



... for a brighter future

Experiment Work Planning & Control

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of Energy

UChicago ►
Argonne_{LLC}



APSUO Steering Committee

Partner User Council Executive Committee

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Timeline for the Argonne Work Planning & Control (WP&C) Process Improvement Project



9/1/2006

12/31/2009

Argonne decides to implement the Laboratory Management System (LMS) and WP&C becomes an issue within LMS.

ANL Acquires ISO 9001 and 14001 Certification (June 2009).

Laboratory Management System (LMS) Governance

❖ Roles & Responsibilities Interaction



Argonne Laboratory Management System (LMS)

Processes: Recommended core processes -

1. Asset Management
2. Business Development
3. Communications
4. Contract Management
5. Environment
6. Financial Management
7. Governance
8. Human Resources
9. Information Services
10. Procurement
11. Project Management
12. R,D&E
13. Risk Management
14. Safety and Health
15. Scientific User Facilities
16. Security
17. Strategic Planning



Work Planning and Control Objectives

- WP&C shall be addressed in two procedures – experimental and non-experimental work
- Non-experimental WP&C is a SUF Issue, and Experimental WP&C is a RD&E Issue
- Experimental work done at scientific user facilities shall be included in the experimental work procedure
- The two procedures shall interface in a well defined manner
- Take advantage of best practices in use at other institutions
- The LMS core processes must invoke the two WP&C processes in a clear and concise manner
- Obtain stakeholder involvement in the development of these processes
- Pilot efforts beginning mid-November 2008
- Implementation by Feb 27, 2009

Experiment WP&C Process Objectives

- Encompass all experimental work regardless of who conducts that work (includes Argonne staff, visiting scientists, and users)
- Consistent with LMS documentation, LMS principles, and the LMS RD&E process including the description and mitigation of risk
- Implement a graded approach
- Ensure proper authorization at each step
- Integrate the aspects of training, certification and qualification verification prior to work authorization
- Implement a defined “skill of the worker” qualification process/standard consistent with the “worker” type designation
- Integrate with other key Lab processes such a procurement, work for others, and field work proposals
- Integrate with existing Permit requirements such that controls implemented in these processes are not duplicated (eg laser control procedures)
- Define SME qualifications, certification process, training, and the required interfaces with SMEs for WP&C
- Employ a systematic approach (on paper) that can be implemented onto a web-based system, including an electronic signature (authorization) process

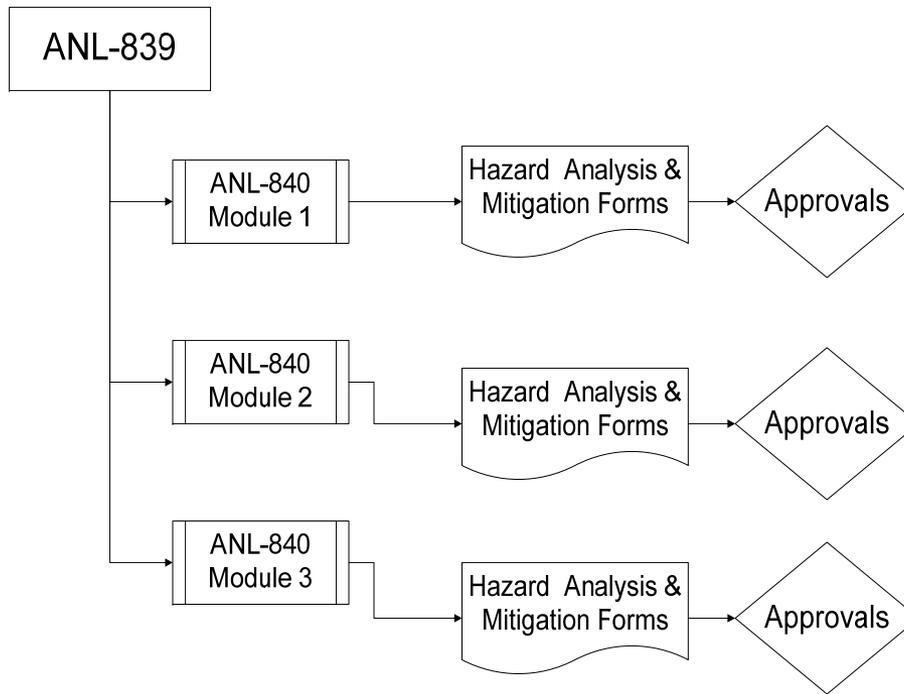
LMS-PROC-79

- Purpose is to establish the process for planning and controlling experimental work to provide for the health and safety of all Argonne employees, its visitors, the public, and the environment.
- Scope includes all Divisions, organizations, buildings, etc... at the Argonne site.
- Specific process identified for performing experimental work within an Argonne division
- Users at a User Facility follow the local experimental work planning and control process for facility users.
- APS User experiments will continue to use the ESAF process
- At APS, all Sector personnel (Beam Line Scientists, Science Associates, etc...) will use **experimental** WP&C processes
- Others (such as AES or ASD technicians) may do work in the Sector under the non-experimental WP&C process

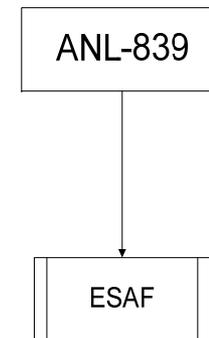
LMS-PROC-79 Implementation in XSD

■ PROC 79 for Experiment WP&C

- High Level Work Control Document (ANL-839)
- Series of Experiment Modules (ANL-840)

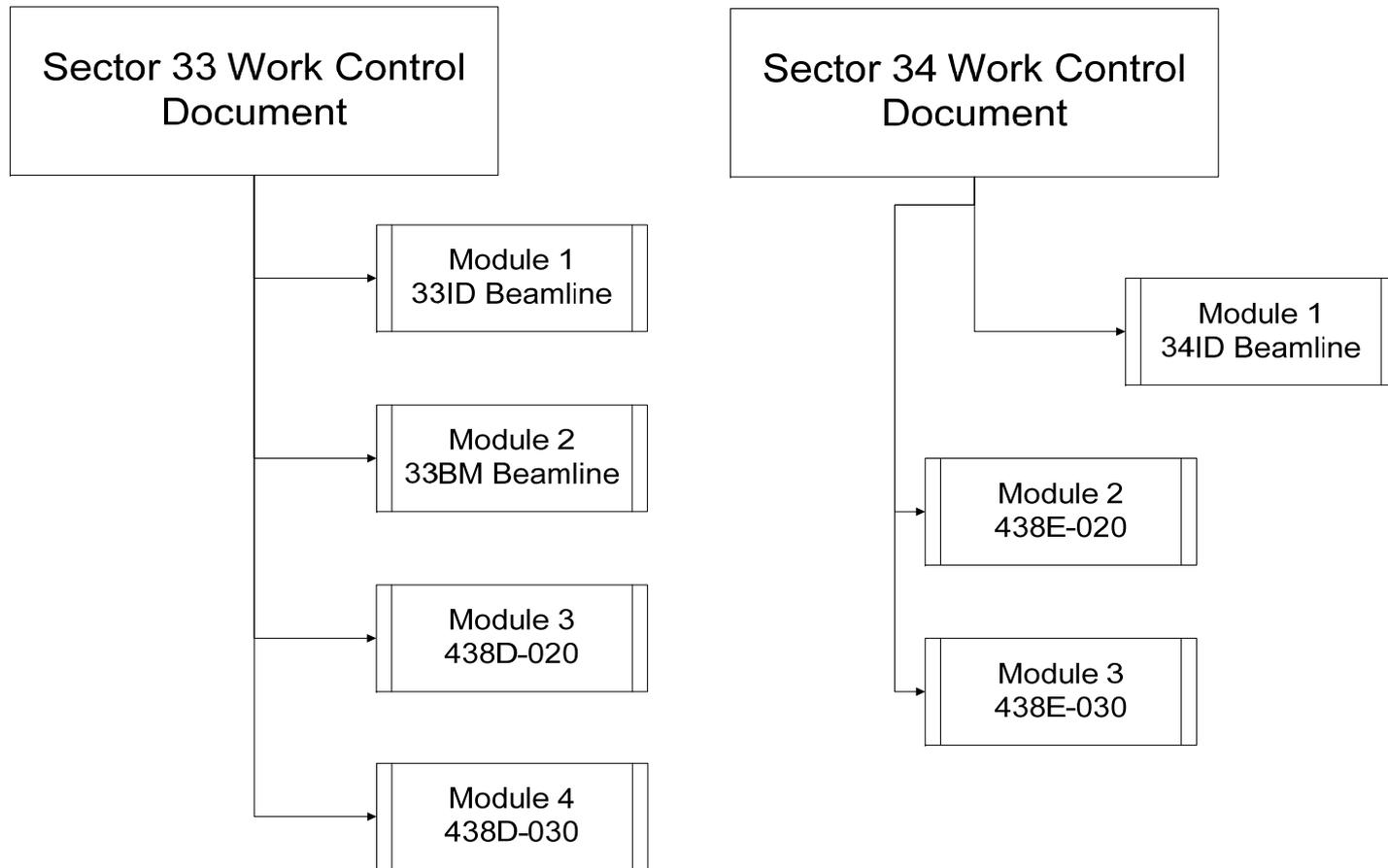


Work by Sector Personnel



Experiments

LMS-PROC-79 Implementation in XSD



Hazard Analysis and Mitigation (HAM) Screening

EMWCD- X S U - S E C U R E - 2 0 0 9 - 0 0 1 - R 0 0 0
 Division Sequence Year Module# Rev.#

2 Hazard Analysis

2.1 Module Hazard Screening

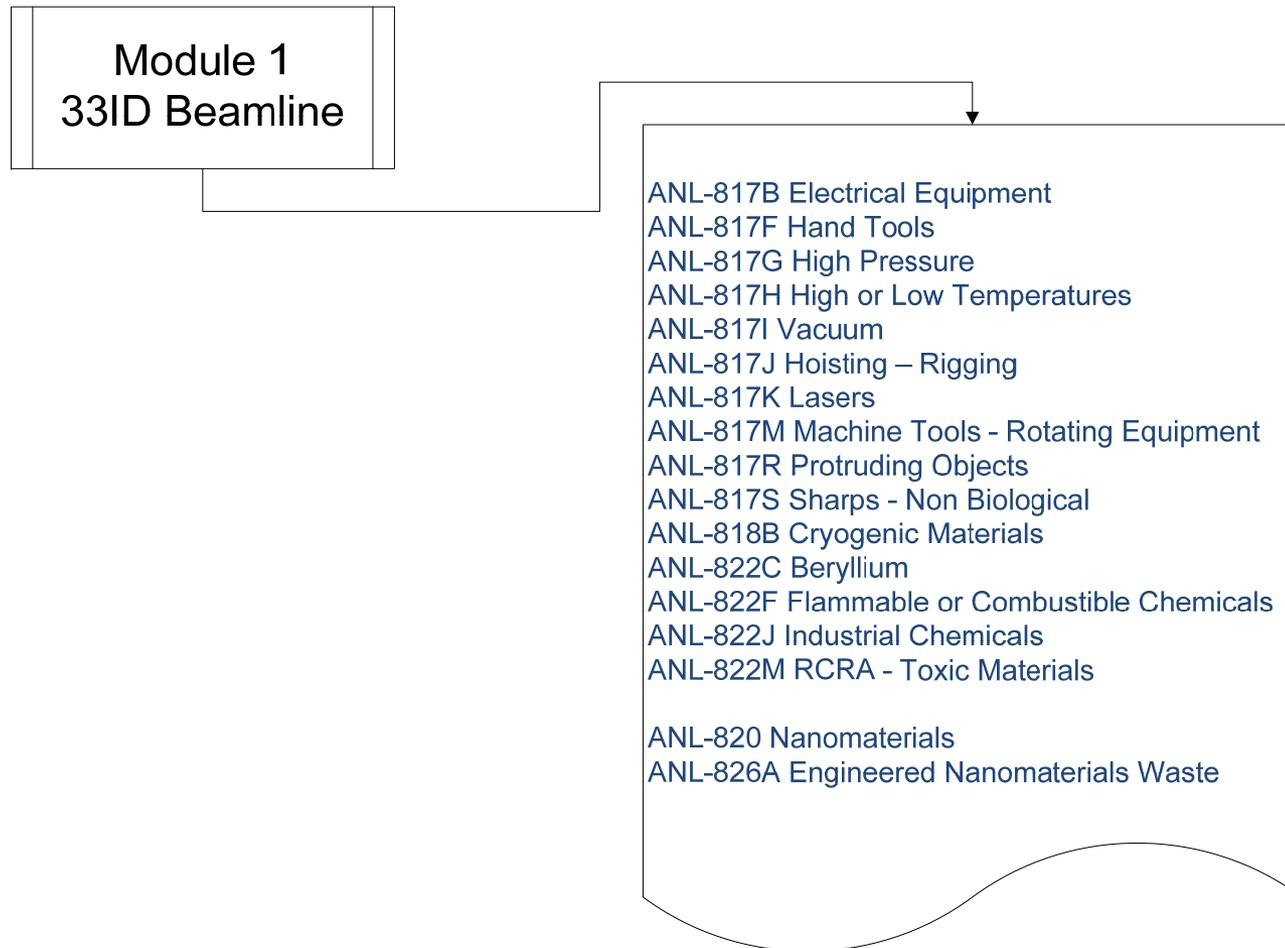
No Hazard Present Analysis Required Use Associated Form Skill of Researcher Mitigated

PHYSICAL (ANL-817 series)

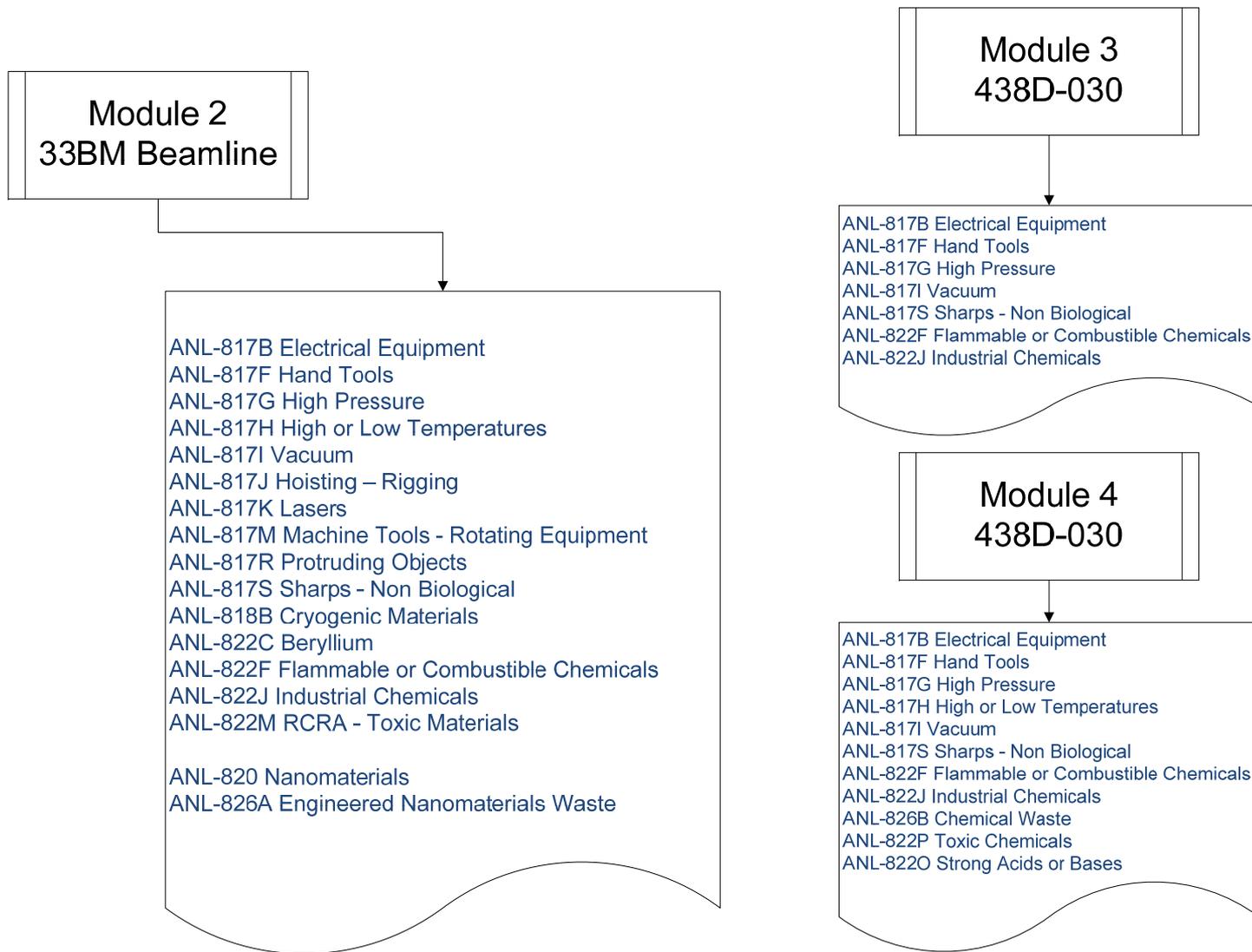
- Electrical Work (ANL-817A)
- Electrical Equipment (If yes:
 - All NRTL or field inspected
 - Some Non-NRTL (ANL-817B)
- Elevated work (>6 feet) (ANL-817C)
- Ergonomics (ANL-817D)
- Fire (If yes:
 - Open Flame (ANL-817E)
- Hand tools (ANL-817F)
 - Class 2 Class 2r Class 3a
 - Class 3b Class 3m
 - Class 4 (ANL-817K)
- Limited egress (ANL-817L)
- Machine tools/rotating equipment (ANL-817M)
 - Magnetic fields (Static) (ANL-817N)
 - Materials handling issues (heavy, bulky, hazardous materials handled individually, with manually operated equipment, with powered equipment such as forklifts,
- Laser (If yes:
 - Class 2 Class 2r Class 3a
 - Class 3b Class 3m
 - Class 4 (ANL-817K)
- Limited egress (ANL-817L)
- Machine tools/rotating equipment (ANL-817M)
- Magnetic fields (Static) (ANL-817N)
- Materials handling issues (heavy, bulky, hazardous materials handled individually, with manually operated equipment, with powered equipment such as forklifts,

PHYSICAL (ANL-817 series)	WORKING ENVIRONMENT (ANL-818 series)	RADIOLOGICAL (ANL-819 series)
<input type="checkbox"/> Electrical Work (ANL-817A) <input checked="" type="checkbox"/> Electrical Equipment (If yes: <input type="checkbox"/> All NRTL or field inspected <input checked="" type="checkbox"/> Some Non-NRTL (ANL-817B) <input type="checkbox"/> Elevated work (>6 feet) (ANL-817C) <input type="checkbox"/> Ergonomics (ANL-817D) <input type="checkbox"/> Fire (If yes: <input type="checkbox"/> Open Flame (ANL-817E) <input checked="" type="checkbox"/> Hand tools (ANL-817F) <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 2r <input type="checkbox"/> Class 3a <input type="checkbox"/> Class 3b <input type="checkbox"/> Class 3m <input checked="" type="checkbox"/> Class 4 (ANL-817K) <input type="checkbox"/> Limited egress (ANL-817L) <input checked="" type="checkbox"/> Machine tools/rotating equipment (ANL-817M) <input type="checkbox"/> Magnetic fields (Static) (ANL-817N) <input type="checkbox"/> Materials handling issues (heavy, bulky, hazardous materials handled individually, with manually operated equipment, with powered equipment such as forklifts, cranes, etc.) (ANL-817P) <input type="checkbox"/> Non-ionizing radiation (except lasers) (If Yes: <input type="checkbox"/> Radio frequency electromagnetic (Infrared <input type="checkbox"/> Ultraviolet) (ANL-817Q) <input type="checkbox"/> Or overhead work or obstructions (ANL-817R) <input type="checkbox"/> Protruding objects (ANL-817R) <input type="checkbox"/> Shields – non-biological (ANL-817S) <input type="checkbox"/> Limited Vision (ANL-817T) <input type="checkbox"/> Welding, cutting, brazing, and grinding (that generates sparks) (ANL-817U)	<input type="checkbox"/> Confined space (ANL-818A) <input checked="" type="checkbox"/> Cryogenic materials (ANL-818B) <input type="checkbox"/> Ground penetrations and/or blind penetrations of walls, floors, and/or ceilings (ANL-818C) <input type="checkbox"/> Excavations deeper than 5 feet (ANL-818D) <input type="checkbox"/> Exhaust or toxic gas generating equipment (ANL-818E) <input type="checkbox"/> Noise (ANL-818F) <input type="checkbox"/> Outdoor exposure (ANL-818G) <input type="checkbox"/> Stored energy (ANL-818H) <input type="checkbox"/> Sewage and waste (ANL-818I) Emergency Management (ANL-822) <input type="checkbox"/> Significant increase in a hazard level requiring EM involvement <input checked="" type="checkbox"/> NEPA (always required; see LMB-PROD-11) ENVIRONMENTAL (ANL-825 series) <input type="checkbox"/> Wastewater (ANL-825A) <input type="checkbox"/> Air emission (ANL-825B) WASTE GENERATION (ANL-826 series) <input type="checkbox"/> Engineered nanomaterial waste (ANL-826A) <input type="checkbox"/> Chemical waste (ANL-826B) <input type="checkbox"/> Radioactive waste (ANL-826C) <input type="checkbox"/> Mixed waste (ANL-826D) <input type="checkbox"/> Transuranic waste (ANL-826E) <input type="checkbox"/> Biological waste (ANL-826F)	<input type="checkbox"/> Airborne radioactivity/cutting, welding, grinding, etc. on radiological material (ANL-819A) <input type="checkbox"/> Radiation Exposure (ANL-819B) <input type="checkbox"/> Removable/Dispensible Radioactive Material (ANL-819C) <input type="checkbox"/> Sealed Source (ANL-819F) <input type="checkbox"/> Contained Material (ANL-819G) BIOLOGICAL (ANL-821 series) <input type="checkbox"/> Recombinant DNA (ANL-821A) <input type="checkbox"/> Plant/animal pathogens; environmental hazards including invasive species and noxious weeds (ANL-821B) <input type="checkbox"/> Etiological agents (including bacteria, viruses, rickettsiae, yeast fungi, transactive or infectious proteins) (ANL-821C) <input type="checkbox"/> Potentially infectious material: Human tissue, blood, primary cell culture or material/waste derived from these sources (ANL-821D) <input type="checkbox"/> Biological toxins (ANL-821E) <input checked="" type="checkbox"/> RESEARCH INVOLVING HUMAN SUBJECTS (ANL-823) NANOMATERIALS (ANL-820) <input type="checkbox"/> Engineered Nanomaterials (ENM) (If Yes: <input type="checkbox"/> Disposable or <input type="checkbox"/> Fixed)
CHEMICAL (ANL-822 Series)	<input type="checkbox"/> Asbestos (ANL-822A) <input type="checkbox"/> Asphyxiant gas (CO etc.) (ANL-822B) <input type="checkbox"/> Beryllium (ANL-822C) <input type="checkbox"/> Cardenogenic chemicals (ANL-822D) <input type="checkbox"/> Explosives or highly reactive (e.g., alkali metals) chemicals (ANL-822E) <input checked="" type="checkbox"/> Flammable and/or combustible chemicals (liquid or solid) (ANL-822F) <input type="checkbox"/> Flammable gas (ANL-822G) <input type="checkbox"/> Hydrofluoric acid (ANL-822H) <input type="checkbox"/> Hydrogen gas above 1% concentration (ANL-822I) <input type="checkbox"/> Industrial chemicals (ANL-822J) <input type="checkbox"/> Oxidizers (ANL-822K) <input type="checkbox"/> Perchloric acid or perchlorate salts (ANL-822L) <input type="checkbox"/> RCRA – toxic metals (ANL-822M) (If Yes: <input type="checkbox"/> As <input type="checkbox"/> Ba <input type="checkbox"/> Bi <input type="checkbox"/> Cd <input type="checkbox"/> Cr <input type="checkbox"/> Pb <input type="checkbox"/> Hg <input type="checkbox"/> Ni <input type="checkbox"/> Se <input type="checkbox"/> Other <input type="checkbox"/> Silica (crystalline) dust generation (ANL-822N) <input type="checkbox"/> Strong acids or bases (ANL-822O) <input type="checkbox"/> Toxic chemicals (ANL-822P) <input type="checkbox"/> Toxic gas (ANL-822Q)	<input type="checkbox"/> ADDITIONAL HAZARD INFORMATION (ANL-827): Including hazard interactions and additional hazards not described above. <input type="checkbox"/> COMPLEXITY (ANL-828): When the work package includes many steps that must be precisely controlled or involves a large diverse group of workers.

33ID Work Planning & Control with LMS



33ID Work Planning & Control with LMS (continued)



Sample HAM

	Module Hazard Analysis and Mitigation Physical Hazards – Laser
Exposure, severe damage to eyes and/or skin, fire	
Module Work Control Document Number: _____	
Task/Hazard Relationship and Description	
<p>In this area, a class 4 excimer laser is used for experiments, which can cause damage to eyes and skin. In addition, lasers are frequently used for alignment of instruments and samples. Only class 2 lasers are permitted for alignment applications.</p>	
Unmitigated Hazard Level Determination	
VH <input checked="" type="checkbox"/> Class 4	M <input type="checkbox"/> Class 3A and 3R
H <input type="checkbox"/> Class 3B	L <input checked="" type="checkbox"/> Class 1 (as supplied by mfr), Class 2 and 2M
_____ Self-determined (explain in Task Hazard Relationship and Description)	
Contact ESQ-IH for Workplace Exposure Assessment.	
ESQ-IH Review by: _____	Date: _____
Controls: _____	
<p>All work with class 4 lasers requires an approved laser operating permit that must have been reviewed and approved by the APS and Argonne National Laboratory Laser Safety Officer.</p>	
<p>Operation of the class 4 laser is restricted to an approved laser control area, by approved users only.</p>	
<p>A Laser Safety Officer is appointed to assure that ANL requirements regarding laser usage are followed.</p>	
<p>A written standard operating procedure (SOP) is required and must have the approval of the ANL laser safety officer. The SOP will be available at the laser control area (LCA) at all times.</p>	
<p>Laser safety eyewear and interlocks shall be inspected as required in the SOP. The results of these inspections shall be documented.</p>	
<p>Laser safety eyewear shall not be relied upon as the primary means of personnel protection.</p>	
<p>All personnel within the Laser Control Area during laser operations are required to successfully complete Argonne specified Laser Safety training.</p>	
<p>Work with class 2 lasers does not require engineering controls. Use where staring into the direct beam or a specular reflection is not permitted.</p>	

HAM Hazard Controls (eg for class 4 Lasers)

- All work with class 4 lasers requires an approved laser operating permit that must have been reviewed and approved by the APS and Argonne National Laboratory Laser Safety Officer.
- Operation of the class 4 laser is restricted to an approved laser control area, by approved users only.
- A Laser Safety Officer is appointed to assure that ANL requirements regarding laser usage are followed.
- A written standard operating procedure (SOP) is required and must have the approval of the ANL laser safety officer. The SOP will be available at the laser control area (LCA) at all times.
- Laser safety eyewear and interlocks shall be inspected as required in the SOP. The results of these inspections shall be documented.
- Laser safety eyewear shall not be relied upon as the primary means of personnel protection.
- All personnel within the Laser Control Area during laser operations are required to successfully complete Argonne specified Laser Safety training.
- Work with class 2 lasers does not require engineering controls. Use where staring into the direct beam or a specular reflection is not permitted.

Work Planning & Control ~maps to CAT safety plans

Safety Guidelines

- ESAF
- LAA (lab activity approval)
- Training
- Construction/Maintenance/Commissioning
- PPE
- Hoisting & Rigging
- Electrical Hazards
- Chemical Hazards
- Radiological Hazards
- LOM User Shop
- Lasers
- Assessments & inspections & Investigations
- Cryogenic Hazards

Safety Function
DEEI
Electrical Safety Officer
Chemical Safety Officer
Cryogenic Safety Officer
Laboratory Supervisor (Captain)
LOM Shop Safety Supervisor
Crane Supervisor
Laser Safety Officer
ESA Officer

Summary

- Argonne now requires that all experimental work be executed according to a process addressed in the new procedure, LMS-PROC-79.
- APS XSD will implement LMS-PROC-79 as a means of addressing the hazards and hazard controls used for beam line operations and use of the LOM laboratories.
- ***The ESAF process will continue to be used for beam line experiments.***
- XSD implementation is a pilot to establish "standard" means of documenting and controlling identical hazards.
- CATs will be expected to complete similar documentation for their facilities after sufficient experience has been gained from the XSD pilot.
- Implementation schedule for CATs initially will be based on the 3 year safety sector reviews schedule. (Interim solution permits ANL-839 + Final Design Report + Sector Safety Plan)