PROJECT ARRANGEMENT NE-03

between
The Department of Energy of the United States of America
and
The Japan Atomic Energy Agency
under the
Implementing Arrangement between the Department of Energy of the United States of America and the Ministry of Economy, Trade and Industry of Japan Concerning Cooperation in the Field of Nuclear Energy-Related Research and Development
for
Cooperation on Light-Water Reactor Research and Development

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1. Objective

The Department of Energy of the United States of America and the Japan Atomic Energy Agency, referred to collectively herein as "Participants",

Acting in accordance with Sections 4 and 5 of the "Implementing Arrangement between the Department of Energy of the United States of America and the Ministry of Economy, Trade and Industry of Japan Concerning Cooperation in the Field of Nuclear Energy-Related Research and Development" of May 3, 2013 (hereinafter referred to as the "Implementing Arrangement"),

Have decided to undertake a cooperative effort under this Project Arrangement to perform light-water reactor research and development.

2. Scope of Work

The scope of work under this Project Arrangement is:
(1) Accident Tolerant Fuels
(2) Accident Tolerant Equipment

3. Project Management

3.1 Each Participant will designate a Project Coordinator and a Principal Technical Contact. The Project Coordinators will be responsible for detailed management, including technical progress reviews, of the cooperation under this Project Arrangement. The Principal Technical Contacts will serve as the points of contact concerning technical details.

3.2 The specific tasks to be conducted are identified in Appendix I and key personnel are identified in Appendix II of this Project Arrangement. Both Appendix I and Appendix II will be updated as appropriate.

4. Financial Management

All costs resulting from the work carried out under this Project Arrangement will be the responsibility of the Participant that incurs them. The ability of the Participants to carry out their specific tasks is subject to the availability of appropriated funds.

5. Intellectual Property

With respect to the protection and distribution of intellectual property rights and other rights of a proprietary nature created or furnished in the course of the cooperative activities under this Project Arrangement and the protection of business-confidential information exchanged under this Project Arrangement, the following paragraphs will apply in addition to the paragraphs of the Intellectual Property Annex to the Implementing Arrangement:

5.1 Inventions

For the purpose of this Project Arrangement, "Invention" means any invention made in the course of the cooperative activities under this Project Arrangement which is or may be patentable or otherwise protectable under the laws of the United States of America, Japan, or any third country.

In accordance with paragraph 3.B.(iii)(a) of the Intellectual Property Annex to the Implementing Arrangement, rights to an Invention made as a result of joint research conducted under this Project Arrangement, and allocation of benefits derived therefrom, are provided as follows:

- If an Invention is made solely by a Participant or a contractor (hereinafter referred to as the "Inventor"), the Inventor will obtain all right, title and interest in and to such Invention in all countries.
- If an Invention is made jointly by a Participant/contractor of both Participants, each Participant will obtain all right, title and interest in and to such Invention in its own country. In third countries where both Participants intend to obtain the right to the Invention, the Participants will be joint owners of such rights. The Participants may jointly apply to obtain and/or maintain the relevant rights. The Participants should come to an agreement concerning the costs associated with obtaining and/or maintaining such rights.
- In any country where the Inventor which is entitled to obtain the rights therein decides not to obtain such rights and interests, the other Participant has the right to do so.
- Each Participant will have, in its own country, for its own research and development activities within the scope of work of this Project Arrangement, during the term of this Project Arrangement, a free right of use of Inventions, whether protected or not by intellectual property rights, solely owned by the other Participant and resulting from the joint research performed under this Project Arrangement.

5.2 Copyright

Allocation of rights to an Invention and benefits derived therefrom stipulated in paragraph 5.1 above will be applied *mutatis mutandis* to disposition of rights to copyrighted works created in the course of the cooperative activities conducted under this Project Arrangement.

6. General Consideration

This Project Arrangement is pursuant to and subject to the Implementing Arrangement, which is, in turn, pursuant to and subject to the agreement between the Government of the United States of America and the Government of Japan concerning cooperation in the field of nuclear-related research and development, effected by the Exchange of Notes of March 9, 2012.

7. Commencement, Modification, and Discontinuation

7.1 This Project Arrangement will enter into effect upon signature by both Participants, continue for a three (3) year period, unless earlier discontinued in accordance with paragraph 7.2, and may be extended or modified by the Participants' mutual written consent, provided that the Implementing Arrangement remains in effect.

7.2 This Project Arrangement may be discontinued at any time by the Participants' mutual consent in writing. Alternatively, a Participant that wishes to discontinue its participation in this Project Arrangement should endeavor to provide at least sixty (60) days advance notification in writing to the other Participant.

Signed in duplicate.

FOR THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA:

Signature: John E Kelly

Name: John E. Kelly

Title: Deputy Assistant Secretary for Nuclear Reactor Technologies

Date: Feb 20, 2014

Place: Tokyo

FOR THE JAPAN ATOMIC ENERGY AGENCY:

Signature: 及川 耕邦

Name: Tetsukuni Oikawa

Title: Director General, International Affairs Department

Date: Feb. 20, 2014

Place: Tokyo

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APPENDIX I-1
Description of Tasks for Accident Tolerant Fuels

1. Outline and Responsibility of Tasks

The United States and Japan have established research and development programs in the area of light water reactor (LWR) accident tolerant fuel and core components. Decades of research combined with continual reactor operation have produced steady advancements in technology and yielded an extensive base of data, experience and knowledge on LWR fuel performance under both normal and accident conditions. Today, one of the missions of the U.S. Department of Energy Office of Nuclear Energy (DOE-NE) and of the Japan Atomic Energy Agency (JAEA) is to develop nuclear fuels and claddings with enhanced accident tolerance and performance. Coordination and collaboration on development of more accident tolerant nuclear components and technologies will benefit both nations.

The scope of work under Accident Tolerant Fuels (ATF) activity is as follows:

Task 1: ATF Attributes and Metrics Identification and Quantification
Task 2: Accident Tolerant Fuel and Core Components
Task 3: ATF Test Methods, Facilities, and Resources

Task 1: ATF Attributes and Metrics Identification and Quantification

A first step in the research and development of ATF is the identification of attributes and quantification of metrics to be used for assessment of concepts. Metrics as defined here are the quantifiable improvements in reactor coping time due to improvements in fuel, clad, or fuel-clad combinations as determined through core accident modeling.

Task 2: Accident Tolerant Fuel and Core Components

The U.S. and Japan research and development programs have similar and possibly synergistic efforts on a selection of accident tolerant core components including fuel cladding, channel box structures and other fuel and core constituents. This activity will be used to coordinate and communicate relevant research and development activities. Activities as currently understood could include materials development, fuel performance modeling toward design optimization, material screening and performance databasing under irradiation conditions, and candidate material testing under normal and off-normal conditions.

Task 3: ATF Test Methods, Facilities, and Resources

Significant effort in both the U.S. and Japan is being conducted in the development of test methods, test facilities, and qualification resources for accident tolerant fuels and core components. The intent of this task is to develop communication of common synergistic activities to possibly include sharing of testing resources, coordination of round-robin tests, and interpretation of the results as applicable to severe accident scenarios.

2. **Sites**

The tasks will be conducted at:

1. Idaho National Laboratory (INL)
2. Oak Ridge National Laboratory (ORNL)
3. Tokai Research & Development Center (TRDC, JAEA)

3. **Schedule**

		2013 CY*	2014CY				2015CY				2016CY			
Activity		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Task 1	ATF Metrics Identification and Qualification		X	X	X	X	X	X	X	X	X	X	X	X
Task 2	Collaboration on ATF R&D		X	X	X	X	X	X	X	X	X	X	X	X
Task 3	Collaboration on ATF test Methods, facilities, and resources.		X	X	X	X	X	X	X	X	X	X	X	X

* "CY" is Calendar Year, Q1: January-March, Q2: April-June, Q3: July-September, Q4: October-December

4. **Deliverables**

Specific deliverables will be identified during the early phase of the collaboration. The exchanged data under this activity will be used by the Participants to support the future research described in the tasks. Data exchange meetings will be conducted on a semi-annual basis as bilateral meetings. Pre-published data may be exchanged to help in ongoing research by the Participants.

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APPENDIX II-1
Key Personnel List

U.S. Department of Energy

1. DOE Headquarters

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APPENDIX I-2
Description of Tasks for Accident Tolerant Equipment

1. Outline and Responsibility of Tasks

The experience that the United States gained analyzing the TMI-2 event could be of interest to Japan in analyzing the Fukushima event. Japan's detailed knowledge about the Fukushima sensors and safety system responses will benefit the United States as it proceeds with its Severe Accident Equipment Needs Assessment. This collaboration could allow a complete assessment of reactor performance, instrument performance, failure causes, failure modes, and times to failure during the Fukushima event. In addition, it would help the United States and Japan by qualifying data that will be used to assess and improve the United States' boiling water reactor accident modeling capability and also to improve effectiveness of the accident safety equipment in nuclear reactors of Japan.

The scope of work under Accident Tolerant Equipment activity is as follows:

Task 1: Extensive integrated understanding of the Fukushima Event

> Based on the knowledge gained through the complete assessment of the instrumentation failures and limitations, specific R&D activities leading to improved SA instruments will be initiated. It is expected these R&D activities will include water level in a reactor core and Spent Fuel Pool (SFP); inlet flow rate; concentration of hydrogen.

Additional R&D topics, including radiation tolerant equipment and reactor safety equipment, may be identified as future additional tasks.

2. Sites

The task will be conducted at:

1. Oak Ridge National Laboratory (ORNL)
2. Tokai Research & Development Center (TRDC, JAEA)

3. Schedule

		2013 CY*	2014CY				2015CY			
Activity		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Task 1	Extensive integrated understanding of the Fukushima event			X	X	X	X	X	X	X

4. **Deliverables**

Specific deliverables will be identified during the early phase of the collaboration. The exchanged data under this activity will be used by the Participants to support the future research described in the tasks. Data exchange meetings will be conducted on a semi-annual basis as bilateral meetings. Pre-published data may be exchanged to help in ongoing research between the Participants..

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APPENDIX II-2

Key Personnel List

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