HFIR/SNS

Greg Rowland
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BES investment has created 2 advanced neutron scattering user facilities

High Flux Isotope Reactor (HFIR)
Intense steady-state neutron flux
and a high-brightness cold neutron source

Spallation Neutron Source (SNS)
World’s most powerful accelerator-based neutron source
## For Fiscal Year 2014

### HFIR
- Delivered 3682 production hrs for users over 6 cycles
- 100% predictability
- Operated at 85 MW
- Completed 50 cycles with cold source

![HFIR Image](image)

### SNS
- Delivered 4424 production hrs for users at 94.1% availability against planned hrs
- Operated at ~1.0 MW and 60 Hz
- World record 1.4 MW for pulsed linac
- Developed plan to extend target life-time

![SNS Image](image)

### Science program
- Supported 893 unique users at SNS and 453 unique users at HFIR
- Over 900 proposals received during last proposal call setting a new facility record
- HFIR is also an exceptional resource for materials irradiation and neutron activation analysis and continuing mission in isotope production

![Science Program Image](image)
SNS Beamlines

The Spallation Neutron Source is a facility of Oak Ridge National Laboratory, managed by UT-Battelle for the US Department of Energy.
HFIR Beamlines

High Flux Isotope Reactor at Oak Ridge National Laboratory

The United States' highest flux reactor-based neutron source

Reactor Pressure Vessel

Cold Neutron Source

Development Beam Line - CG-1A
Detectors, optics, and spin echo development
Ray Nagel - 865.576.2906
ray.nagel@fandl.gov

Cold Neutron Imaging Beam Line - CG-1D
Transmission imaging of natural and engineered materials
Maurice Weekes - 865.246.8633
m.weekes@fandl.gov

General-Purpose SANS - CC-2
Materials structure and processing, metastable phases, high- & low-temperature, supercurhuroducts, and complex fluids
Brian Lenz - 865.576.3377
brian.lenz@fandl.gov

Bio-SANS - CC-3
Proteins and complexes, pharmaceuticals, biomaterials
Walter Oeltmann - 865.576.7074
walter.oeltmann@ornl.gov

Optics Development Beam Line - CG-1B
X-ray imaging and optics
Lin Budai - 865.576.8908
l.budai@fandl.gov

Image Plate Single-Crystal Diffractometer (IMAGINE) - CG-4D
Atomic resolution imaging in biology, chemistry, and complex materials
Mary Strycula - 865.576.2774
mary.strycula@fandl.gov

Fixed-Incident-Energy Triple-Axis Spectrometer - HB-1A
Low-energy excitations, magnetic, structural transitions
Will Turner - 865.576.9021
will.turner@fandl.gov

Polarized Triple-Axis Spectrometer - HB-1
Polarized neutron studies of magnetic materials, low-energy excitations, structural transitions
Annika Macek - 865.576.8399
annika.macek@fandl.gov

Neutron Powder Diffractometer - HB-2A
Structural studies, magnetic structures, texture & phase analysis
Charlies K. Ayers - 865.576.6477
chayers@fandl.gov

Neutron Residual Stress Mapping Facility - HB-2B
Stress and phase mapping in engineering materials
Andrew Harris - 865.576.2093
ajharris@fandl.gov

Four-Circle Diffractometer - HB-3A
Small-angle neutron scattering & magnetic, structural studies
Heather Baker - 865.576.9048
hbaker@fandl.gov

Future Development - CG-4B
Future Development - CG-4C
Future Development - CG-4D

PREP-2013 - High Flux Isotope Reactor at Oak Ridge National Laboratory
What we do well....

- Quick Start Guides
- Lab Video
- Sample Handling (tracking)
- Operational Feasibility (SAs)
Challenges...

- Sample Handling
- User Training (how much is enough?)
- Science case vs actual work steps
Operational risk...
### Potential Hazards while performing these activities

<table>
<thead>
<tr>
<th>Hazard Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Hazard</td>
<td>This equipment is operated on a high voltage system and may remain charged after being powered off.</td>
</tr>
<tr>
<td>Heat Hazard</td>
<td>Some models have vacuum ovens installed. The ovens produce heat and may cause burns. Use caution around oven or other heat sources.</td>
</tr>
<tr>
<td>Suffocation Hazard</td>
<td>There is a risk of asphyxiation when working with inert gasses.</td>
</tr>
<tr>
<td>General Hazards</td>
<td>Depending on the type of work being performed in the box, thermal, mechanical, electrical, and/or chemical hazards may be present.</td>
</tr>
</tbody>
</table>

### Preventions to reduce exposure to hazards:

<table>
<thead>
<tr>
<th>Safety Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Protection</td>
<td>Wear safety glasses with side shields while operating equipment and working in laboratory.</td>
</tr>
<tr>
<td>Protective Gloves</td>
<td>Wear appropriate gloves for heat and chemical usage over top of glove box gloves. Keep glove box gloves away from hot surfaces.</td>
</tr>
<tr>
<td>Read Manual</td>
<td>Become familiar with this guide before operating.</td>
</tr>
</tbody>
</table>