HFIR Scientific Facilities Upgrade Project

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The U.S. Department of Energy's High Flux Isotope Reactor (HFIR), at Oak Ridge, is undergoing a multiyear upgrade of its neutron scattering capabilities. The project includes a cold neutron source, described in a separate paper; a building to house the cold neutron instruments; modification of internal reactor components to provide more, larger neutron beams at each of the four neutron beam ports; expansion of the HB-2 thermal beam system to accommodate three beams and four instruments; modification of the other beam tubes to provide taller beams, with appropriate new monochromators; and several new instruments. The project is planned to minimize additional downtime by taking advantage of the scheduled six-month shutdown, in the year 2000, for changeout of the so-called permanent beryllium reflector. A proposal has also been made for extending the cold guide hall to provide space for two large SANS machines in an area remote from the reactor.

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ORNL is managed by Lockheed Martin Energy Research Corporation, under Contract No. DE-AC05-6OR22464 for the U.S. Department of Energy.

COLD NEUTRON SOURCE (1)

- BUILDING COMPLETE
  — except “Safe Room”

- REFRIGERATOR EQUIPMENT RECEIVED, EXCEPT FOR THE DIESEL GENERATOR
  — piping assembly has begun

- TEST OF FULL REFRIGERATOR (HELIUM) PLANNED FOR JANUARY 2000

COLD NEUTRON SOURCE (2)

- HYDROGEN TEST OF COMPLETE SYSTEM (OUT-OF-PILE) PLANNED FOR FALL OF 2000
- PRELIMINARY ISSUE OF SAFETY ASSESSMENT REPORT SCHEDULED FOR APRIL 2000
- INSTALLATION AFTER POST-BERYLLIUM CHANGEOUT RESTART

THE MAIN REACTOR MODIFICATIONS (1)

- FOUR NEW BEAM TUBES
  - — HB-2, HB-4 are larger inside and outside the pressure vessel
  - — HB-1, HB-3 are larger outside the pressure vessel

- NEW BERYLLIUM PERMANENT AND SEMIPERMANENT REFLECTOR RINGS
  - — redesigned for larger HB-2, HB-4 beam tubes

THE MAIN REACTOR MODIFICATIONS (2)

- NEW “CAGE” (THE SUPPORT STRUCTURE FOR THE REFLECTOR AND MANY OF THE REACTOR COMPONENTS)
  - redesigned to suit the larger beam tubes and the new permanent reflector

- NEW SHUTTERS

- NEW VESSEL SURVEILLANCE SPECIMEN MOUNTS AT HB-2 AND HB-4
  - redesigned to accommodate the vessel surveillance program through 2035

STATUS OF REACTOR MODIFICATIONS (1)

- NEW REFLECTOR RINGS, NEW “CAGE”, HB-1, -2 AND -3 BEAM TUBES
  — fabrication underway

- HB-2 SHUTTER
  — part of the CILAS contract (in place)

- HB-2 AND HB-4 VESSEL NOZZLE SURVEILLANCE SPECIMEN MOUNTS
  — fabrication should begin in December

STATUS OF REACTOR MODIFICATIONS (2)

- HB-1 AND HB-3 SHUTTER DESIGN COMPLETE
  — fabrication out for bids

- HB-4 BEAM TUBE AND COLD NEUTRON SOURCE MODERATOR ASSEMBLY IS IN FINAL DESIGN REVIEW

- HB-4 BEAM TUBE SHUTTER DESIGN SHOULD BE COMPLETE THIS MONTH,
  — fabrication should begin this year

HB-2 BEAMLINE

- CONCEPTUAL DESIGN COMPLETE (CILAS)

- DETAILED DESIGN, FABRICATION AND INSTALLATION CONTRACT IN PLACE AND UNDERWAY (CILAS)

- BLOCK (PARAFFIN AND STEEL SHOT) DESIGN DRAWINGS ARE IN CHECKING STAGE
  — expect to go out for bids in January

HB-4 BEAMLINE

- CONCEPTUAL DESIGN COMPLETE (CILAS)

- DETAILED DESIGN CONTRACT IN PLACE AND UNDERWAY (CILAS)
  - includes second SANS beamline as an option (not yet activated)

- FABRICATION AND INSTALLATION PHASES OF THE CONTRACT ARE AGREED AND IN PLACE, BUT NOT YET ACTIVATED

- BEAM ROOM EQUIPMENT REMOVAL PLAN IS DEFINED

- SHIELDING DESIGN CONCEPT NOT YET FINALIZED

MONOCHROMATOR DRUMS
(HB-1, -2, -3)

- MODEL (HALF-SCALE) OF NEW APERTURE WEDGE SYSTEM WORKS SUCCESSFULLY
  - larger aperture needed to suit taller beams

- DRUM DESIGN COMPLETE, DRAWINGS, (~250 OF THEM) APPROVED
  - package has gone out for bids

- SADDLE SHIELD DESIGN NOT YET COMPLETE
  - will be added to fabrication contract l later