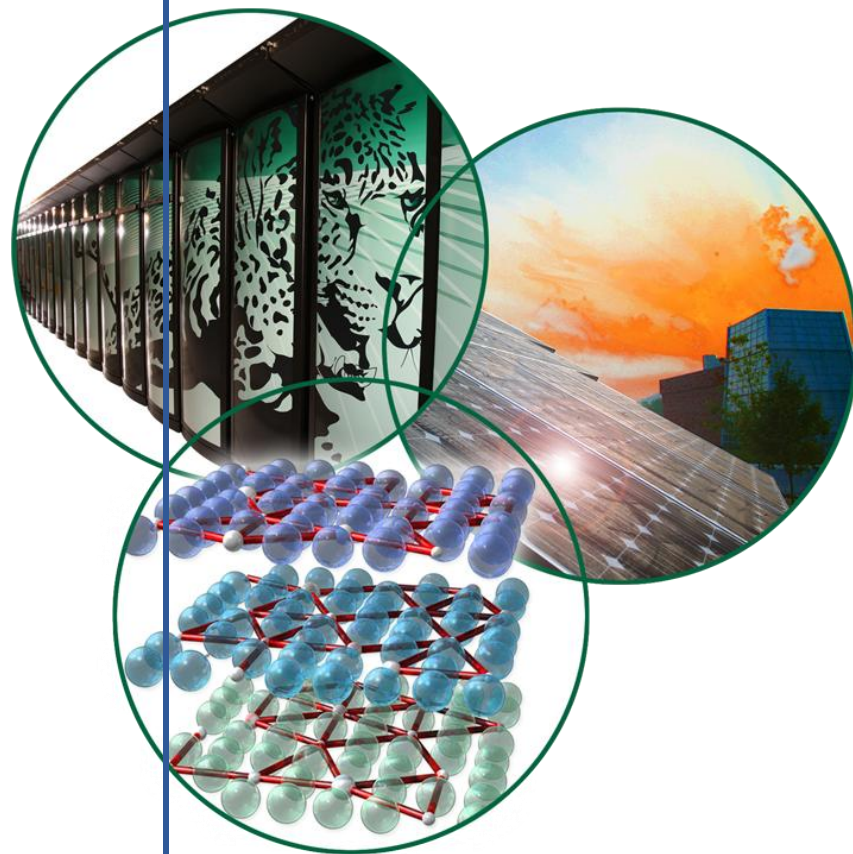


# NSED Monthly Report

## June 2012

### Nuclear Science & Engineering Directorate

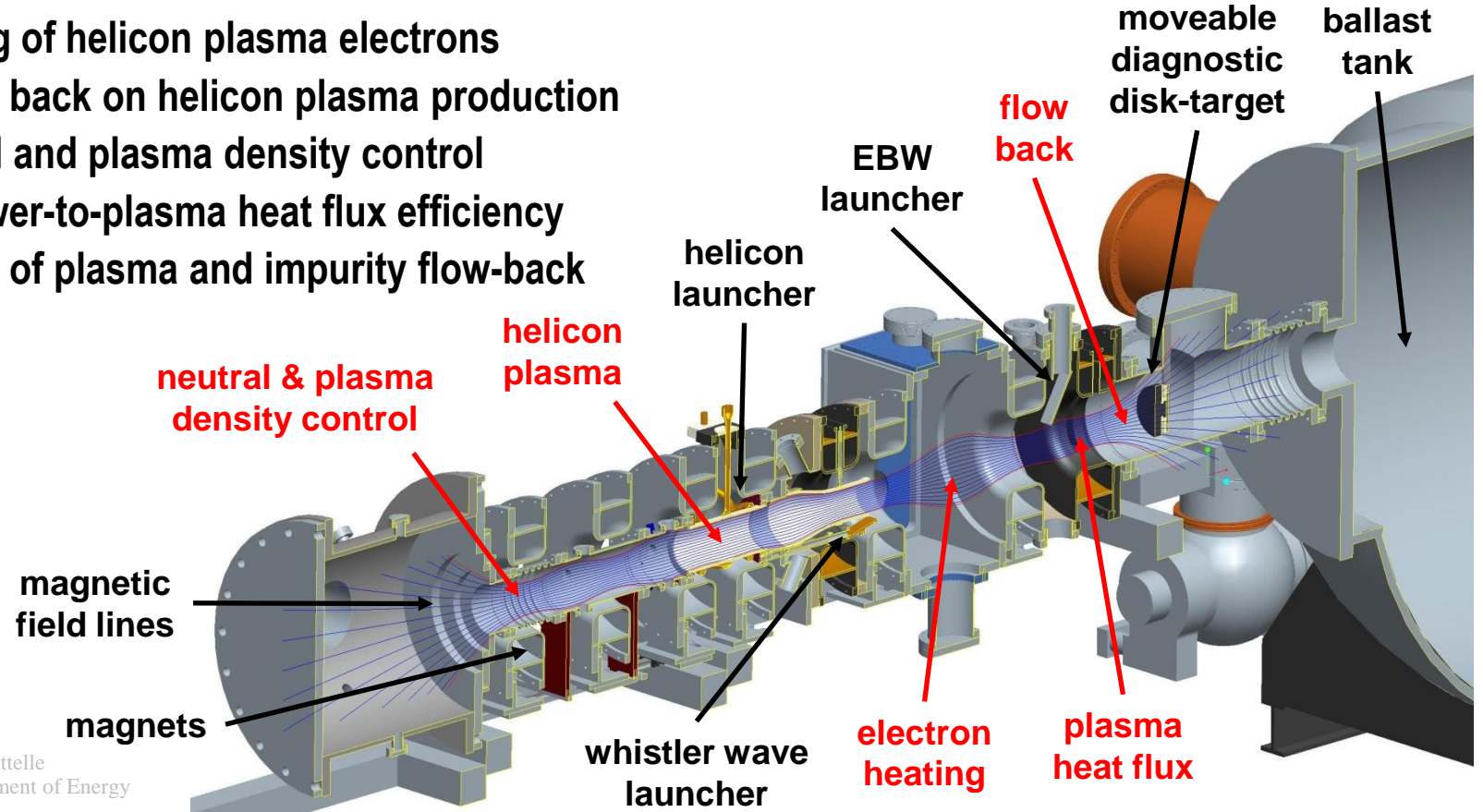
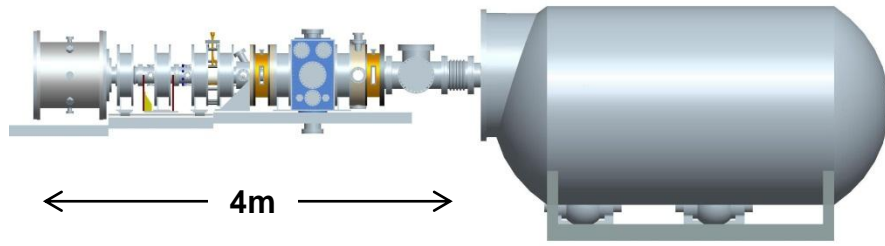




# Physics Integration eXperiment (PhIX)

- PhIX investigates the addition of electron heating to helicon plasma – the first building blocks of the new high-intensity plasma source needed by a powerful plasma materials test station.
  - Heating of helicon plasma electrons
  - Effects back on helicon plasma production
  - Neutral and plasma density control
  - RF power-to-plasma heat flux efficiency
  - Effects of plasma and impurity flow-back

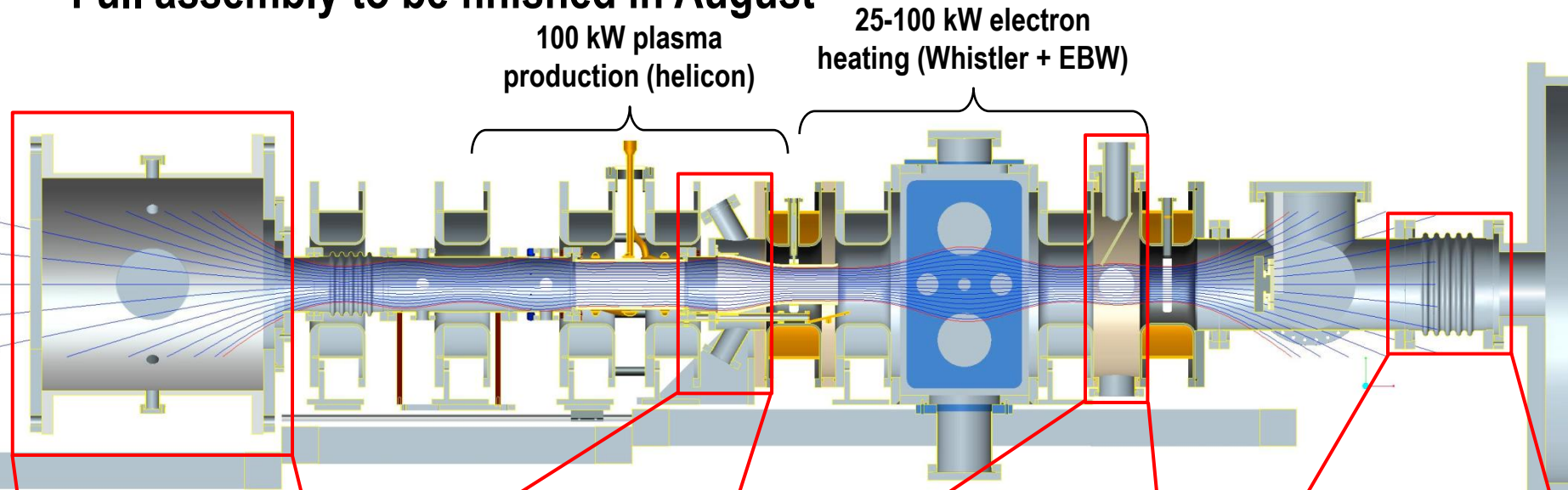
(helicon + electron heaters)



# PhIX assembly progress



- Fabrication of all interface hardware is complete
- Full assembly to be finished in August



expansion tank



helicon & Whistler launcher interface



EBW launcher interface



interface bellows to ballast tank



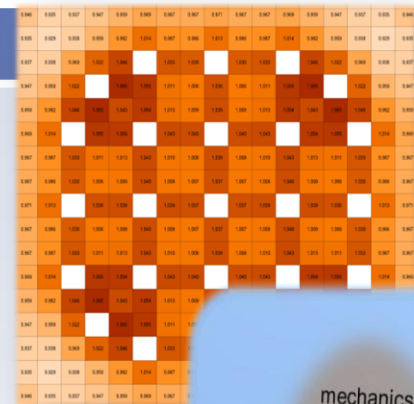
# 6/30/2012: Snapshot 2.0 of the CASL Virtual Reactor

## The Virtual Environment for Reactor Applications (VERA)

- A suite of tools for scalable simulation of nuclear reactor core behavior

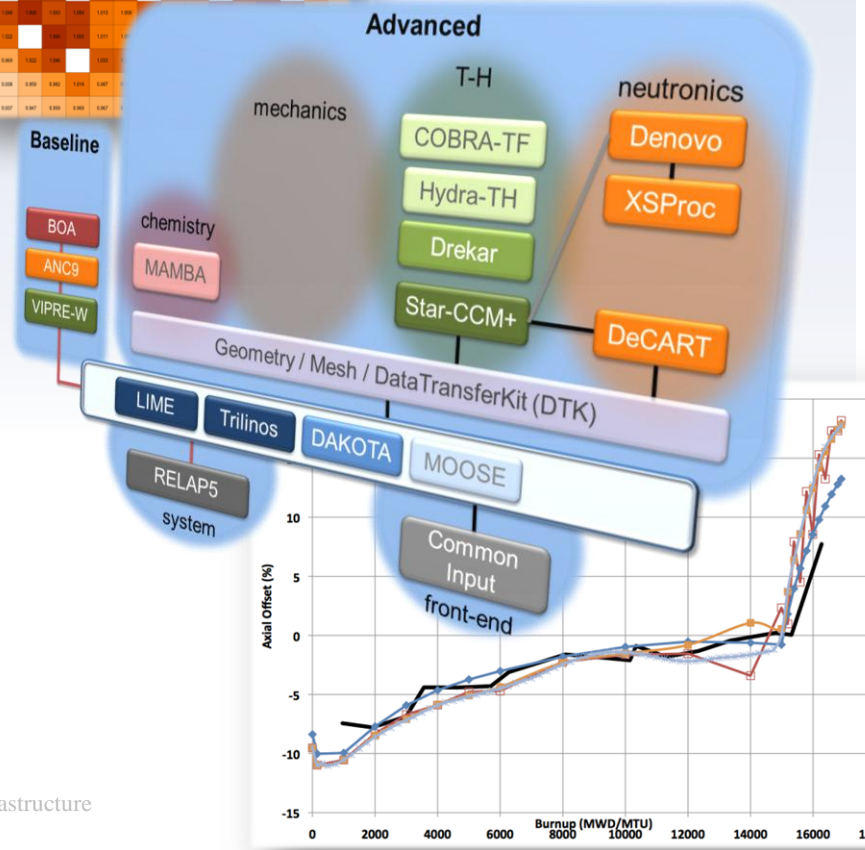
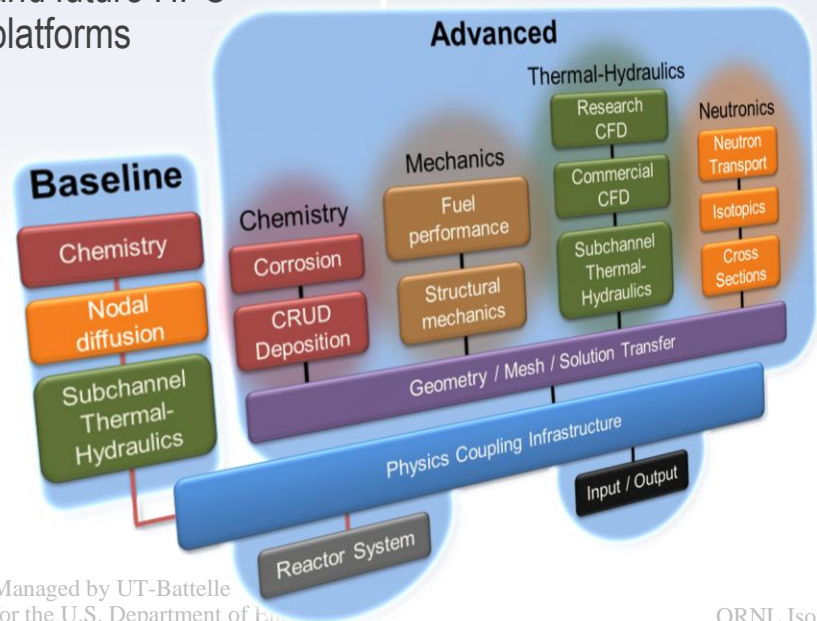
### Goals

- Flexible coupling of physics components
- Toolkit of components
- Rigorous software processes
- Scalable from high-end workstations to existing and future HPC platforms
- Attention to usability
- Development guided by relevant challenge problems
- Broad applicability
- Fundamental focus on V&V and UQ



### VERA Snapshot 2.0

- Baseline industry capability
- Initial advanced capability





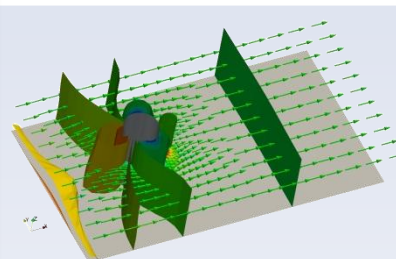
## The Integration of Hydra-TH in VERA

- A standalone executable within VERA for Thermal-Hydraulics simulations

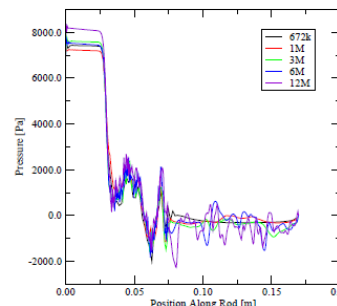
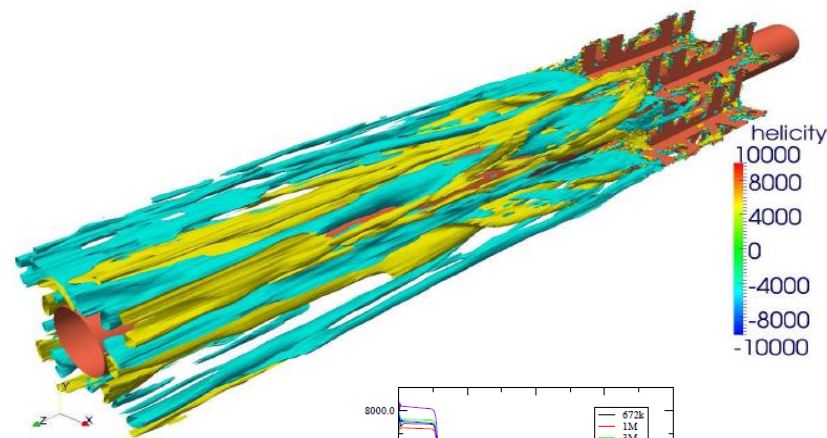
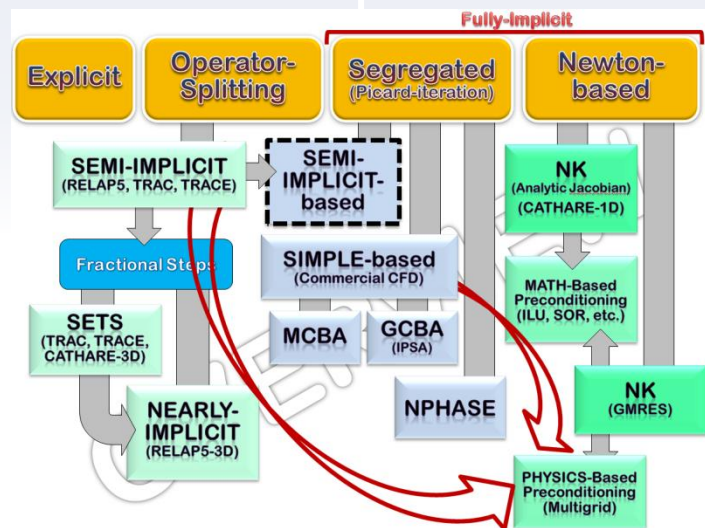
### Goals

- Attention to usability
- Development guided by relevant challenge problems
- Ability to cover all speeds (from nearly-incompressible to fully-compressible)
- Multi-(N)-fluid (user specified) formulation
- All keywords, boundary and initial conditions, inherited from virtual incompressible physics
- Include emphasis on V&V and UQ

### Hydra-TH



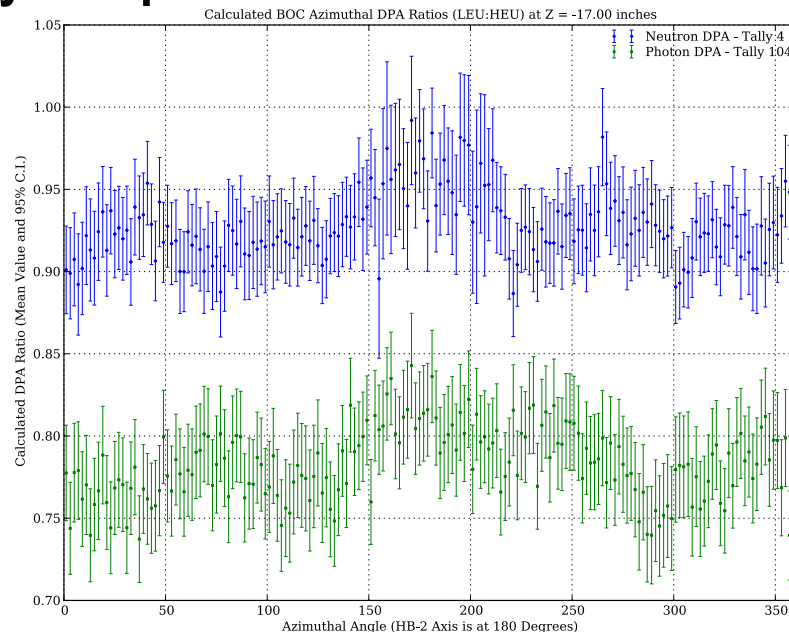
- Prototype multiphase physics is in place
- Continued development plan on-going



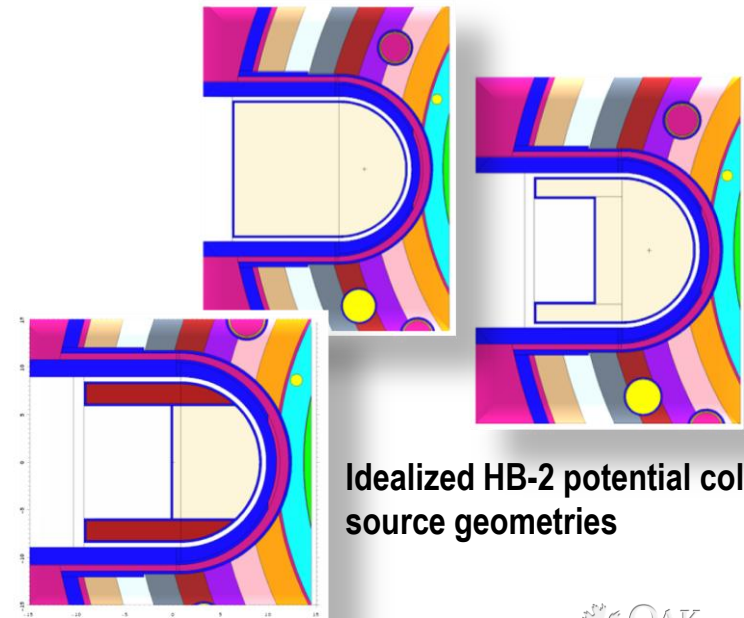
# Successful HFIR M&S outcomes



- RNSD supported HFIR's long-term materials surveillance program by predicting the displacements per atom (DPA) in the HFIR pressure vessel assuming future operation with both HEU and LEU cores. No adverse impact was indicated with any future conversion to LEU fuel.
- RNSD completed a preliminary evaluation of a potential idealized cold source geometries in Horizontal Beamline 2 of HFIR as part of an LDRD study on optimization of neutron sources at ORNL.



HFIR Girth Weld Neutron and Gamma LEU/HEU DPA Ratios



Idealized HB-2 potential cold source geometries

# Fusion Energy Division's Joon-Wook Ahn wins an R&D 100 award



The editors of R&D Magazine have bestowed an “R&D 100” Award upon researchers for seminal theoretical work and two experimental studies that led to the creation of the “snowflake power diverter.” Joon-Wook Ahn (ORNL) is part of the team working with Princeton Plasma Physics Laboratory and Lawrence Livermore National Laboratory that is being honored with this prestigious award for aiding the development of a device representing a key advance for fusion energy. Joon-Wook contributed to the work by measuring heat flux at the divertor surface using the IR technique.

# DOE-NE awards

- **Nathan George and Cole Gentry** have both received the *Innovations in Fuel Cycle Research Award* from US DOE-NE. The awards are for the comprehensive work they have performed to date in assessing the reactor physics aspects of FCM (fully ceramic microencapsulated) fueled LWR cores.
- **Anselmo T. (Tommy) Cisneros (UC-B)** won an award in the Nuclear Science and Engineering category for his paper entitled, “Neutronics and Depletion Methods for Parametric Studies of Fluoride-Salt-Cooled High-Temperature Reactors with Slab Fuel Geometry and Multi-Batch Fuel Management Schemes.” He was assisted by Dan Ilas of RNSD.





# Awards and recognitions



- 2012 CASL Knight: Andrew Godfrey**

The CASL Knight Technical Contribution Award is given out each year to an individual who is deemed to make the most outstanding technical contribution to the success of CASL. The 2012 award went to Andrew Godfrey of the RNSD Reactor Physics Group and CASL Advanced Modeling Applications Focus Area for “Outstanding technical leadership and contribution in providing requirements, direction, and applications that significantly increase the relevance of VERA to problems of interest to industry.”

**Congratulations Andrew!**



Andrew being congratulated by Alex Larzelere, DOE/NE Advanced Modeling and Simulation Office.



Andrew being congratulated by CASL Director Doug Kothe and AMA Focus Area Lead Jess Gehin.

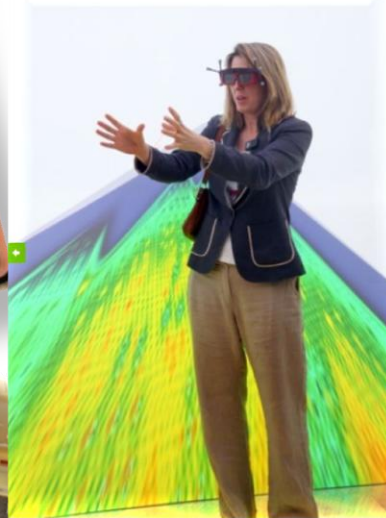
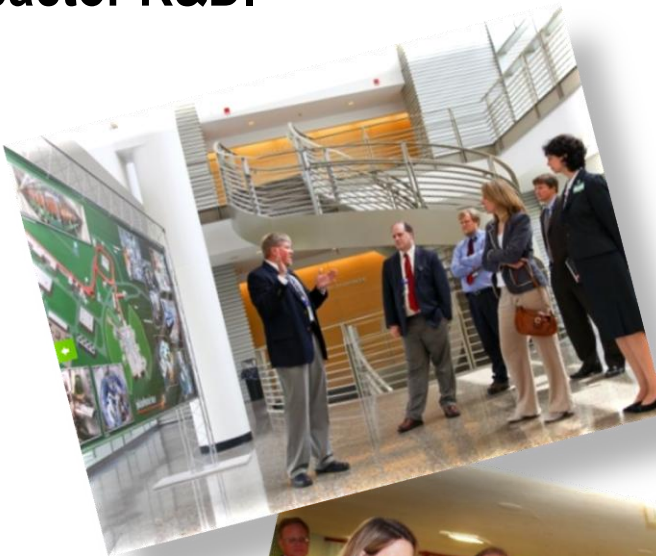


- John Wagner has been invited to be a member of the International Advisory Board of the Joint International Conference on Supercomputing in Nuclear Applications + Monte Carlo 2013 (SNA2013 + MC2013).**

# Baroness Worthington



- June 4 - Baroness Bryony Worthington, Life Peer, British House of Lords (Head of the All-Party Parliamentary Group on Thorium Energy) visited with Thom Mason and toured ORNL facilities with a focus on fluoride salt reactor R&D.



# Knoxville News Sentinel and KACARE



- Frank Munger and John North- *Knoxville News Sentinel*.
  - This was an ORNL orientation for John North, the new Continuous News Editor for the Knoxville News Sentinel.
- Representatives of King Abdullah Center for Atomic & Renewable Energy, *Saudi Arabia*.
  - This is a newly established research center that is being developed in Saudi Arabia,. Battelle has been working with them to identify research capabilities that they need to consider.



Virtual Office, Community,  
and Computing



Innovation at the speed of Insight

# NSED organizational announcement

## Organizational Announcement



The Environmental Management Program Office (EMPO) has made great progress in reducing risk at ORNL and contributing to the modernization of our campus. The level of this type of activity has now shifted enough that integration of EMPO's work back into our ongoing nuclear operations makes good business sense. Therefore, effective immediately, EMPO will be integrated into the Non Reactor Nuclear Facilities Division (NNFD) as a group. Ken Schneider will be the Group Leader for the EMPO Group reporting to Tim Powers.

Dirk Van Hoesen, who has served as the EMPO Director, will take on a strategic planning assignment reporting to Jeff Binder.



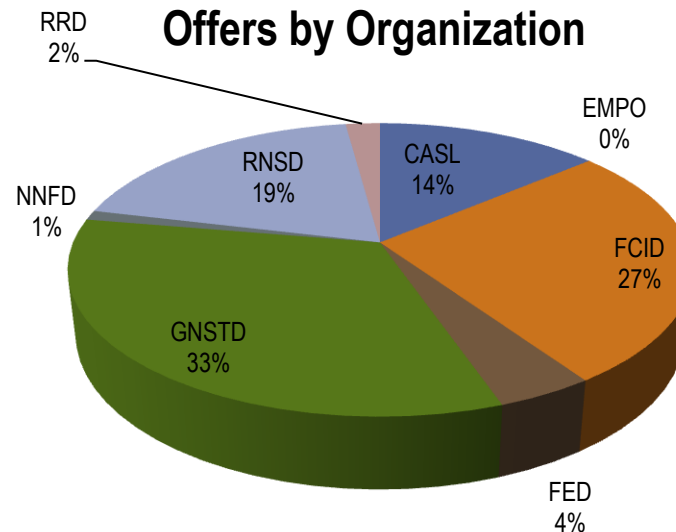
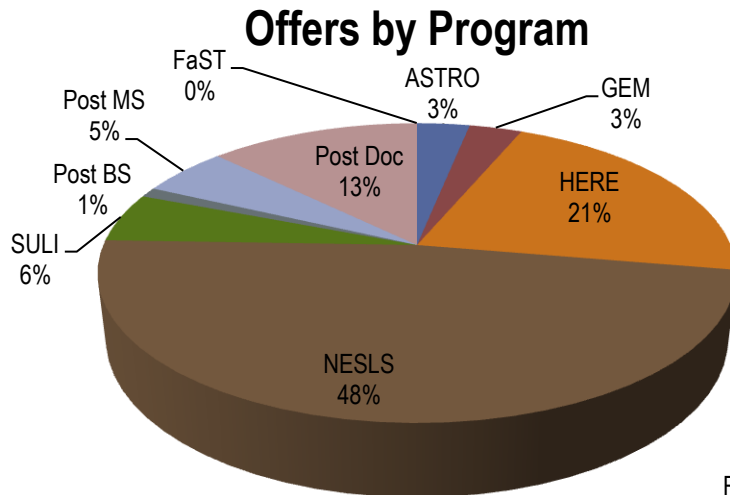
Please support Ken, the EMPO Team and Dirk as they transition into these new and important roles!

**This reflects the organization as of June 30, 2012**

# Education outreach committee summer interns



Student Program	Applications	Offers as of 5/24/12
ASTRO	69	3
GEM	24	3
HERE (UG+Grad)	524	38
NESLS	269	45
SULI	300	5



# NSED education outreach committee summer activities



## Tours:

- 98 Students attended
- SNS, HFIR/REDC, EVEREST, Remote Systems, & Aquatics Ecology Lab
- Registration via SharePoint site
- Twice as many tours as last year



## Seminars:

- Kevin Clarno, Integrated Radiation Transport and Nuclear Fuel Performance for Assembly-Level Simulations
- Rose Montgomery (TVA), Industry Viewpoint on Collaborative Research with National Labs and DOE
- Michael Whitaker - Application of International Safeguards at Uranium Enrichment plants

# NSED education outreach committee summer activities



## Project Grad at Pellissippi State Technical Comm. College

- June 14<sup>th</sup> at the Hardin Valley Campus
- Both the Hot Cell Manipulator Mock-up and ANDROS present for hands-on demonstrations
- High School student program



## Science Village at Secret City Festival

- June 15<sup>th</sup> & 16<sup>th</sup>
- Hot Cell Manipulator Mock-up was a huge success with all ages
- NNFD personnel staffed the demonstration





A three-day event organized by Dawn Eipeldauer and intern Bruce Shelander and sponsored by NA-24 included guest lectures and hands on exercises aimed at opening this broad arena for interns and mid-career professionals interested in learning about safeguards.

The purpose of the workshop was to focus on international policies, safeguards technologies, methodologies, and applications. Jaime Vidaurre-Henry, retired from the International Atomic Energy Agency (IAEA), was a guest lecturer who brought an IAEA perspective to the workshop. Topics discussed ranged from security impacts on the nuclear fuel cycle to the use of nuclear materials for humanitarian and peaceful purposes.





A water loop in Building 5800 Lab D111 is being used to validate the rotating drum concept of a beam dump for the Facility for Rare Isotope Beams (FRIB). A critical component of the beam dump assembly is the rotating water coupling, and the pressure drops through the coupling have been characterized in Phase 1 testing. Phase 2 testing will commence later this year when the rotating drum assembly is received at ORNL from Michigan State University.

Isotope program researchers at building 4501 received the first proton-irradiated Thorium-232 foil sample from Brookhaven National Laboratory (BNL) in collaborative investigation to develop alternative source of important medical radioisotope, Actinium-225. ORNL's role in this collaboration is to develop processing and separation/purification procedures for future large-scale production.

Following the hot liquid transfer at the end of May, the insulation, heating blankets and heat tape, and thermocouples were removed from the transfer tanks and transfer tubing. The salt transfer tubing was then removed without difficulty, and the tank penetrations were plugged. Final tank decontamination and sampling, preparations for transportation, and cleanup of the hood and laboratory will proceed as funding is available.

Exploratory column tests for protactinium removal were performed. Installation of new conversion equipment is ongoing. The new Modified Direct Denitration system equipment will be used to convert neptunium nitrate solutions to oxides. A poster related to Np target fabrication was presented at the 2012 Actinides Separations Conference.

Transferred two special form capsules of curium from temporary storage in Building 4501 to the hot cells in Building 7920. This involved transferring the special form capsules from their shipping drums into the loop cask in Building 7936 and design of special tools to perform this task.

# Radioisotope production

## Isotopes

- Completed Cf Package Loading
- Recover of Cm-244 for future HFIR targets

Heavy Element Campaign C-75



- Receipt and Storage of LANL Cm-244 Material - Ongoing

Curium Receipt



- Processing of Mk42 AmCm Containers – Dissolutions operations in preparation for Lanthanide separations

Americium-Curium Processing



- Shipped 1,238 micrograms to QSA June 27th
- Currently processing two customers' orders
- Stripped package for upcoming orders

Californium Wire Production



- Three (3) rabbits have been assembled and tested for Cycle 443

Selenium Processing



- Operations are ongoing; Completed 100<sup>th</sup> Processing Campaign

Actinium Production



- Template for Risk Registry Matrix sent to INL and to LANL for Pu shipments
- PEP being signed off by ORNL staff to send to OSO next
- Alpha plug under fabrication – wiring to be added next.

Pu-238



- Installed stud welder to support KAPL material tests
- Completed reconfiguring Cell 6 MTS Test Frame to support tensile testing (KAPL)

Fusion



# Enriched stable isotope fabrication and shipping



**Thirteen shipments of 24 enriched stable isotopes were made in June**

- 123 shipments of 304 enriched stable isotopes have been made in FY12 to date

**Two custom technical services were completed in June**

- 90 technical services have been completed in FY12 to date
- Included among these was a Ni-62 rolled foil measuring 1.2 cm x 4 cm x 0.02 cm for an ORNL summer student project using HFIR to study Ni-63 production.



# Highlights

GNSTD



The Safeguards and Security Group Security Systems team has been successful with test flights of ORNL designed air sampler payloads in their Unmanned Aerial Vehicle. The flights proved the viability of two sampling payload types: a passive impactor design and an active electrostatic precipitator design. These payloads could potentially be used to enhance the nuclear forensics capabilities of the lab.

GNSTD Transportation Technology Group Staff traveled to China to train representatives from the Ministry of Environmental and Provincial Environmental Protection Bureaus in the IAEA TS-R-1 Transportation Safety Regulations. The use of these regulations will assist in safely transporting radioactive sources from radiological sites to provincial repositories. TS-R-1 are IAEA transport safety regulations recommended for adoption by foreign governments.

The 2012 GTRI Transportation Security Symposium, hosted by Oak Ridge National Laboratory, was held in Washington, DC. Participants included carriers and private industry shippers of category 1 and 2 radioactive materials. Speakers included U.S. Federal Government officials, and other transportation security experts, who provided status updates on regulatory matters and other relevant issues.



# New projects funded

GNSTD



*From left to right are UCOR's Bob Smith, Leo Sain, Cathy Hickey, Veronica O'Hearn, and Ken Rueter with University of Tennessee assistant professor Jason Hayward in Hayward's lab. (Photo submitted by UT)*

URS-CH2M (UCOR), a federal cleanup contractor in Oak Ridge, is donating \$250,000 to set up an engineering faculty fellowship at the University of Tennessee. The first award recipient is Jason Hayward, an assistant professor in UT's Department of Nuclear Engineering, a university press release said. Leo Sain, UCOR's president and project manager, announced the fellowship on Friday, June 29, at the East Tennessee Economic Council meeting in Oak Ridge. The press release said UCOR established the fellowship because it is "committed to doing its part to ensure continued excellence in education in the nuclear field." UT said Hayward is a top recipient of external research awards in the department, the ninth-ranked graduate program in the nation. Since arriving at UT in 2008, Hayward has been awarded more than \$7 million in research funding, the release said. His group has used that money to focus on research in areas of detector science and development of gamma ray and neutron imaging for applications in nuclear security, neutron scattering science, and medical imaging.

## *In Addition:*

DNDO is interested in preserving high purity U-233 and has funded the Safeguards and Security Group to recover and stabilize a portion of available U-233 for use in their future efforts. They have also funded a study that will focus on U-233 storage options and a long range schedule for unique radiological signature training devices that will be designed.



# Visits and tours

GNSTD



Mike Sparks, Deputy Director, DOE Office of Security Assistance (DOE HS-52), visited Oak Ridge National Laboratory on June 15, 2012 for a program review. In addition to reviewing current projects, discussions were held regarding a new effort for FY13 to conduct regional risk assessments for the Western Area Power Administration (WAPA). WAPA is one of four Power Marketing Administrations within DOE.

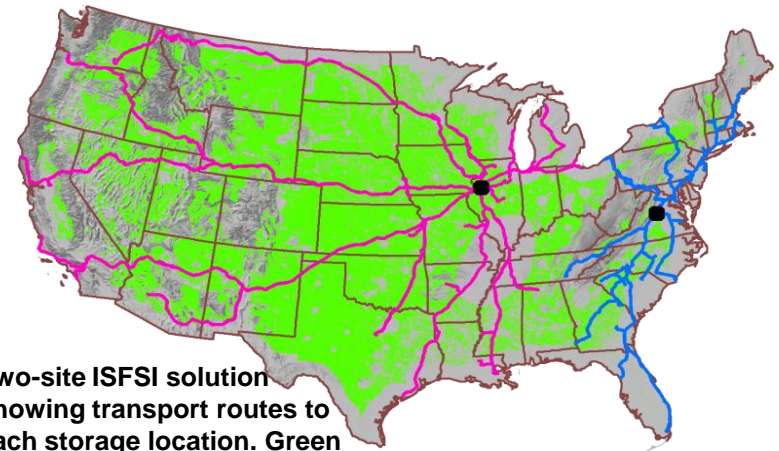
During the week of May 7, Bill Hopwood hosted the Foreign Nationals (FN) Group in the Safeguards Laboratory (SL). The training addressed the preparation of NDA (Nondestructive Assay) Standards and the training modules were developed and led by the SL staff as well as experts from the New Brunswick Laboratory and the Y-12 National Security Complex. During the week of June 25, Mr. Hopwood also participated in another workshop with this same country's FNs were hosted by the Idaho National Lab (INL). Mr. Hopwood was an instructor with others from INL, Pacific Northwest National Lab, and a Gregg Services' expert (formerly from the Savannah River Lab). This workshop addressed MC&A Measure Control Programs and practices implemented at DOE facilities.

John Begovich and Michael Whitaker attended a NA-24 sponsored meeting in London with British and French counterparts to discuss the application of improved nuclear safeguards to uranium conversion and enrichment plants.

- Thom Mason briefed the Secretary of Energy, Steven Chu, on a recent RNSD-led, multi-lab technical review and assessment of the current inventory of domestic used nuclear fuel. The briefing was well received and will be considered in preparing DOE's response to the Blue Ribbon Commission report.
- RNSD is working with RPI to coordinate the development of a new intermediate-energy neutron capture cross-section measurement capability at RPI in support of the NNSA/NA-16 Nuclear Criticality Safety Program.
- An RNSD team presented a training class on depletion and criticality analysis for spent fuel systems to 15 staff from the Nuclear Regulatory Commission.



- **George Flanagan and Calvin Hopper had key leadership roles in the International Standards Organization Technical Committee on Nuclear Technology (TC-85)**
  - **Flanagan - Chair of the Subcommittee on Reactor Technology**
  - **Hopper - US Technical Advisor for Subcommittee on Fuel Cycle Technology.**
- **In support of DOE-NE, RNSD worked with CSED staff to investigate siting options for Interim Spent Fuel Storage Installations (ISFSIs) for nuclear energy growth projections out to 2050 ranging from “no growth” to “aggressive growth.” Favorable ISFSI locations based on land availability, transportation advantages, and population were identified. (ORNL/TM-2012/237)**



Two-site ISFSI solution showing transport routes to each storage location. Green background depicts ISFSI available siting. Optimization is by transportation distance only.

Base case two-site ISFSI solution based on limiting transportation distance.



- Conference papers – 14
- ORNL/TM - 2
- Letter reports – 1



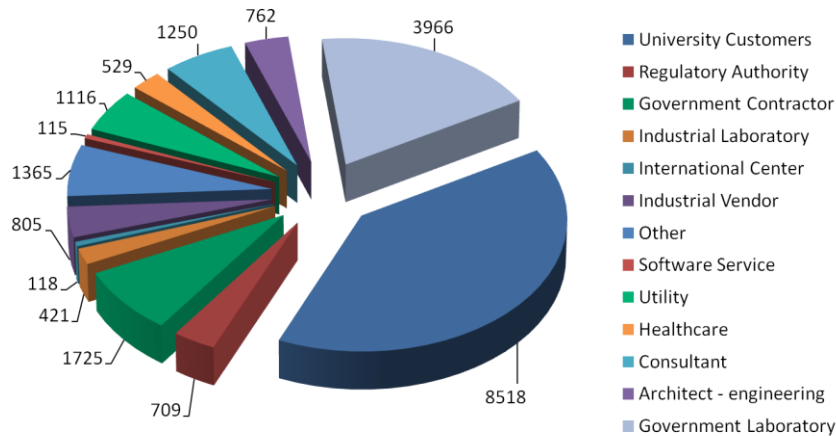
- The paper titled “Design of a Low-Enriched Uranium Fuel for the High Flux Isotope Reactor - Reactor Physics Analyses” by Germina Ilas (RNSD), Trent Primm, and David Renfro (RRD) won the Reactor Physics Division Best Paper Award at the ANS Annual Meeting held in Chicago, June 24–28, 2012.
- “Neutronics at Wisconsin, ORNL advances ITER shielding and international collaboration,” highlighted use of hybrid radiation transport methods developed by RNSD.
  - US ITER Media Corner,  
[https://www.usiter.org/media/features/neutronics\\_wisconsin.shtml](https://www.usiter.org/media/features/neutronics_wisconsin.shtml)



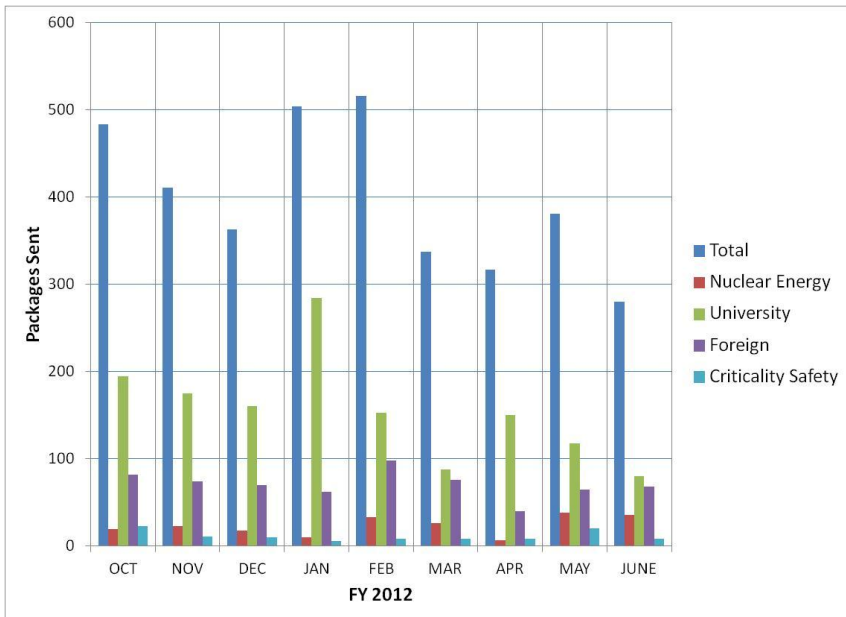
# Radiation Safety Information Computational Center (RSICC): Serving the Scientific Community for 50 years



RSICC Customer Base



- **Software and data packages distributed FY2012: 3,592**
- **5 package updates and revisions June 2012**



# CASL holds 2nd Annual Round Table Meeting

*Held virtually with VOCC Laboratory technology and staff*

- Annual principal investigator meeting to review technical progress in key areas
- Conducted completely virtual with CASL's VOCC collaborative technology
- 9 sessions of three PI presentations each
- Technical Contributor of the Year Award – Andrew Godfrey, ORNL
- Jester Award – Zeses Karoutas, WEC
- Attended by 139 people over four day period
- Average daily attendance – 82



# Non-Reactor Nuclear Facilities Division

NNFD

## Nonreactor Nuclear Facilities Division Monthly Highlights – June 2012



**Actinium Glove box line in Lab 201**

**NNFD and FCID recently completed the 100<sup>th</sup> Ac-225 Campaign.  
ORNL has been supply this isotope to various users since the mid-90s.**

# NNFD FY2012 Cumulative Facility Metrics

## Hot Cell Availability

## Facility Upgrades and Maintenance Activities

96.70% REDC (7920)

95.00% REDC (7930)

92.00% Irradiated Fuels Examination Laboratory (3525)

90.00% Irradiated Material Examination and Testing Laboratory (3025E)

### 7920

- TSR Calibrations and Functional Testing
- Work continues on replacement of Hot Cell Conveyor Dolly and Drive Chains



Replacement Conveyor Dolly

- Work continues on installation of Glove-boxes for Lab 108

### 7930

- Programmed maintenance operations

### 3525

- Performed 50 year sprinkler head inspection and change out



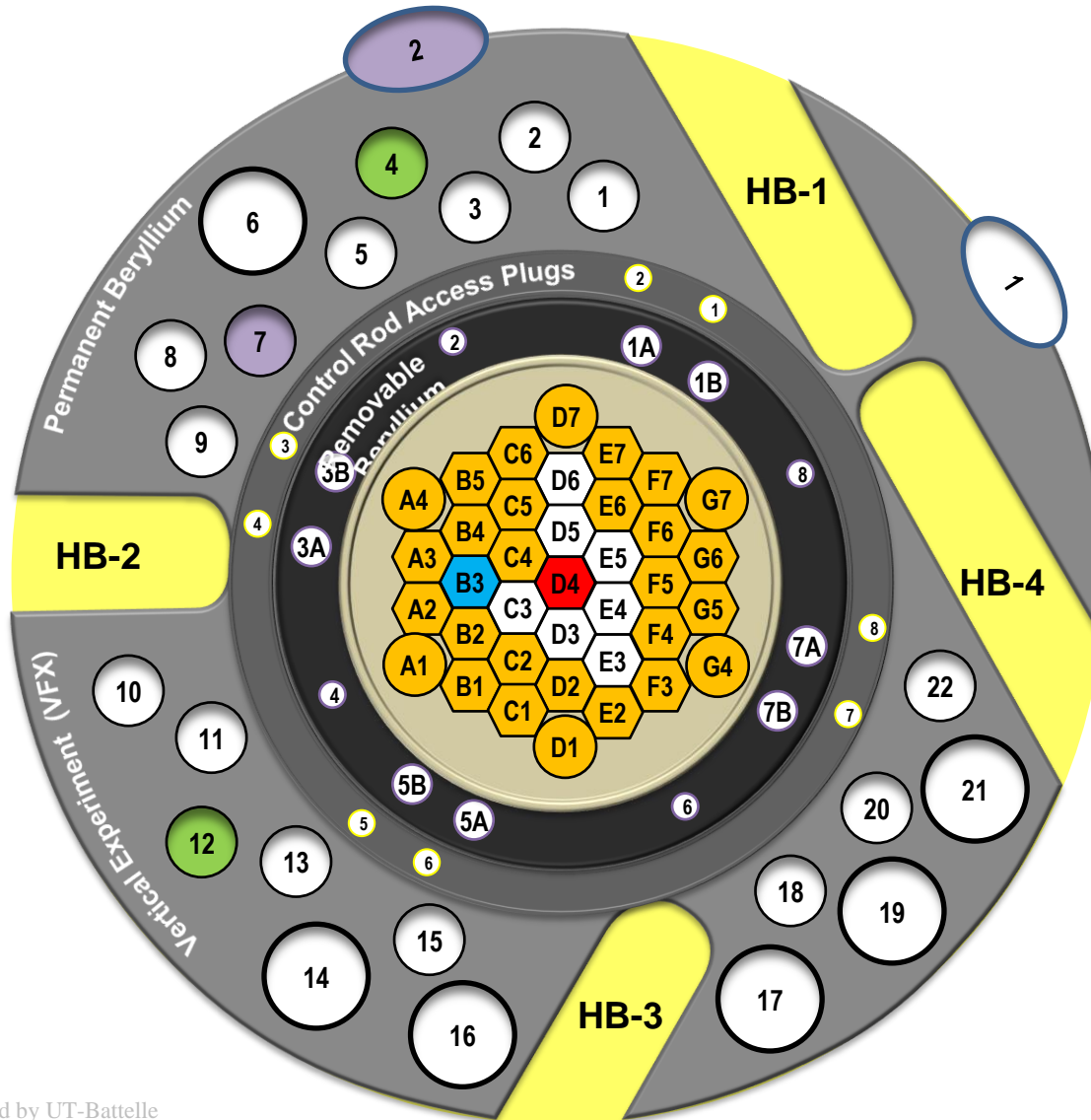
### 3025E

- Routine ongoing maintenance activities

# HFIR Cycle 442 continues strong demand for materials irradiation

HFIR

June 2012						
SU	M	T	W	TH	F	SA
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
Reactor On						



- Isotope Production
- Isotopes for Research
- Materials Experiment
- Fuels Experiment
- Pneumatic Facility NAA
- Hydraulic Facility
- Neutron Scattering
- Available Positions

# The number of Cycle 442 irradiations being driven by materials research

## 113 Materials and Fuels Experiments

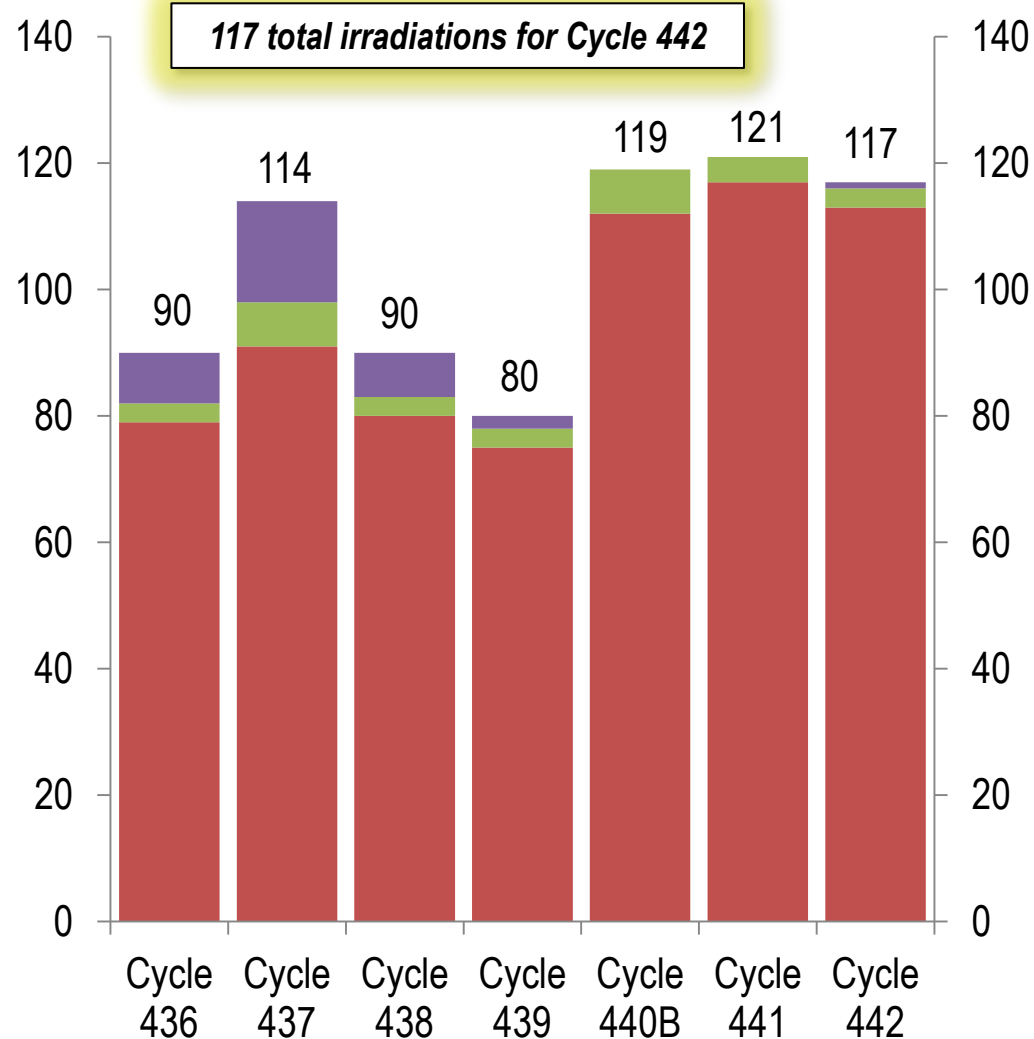
- Silicon Carbide
- V, Mo, & Cu alloys
- Zircaloy
- UO<sub>2</sub> Fuels
- Graphite
- Uranium
- Steels
- UCN Fuels

## 3 Commercial Isotope Production Capsules

- 3 Selenium (Se-75) - production

## Isotopes for Research

- Pneumatic Tube Isotopes research

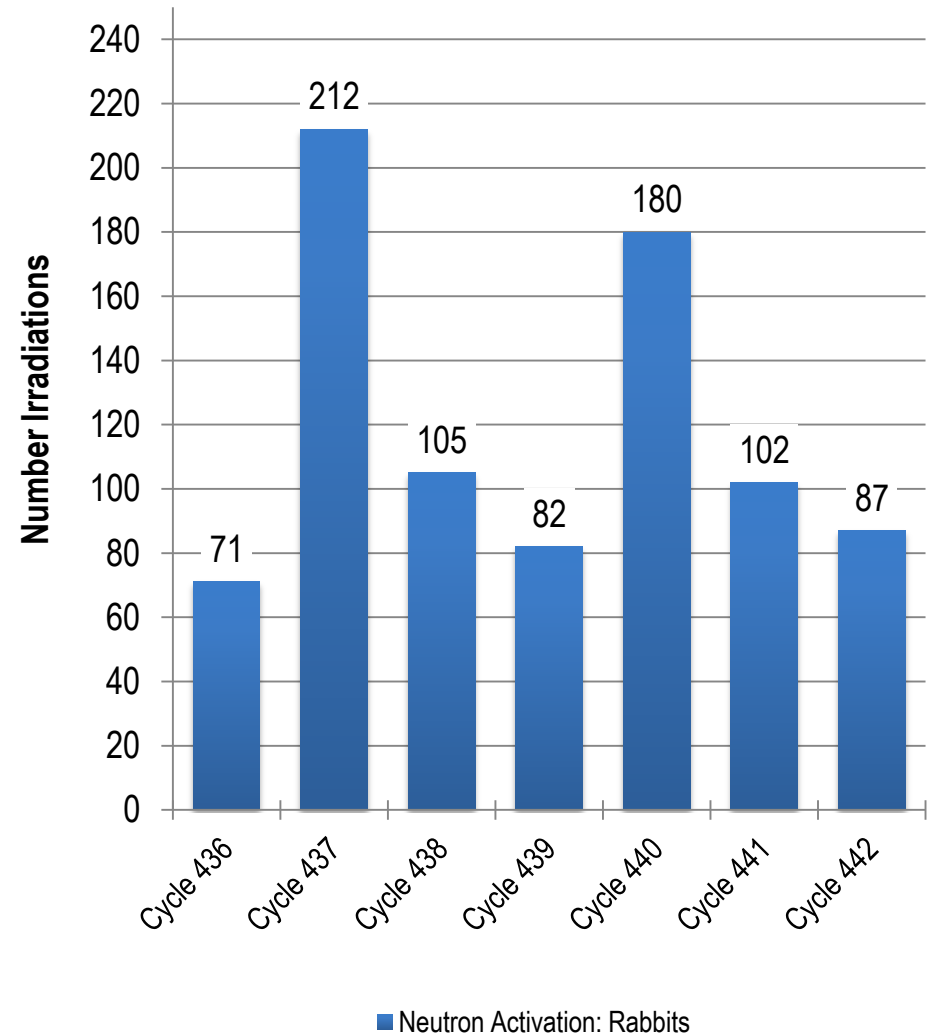


# Significant number of NAA irradiations during Cycle 442

HFIR

## NAA irradiations during Cycle 442 include:

- 1 rabbit for NIH looking at impurities in diamond powder
- 2 rabbits (of smears) looking for cadmium in the HFIR off gas system
- 12 rabbits for VT researchers in conjunction with CNMS – 4 graphene and 4 nanotubes
- 9 rabbits for Roger Kapsimalis (DNAA data deconvolution to simultaneously determine U, Pu)
- 63 rabbits for IAEA





## ITER-like Elm Pacing Experiment

- An ELM pacing experiment was carried out on DIII-D on June 21 to investigate the compatibility of High Field Side (HFS) fueling pellets with pellet ELM pacing from the X-point location. The new smaller 1.3 x 0.9-mm pellets were found to trigger ELMs reliably from the X point and a single gun operated successfully at 30-Hz pacing the ELMs at that frequency. This implies that our future experiment with all three guns operating in pacing configuration can achieve a cumulative rate of 90 Hz. The larger 1.3-mm HFS pellets were found to trigger ELMs, but the ELMs were not larger than those from the X-point pellets.
- The HFS pellets add fuel to increase the density when combined with the X-point pacing pellets compared to non-pellet and pacing only comparison shots. The pellet ablation data from the X-point pellets indicates that a penetration of <1 cm inside separatrix is needed to trigger the ELM. This implies that even smaller pellets can be successfully used to mitigate ELMs. A gas only fueling comparison at 50 torr-L/s flow was found to increase the ELM frequency by increasing the pedestal density by ~15%. The ELM frequency increase was ~40% of the ELM rate achieved with the equivalent pellet gas flow.

Dr. Peter Pappano announced that ORNL will receive four new projects in response to the Office of Fusion Energy Sciences LAB 12-603 call for proposals. The four PIs and their awards are:

- Zhili Feng, “Friction Stir Welding of ODS Steels and Advanced Ferritic Structural Steels.”
- David Hoelzer, “Development of High-Cr ODS Alloys with Zr Additions for Fusion Reactor Applications.”
- Yutai Katoh, “Silicon Carbide Joining Technology for Fusion Energy Applications.”
- Steve Zinkle, “Structural Materials of Potentially Unique Irradiation Resistance.”

FED hosted a visit by Robert Pearce and Matthias Dremel of the ITER vacuum group to participate in tests of the ITER cryogenic viscous compressor cryopump being designed for the ITER roughing pump system. A 1/20<sup>th</sup> scale prototype is under test in the FED Pellet Lab and is showing good promise in the tests carried out thus far.

Juergen Rapp gave a presentation, “Update on PFC and PMI Testing Possibilities in a Plasma Material Test Station,” at the Plasma Facing Components Meeting, Princeton, NJ, June 20-22, 2012.

- **G. Chen, L. Chacon, and D.C. Barnes co-authored an article published in the Journal of Computational Physics, Volume 231, Issue 16 entitled: *An efficient mixed-precision, hybrid CPU-GPU implementation of a nonlinearly implicit one-dimensional particle-in-cell algorithm.***
- **J. D. Lore, J. M. Canik, Y. Feng, J. W. Ahn and R. Maingi co-authored an article published in Nuclear Fusion, Volume 52, Issue 5, entitled: *Implementation of the 3D edge plasma code EMC3-EIRENE on NSTX***



# Campus remediation

- **ORNL North-West Quad Soils and Slabs D&D and Remediation**
  - Completed site restoration at 2000, 2024, and 2001
  - Completed concrete sidewalk and curb repair
  - Completed final waste shipments
  - Demobilized subcontractor
  - Submitted D3 version of Waste Handling Plan (WHP) to DOE for transmittal to EPA and TDEC for review
  - Initiated Phased Construction Completion Report (PCCR) preparation
  - Final waste shipments total 411 loads to EMWMF and 91 loads to the Y12 landfill



**Sidewalk Repair at 2000**



**Overview of Restored 2001/2024/2000 Site**

# Campus remediation

- 4500 Area Gaseous Waste Reconfiguration and Stabilization Project
  - 4556 Filter Pit clean out subcontractor continued the submittal process and began mobilizing to ORNL
  - Completed removal of HEPA filters from 4556 filter housings
  - Collected in-leakage sample from 4556 footer drain sump
  - Reconfiguration contractor continued assembly/installation of the electrical panels and associated conduit
  - Completed forming/pouring interior equipment pads
  - Initiated efforts on generator pad construction
  - Began shop fabrication of Hot Off Gas (HOG) piping



4556 Filter Pit Entry



Removing HEPA Filter from 4556 Filter Pit Housing



ISOCS Survey of Removed HEPA Filter

# Campus remediation

- **Enhanced Power Supply to Building 7625**

- Fast track project initiated and funded on May 25 with multi-organization project team mobilized
- 2 new 2.5MW Unit substations ordered with delivery date of September 1 with power up installation by September 30
- 2 large Trans-Rex's relocated and unit substation receptor areas cleared for installation



- **Isotopes Area Legacy Material Removal**

- Submitted D1 Phased Construction Completion Report (PCCR) to DOE with EPA and TDEC comments incorporated
- Finalized waste disposition documentation packages for intermodal, B-25 box, and drum of mixed waste
- Loaded waste packages trailer and staged in 7000 Area to await shipment



Isotopes Area Mixed Waste Staged for Transport to Energy Solutions -Clive

# Campus remediation

- Integration Support

- EM Contractor Perma-Fix completed demobilization from Campus on Miscellaneous Facilities Project
- UT-B completed the design for the SNAP-7C/ Weather Bureau RTG spacers & submitted for cost estimate for Miscellaneous Facilities Project.
- UT-B personnel commented NNS's draft RTG unloading procedure for Miscellaneous Facilities Project.
- EM Contractor Perma-Fix continued performing evolution mock-ups preparing for 3026D Management Assessment
- EM Contractor Perma-Fix began the erection of a wind barrier for the roof access enclosure on top of 3026D hot cells



3026D Hot Cell Roof Access Enclosure Wind Barrier



Former Building 3508 Slab