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LLNL

FOREIGN TRIP REPORT

LLNL-MI-678435

DATE: September 30, 2015

SUBJECT: Report of Foreign Travel to Paris, France

TO: Dr. Jerry N. McKamy, USDOE Nuclear Criticality Safety Program Manager, National Nuclear Security Administration, NA-511

FROM: David P. Heinrichs, Nuclear Criticality Safety Division Leader, Lawrence Livermore National Laboratory

MEETING TITLE:

International Criticality Safety Benchmark Evaluation Project (ICSBEP) Technical Review Group (TRG) Meeting

MEETING LOCATION:

Organization for Economic Cooperation and Development (OECD), Nuclear Energy Agency (NEA), Le Seine Saint Germain, 12 Boulevard de Iles, 92130 Îssy-les-Moulineaux, Paris, France

MEETING DATES:

May 11-12, 2015

ATTENDEES ON BEHALF OF NCSP:

Gary Harms, David Heinrichs, Soon Kim, Chuck Lee, Thomas Miller

MEETING BENEFITS TO NCSP:

Two NCSP evaluations were prepared and reviewed by the attendees on behalf of NCSP were submitted to the ICSBEP Technical Review Group (TRG) for review for publication in the International Handbook of Evaluated Criticality Safety Benchmark Experiments. Publication in the Handbook completes NCSP

CED-4b milestones as defined in the NCSP Critical & Subcritical Experiment Design Team (C_EdT) Process Manual and specified in the NCSP Five-Year Execution Plan tasks for LLNL, ORNL and SNL for FY-2015.

MEETING PURPOSE:

The USDOE Office of Defense Programs founded the Criticality Safety Evaluation Project (CSBEP) in 1992 to document and preserve criticality safety benchmark experiments. In 1994, the CSBEP welcomed international participants from France, Hungary, Japan, Russia and the United Kingdom; and in 1995, the DOE allowed the CSBEP to become an official activity of the OECD NEA to further enhance international participation and changed the name to the ICSBEP. As described in the USDOE NCSP Mission and Vision and Five-Year Execution Plan, the ICSBEP remains an important element of information preservation and dissemination.

During this, the 2015 annual meeting, two NCSP evaluations were submitted to the Technical Review Group for pre-publication review and approval:

- LEU-COMP-THERM-096, Partially-Reflected Water-Moderated Square-Pitched U(6.90)O_2 Fuel Rod Lattices with 0.67 Fuel-to-Water Ratio (0.800 cm Pitch)
- ALARM-TRAN-AIR-SHIELD-001, Neutron Activation and Thermoluminescent Detector Responses to a Bare Pulse of the CEA Valduc SILENE Critical Assembly

As members of the Technical Review Group, the NCSP attendees also participated in review of five additional new evaluations:

- LEU-COMP-THERM-067, Critical Loading Configurations of the IPEN/MB-01 Reactor Composed of Fuel and Molybdenum Rods*
- IEU-SOL-THERM-005, Critical Dimensions of Aqueous Solutions of U(37%)O_2F_2 in Spherical Geometry
- HEU-MET-FAST-074, Oralloy (93.2% ^{235}U) Bare Metal Annuli and U-Ring*
- HEU-MET-FAST-083, Complex Geometry Bare Oralloy (93.15% ^{235}U) Metal Annuli Experiments*
- HEU-MET-FAST-077, HEU (93.14% ^{235}U) Metal Annuli (15-9 inches, 15-7 inches and 13-7 inches) with Internal Graphite Cylinders*

All seven new evaluations were approved for publication subject to satisfactory completion of the review comments. Note that during the meeting there was consensus that ALARM-CRIT-AIR-SHIELD-001 should be re-categorized as ALARM-TRAN-AIR-SHIELD-001. John Bess, ICSBEP Chair, presented those four evaluations identified with an asterisk following the title on behalf of four evaluators unable to attend the meeting.

As listed in the attached Final Agenda, the status of unpublished evaluations and minor revisions to several approved ICSBEP and International Reactor Physics Experiment Evaluation Project (IRPhEP) evaluations were also discussed.

The meeting concluded with:

- A status report by Ian Hill (NEA) on the Database for ICSBEP (DICE)
- A general discussion on establishing a task force to provide guidance on correlation matrices

- A general discussion on evaluations planned for publication in 2016
- A general discussion pertaining to the desirability of convening the next ICSBEP meeting in conjunction with the IRPhEP meeting

OTHER DISCUSSIONS:

While visiting OECD NEA Headquarters, the NCSP participants from LLNL also met with NEA staff to discuss several topics including:

- Size limitations on current DVD media and alternative media
- OECD milestones and publication schedule constraints
- Protocol for LLNL distribution of the OECD version of the Handbook to NCSP participants
- Protocol for mirroring OECD webpage contents on the NCSP website managed by LLNL
- Recent additions to the NEA Data Bank
- Times and places of upcoming WPEC subgroup meetings
- Possible LLNL participation in the NEA NDEC project

DATE AND LOCATION OF THE NEXT ICSBEP MEETING:

On July 29, 2015, John Bess, ICSBEP Chair, announced that the next ICSBEP meeting is scheduled for the week of April 18-22, 2016, at OECD NEA Headquarters in conjunction with the IRPhEP meeting, as a cost saving measure.

ATTACHMENTS:

- Preliminary Agenda, International Criticality Safety Benchmark Evaluation Project Technical Review Group Meeting (2 pages)
- ICSBEP Meeting NEA List of Participants (3 pages)
- Summary of the 2014 [sic] International Criticality Safety Benchmark Evaluation Project Meeting, 11-12 May 2015 (1 page)

DISTRIBUTION:
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INTERNATIONAL CRITICALITY SAFETY BENCHMARK EVALUATION PROJECT TECHNICAL REVIEW GROUP MEETING

PRELIMINARY AGENDA
11 – 12 MAY 2015

Le Seine Saint Germain, 12, bd des Iles, 92130 Issy-les-Moulineaux, Paris France
Ground Floor, Room D

Upon arrival please report to the Reception Desk on the ground floor with a photo ID. A badge will be issued that will allow you to enter the premises at all times during the meeting.
Local information about hotels and transport, as well as an area map, can be found on the Web page:
http://www.oecd-nea.org/general/practical/

Monday, 11 May 2015			
09:30 – 10:00	**SESSION 1:**	**WELCOME AND INTRODUCTION**	
		Welcome and Introduction	Jim Gulliford John Bess
10:00 – 10:30	**SESSION 2:**	**DISCUSSION OF MINOR REVISIONS AND APPROVED IRPhEP EVALUATIONS**	
	HEU-SOL-THERM-020	Unreflected Cylinders of Uranyl-Fluoride Solutions in Heavy Water (Revision to Level Indicator Pipe Diameter)	John Bess
	LEU-COMP-THERM-039	Incomplete Arrays of Water-Reflected 4.738-wt.%-Enriched Uranium Dioxide Fuel-Rod Arrays (Revision to Figure and APOLLO-MORET Calculations)	Nicolas LeClaire
	HEU-MET-FAST-099 (ORCEF-SPACE-EXP-001)	Fast Neutron Spectrum Potassium Worth for Space Power Reactor Design Validation	John Bess
10:30 – 10:45	**BREAK**		
10:45 – 11:30	**SESSION 3:**	**DISCUSSION OF EVALUATIONS THAT HAVE BEEN REVISED TO INCLUDE ADDITIONAL DATA**	
	HEU-COMP-FAST-004 (SCCA-SPACE-EXP-003)	Critical Configuration for Beryllium-Reflected Assemblies of U(93.15)O_2 Fuel Rods (1.506-cm Pitch and 7-Tube Clusters) (Revision to Include Two New Critical Configurations)	Margaret Marshall
11:30 – 12:30	**SESSION 4:**	**APPROVAL OF NEW EVALUATIONS**	
	LEU-COMP-THERM-067	Critical Loading Configurations of the IPEN/MB-01 Reactor Composed of Fuel and Molybdenum Rods	Adimir dos Santos
12:30 – 13:30	**LUNCH**		
13:30 – 15:30	**SESSION 5:**	**APPROVAL OF NEW EVALUATIONS (Continued)**	
	LEU-COMP-THERM-096	Partially-Reflected Water-Moderated Square-Pitched U(6.90)O_2 Fuel Rod Lattices with 0.67 Fuel-to-Water Ratio (0.800 cm Pitch)	Gary Harms
15:30 – 15:45	**BREAK**		
15:45 – 18:00	**SESSION 6:**	**APPROVAL OF NEW EVALUATIONS (Continued)**	
	ALARM-CRIT-AIR-SHIELD-001	Neutron Activation and Thermoluminescent Detector Responses to a Bare Pulse of the CEA Valduc SILENE Critical Assembly	Thomas Miller

INTERNATIONAL CRITICALITY SAFETY BENCHMARK EVALUATION PROJECT TECHNICAL REVIEW GROUP MEETING

Tuesday, 12 May 2015			
09:30 – 10:30	**SESSION 7:**	**APPROVAL OF NEW EVALUATIONS (Continued)**	
	IEU-SOL-THERM-005	Critical Dimensions of Aqueous Solutions of U(37 %)O_2F_2 in Spherical Geometry	Tanja Kaiba
10:30 – 10:45	**BREAK**		
10:45 – 12:30	**SESSION 8:**	**APPROVAL OF NEW EVALUATIONS (Continued)**	
	HEU-MET-FAST-074	Oralloy (93.2 ^{235}U) Bare Metal Annuli and U-Ring	Andrew Hummel
	HEU-MET-FAST-083	Complex Geometry Bare Oralloy (93.15 ^{235}U) Metal Annuli Experiments	Quinton Beaulieu
12:30 – 13:30	**LUNCH**		
13:30 – 15:30	**SESSION 9:**	**APPROVAL OF NEW EVALUATIONS (Continued)**	
	HEU-MET-FAST-077	HEU (93.14 wt.%) Metal Annuli (15-9 inches, 15-7 inches and 13-7 inches) with Internal Graphite Cylinders	Xiaobo Liu
15:30 – 15:45	**BREAK**		
15:45 – 16:00	**SESSION 10:**	**DISCUSSION OF MINOR REVISIONS AND APPROVED IRPhEP EVALUATIONS (Continued)**	
	IEU-MET-FAST-020	The FR0 Series 1: Copper-Reflected "Cylindrical" Uranium (20 % 235U) Metal (Revision to Include Released Data)	Dennis Mennerdahl
	IEU-MET-FAST-022	The FR0 Experiments with Diluted 20%-Enriched "Cylindrical" Uranium Metal Reflected by Copper (Revision to Include Released Data)	Dennis Mennerdahl
16:00 – 18:00	**SESSION 11:**	**DISCUSSION**	
		STATUS: ICSBEP Database (DICE)	Ian Hill
		Establish Task Force to Provide Guidance for Correlation Matrices	All
		Evaluations Planned for 2016 Publication	All
		Next ICSBEP Meeting and Discussion of Coordination with IRPhEP Meetings	Jim Gulliford
		Adjourn	

ICSBEP MEETING NEA
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SUMMARY OF THE 2014
INTERNATIONAL CRITICALITY SAFETY
BENCHMARK EVALUATION PROJECT MEETING

11-12 May, 2015
Paris, France

The annual International Criticality Safety Benchmark Evaluation Project (ICSBEP) Meeting was held in Paris, France May 11 - 12, 2015. Representatives from 7 of the 20 participating countries attended, including the United States (BAPL, INL, ANL, LANL, LLNL, ORNL), Japan (JAEA), Russian Federation (IPPE), France (IRSN, CEA), Slovenia (JSI), Canada (CNL), and Sweden (EMS). A total of 22 individuals participated in the meeting, including Jim Gulliford, Ian Hill and James Dydra of the OECD NEA.

The following individuals participated in the meeting:

J. Bess	INL	C. Lee	LLNL
J. Chow	CNL	Y.K Lee	CEA
J. Dydra	OECD/NEA	R. Lell	ANL
J. Gulliford	OECD/NEA	M. Marshall	INL
S. Gunji	JAEA	D. Mennerdahl	EMS
G. Harms	SNL	T. Miller	ORNL
D. Heinrichs	LLNL	M. Murphy	OECD/NEA Subcontractor
I. Hill	OECD/NEA	Y. Rozhikhin	IPPE
Y. Ivanov	IRSN	L. Snoj	J. Stefan Inst.
S.S. KIM	LLNL	U.K. Wehmann	OECD/NEA Subcontractor
N. Leclaire	IRNS	M. Zerkle	BAPL

Seven new evaluations and seven revisions of previously published ICSBEP evaluations were reviewed and discussed. All of the new evaluations were approved for publication, subject to satisfactory resolution of all assigned actions. If all of the approved evaluations are completed in time for publication of the 2015 Edition of the *International Handbook of Evaluated Criticality Safety Benchmark Experiments*, the Handbook will contain approximately 4877 critical or subcritical configurations, 31 criticality-alarm/shielding configurations, and 207 configurations categorized as fundamental-physics measurements that are relevant to criticality-safety applications.