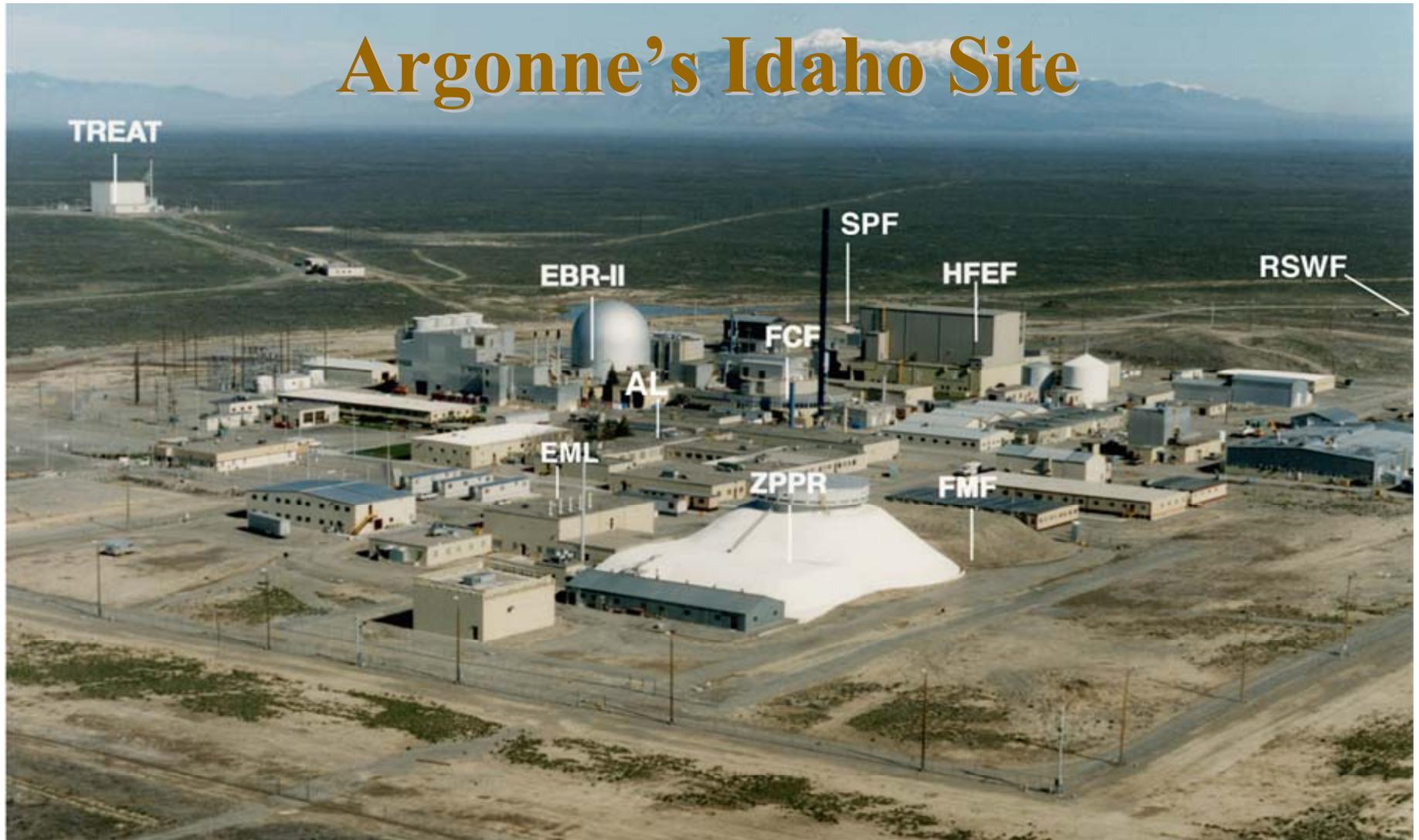


Argonne's Idaho Site



Transient Reactor Test Facility (TREAT), Experimental Breeder Reactor (EBR-II), Analytical Chemistry Laboratory (AL), Fuel Conditioning Facility (FCF), Zero Power Physics Reactor (ZPPR), Sodium Process Facility (SPF), Hot Fuel Examination Facility (HFEF), Fuel Manufacturing Facility (FMF), the Radioactive Scrap and Waste Facility (RSWF), and ancillary facilities such as the Electron Microscopy Laboratory (EML).



ANL-W Nuclear Facilities

- Fuel Conditioning Facility (**FCF**) – Cat II
- Hot Fuel Examination Facility (**HFEF**) – Cat II
- Neutron Radiography Reactor (**NRAD**) – Cat II
- Transient Reactor Test Facility (**TREAT**) – Cat II
- Radioactive Scrap and Waste Facility (**RSWF**) – Cat II
- Fuel Manufacturing Facility (**FMF**) – Cat II
- Zero Power Physics Reactor (**ZPPR**) Workroom & Vault - Cat II
- ZPPR Cell and Material Control Building (**784**) - Cat III
- TREAT Warehouse (**723**) – Cat III
- Analytical Laboratory (**AL**) – Cat III
- Contaminated Equipment Storage Building (**CESB**) – Cat III
- Outside Radioactive Storage Area (**ORSA**) including Radioactive Sodium Storage Facility (**RSSF**) – Cat III
- Building 792A, Future Cat II



ANL-W Radiological Facilities

- Sodium Components Maintenance Shop (**SCMS**)
- Electron Microscopy Laboratory (**EML**)
- Fuel and Assembly Storage Building (**FASB**)
- Radioactive Liquid Waste Treatment Facility (**RLWTF**)
- Sodium Process Facility (**SPF**)
- Experimental Breeder Reactor II (**EBR-II**)
- Engineering Development Laboratory (**EDL**)
- Contaminated Laundry Building (**702**)
- Inspection and Testing Facility (**772B**)
- Sodium Storage Building (**703**)
- North Fenced Area



ANL-W RCRA Permitted Facilities

- Hot Fuel Examination Facility (**HFEF**)
- Transient Reactor Test Facility (**TREAT**)
- Radioactive Scrap and Waste Facility (**RSWF**)
- Contaminated Equipment Storage Building (**CESB**)
- Radioactive Sodium Storage Facility (**RSSF**)
- Sodium Components Maintenance Shop (**SCMS**)
- Sodium Process Facility (**SPF**)
- Experimental Breeder Reactor II (**EBR-II**)
- Sodium Storage Building (**703**)



Transient Reactor Test Facility



Capabilities

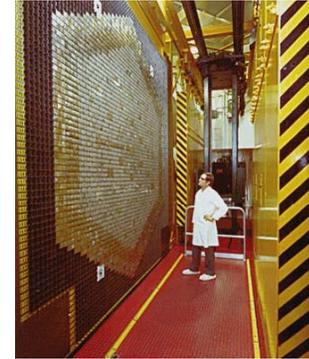
- Transient testing to 20 GW
- Fuel storage
- RCRA storage and treatment

Programs

- *Reactor operations on standby*
- Testing and examination in high-bay



Zero Power Physics Reactor



Capabilities

- Critical experiment hardware
- SNM storage vault
- Glovebox & fuel handling hoods
- Reactor materials inventory

Programs

- *Reactor operations on standby*
- Radioisotope power source assembly
- RPS storage



Fuel Manufacturing Facility



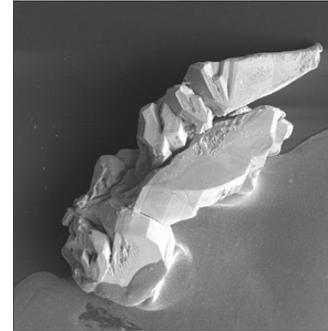
Capabilities

- Fuel fabrication and assembly
- SNM storage vault
- Gloveboxes
- NDE – Radiography
- Reactor materials inventory

Programs

- AFCI
 - Transmutation fuel development
 - Waste Form Qualification
- RERTR fuel development
- HEU processing for BWXT

Electron Microscopy Laboratory



Capabilities

- Materials characterization
- Analysis of radioactive materials
- Scanning Electron Microscope
- Transmission Electron Microscope

Programs

- AFCI
 - Pyroprocess development
 - Transmutation fuels
- Medical radioisotope applications
- NEPO-Stainless Steel
- Industry support



Analytical Laboratory



Capabilities

- Shielded hot cells
- Gloveboxes
- Analytical chemistry
- Fuel casting laboratory
- NDA laboratory

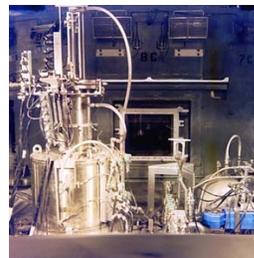
Programs

- AFCI
 - Pyroprocess development
 - Transmutation fuel characterization
- High density PuO₂
- Pu Metal Exchange Program
- Site-wide ES&H sampling & analysis

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Fuel Conditioning Facility



Capabilities

- Shielded hot cells (air and argon)
- Remote equipment mockup shop

Programs

- AFCI
 - EBR-II Spent Fuel Treatment
 - Pyroprocess development
- Nonproliferation technology



Experimental Breeder Reactor II



Capabilities

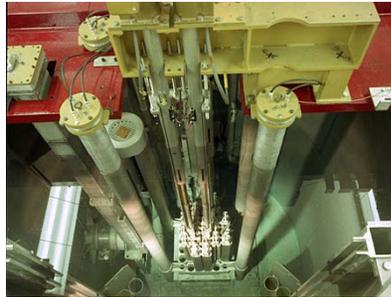
- Collection of irradiated material
- Plant closure experience
- Containment and control room
- Sitewide Infrastructure

Programs

- FFTF and BN-350 plant closure
- Evaluation of irradiated stainless steel for NEPO, LLNL, JNC
- NASA NSI ground test?



Hot Fuel Examination Facility



Capabilities

- Shielded hot cells (air & argon)
- TRIGA reactor
- Characterization & examination
- TRU waste characterization
- Neutron radiography

Programs

- AFCI
 - EBR-II spent fuel treatment
 - Pyroprocess development
 - Waste form development
- WIPP technical support
- Plutonium aging

Fuel and Assembly Storage Building



Capabilities

- Large gloveboxes
- LEU fuel fabrication
- High temperature furnaces
- Metallurgical sample preparation

Programs

- AFCI
 - Spent Fuel Treatment
 - Pyroprocess development
- RERTR fuel fabrication
- Sodium separation (MEDEC)



Sodium Process Facility



Capabilities

- Sodium passivation
- RCRA storage and treatment

Programs

- FERMI sodium drums
- INEEL mixed waste treatment
- EBR-II closure (& FFTF?)
- Model for BN-350 closure



Radioactive Scrap and Waste Facility



Capabilities

- RCRA storage
- Spent fuel storage
- Radioactive materials storage

Programs

- AFCI
 - EBR-II spent fuel storage
 - Pyroprocess development
- TPBAR storage



Engineering Development Laboratory



Capabilities

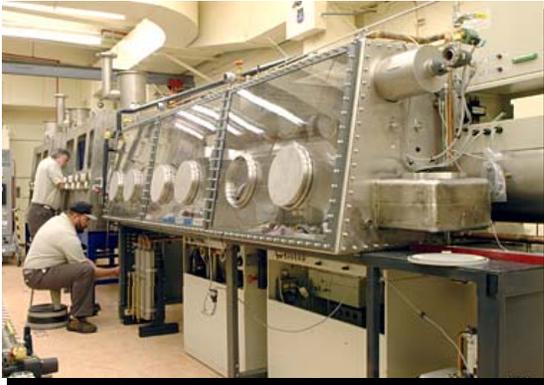
- High-bay buildings
- Fabrication shop
- Test equipment

Programs

- Process equipment assembly & test
- Radioisotope Power Source
- AFCI glovebox fabrication



Balance of Plant

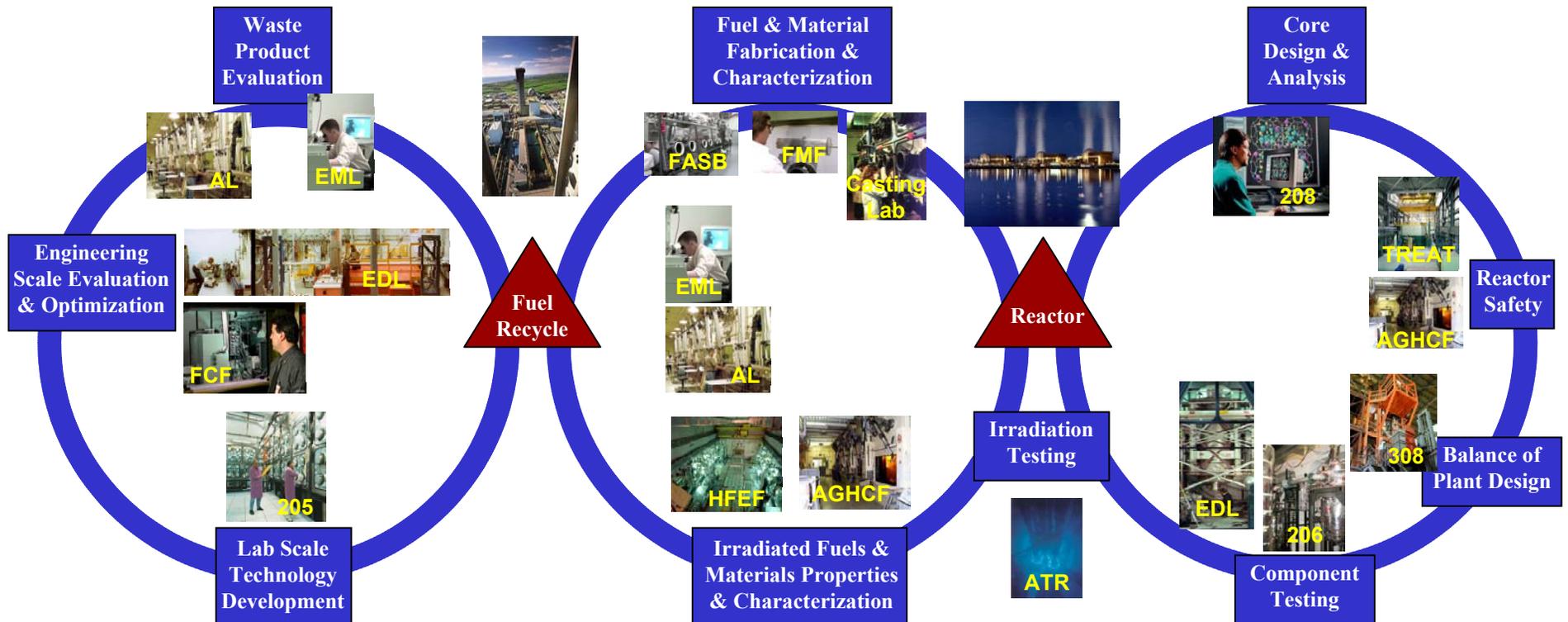


ANL's Idaho Facilities Support DOE-NE Missions and Other Programs

Missions & Program	FCF	HFEF	FMF	ZPPR	AL	RSWF	TREAT	EML	FASB	EBR-II	EDL
Expand Nuclear Energy – Short Term											
Southern California Edison								X			
NEPO-Stainless Steel					X			X	X	X	
JNC EBR-II Stainless Steel		X			X			X			
Advanced Nuclear Energy Systems (GEN IV, AFCI)											
AFCI Oxide Fuel Processing			X		X			X			
AFCI Fuel Development		X	X	X	X			X			
AFCI Materials Handbook								X			
RERTR					X			X	X		
Spent Fuel Treatment	X	X			X	X		X	X	X	X
JNC Safety Testing										X	
BN 350 Plant Closure										X	X
FFTF Studies										X	
MEDC		X			X		X	X	X	X	X
Molten salt fusion blanket					X			X			
NERI-Proton Irradiation								X			X
NERI-Corrosion Mechanisms								X			X
Other Nuclear Research											
Radiovascular catheter					X			X			
Fuel Cell Ceramic Plates								X			
NUPEC Heater								X			
Microbial Induced Corrosion					X						
National Security											
B&W HEU			X	X	X			X			
RTG Storage				X							
ATR Be Analysis					X						
LLNL Pu Oxide					X			X			X
LLNL Stainless Steel		X						X		X	
LANL Pu Exchange					X						
Materials Protection			X	X						X	
ORNL MOX										X	
Sensor Development	X	X				X					
INEEL/WIPP 3100		X			X		X				
INEEL Mixed Waste Treatment						X				X	
LLNL Pu Aging				X							



Integrated Facilities Supporting Research and Development

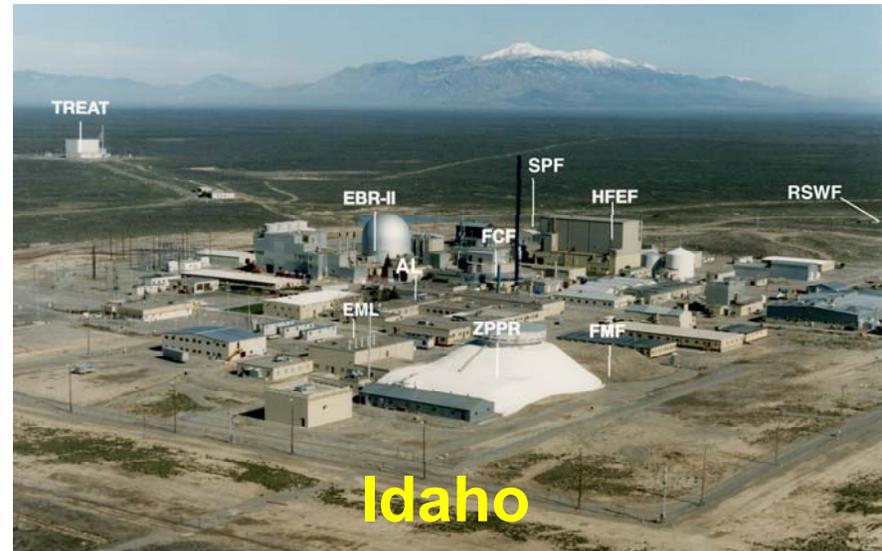


Strong Synergism Between Argonne Sites



*Leading-edge science underpins
ANL's nuclear technology
development*

*INEEL scientists and engineers
take advantage of unique
facilities at both ANL sites*



Continuing History of Idaho Collaboration



- **Common site services**
- **High-level waste form development**
- **TRU waste characterization**
- **TRU waste stabilization**
- **Engineering support**
- **Fusion blanket R&D**
- **ATR irradiation; HFEF examination**

Assessment of ANL Nuclear Program Staffing by Specialty

Specialty	Experienced Personnel	Staff under 40 yrs
Reactor and fuel cycle concept development	substantial	some
Reactor component and system design	some	few
Fuel processing	substantial	substantial
Core design and analysis	substantial	some
Reactor safety analysis and testing	substantial	some
Fuel development and testing	substantial	substantial
Remote systems engineering	some	some
Reactor and hot cell operations	substantial	some

Although for some specialties staffing is not extensive in personnel under 40 yrs, ANL has retained key personnel in each area who are supported by key under-40 individuals.

A meaningful, sustained program is necessary to maintain a capable staff.



Mission Needs vs. Facility Matrix

Mission Needs For Idaho Nuclear Energy Facilities: Generation IV Nuclear Energy Systems and Advanced Fuel Cycle Initiative										
Location	ANL-W	ANL-W	ANL-W	ANL-W	ANL-W	ANL-W	ANL-W	ANL-W	ANL-E	ANL-W
Facility Type	Test Reactor	Nuclear Materials	Test Reactor	Hot Lab	Hot Lab	Hot Cells	Hot Cells	Large Nuclear Facility	Hot Cells	Lab-scale & Eng'ring-scale facilities
X = Applicable; XX = Current Capability	TREAT	FMF	ZPPR	ANL-W AL	EML	FCF	HFEF	EBR-II CONTAINMENT	ALPHA GAMMA HOT CELL	EDL
FUELS AND MATERIALS										
Irradiation Testing										
Transient Testing	XX									
Examining Irradiated Fuels and Materials							XX		XX	
Sample Preparation, Mechanical Testing, and Microstructure Characterization					XX				XX	
Fabricating and Characterizing Test Fuel and Assemblies		XX		XX						
FUEL CYCLE										
Advanced Aqueous Reprocessing										
Pyroprocessing						XX	X		X	
Fuel Dissolution										
Fuel Separations						XX	X		X	
Nuclear Material Forms		X				XX				
Waste Form				XX	XX	X	X			
REACTOR SYSTEMS										
Experiments								X		X
NUCLEAR DATA MEASUREMENTS										
Neutronic Measurements	X		X							
BALANCE OF PLANT										
SAFETY										
Validation Of Safety Margins	X			X					XX	X
Passive Safety Features	X									X
SCWR Safety	X						X		XX	
Separate Effects Experiments	X			X			X		X	X
Integral Experiments								X		X
DESIGN AND EVALUATION										
ENERGY PRODUCTS										
Testing Thermochemical Hydrogen Production Processes								X		X
Molten Salts For Heat Transfer				X						X



Continuing INL Ties to ANL



- **NRC severe accident research**
 - Contained explosive reactions (Bldg. 315)
- **Spent nuclear fuel characterization for disposal**
 - (CMT laboratories)
- **Fission physics**
 - (IPNS)
- **Separations technology**
- **High-level waste form development**
- **AGHCF examinations**

