Final Phase of the Scientific Upgrades at the Oak Ridge National Laboratory High Flux Isotope Reactor

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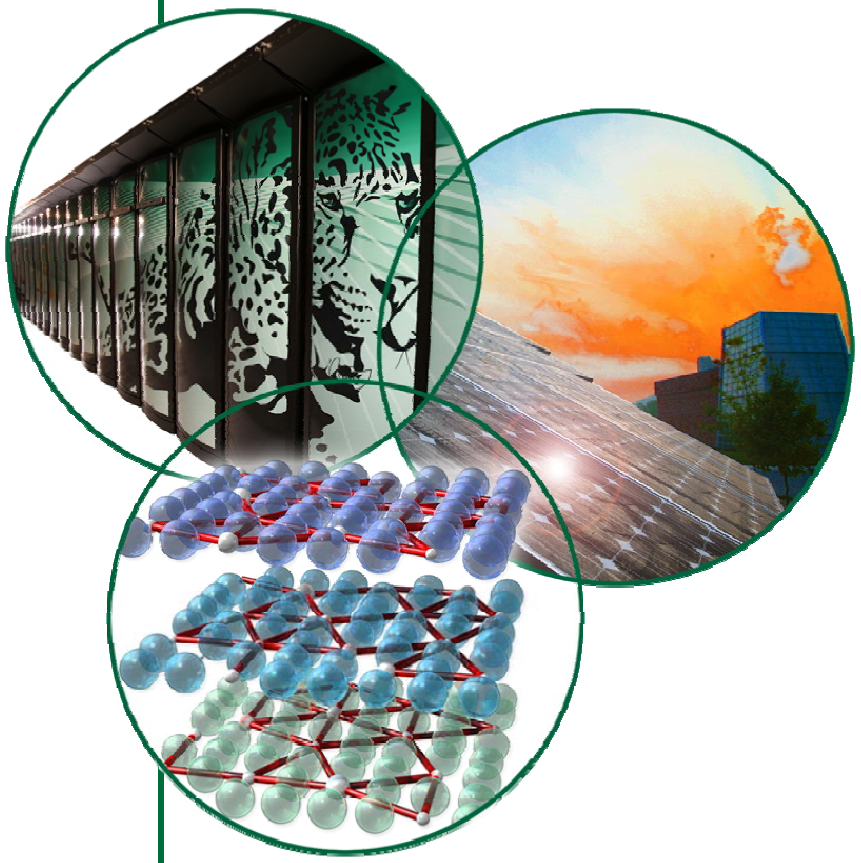

U.S. DEPARTMENT OF ENERGY

OAK RIDGE NATIONAL LABORATORY
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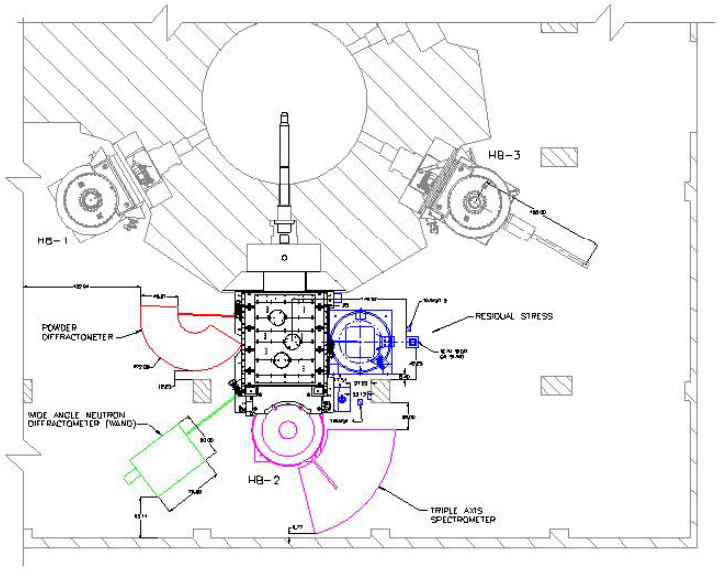
A 10 Year Program to Enhance the Scientific Capabilities of the HFIR Was Initiated in 1998

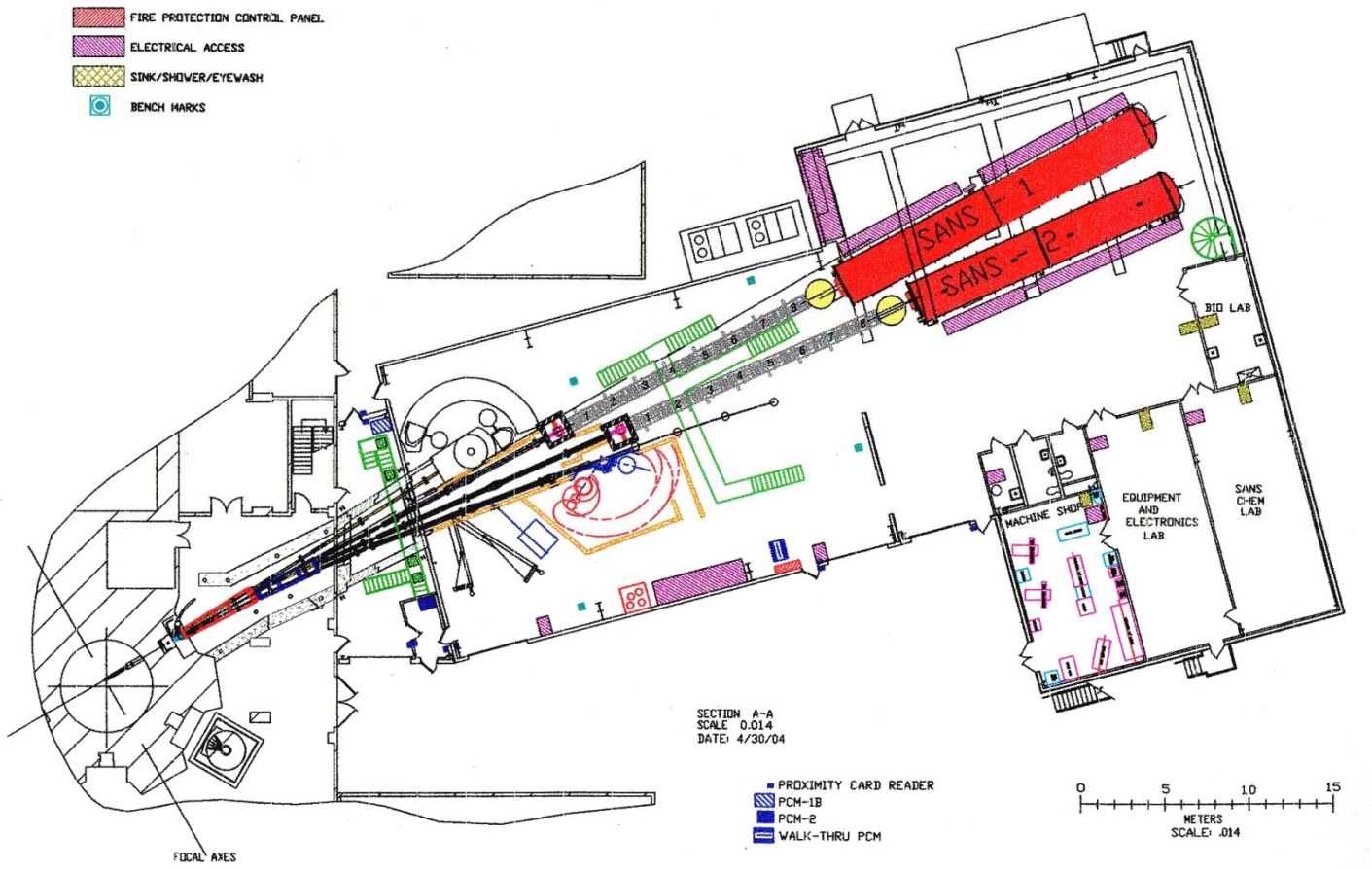
- Upgrade program was divided into 4 phases
  - Phase 1: Increased sizes of beam tubes
  - Phase 2: Upgrade thermal instruments to handle larger beams and increase access to the large HB-2 beam
  - Phase 3: Install supercritical hydrogen cold source on the HB-4 beam and construct HB-4 Guidehall
  - Phase 4: Install cold neutron beam instruments in Guidehall and install new instruments at open positions on thermal beams

The Completion of Phases 1-3 Has Been Reported in Previous IGORR Presentations in 2003, 2005, and 2007

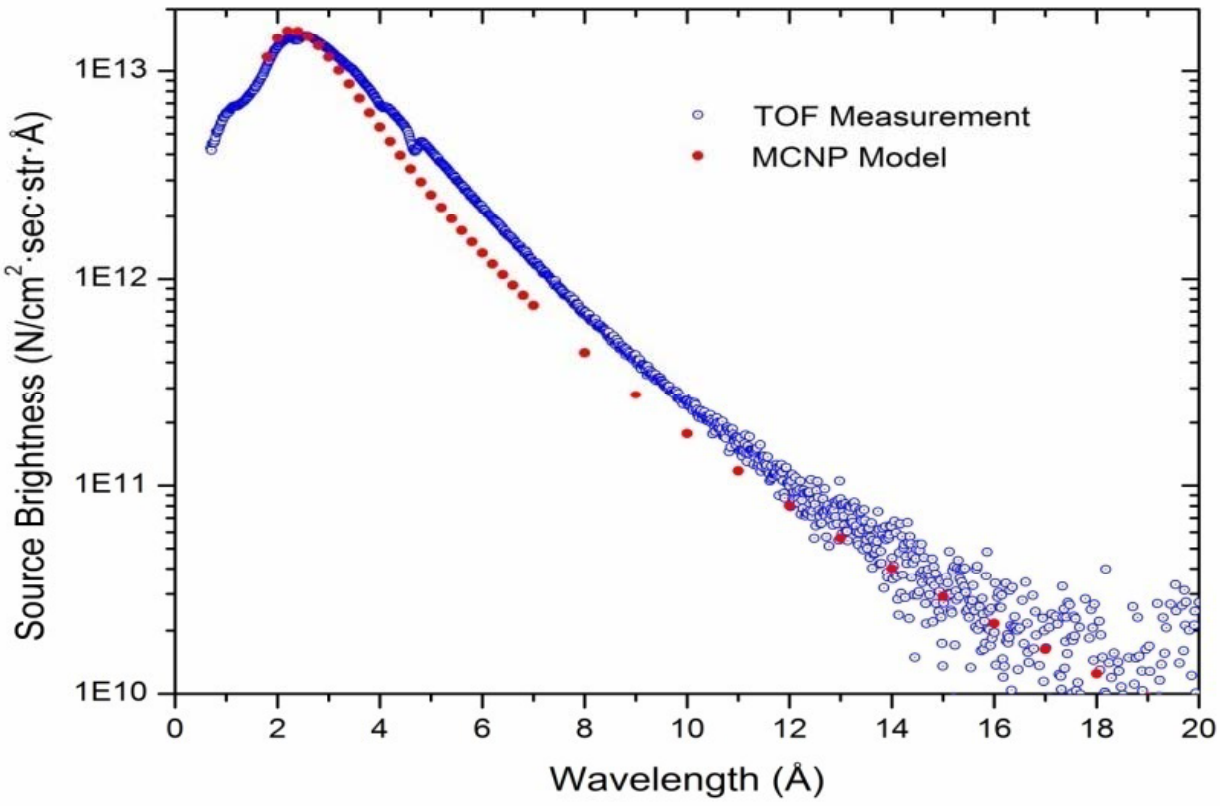
- With the larger beams and the use of vertical focusing improvements of flux on sample of factors of 2 to 10 have been measured for the thermal instruments
- HB-2 extension into beam room was a success allowing 4 instrument positions to access the HB-2 beam



HB-4 Cold Source and Guide System Was Declared Operational in May and June of 2007, shortly after the last IGORR Meeting

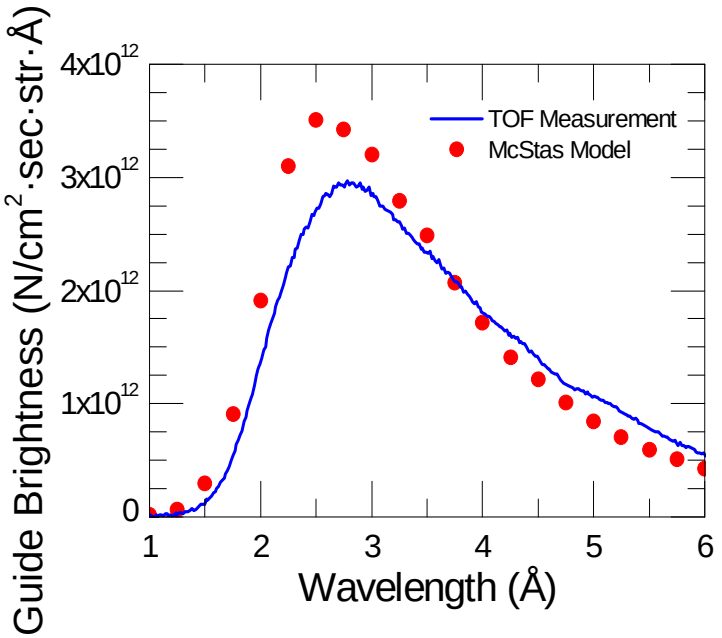


Measurements of the HB-4 Cold Neutron Beam Have Now Been Performed at the Start of the Guide System



Time-of-flight Measurements Have Also Been Performed at the End of Cold Guide 4 (CG-4)

- Impact of septa alignment in CG-4 guide was not as bad as first perceived



Over the Last Two Years, Three New Neutron Scattering Instruments Have Been Installed at HFIR

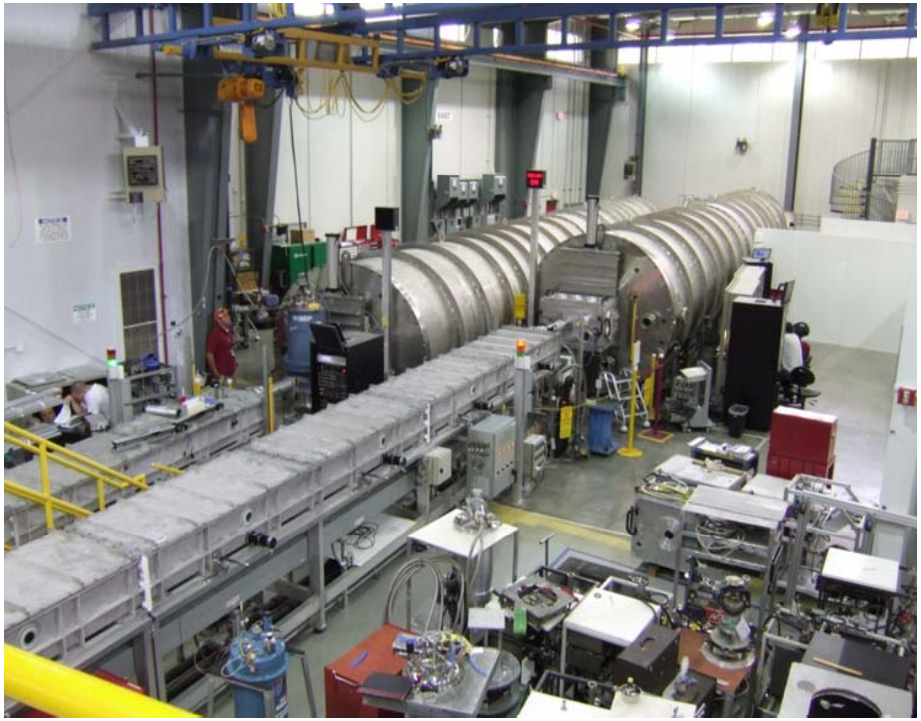
- Powder Diffractometer at HB-2A thermal beam position
- General purpose SANS instrument at CG-2 cold beam position
- BioSANS instrument at CG-3 cold beam position

Powder Diffractometer Instrument Was Declared Operational in January 2009

- Instrument was officially placed in the Formal User Program during the spring of this year
- Instrument is already oversubscribed

General Purpose SANS and BioSANS Instruments were Declared Operational During the Summer of 2007

- Both SANS instruments were placed in the User Program during the last quarter of 2007
- Both instruments are oversubscribed
- Efforts are underway to upgrade the 1m x 1m detectors in order to make full use of the beam

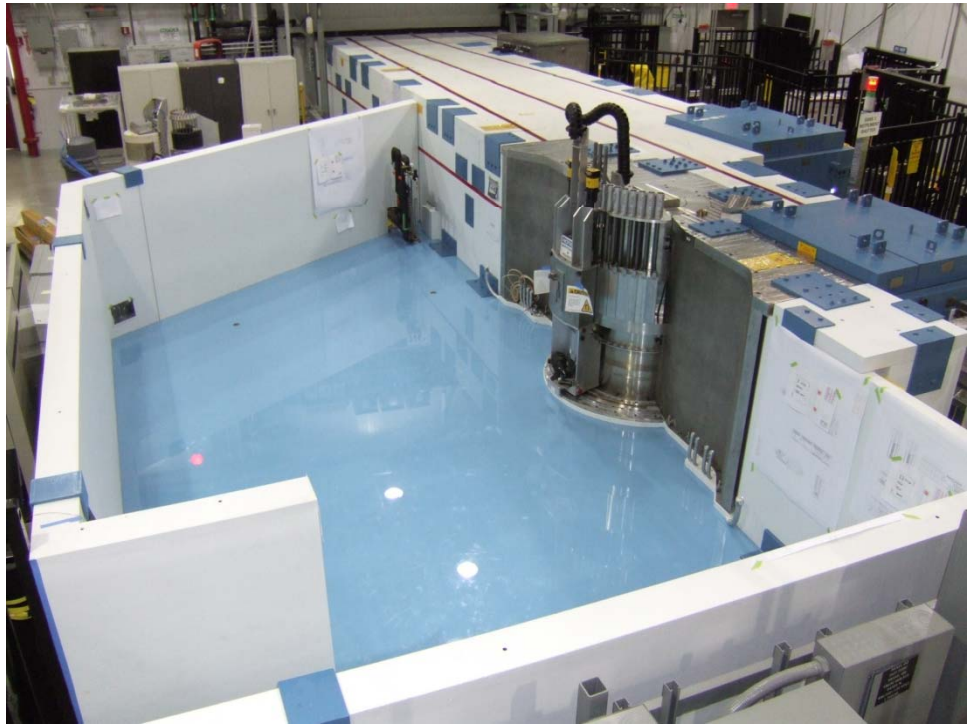


Four Additional Instrument Projects are in Various Stages of Completion

- Installation of US/Japan collaboration cold triple axis instrument is well underway
- Installation of a 4 beam test station area at CG-1 is nearly complete
- Design of new single crystal diffractometer instrument at the end of CG-4 is well underway
- New wide angle neutron diffractometer instrument for thermal beam HB-2C is also in the design phase with operation scheduled for fall of 2010

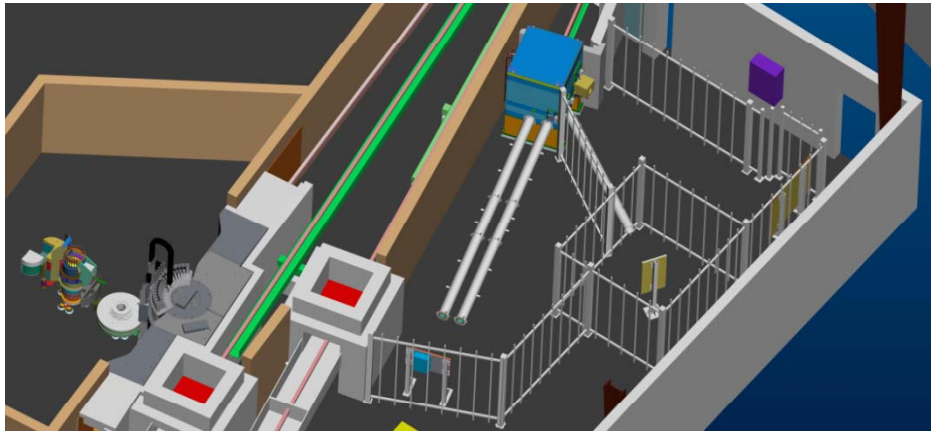
US/Japan Cold Triple Axis Instrument Installation is Well Underway

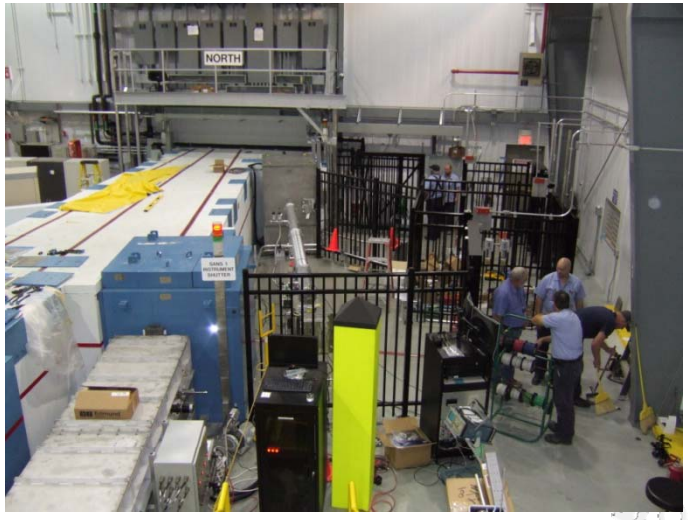
- Just completed installation of precision floor for air pad use
- Instrument monochromator and shielding have also been installed
- Scheduled to begin operation in the summer of 2010



Test Stations Are Being Temporarily Installed at CG-1 to Make Early Use of this Cold Neutron Beam

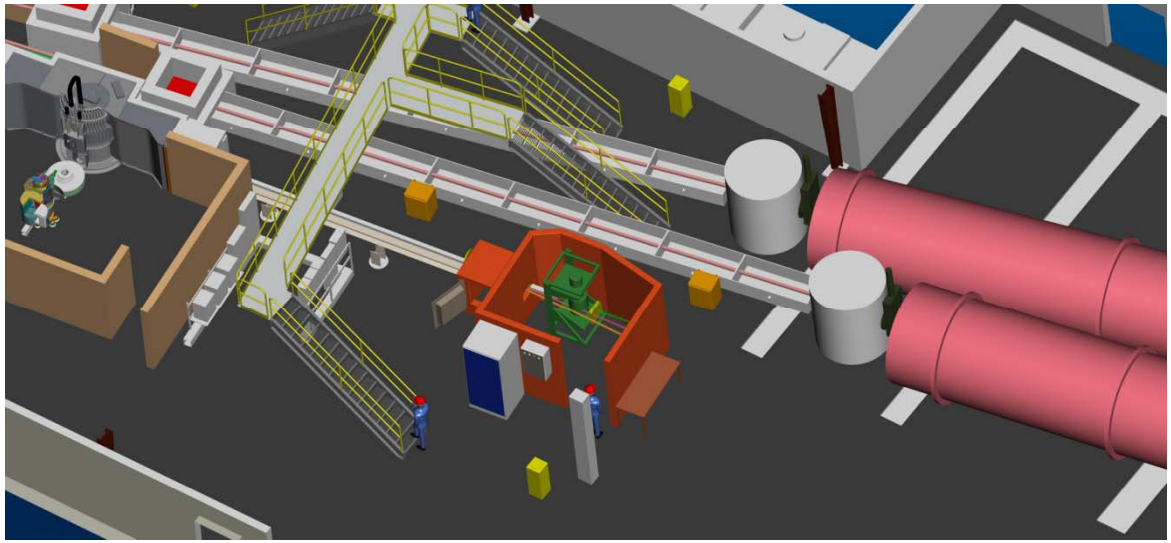
- Four beams will support three test station areas for studies supporting both HFIR and SNS instruments.
- CG-1A – test new neutron spin echo concepts
- CG-1B will be used to align samples and perform optics research
- CG-1C and CG-1D will be used for neutron imaging research





IMAGINE Instrument Project is Scheduled for Completion in the Spring of 2011

- Modeled after the LADI III instrument at the ILL reactor and the KOALA instrument at the OPAL reactor
- Uses image plates as the detector
- Scheduled for operation in spring of 2011



A New Major Scientific Upgrade Project for HFIR is Being Planned to Start As Early As 2016

- Includes 2nd cold source which would be located on HB-2 beam
- Large HB-2 Guidehall with nine cold guides and support offices and labs
- Assortment of new instruments
- Part of the DOE 20 year facility plan with an early estimated cost of about $200M US