Configuration Control and Implementation of Safety Principles on the Research Side of the HFIR Site Operations

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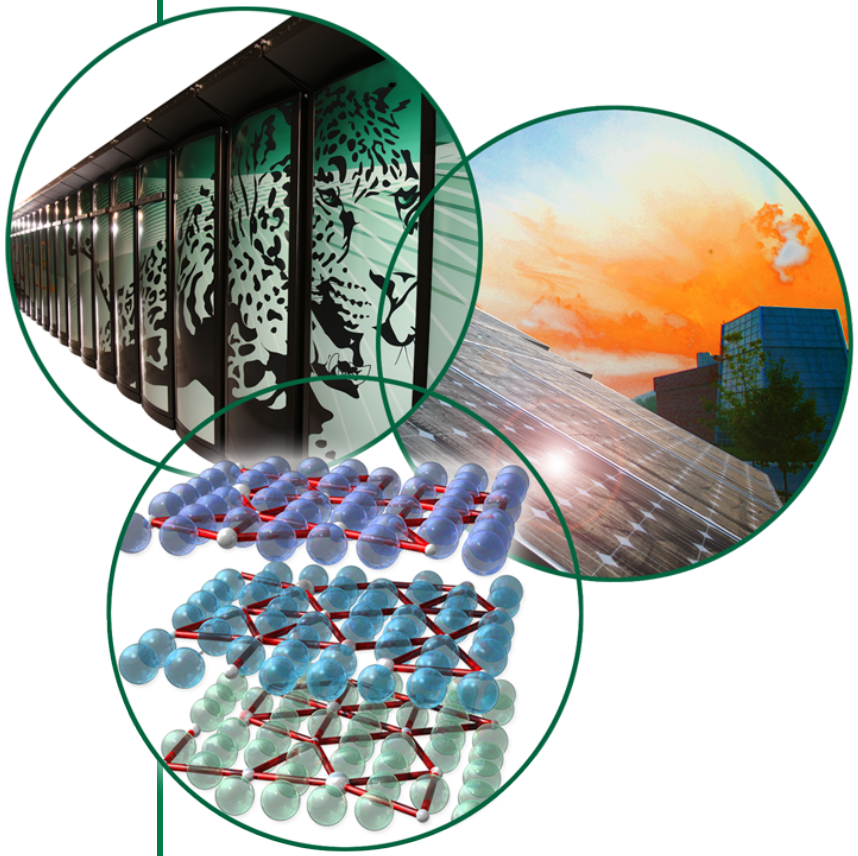
Presented at the 2010 TRTR/IGORR Conference



U.S. DEPARTMENT OF ENERGY

OAK RIDGE NATIONAL LABORATORY
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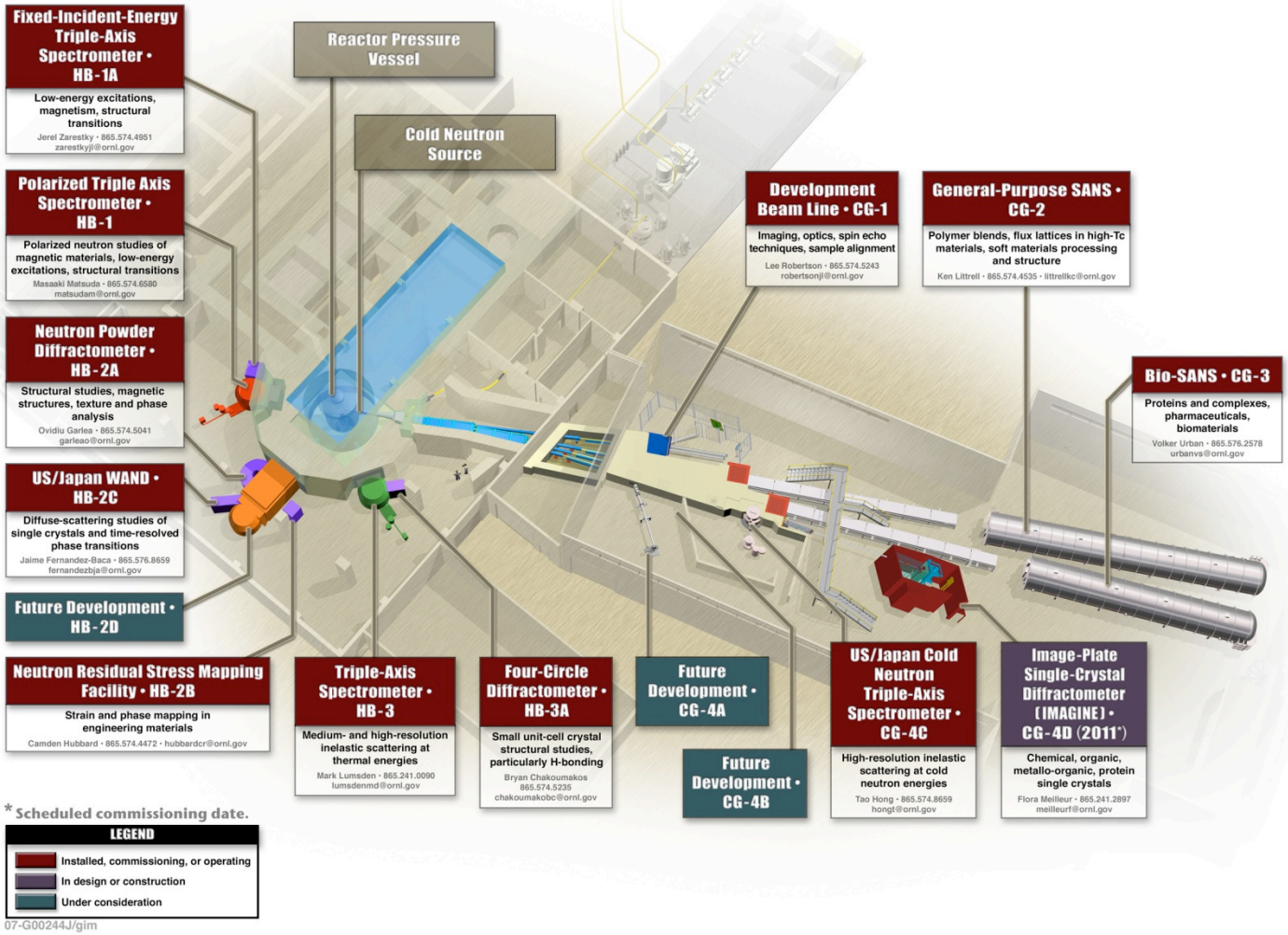
HFIR Reactor and Neutron Science Instrument Layout

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Oak Ridge National Laboratory's High Flux Isotope Reactor
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Formal User Program at HFIR

- Formal user program started in 2003 for three instruments and has now grown to 9 instruments with 4 additional instruments expected to be added to the program over the next 18 months.
  - FY 2003: 51 users
  - FY 2005: 96 users
  - FY 2009: 358 users

- The implications of having a significant number of non staff scientists and researchers on site working with the neutron beams raised a number of concerns about science and safety issues.

Evaluation of Relationship Between HFIR Reactor Operations and Science Operations on the HFIR Site

- About eight years ago the management of the reactor and neutron science divisions decided to take a hard look at the relationship between reactor operations and science operations on the reactor site
  - Triggered by a number of incidents over a several year period
- What we found was that a number of problems could be traced to a lack of real communication between the two groups and a general feeling by the staff in each group that there was no need to know what the other group was doing
  - Reactor management did not fully understand the concept of predictability being as important as availability nor was there an understanding that the science side needed to be kept informed of reactor issues
  - Science side had little understanding of the need for configuration management and the need to track and control the introduction of hazards on the reactor site

The Conclusion from this Self Assessment was that We had a Formula for Disaster and We Needed to Address this Problem

- MOU was developed and approved by all three responsible divisions (NSSD, NFDD, and RRD)
- Science side Configuration Control Committee established
- NS 1.1 Procedure was developed and approved for new instrument and instrument modification projects
- ES&H review of all experiments and an ES&H staff person was placed on site in 2008 to support science operations
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- All Instrument Technical Operating Guidelines were revised
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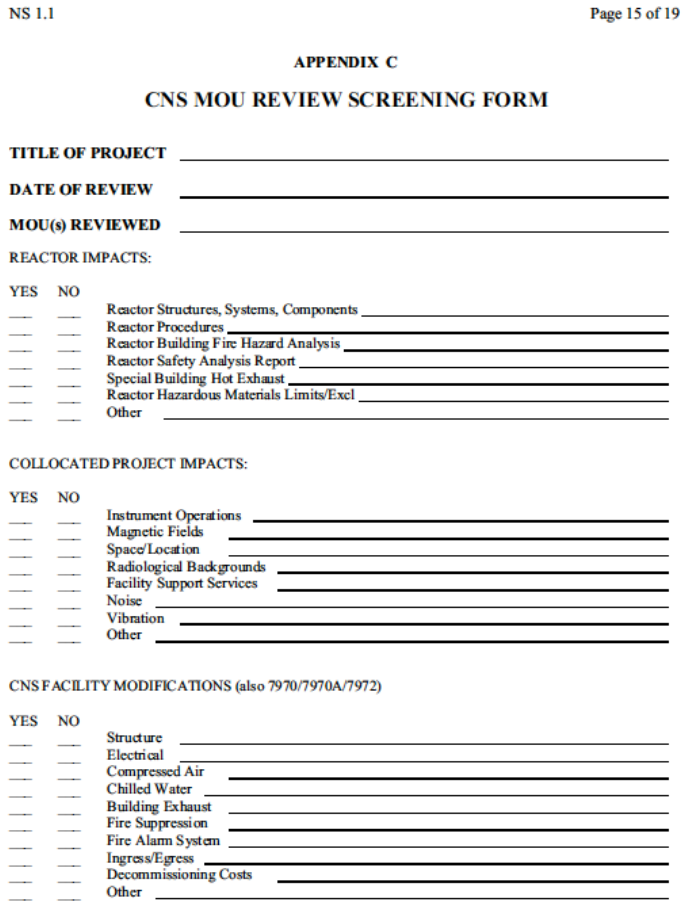
MOU Between Three Divisions Developed

- This MOU established communication paths, reporting requirements, and interfaces
- MOU Review between RRD and NFDD was established as an early step in any new project to review applicable interfaces with the RRD to establish reporting requirements and reviews that needed to involve reactor engineering and operations
- This review also established requirements in such areas as seismic and fire loading qualifications where equipment associated with a science instrument was perceived to have potential impact on reactor safety related equipment in the area.



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APPENDIX C

CNS MOU REVIEW SCREENING FORM

TITLE OF PROJECT _____

DATE OF REVIEW _____

MOU(s) REVIEWED _____

REACTOR IMPACTS:

YES	NO	
___	___	Reactor Structures, Systems, Components
___	___	Reactor Procedures
___	___	Reactor Building Fire Hazard Analysis
___	___	Reactor Safety Analysis Report
___	___	Special Building Hot Exhaust
___	___	Reactor Hazardous Materials Limits/Excl
___	___	Other

COLLOCATED PROJECT IMPACTS:

YES	NO	
___	___	Instrument Operations
___	___	Magnetic Fields
___	___	Space/Location
___	___	Radiological Backgrounds
___	___	Facility Support Services
___	___	Noise
___	___	Vibration
___	___	Other

CNS FACILITY MODIFICATIONS (also 7970/7970A/7972)

YES	NO	
___	___	Structure
___	___	Electrical
___	___	Compressed Air
___	___	Chilled Water
___	___	Building Exhaust
___	___	Fire Suppression
___	___	Fire Alarm System
___	___	Ingress/Egress
___	___	Decommissioning Costs
___	___	Other

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Neutron Instrument Configuration Control Committee (CCC)

- CCC composed of NSSD, NFDD, RRD, and ES&H staff
- Meets on an as needed basis
- Committee focuses on the review of the process rather than technical review of an activity

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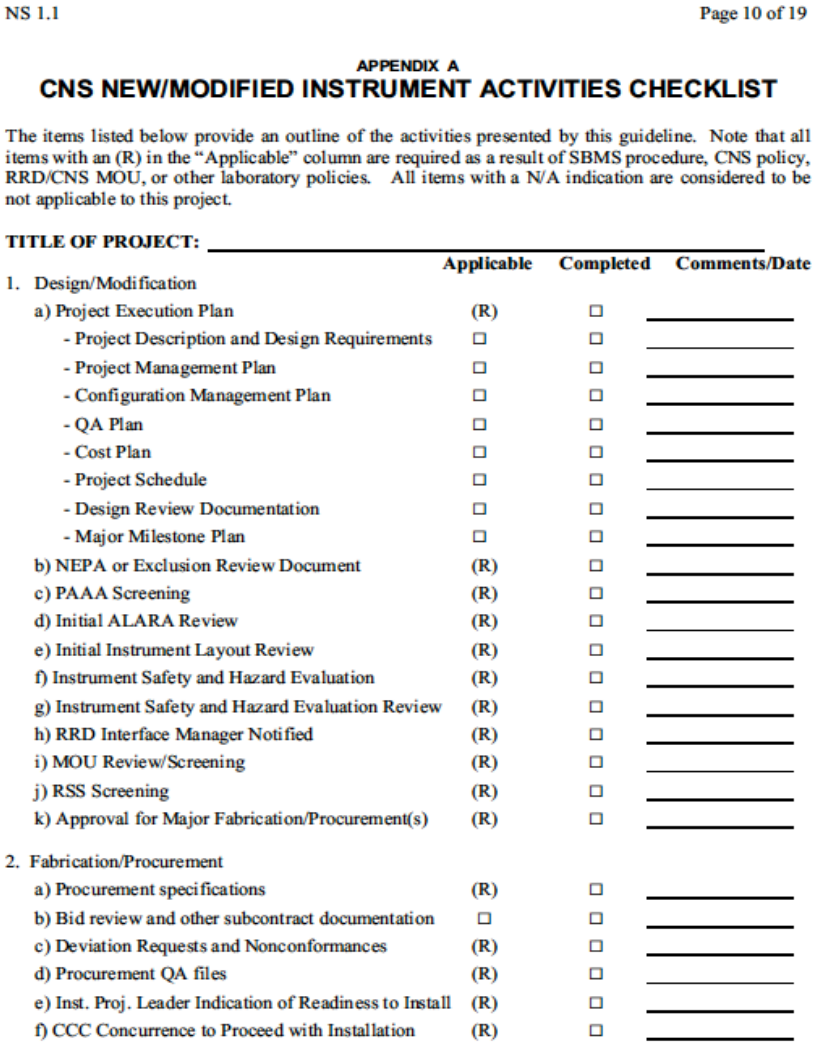
NS 1.1 Procedure is Controlling Document for New Projects

- Establishes CCC review points
  - Design
  - Procurement
  - Installation
  - Commissioning
  - Normal Operation
- Establishes Documentation and Testing Requirements
  - ALARA
  - Design Reviews
  - Hazard Analysis
  - Technical Operating Guideline
  - Radiological Surveys
- Also establishes Project Management Requirements



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APPENDIX A

CNS NEW/MODIFIED INSTRUMENT ACTIVITIES CHECKLIST

The items listed below provide an outline of the activities presented by this guideline. Note that all items with an (R) in the "Applicable" column are required as a result of SBMS procedure, CNS policy, RRD/CNS MOU, or other laboratory policies. All items with a N/A indication are considered to be not applicable to this project.

TITLE OF PROJECT: _____

	Applicable	Completed	Comments/Date
1. Design/Modification			
a) Project Execution Plan	(R)	☐	_____
- Project Description and Design Requirements	☐	☐	_____
- Project Management Plan	☐	☐	_____
- Configuration Management Plan	☐	☐	_____
- QA Plan	☐	☐	_____
- Cost Plan	☐	☐	_____
- Project Schedule	☐	☐	_____
- Design Review Documentation	☐	☐	_____
- Major Milestone Plan	☐	☐	_____
b) NEPA or Exclusion Review Document	(R)	☐	_____
c) PAAA Screening	(R)	☐	_____
d) Initial ALARA Review	(R)	☐	_____
e) Initial Instrument Layout Review	(R)	☐	_____
f) Instrument Safety and Hazard Evaluation	(R)	☐	_____
g) Instrument Safety and Hazard Evaluation Review	(R)	☐	_____
h) RRD Interface Manager Notified	(R)	☐	_____
i) MOU Review/Screening	(R)	☐	_____
j) RSS Screening	(R)	☐	_____
k) Approval for Major Fabrication/Procurement(s)	(R)	☐	_____
2. Fabrication/Procurement			
a) Procurement specifications	(R)	☐	_____
b) Bid review and other subcontract documentation	☐	☐	_____
c) Deviation Requests and Nonconformances	(R)	☐	_____
d) Procurement QA files	(R)	☐	_____
e) Inst. Proj. Leader Indication of Readiness to Install	(R)	☐	_____
f) CCC Concurrence to Proceed with Installation	(R)	☐	_____

NS 1.1 Also Requires a Hazard Analysis Screening Followed by a Hazard Mitigation Document

APPENDIX B

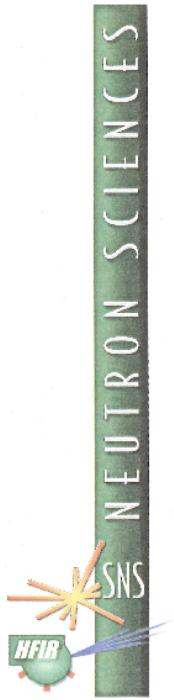
INSTRUMENT HAZARD IDENTIFICATION & SCREENING FORM

TITLE OF PROJECT: _____

- ❑ RADIOLOGICAL
  - ❑ Beam Access _____
    - ❑ Engineered Restriction _____
    - ❑ Administrative Restrictions _____
  - ❑ Shielding Hazards and Beams Modifiers (or other components that may be placed in the beam)
    - ❑ Activation _____
    - ❑ Prompt Radiation _____
    - ❑ Scatter _____
  - ❑ Background Contribution
    - ❑ Neutrons _____
    - ❑ Gamma _____
    - ❑ Personnel _____
    - ❑ Adjacent Instruments _____
- ❑ FISSIONABLE MATERIALS _____
- ❑ EXPLOSIVE MATERIALS _____
- ❑ CONFINED SPACE _____
  - ❑ Permitted
  - ❑ Non-Permitted
- ❑ HAZARDOUS MATERIALS (Lead, Cadmium, Beryllium, etc) _____
- ❑ HIGH VOLTAGE _____
- ❑ HIGH CURRENT _____
- ❑ MACHINE GUARDING _____
  - ❑ Pinch Points
  - ❑ Motion/Speed
  - ❑ Gears/Chains
  - ❑ Electropneumatic/Electromechanical Lifters/Drivers
- ❑ COMPRESSED GASES/AIR _____

US/Japan Cold Neutron Triple-Axis Spectrometer CG4C (HFIR)

Hazard Identification and Analysis



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IPTS –Integrated Proposal Tracking System

- Part of the safety review process is facilitated through the proposal system used by researchers. Currently this includes review of the sample and eventually the experimental conditions
- Some experiments may require extensive reviews by Fire Protection , Radiation Office, Instrument support , Sample Environment or the Biosafety Committee. This is presently a manual operation that requires coordination and communication between divisions.
- The evolution of proposal system has multiple reviewers required to provide oversight , input and approval.
- Extraordinary conditions are communicated to RRD interface by ESH Coordinator and a determination is made on whether any special interactions are required

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End of cycle reviews are held as a joint meeting of divisions

- These help to identify any issues good or bad that occurred during the last cycle.
- Input obtained from users by the user office is discussed at this meeting
- Science staff and reactor operations staff supply input as well
- Things are discussed and solutions to any problems are worked on to prevent reoccurrence.
- Findings from these end of cycle reviews are then discussed at a monthly management meeting of the three divisions

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Part of the ESH onsite support included updating the Technical Operating Guidelines for the Instruments

- The Science Instrument documents have been updated to reflect coordination between divisions based on NS 1.1 and the MOU
- This system has been implemented for both previously installed (modifications of) and newly proposed instruments.

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Although we have Separate Work Activities on the HFIR Site Tied to Three Divisions We are Working to Communicate as One Group