

MEMORANDUM OF UNDERSTANDING

BETWEEN

THE

INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE

AND

THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF  
AMERICA – National Nuclear Security Administration

IRSN and DOE-NNSA being hereinafter together referred to as the “Parties”

**Purpose**

DOE-NNSA and the IRSN enter into this Memorandum of Understanding (MOU) to express their intent to work together to establish programs of research collaboration in areas of mutual interest and benefit to both institutions and the communities they serve. This MOU will serve as a general framework for cooperation.

**Clause 1**

(a) The parties intend to collaborate in specific topics of cooperation within the framework of nuclear criticality safety, for which a list is given in Appendix 1 of this MOU. Appendix 1 forms an integratral part of the MOU. Additional topics of cooperation may be added to this MOU by written agreement of the Parties.

(b) The form of cooperative activities under this MOU may consist of exchange visits of researchers, exchanges of scientific information and data including scientific literature (subject to the conclusion of appropriate non-disclosure agreements), joint-research projects between scientists of both Parties (engaged in research disciplines of mutual interests) and other forms of cooperative activities as are mutually agreed.

**Clause 2**

A designated person at each Party will oversee and facilitate implementation of this MOU. The DOE-NNSA responsible individual is the DOE Nuclear Criticality Safety Program Manager, Dr. Jerry N. McKamy. The IRSN responsible individual is Mr. Jacques Repussard, IRSN Director General (and each Party may replace its designated person by notice in writing to the other Party from time to time). Parties shall meet as

much as necessary to review the content of the cooperation and agree upon specific tasks to be undertaken jointly.

### **Clause 3**

Execution of specific programs of activities covered under this MOU will be described in written statements of intent approved by the two responsible individuals for DOE-NNSA and IRSN. These written statements of intent will include at a minimum the purpose and objectives of the activity, identification of individuals anticipated to oversee the work, an anticipated schedule for the work, and anticipated deliverables to be produced. Any such statement of intent will also contain clauses substantially the same as paragraphs (b) and (c) of Clause 4 of this MOU. Any cooperative activities undertaken in furtherance of this MOU which are anticipated to involve exchanges of funds or proprietary information or which are intended to involve other legally-binding obligations will be undertaken only pursuant to separate contractual agreements executed in accordance with the policies and procedures of the Parties and/or their laboratories or other contractors or agents.

### **Clause 4**

(a) This MOU in no way restricts either of the parties from participating in any activity with other public or private agencies, organizations, or individuals.

(b) This MOU is neither a fiscal nor a funds-obligation document. Nothing in this MOU authorizes or is intended to obligate the parties to expend, exchange, or reimburse funds, services, or supplies, or transfer or receive anything of value.

(c) This MOU is strictly for management purposes for each of the parties. It is not legally enforceable and shall not be construed to create any legal obligation on the part of either Party. This MOU shall not be construed to provide a private right or cause of action for or by any person or entity.

(d) Subject to the respective French and United States laws or court orders governing disclosure of information, decisions on disclosure of information to the public regarding projects and programs referenced in this MOU shall be made by each Party following consultation with the other.

(e) This MOU may be amended by written agreement of the parties. This MOU may be terminated by mutual written agreement of the parties, or by either Party upon 30 days written notice to the other Party.

### **Clause 5**

This MOU shall become effective on the date when the last Party to sign executes the MOU and sends notice to the other Party that it has done so. It shall remain in effect for a

2-year term from the effective date, unless terminated earlier as provided herein. The Parties may renew or extend this MOU by written agreement.

**Executed as a Memorandum of Understanding in two original copies**

For the Department of Energy,  
National Nuclear Security Administration

  
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TBD

12/11/2014  
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Date

Jerry N. McKamy, Ph.D.  
DOE Nuclear Criticality Safety Program Manager  
NNSA

For the Institut De Radioprotection Et De Sûreté Nucléaire (12145)

  
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TBD

**Jacques REPUSSARD**  
Director General  
IRSN

21/10/2014  
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Date

## **LIST OF THE SPECIFIC TOPICS OF COOPERATION**

The following topics of collaboration between the Partners in Criticality Safety include but are not limited to:

### **1. Analytical Method**

- a. Development of methods to provide integral experiments correlation data.
- b. Transmission of correlation data for integral benchmark experiments.
- c. Development of S/U (Sensitivity/Uncertainty) capabilities to facilitate similarity assessment and determination of applicability area.
- d. Development of data adjustment capabilities to support uncertainty analysis and bias quantification.
- e. Validation of sensitivity calculations and bias quantification tools
- f. Development and validation of methods for source convergence in Monte Carlo calculations
- g. Development and validation of methods for fixed source calculations in Monte Carlo codes
- h. Validation of fuel cycle simulators
- i. Development of updated slide rules for emergency preparedness and response (consequence, location, stop)
- j. Development and validation of various tools (codes, simplified models) to evaluate consequences (number of fissions, doses) and detection (CAAS placement) of criticality accident
- k. Development of methods for use of neutron noise measurements in nuclear criticality safety (characterisation of fissile materials and detection of anomalies).
- l. Comparison of nuclear criticality safety approaches in US and France

### **2. Integral Experiments and general studies**

- a. TEX experimental program.
- b. Experimental programs on NNNS and SNL facilities (in particular criticality experiments on SPRF/CX with water moderated UO<sub>2</sub> rods, critical and super-prompt critical experiments on GODIVA machine).
- c. Dosimetry exercises at NNSS.
- d. General studies of physical phenomena linked to the criticality accident, in particular for solution system

### **3. Nuclear Data**

- a. Accurate and reliable cross-section evaluations and dissemination to end-users.
  - b. Development and use of S/U analysis methods needed to quantify target accuracies for differential measurements
  - c. Validation of new nuclear data evaluations
  - d. Enhancement of nuclear data processing tools
4. Information Preservation and Dissemination
- a. Review evaluations in the ICSBEP Handbook to assess the quality of available data to ensure data consistency and communication of discrepancies.
  - b. Update of “Review of criticality accident (2000)” and addition of “near misses” criticality events.
  - c. Participation in workshops linked to the nuclear criticality safety and criticality accident (like the ANS professional development Workshop “Criticality Accident Source Term”, Reno, NV, 2008).
5. Upon invitation of the DOE-NNSA/Nuclear Criticality Safety Program Manager (NCSP):
- IRSN will participate to the NCSP meetings,
  - IRSN will participate to the NCSP programs,
  - IRSN will have access and will participate to the Critical-subcritical Experiment Design Reports.