

Status of the High Flux Isotope Reactor and the Reactor Scientific Upgrades Program

September 13, 2005

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High Flux Isotope Reactor (HFIR) Status

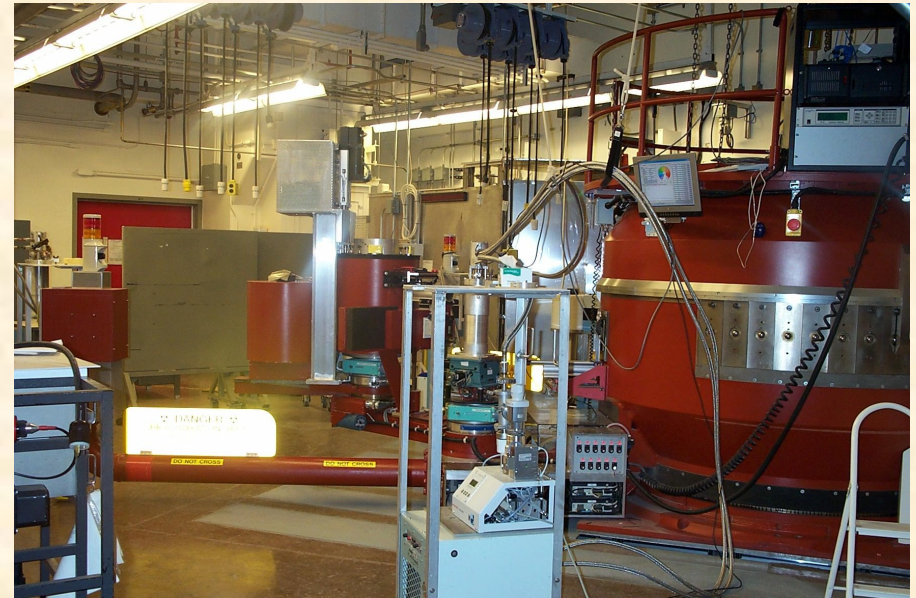
- **In July 2005, the HFIR's 406th operating fuel cycle was completed.**
- **Following this cycle the reactor was shutdown for a long outage in preparation for the installation of the new cold source.**
- **The reactor is expected to resume operation at 85 MW in December.**
- **However, a normal schedule of operating cycles is not expected to occur until fall of 2006.**

History of the HFIR Scientific Upgrades Program

- **The HFIR Scientific Upgrades Program was initiated in the mid 1990's following the cancellation of the Advanced Neutron Source Project when money was supplied to develop a cold source concept.**
- **Plans for improvement in performance at all four beam lines were developed.**

Planned Scientific Upgrades at HB-1 are Completed

- A new larger beam tube was installed.
- New monochromator drum was designed, fabricated, and installed to accommodate the larger neutron beam.
- HB-1 Triple Axis Spec. is operating as part of the user program with a factor of $\sim 2-3$ improvement in signal.



Extensive Changes Were Made to the HB-2 Capabilities (2)

- **Activities also included the installation of a neutron guide to support the portion of the beam feeding the HB-2D location at the end of the tunnel.**



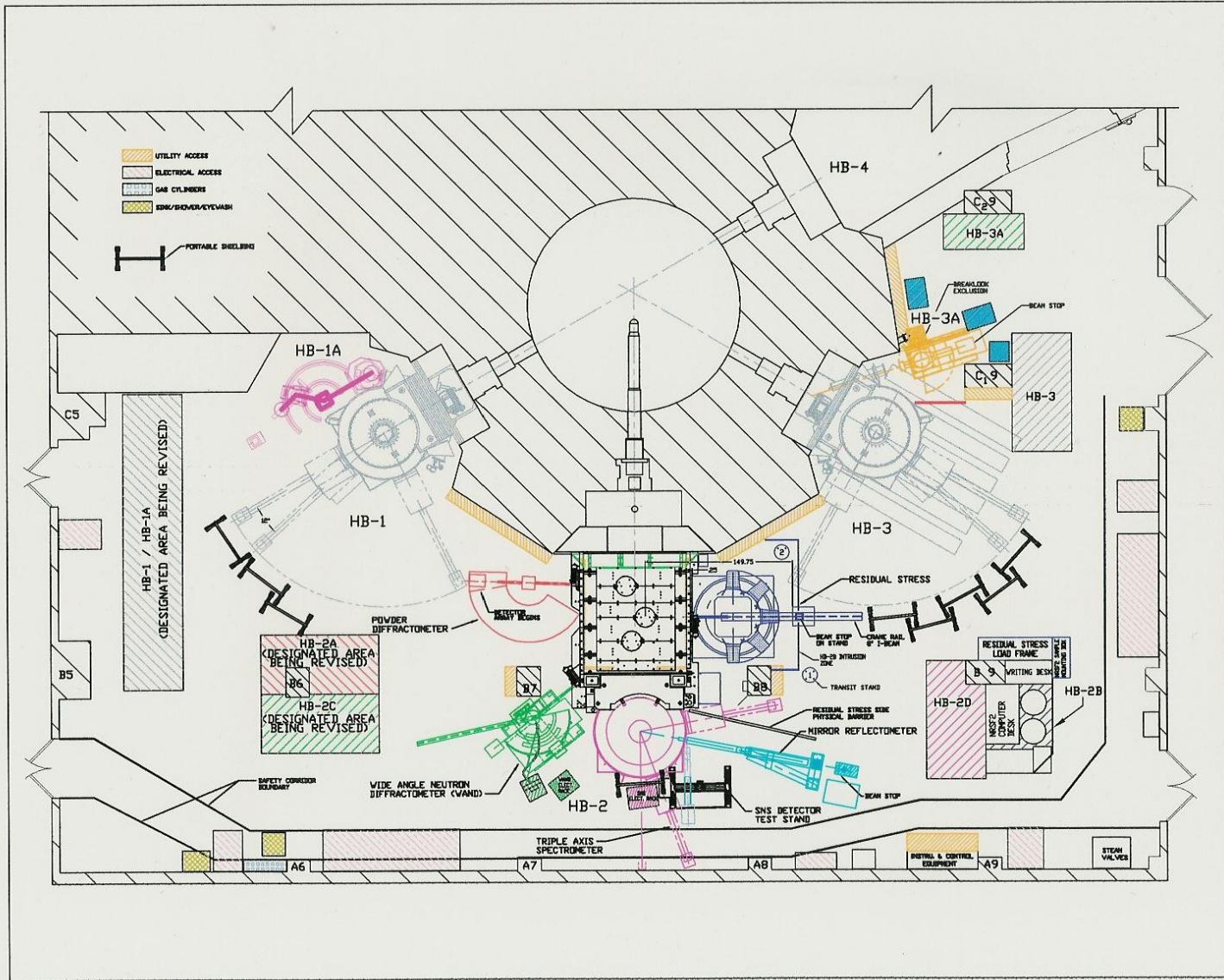
Fully Assembled Shield Tunnel at HB-2



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New HB-2 Layout



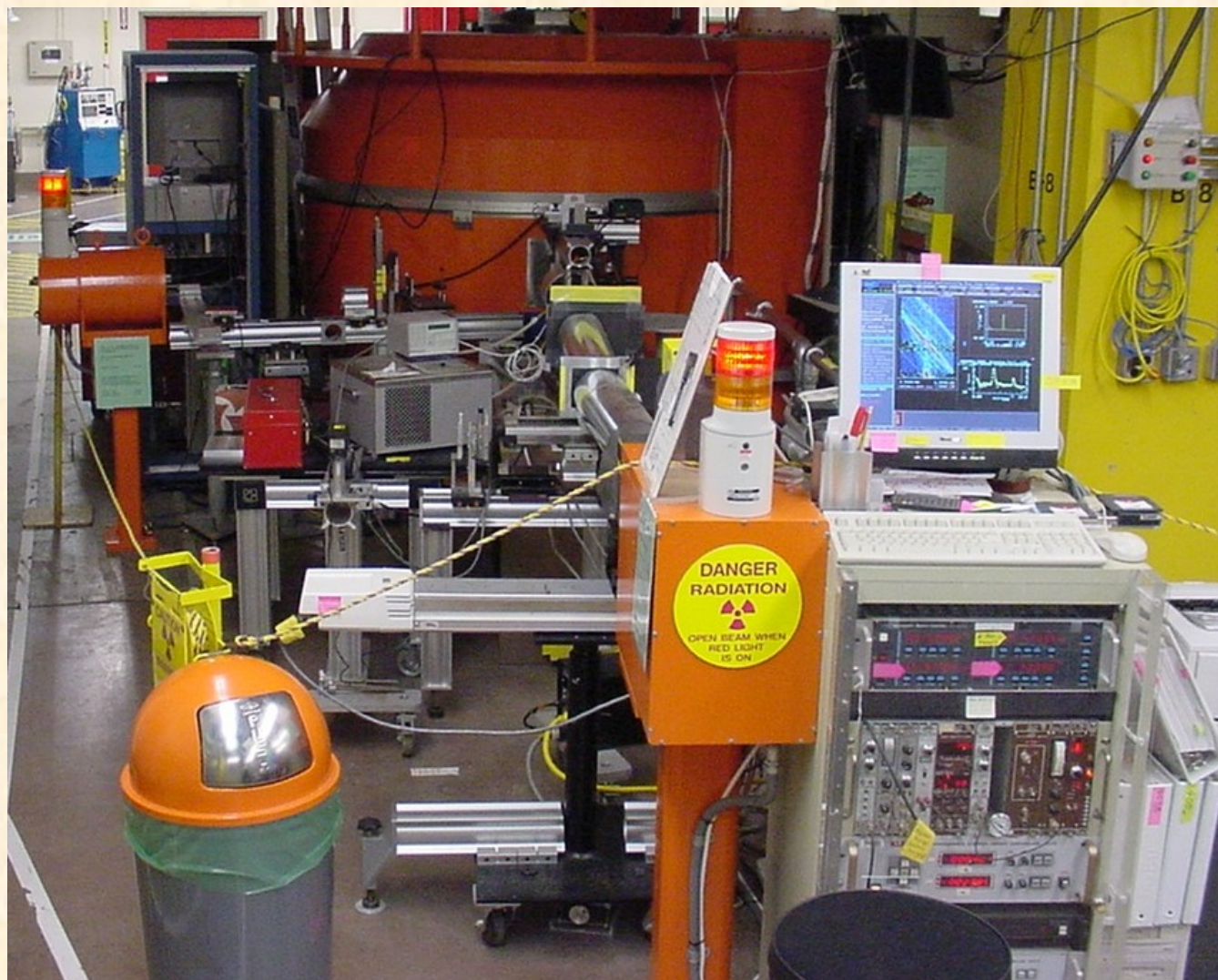
Residual Stress Instrument At HB-2B



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Reflectometer (MIRROR) at the HB-2D Beam Line

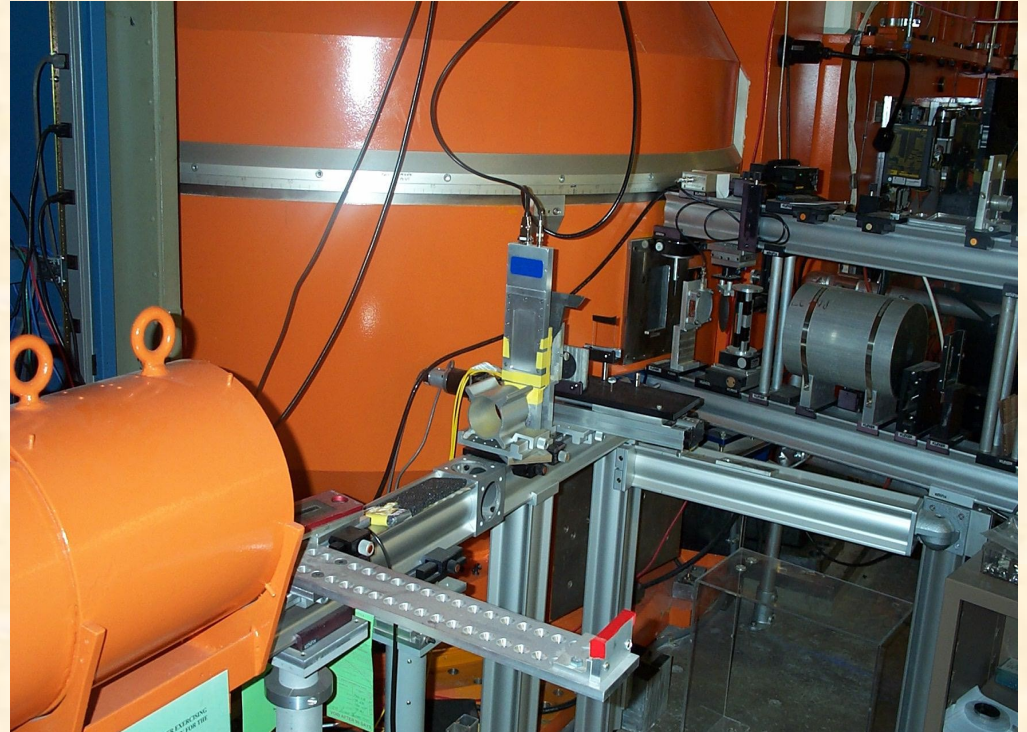


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SNS Detector Test Station at the HB-2D Beam Line

- SNS test station uses the top 1 cm of the HB-2D beam.
- Flux is about 10^5 with nominal neutron wavelength of 4.25 \AA (4.5 meV).



HB-2C is the Home for the WAND Instrument Which is Presently in the Commissioning Phase



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Scientific Upgrades at HB-3 Should be Completed This Calendar Year

- **New larger beam tube has been installed.**
- **New monochromator drum has been installed to accommodate the larger neutron beam.**
- **The HB-3 Triple Axis Spectrometer is operating as part of the user program with a factor of 3-4 improvement in flux.**



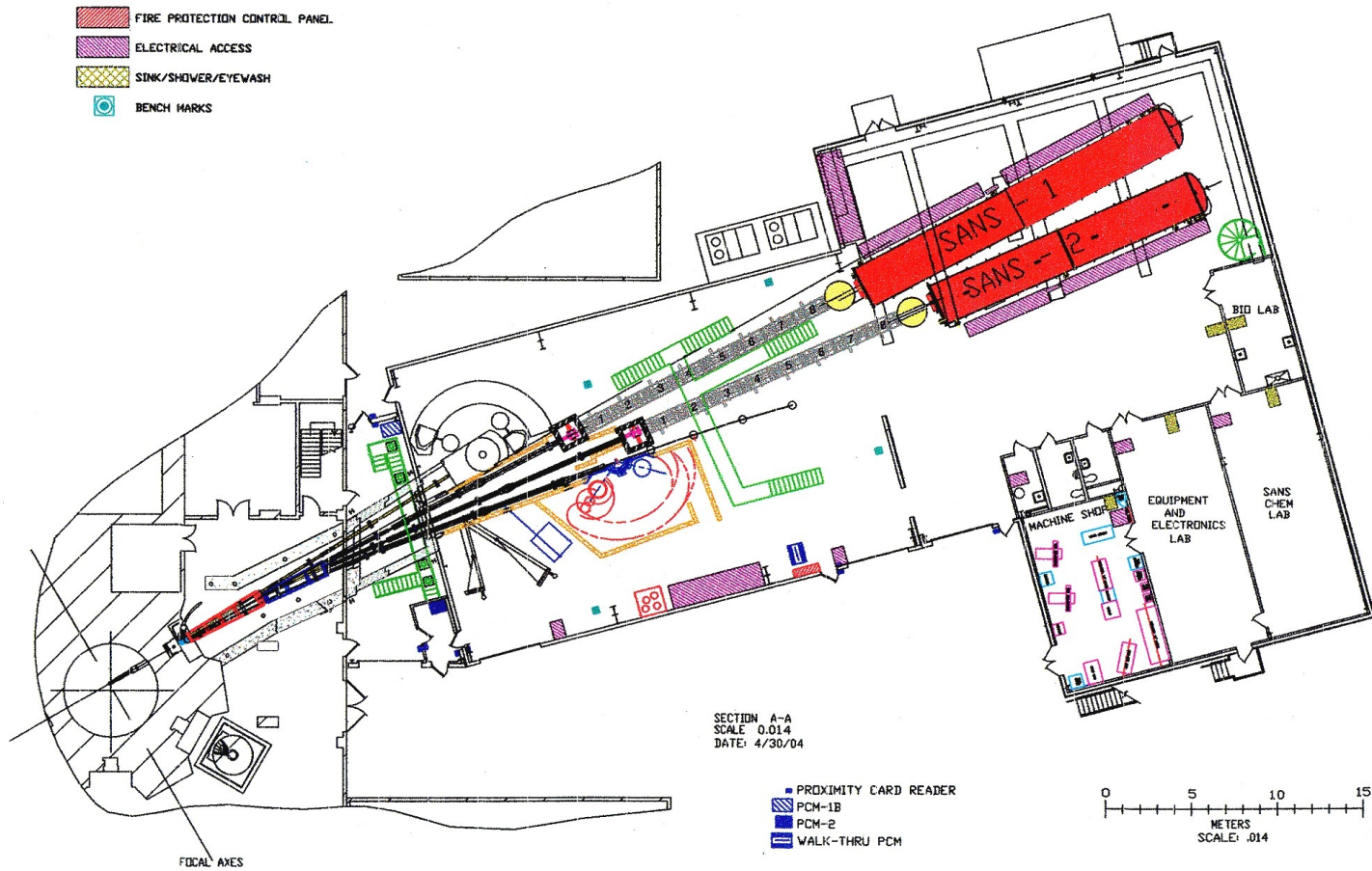
Estimated/Measured Performance Gain Factors for Instruments at HB-1, 2, and 3 (1)

Beam Line	Instrument	Estimated Performance Improvement Factor	Measured Performance Improvement Factor
HB-1	Triple Axis	2.5	2 to 3
HB-1A	Double Crystal Triple Axis	2.5	2 to 3
HB-2A	Powder Diffractometer	10	
HB-2B	Residual Stress	2	8 to 10

Estimated/Measured Performance Gain Factors for Instruments at HB-1, 2, and 3 (2)

Beam Line	Instrument	Estimated Performance Improvement Factor	Measured Performance Improvement Factor
HB-2C	WAND	10	
HB-2D	Triple Axis	3.5	
HB-3	Triple Axis	2	3 to 4
HB-3A	Four-Circle Diffractometer	2	

HB-4 Layout



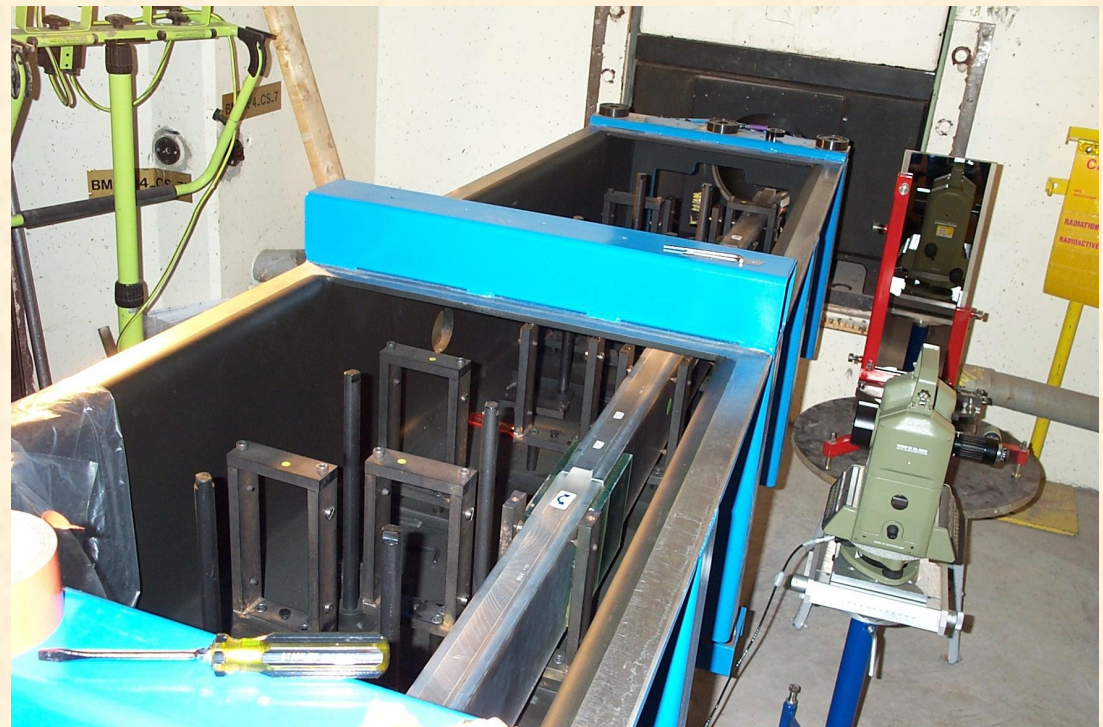
Pour-In-Place Portion of the Shield Tunnel has been Completed

- **Pour-in-place shield tunnel in beam room was a massive undertaking, but it is now completed with the exception of the door installation.**



Neutron Guide System Has Been Delivered and Installation is Underway (1)

- **Guide installation began in January of this year**
- **The common casings have been installed and CG-1, 2 and 3 have been installed in the first common casing.**



Neutron Guide System Has Been Delivered and Installation is Underway (2)

- At this time CG-1 and CG-2 have been installed through the Guidehall.
- Guide installation should be completed by the end of the calendar year.



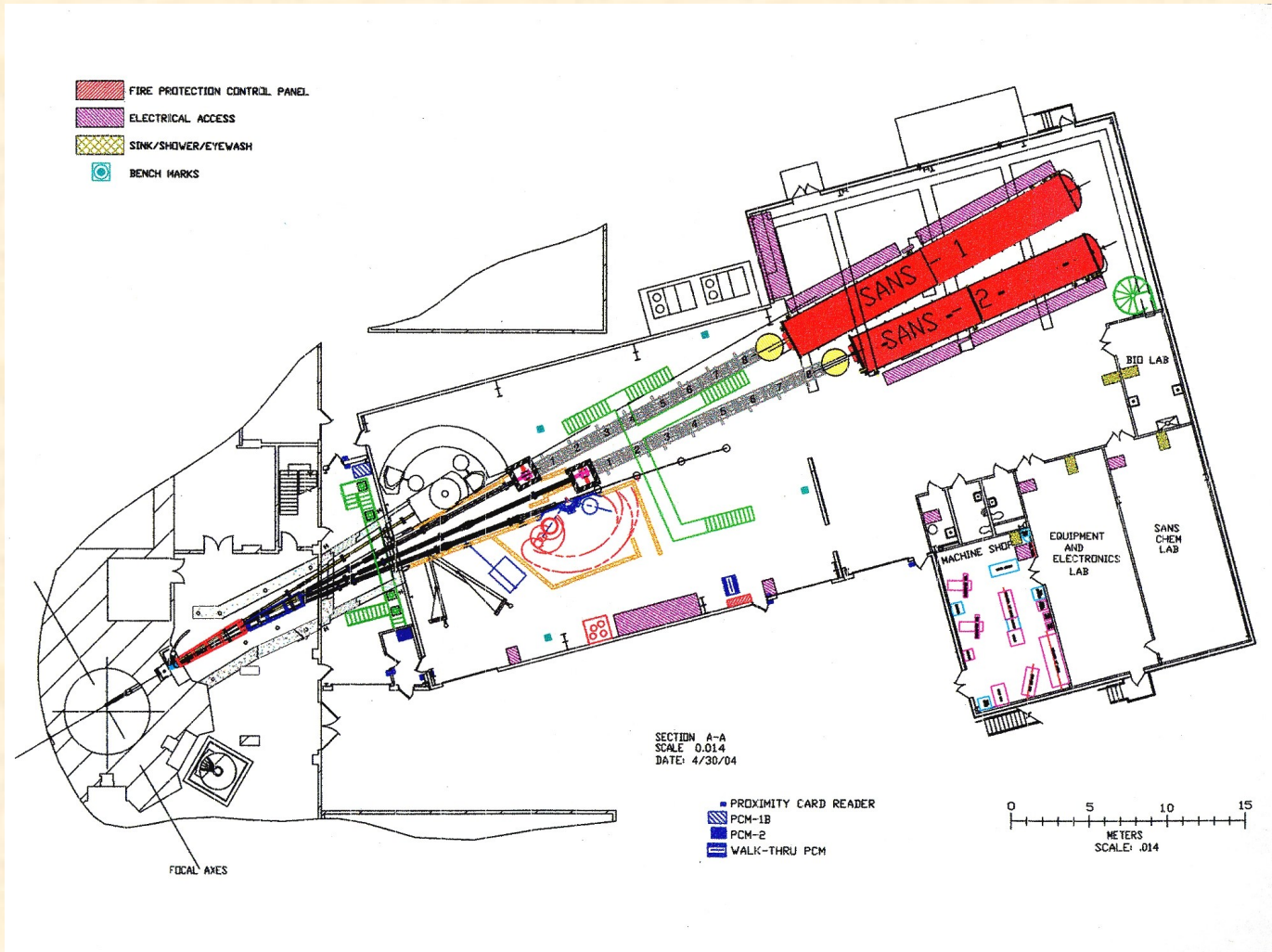
Construction of the HB-4 Guidehall Buildings Was Completed in 2003



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The logo for UT-Battelle, featuring a stylized mountain range above the text "UT-BATTELLE".

Design of Portable Shield Sections for the Guidehall Is Underway



SANS-1 and SANS-2 Flight Tubes Have Been Delivered



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Guidehall is Starting to Look Like a Guidehall

