HIFAR Refurbishment of Systems for Safe Enclosure

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HIFAR Decommissioning

• Phase A – Closure
  • Part 1 – Shutdown, remove fuel, water, rigs
  • Part 2 – Preliminary dismantling
  • Part 3 – Refurbishing

• Phase B – Care & Maintenance

• Phase C – Decommissioning
  • Part 1 – Preparation for dismantling
  • Part 2 – Dismantling

• Phase D – Return to Green/Brown Field
Phase A – Part 1

• Shutdown & removal of fuel, rigs, targets, absorbers and water
  • As per HIFAR QMS and operational Licence
  • Followed by cessation of shift staff coverage of HIFAR
  • Care and maintenance licence application

• Minimisation of hazards
  • Sources
  • Fire loading (wax, timber, clothing, boxes)
  • Other hazards (gas bottles, chemicals)
  • No plant modifications
Phase A – Part 2

- Preliminary dismantling of selected redundant plant
  - Reduce footprint (quantity of plant and equipment to maintain)
  - Minimise hazards (electrical, confined space, fire loading, contaminants)
Phase A – Part 3

• Installation and commissioning of refurbished plant
• Reduce maintenance and operational costs
• Increase safety and efficiency
Refurbishment Milestones

- Jan 07  Shutdown
- May 07  Initial Possess or Control Licence application
- Jun 07  24hr shift staffing ceased
- Sep 08  Possess and Control Licence granted
- Apr 09  3D laser scan of HIFAR
- Jun 10  New EPS completed
- Jul 10  Containment Isolation System removals
- Jul 10  Space Conditioning System removed
- Mar 11  HIFAR cranes disabled (except main crane)
Refurbishment Milestones

- 2011 Security System refurbished
- 2011 New HP Instrumentation system completed
- 2011 New Fire Protection System installed
- 2011 Communication system rationalised
- 2011 New Stacks Monitoring System completed
- Jul 11 HVAC Upgrade completed
- Jul 11 New SCADA completed
- Jul 11 New HVAC/SCADA Control Room built
- Jan 12 EPSS wiring, diesel generators, switchboards removed
- Apr 12 Lighting System Refurbishment
- May 12 HIFAR Records Repositories
Electrical Power Supply System – HIFAR Operation

• EPSS for HIFAR operations – large and complex.
• Mains supply to 2 separated switch boards. Standby boards each backed up by a diesel generator. UPS supplies to instrumentation and rigs.
Electrical Power System – Post Shutdown

- Refurbished Electrical Power Supply - simpler design and decreased capacity.
- Installed and commissioned in parallel with EPSS.
- New main switchboard has been installed.
- Power supply to the new HVAC and ventilation system, power for the instrumentation, lighting and power supply. Stand-by power available for the extract ventilation system and PLC for the SCADA.
- Significant reduction in maintenance requirements
- Procurement and installation costs was $260,000
Electrical Power System – Post Shutdown

New Electrical Power Supply Distribution Board

New Ventilation Distribution Board
Electrical Power Supply Observations

- Planning and scheduling issues.
- Site location of plant – think about future use of areas
- Running two power supply systems in parallel, safety issues
- Selection of contractors
- Stakeholder relations – impact on other buildings
Ventilation System

• During HIFAR Operation:
  • Active and Normal Extract systems and Normal Supply System
  • Gamma monitoring on each filter bank which could shut down HIFAR during operation. CIS radiation sensor on the filter banks which would seal the ventilation system.

• Post HIFAR shut down
  • Ventilation System refurbished,
  • water seals removed,
  • automatic fan change over
  • variable speed fan motors
Ventilation System – Observations

- Standby AVS to be kept
- Should you really dismantle the plant?
- Re-use plant as much possible
- Staff continuity on projects is important
  - However different people will have different ideas
- Evaluate conditions early so as to prevent rework
HVAC System

• During HIFAR Operation:
  • Supply air was conditioned. Old and obsolete controls and equipment. Heating elements used – expensive to operate

• Post HIFAR Shutdown
  • New air handling unit and chiller installed. Heating and cooling via reverse cycle air conditioning.

• Observations
  • Reuse existing plant and equipment (ducts) where possible and appropriate
  • Benefits of designing plant in-house to ensure correct results
  • Choose the contractor carefully
  • Proven and reliable
SCADA

• During HIFAR Operation:
  • Data Acquisition System was used to monitor the reactor operating systems, plant and experiments. The system did not provide any control functions of the HIFAR plant items.

• Post HIFAR shut down:
  • For the unmanned HIFAR there is a requirement for a SCADA system to monitor residual radiation levels,
  • building temperature pressure and humidity.
  • SCADA system forms part of HIFAR BMS

• Observations
  • Companies use different software standards
  • Corel Draw vs. AutoCAD
Radiation Monitoring

• HIFAR Operation:
  • Eberline Gamma Monitors
  • Obsolete & no spare parts available
  • Triton Tritium Monitors
  • Obsolete & no spare parts available

• Post HIFAR shut down:
  • New Minalarm Gamma Monitors
  • New Overhoff Tritium Monitors
  • New units connected to SCADA system to enable monitoring from outside of the reactor building

• Observations
  • Will spare parts be available for the expected lifetime of new plant and equipment
  • Sometimes good equipment may need to be replaced due to lack of spares