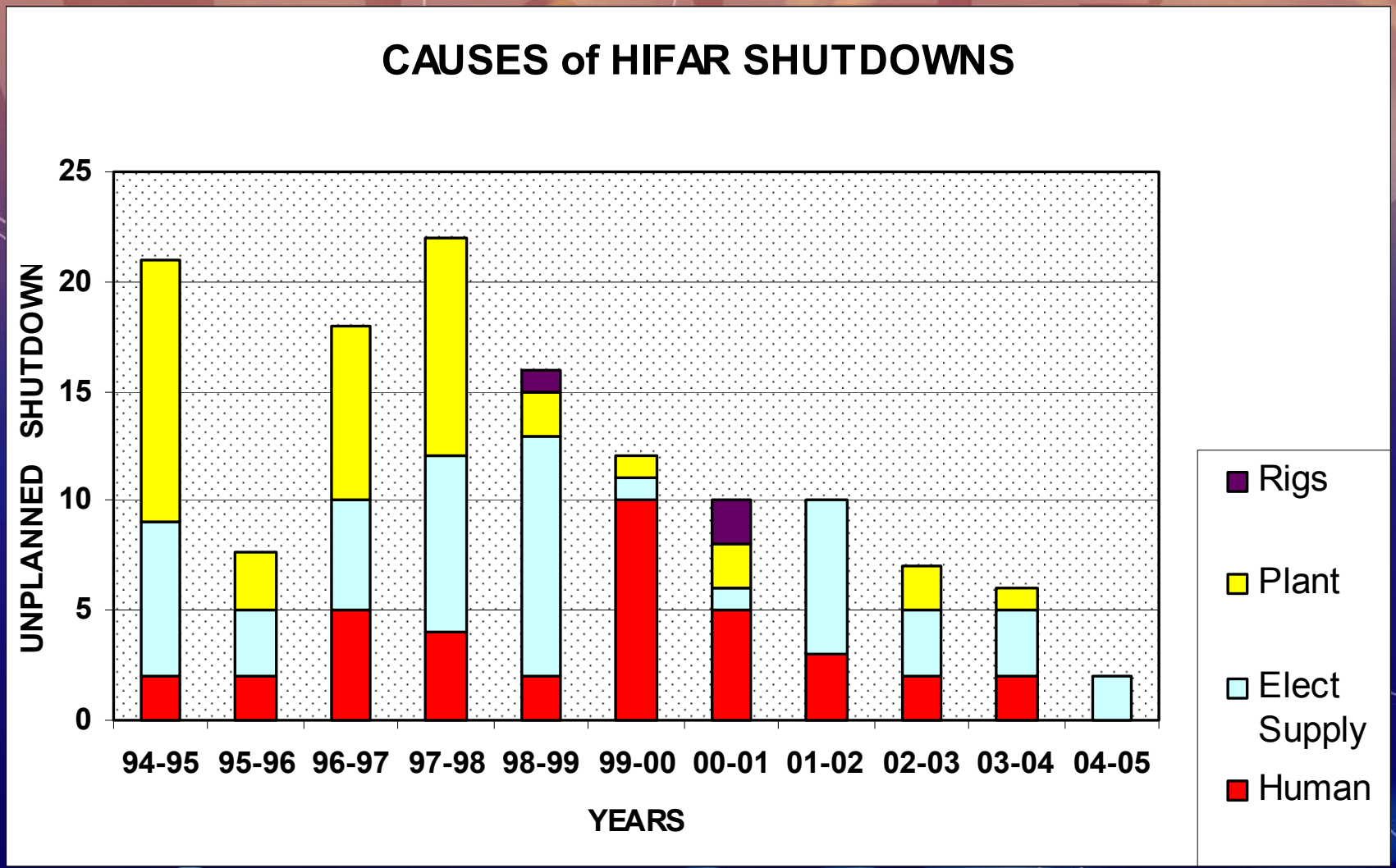

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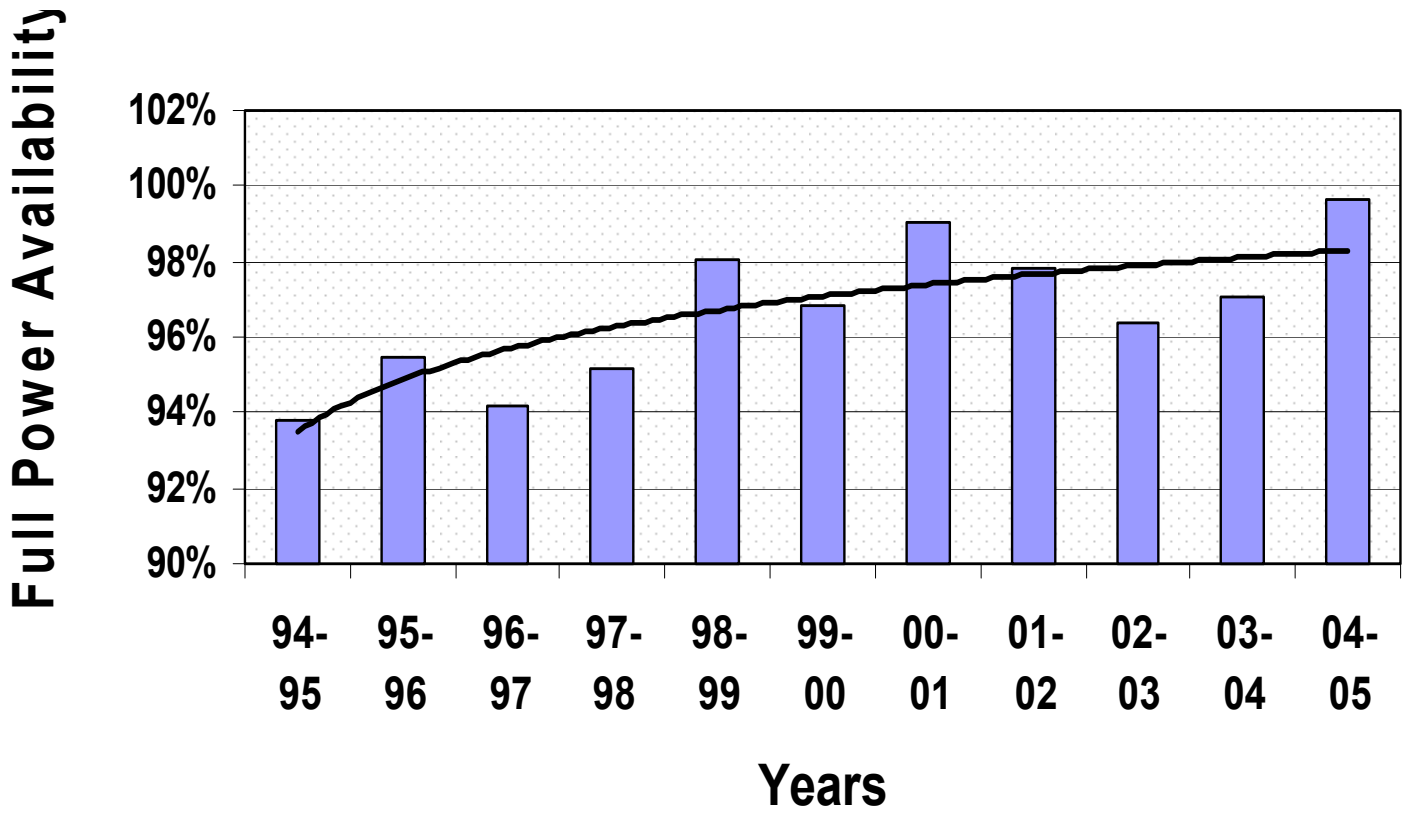
HIFAR Performance 1994 to 2005



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HIFAR Operating Cycle

- 1960's - "Ad Hoc"
- 1970's - 28 Day Program
  - 4 to 5 day Shutdown for maintenance and re-fuelling
- 2001 – 35 Day Program
  - 3.6 day Maintenance & re-fuelling

Operational Issues

- Compliance with Operating License
  - Regulatory Requirements (ARPANSA)
  - Operational Limits and Conditions
  - Compliance to ISO 9001 (QA) & 14000 (Environ't)
- Safety
  - Radiation
  - OH&S
- Shutdown Duration - Customer
  - ARI (Production)
  - Bragg Institute (Neutron Beam Users)

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HIFAR Maintenance

- Corrective and Preventive
  - Mechanical
  - Electrical
  - Instrumentation

- "At Power" and Shutdown Maintenance
- Radiation Work and Non-Radiation Work

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Maintenance Resources

- Dedicated Maintenance Staff (non-shift)
- Increased involvement in the new Reactor
- Other ANSTO Staff
- Specialist Contractors

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Maintenance for Shutdown

- Minimum Plant Configuration (MPC)
- Re-fuelling after 56 hours
- Rotation of standby equipment
  - A & B Electrical Trains
  - Containment
  - Other Duplicated Safety Systems
- Defect Rectification

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Maintenance for Shutdown

- Other considerations
  - ANSTO Site Services
    - Crane Inspections / Maintenance

- Offsite Stakeholders
  - Energy Australia

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Radiation

- Controllable Hazard
  - Training
  - Time
  - Distance
  - Shielding

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Shutdown Planning

- HIFAR Programming Officer
- Maintenance Planner
- CMMS

Input from

- Maintenance Supervisors
- Engineering Project Officers
- Operations Group
- Utilisation Group
- Management

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Shutdown Planning Cont.

- Maintenance Forecast (CMMS)
- Identification of Shutdown Tasks
- SD Planning Meetings
- Inclusion of Additional Tasks
  eg.Control Absorber Arm Changes
- Generation of Shutdown Schedule

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Future Direction

- Rationalisation of Maintenance Tasks
- Training of Staff for new Reactor
- Planning for Decommissioning

Australian Nuclear Science & **Technology** Organisation

Any questions?