The Shutdown of the Intense Pulsed Neutron Source and Lessons Learned

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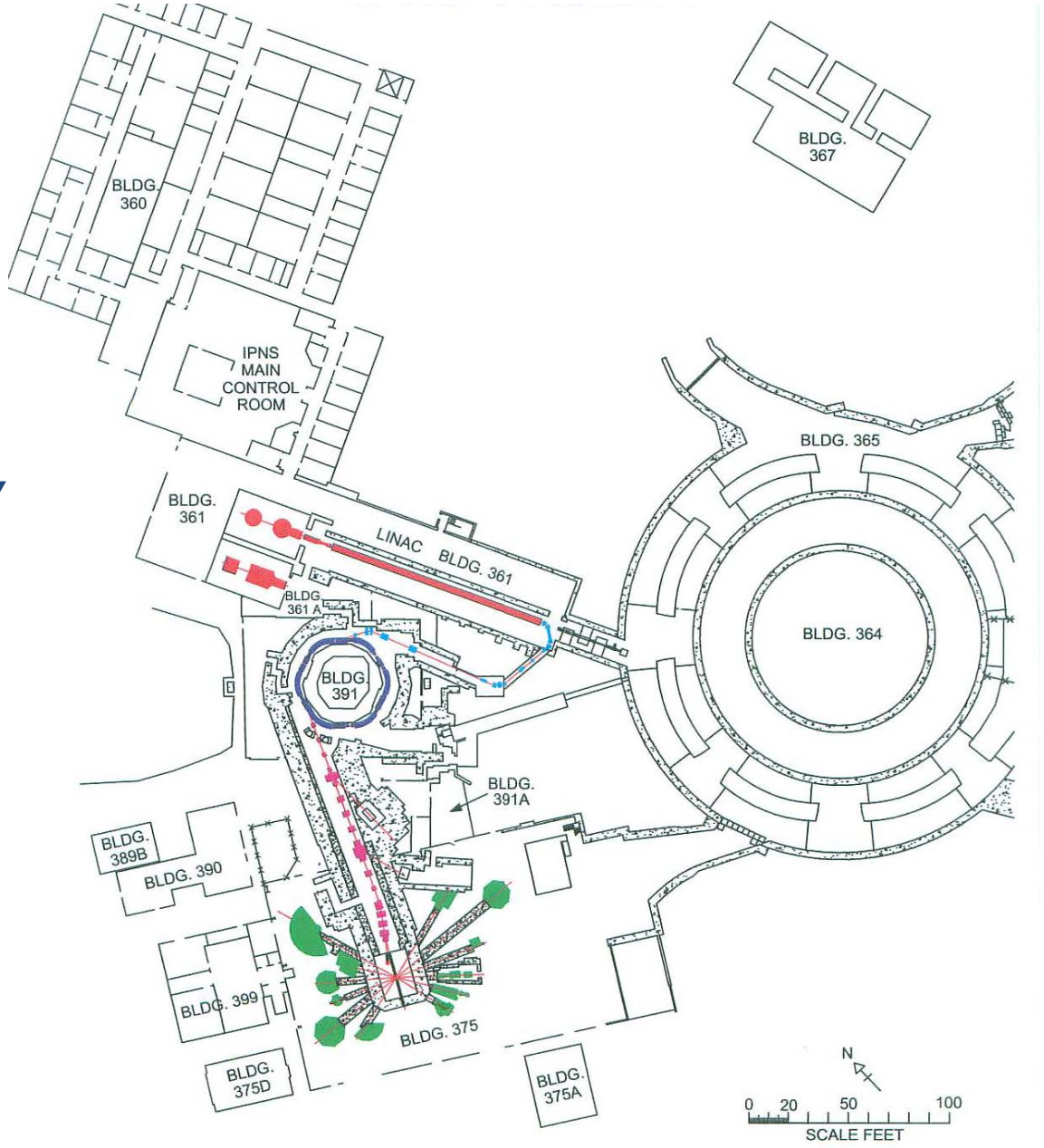
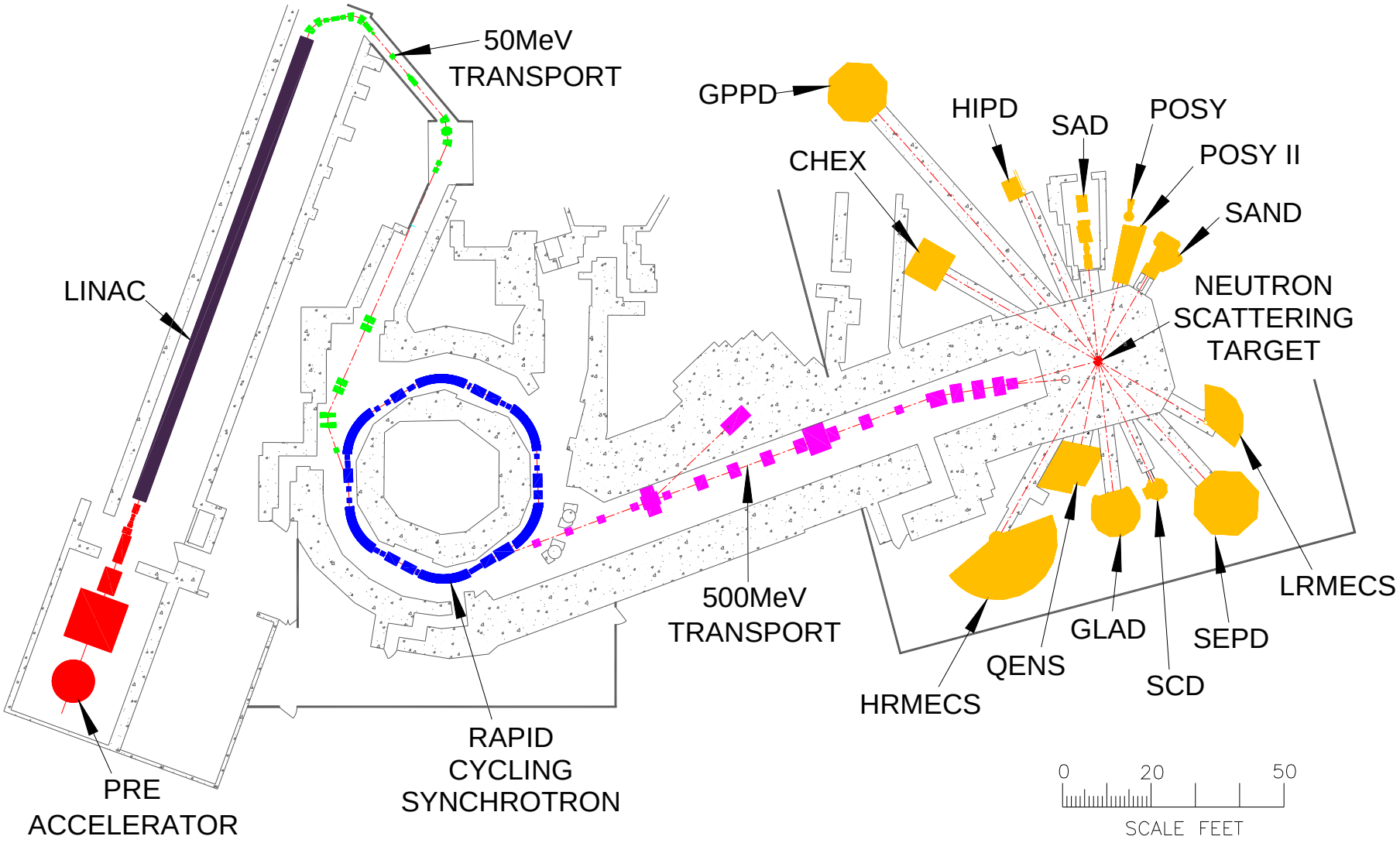
Introduction

- **Facility description**
- **Shut down**
- **Transition work scope**
- **Lessons learned**

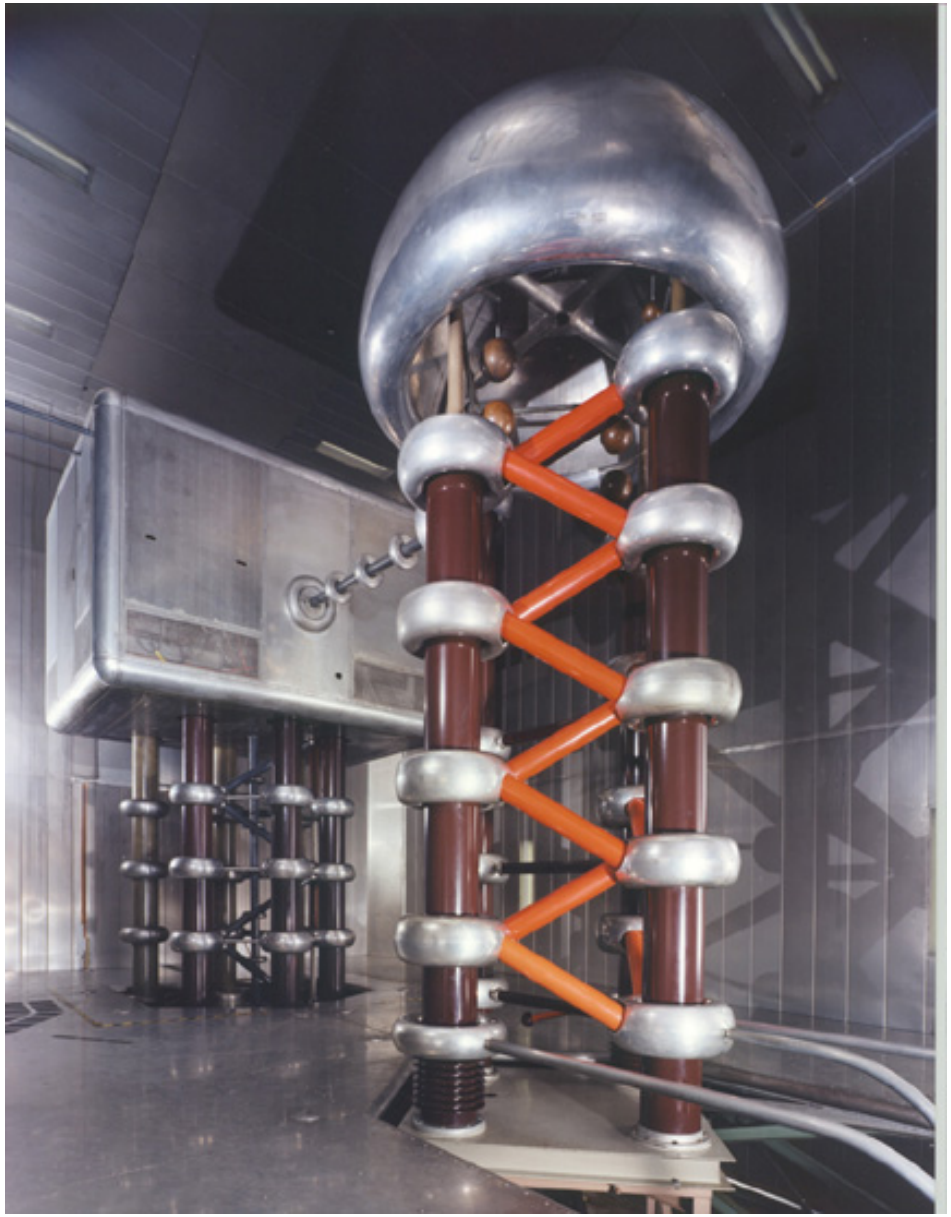
IPNS Facility Map



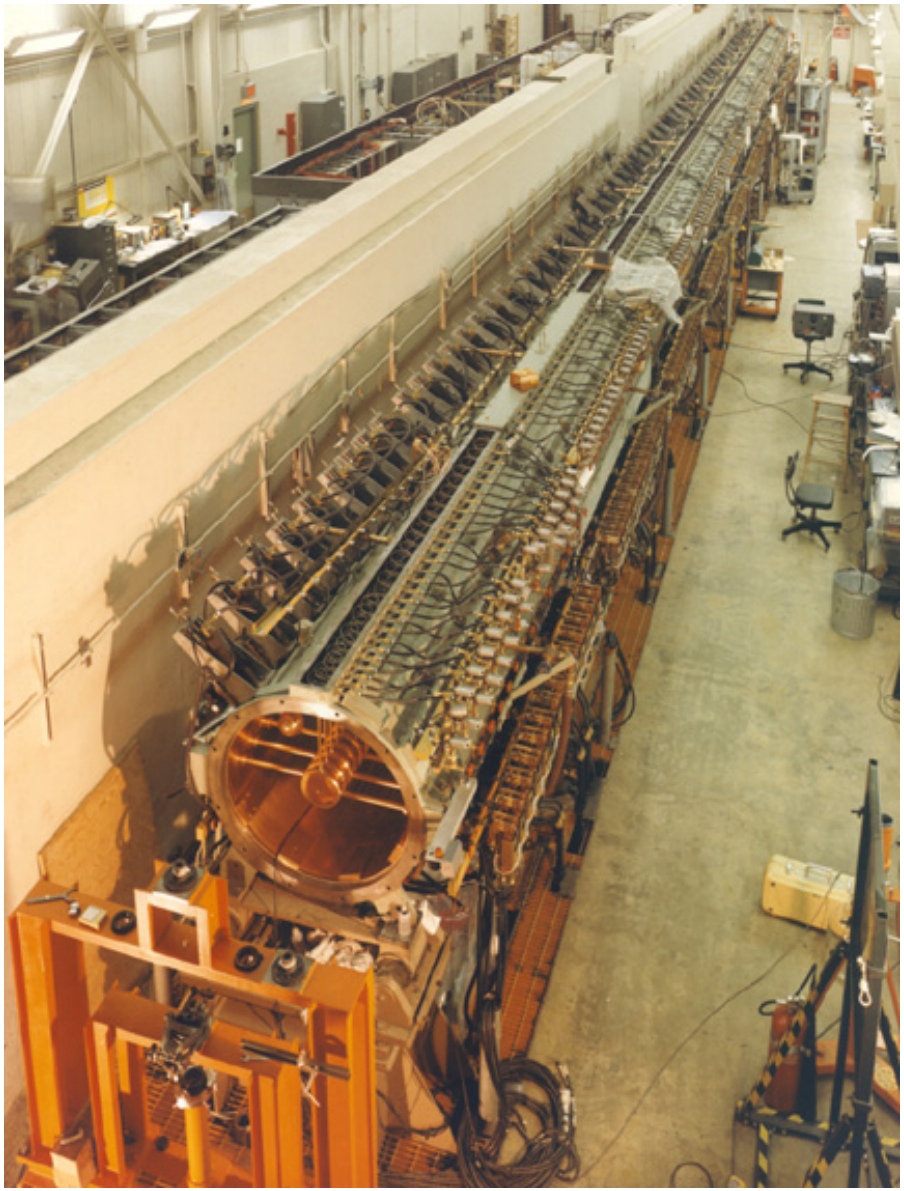
IPNS Facility Diagram



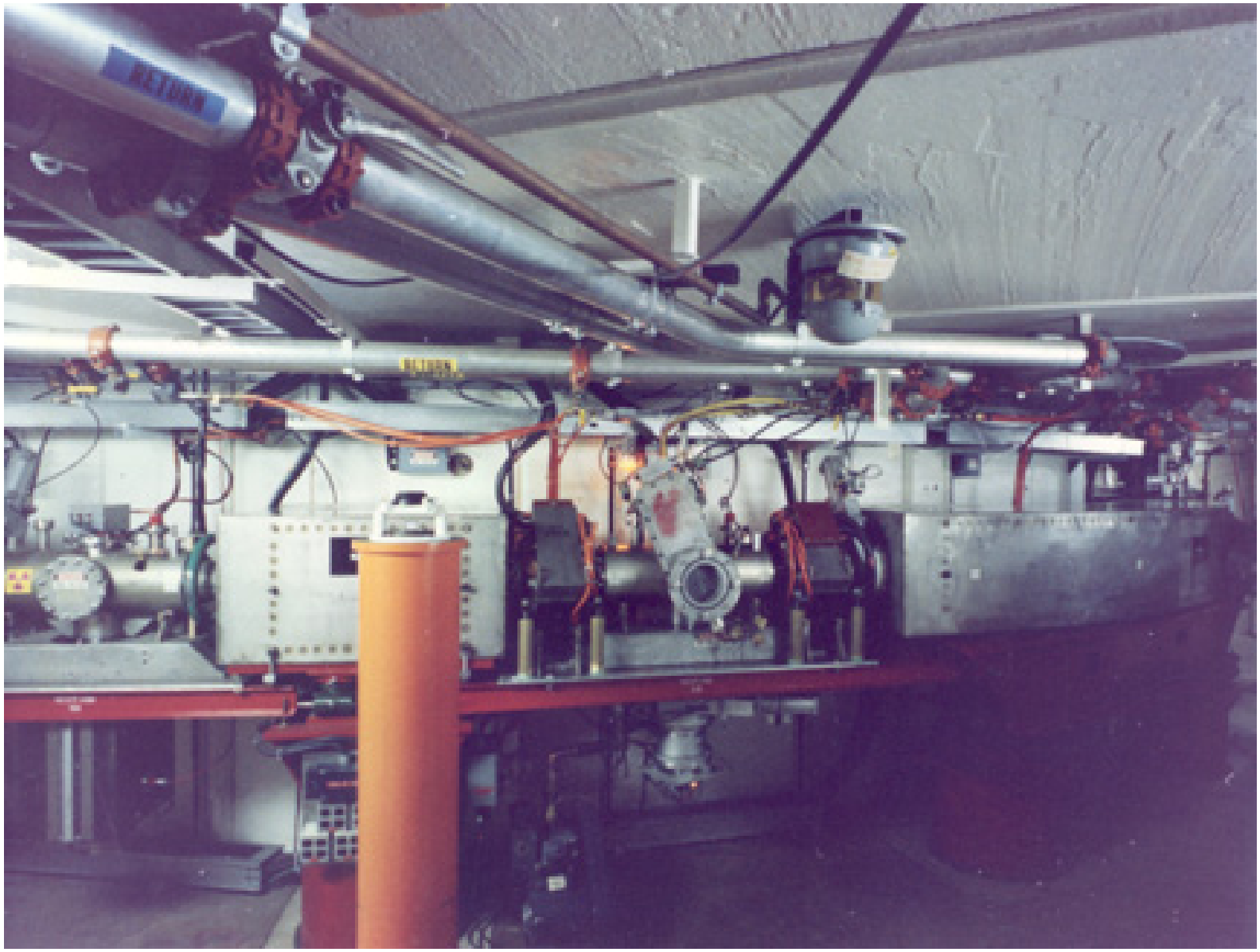
Ion Source and Pre-accelerator



Linear Accelerator

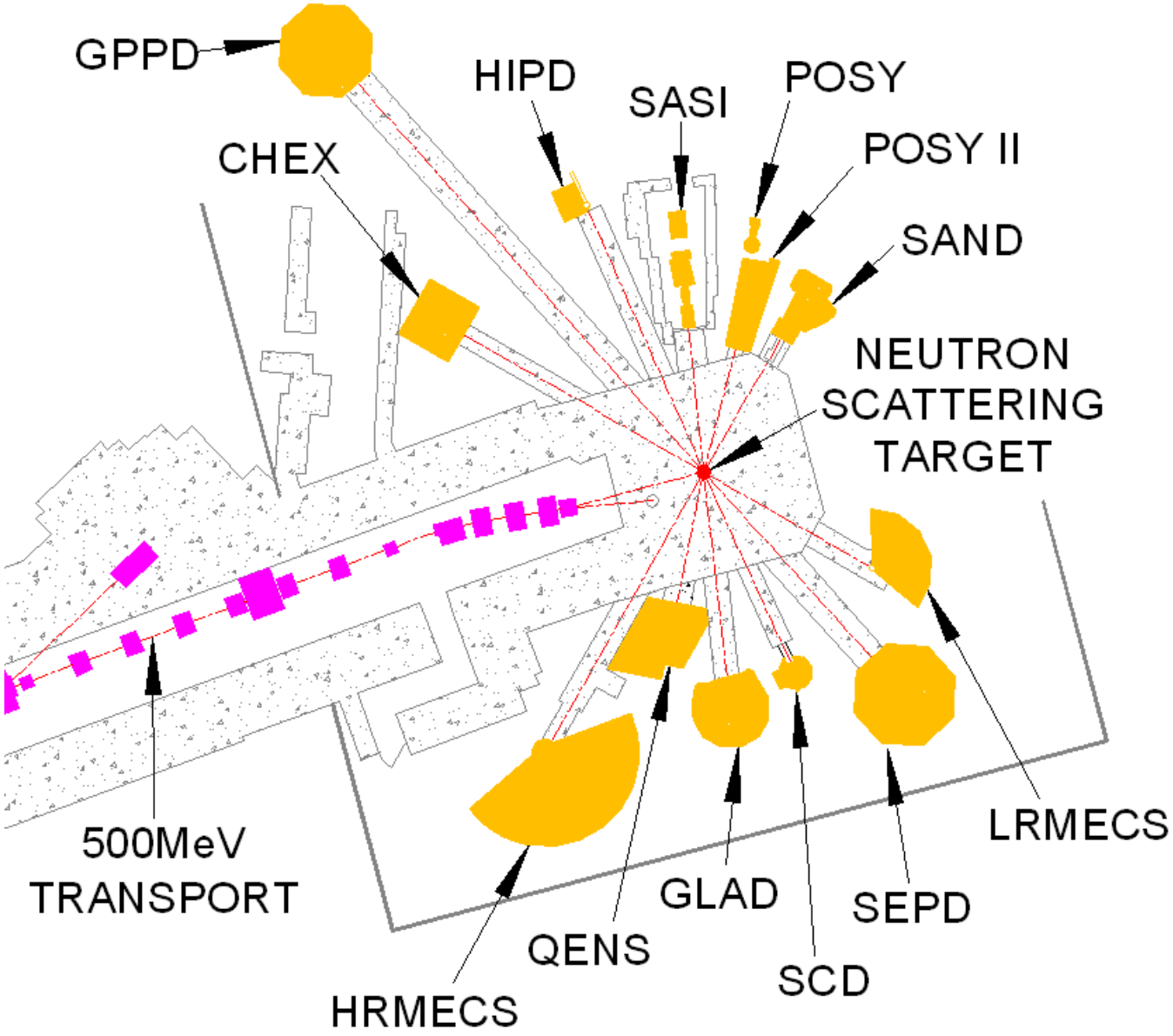


Rapid Cycling Synchrotron

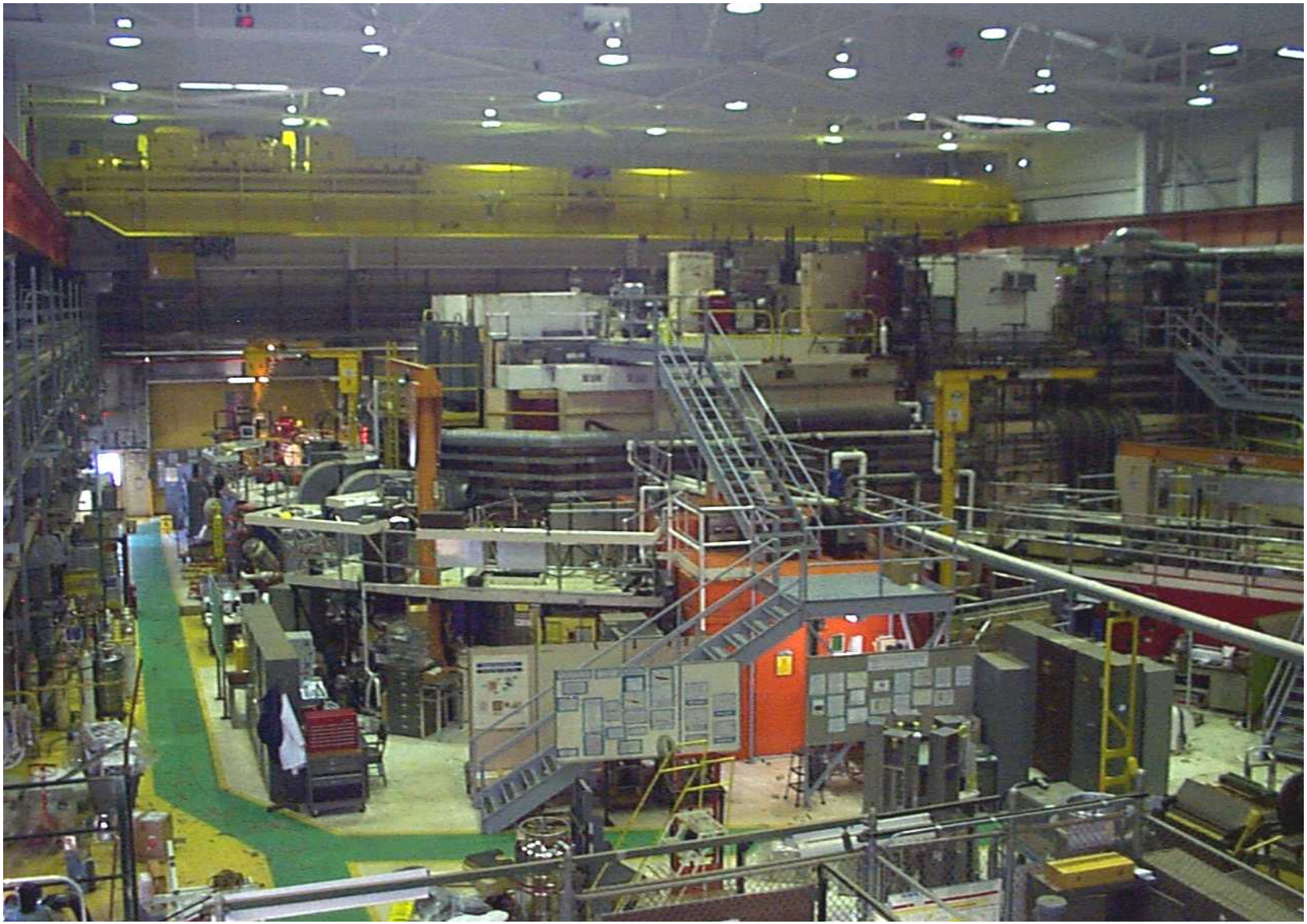


Proton Transport System

IPNS Experimental Hall and Instruments



Experimental Hall



Shutdown and Reduction in Force

- **DOE-SC-BES informed Argonne National Laboratory management on December 27, 2007 that due to budgetary constraints, the Intense Pulsed Neutron Source facility should cease neutron generating activities and shut down effective immediately.**

- **A Reduction In Force (RIF) was implemented and reduced the workforce from 70 down to 22 on March 1, 2008. Team members were chosen for their knowledge, skills and experience in the types of work that were planned for the safe shutdown. A second RIF was necessary by September 30, 2008 leaving a workforce of six.**

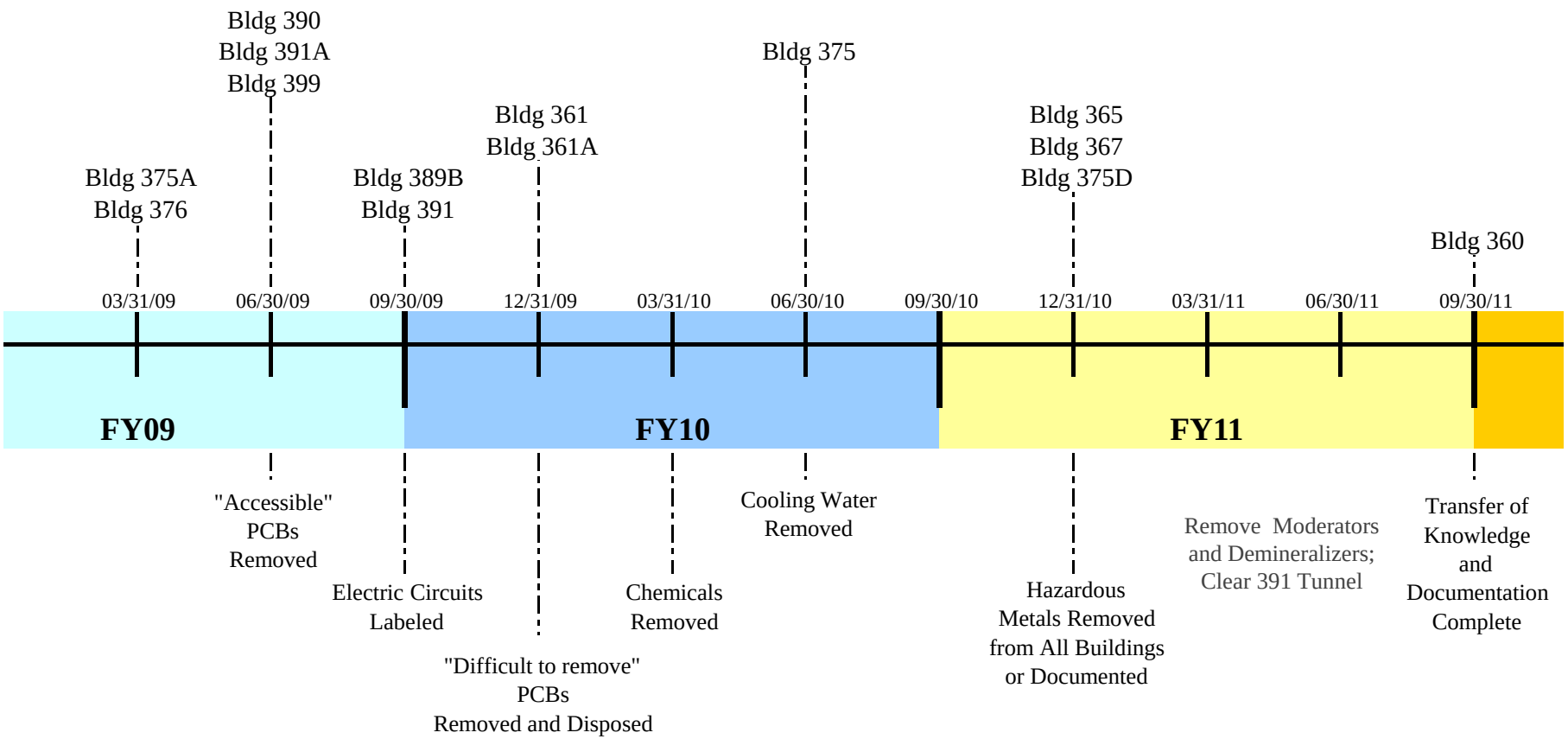
Transition Plan

- **DOE-Argonne Site Office requested a Transition Plan be developed consistent with DOE Transition Implementation Guide, DOE G 430.1-5, 4-24-01.**

- **The plan was written and submitted. After discussion between Argonne management and DOE, funding was promised, and subsequently provided, through FY11.**

Schedule for Major Transition Plan Items

IPNS Buildings Transferred to Laboratory



Major Tasks Completed

Deactivation Activities

- Energy sources were removed or secured with administrative LO/TO
  - Electrical power
  - Vacuum
  - Pressure
  - Gases
  - Water

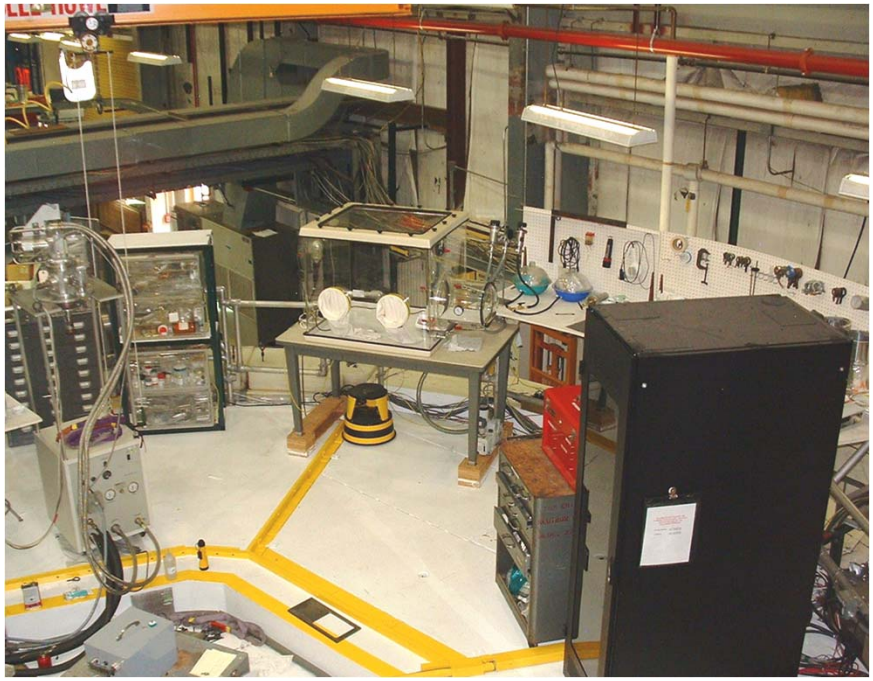
- Fire protection, lighting, most HVAC, outlet power, safety, and security systems were maintained

Removal/Disposal Activities

- **Buildings must be in "EM-ready" condition**
  - **If it's not bolted down, dispose of it**
    - **Exception: structural or beamline components**
  - **Remove (or identify) hazards**
- **Disposal of chemicals and hazardous metals**
- **Removal of accessible radioactive materials**
- **Clearing buildings of excess equipment and materials**

Initial Conditions

Removal of Equipment



Before

After

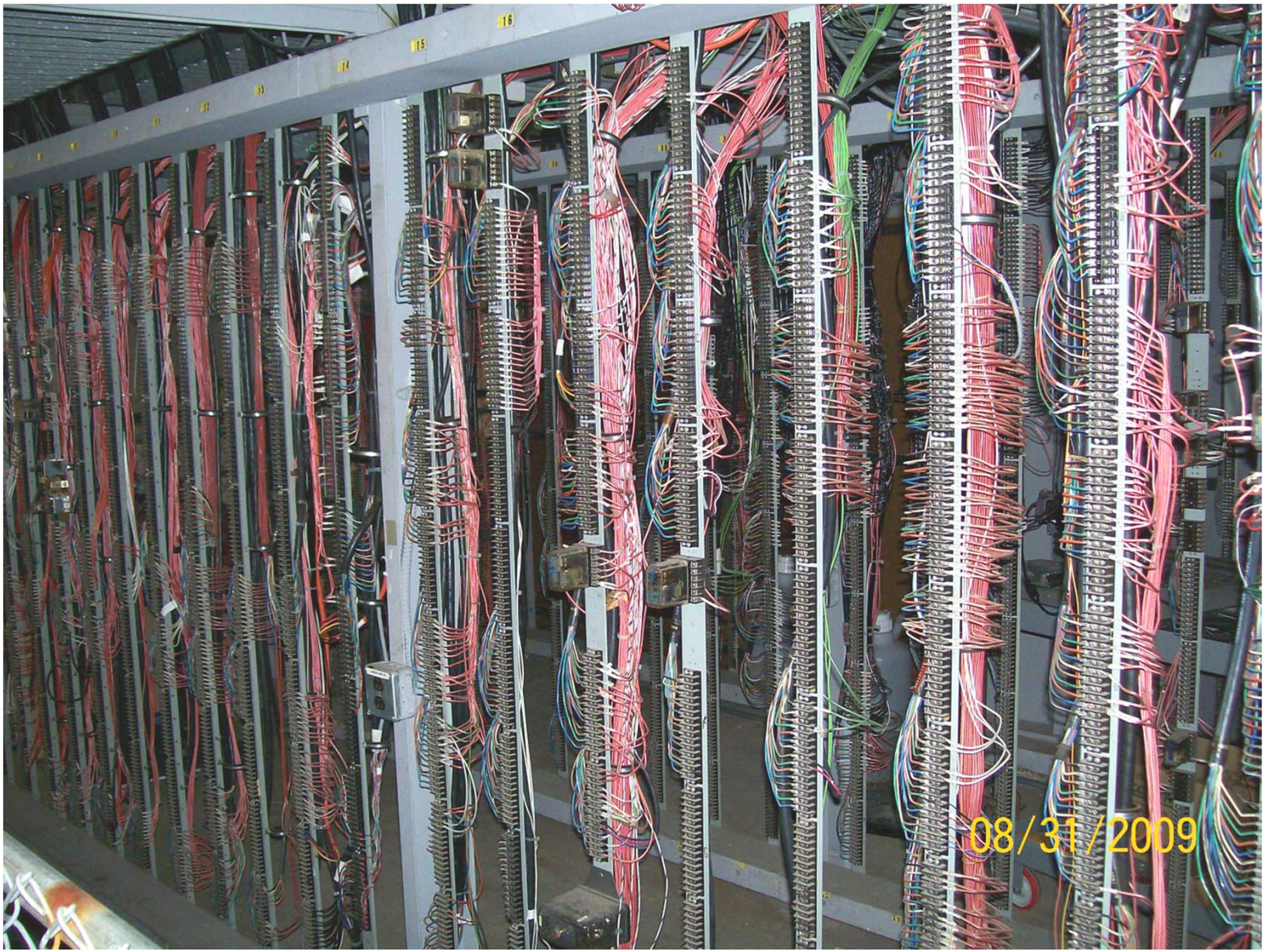
Disassembly of Instruments

Before

After

Distribution of Usable Equipment

Testing and Labeling of Exposed Circuits



Disposal of PCBs

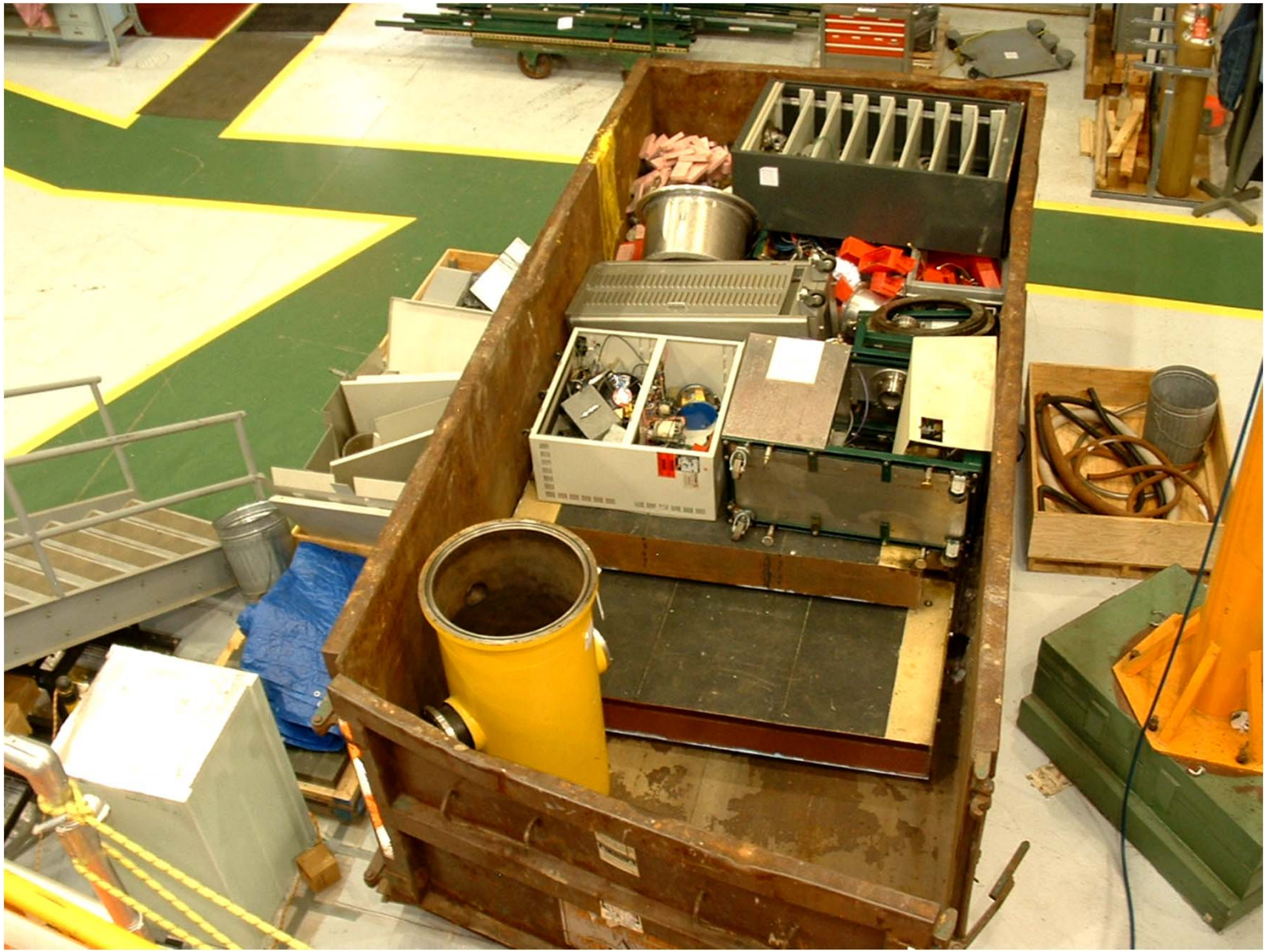
Disposal of Chemicals

Disposal of Hazardous Metals

Disposal of Experimental Samples

Disposal of Radioactive Waste

Disposal of Moratorium Waste



Lessons Learned

Lessons Learned

- **Involve upper management promptly**
  - **Influence needed within the Lab to raise awareness**
  - **Support was needed to acquire sponsor funding**
  - **We received valuable help from DOE Site Office, the Lab Director and our management**

Lessons Learned

- **Select only the most qualified staff**
  - **Specific knowledge, skills and experience are necessary**
  - **Human memory is more valuable than stored information**
  - **Argonne's HR process was helpful**

Lessons Learned

- **Form multi-organizational teams early**
  - **IPNS teamed with the facilities and waste management divisions**
  - **IPNS will eventually be the responsibility of the facilities division**
  - **All of our hazardous waste was disposed through the waste management division**
  - **Common goals: our success is everyone's success**

Lessons Learned

- **Hold a daily group meeting**
  - **Discussion of planned work and controls**
  - **Safety topics covered regularly**
  - **Our group size was ~10; meeting was effective**

Lessons Learned

- **Supervisors should keep a daily work journal**
  - **Use a bound format**
  - **Knowing the chronological order later was helpful**

Lessons Learned

- **Programmatic divisions typically do not dispose of excess equipment and materials during operations**
  - **Disposal costs money; budgets are tight**
  - **Take advantage of any Lab clean up programs**
  - **Argonne has the “Clean Sweep” program**

Lessons Learned

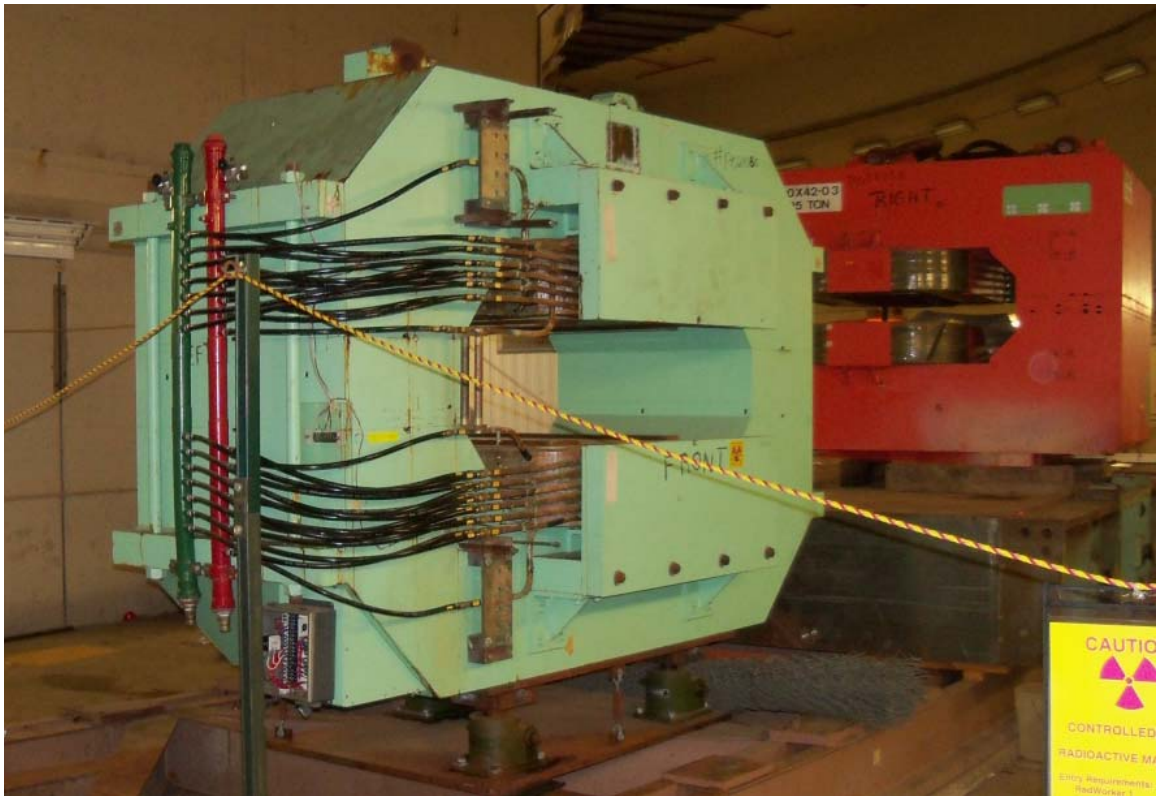
- **Surveillance and maintenance is more time consuming after shutdown**
  - **Smaller staff**
  - **Be careful to include required expertise**

Lessons Learned

- All disposed items were photographed
  - Good quality cameras are economical – have several
  - Add ID tag info for later reference
  - Give thought to logical labeling of photos – with thousands of photos, it can be confusing

Lessons Learned

- For lifting of heavy legacy items, bolts and shackles were an issue
  - Suppliers need to be qualified; possible long lead time; start early
  - Lab engineers performed time consuming qualification calculations



Lessons Learned

- **Simplify necessary systems to reduce maintenance**
  - **Example: electronic accelerator security system replaced with keylock entry/crashbar exit – no special maintenance required**

Lessons Learned

- Do not take so called “simple tasks” lightly
  - Clearing of offices, small labs and paper files can be onerous
  - PII check and shredding require time (embedded PII)
  - The Lab has specific records retention requirements
  - Contact the Lab records people early

Lessons Learned

- Experimental sample disposal is a time consuming task
  - Samples should have been returned to scientific users
  - Identification required before disposal – some unknowns
  - We used an outside vendor for neutralization of some highly reactive samples
  - Ability to import spreadsheet would have been useful

Lessons Learned

- **Unused industrial chemicals (oil, paint, acetone) are difficult to give away**
  - **Consider the use of a commercial disposal vendor for efficiency**

Lessons Learned

- **Argonne's online excess material system was inadequate**
  - **Not designed for huge quantities of equipment and material**
  - **The Lab rarely needed to dispose of this much over a short time span**
  - **Individual component data entry is tedious**

Lessons Learned

- **Shipping to other labs can be tricky**
  - **Requestor is often not aware of transportation and administrative requirements**
  - **Management and requestors do not always agree**
  - **Get a management signature *before* shipping**

Lessons Learned

- **Historian and archaeologist visited too late**
  - **We were not informed early enough**
  - **Components were removed**

Lessons Learned

- **Use "Authorized Release Process" if applicable**
  - **Disposal of several hundred slightly activated PCB capacitors**
  - **We were on an EPA one year clock**
  - **PCBs + activation = mixed waste; very high cost**
  - **Portsmouth Gaseous Diffusion Plant had successfully used authorized release for PCBs**
  - **Radiological characterization report accepted by Clean Harbors and State of Texas**
  - **$1M saved**
  - **DOE-SC awarded Argonne with Noteworthy Practice citation**

Lessons Learned

- **Paperwork requirements for disposal are a major burden**
  - **Descriptions, quantities, weights, nuclide inventories**
  - **Forms were carefully reviewed and needed to be perfect**
  - **Send an informal check copy of disposal paperwork first to save considerable time**

Lessons Learned

- **Record lessons learned as soon as practical**
  - **It is difficult to remember and reconstruct later**