U.S. DEPARTMENT OF ENERGY | Nuclear Energy

# IRP NE-1: International Challenge Problem for Nuclear Energy

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**Federal Point of Contact**

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# International Challenge Problem for Nuclear Energy (IRP-NE-1)

**Federal Manager: Janelle Eddins and Technical POC: Bob Hill(ANL)**

- **Background**
  - U.S. and Japan participate in a bilateral collaboration for R&D known as the Civil Nuclear Energy R&D Working Group (CNWG)
  - Shared utilization of nuclear facilities has been a topic of interest between Japan and the U.S.
    - *Both countries would like to explore measures to strengthen U.S./Japan collaboration through an initiative to facilitate the use of nuclear facility sharing*
  - During the May 2018 CNWG Meeting an expert-level discussion regarding promotion of facility sharing between the U.S. and Japan explored near and long-term opportunities for enhancing these efforts. Key outcomes included:
    - *Agreement to pursue use of a U.S. Nuclear Energy University Programs Integrated Research Project to establish a program for university researchers from the U.S. and Japan to address research issues which present challenges to expanded use of nuclear energy worldwide while making beneficial use of facilities*
- **IRP Goal and Objectives**
  - The goal of this IRP is to solve a significant problem(s) which presents a challenge to expanded use of nuclear energy world wide
  - The main objective of the IRP is to support education, development and training in multiple technical disciplines associated with the use of nuclear energy.
  - The IRP requires participation by both US and Japanese researchers
  - Only universities are eligible to lead
  - Up to 3 years and $3,000,000 total U.S. Project Cost
    - *Government of Japan will provide funding to support their researchers)*

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# IRP Scope

- **Applicants are required to define a problem(s) which represents a challenge to expanded use of nuclear energy worldwide**
- **Some examples are:**
  - Materials in Gen IV reactors
  - Fuel related safety criteria
  - Improved accident tolerance for LWRs or advanced reactors
  - Reducing construction and operating costs of SFRs
  - Addressing important fuel cycle challenges including materials degradation, processing, safeguarding of nuclear facilities and radioactive waste reduction
- **Applicant may choose one or more of the examples above or define a challenge of their own**
  - If applicant proposes their own topic, they must elaborate on their understanding of the proposed problem(s) and how it meets the goals and objectives of this IRP

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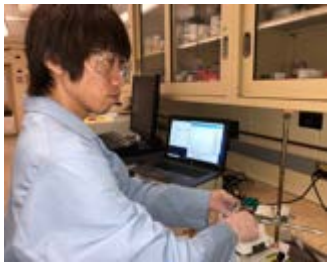
# Additional Work Scope Details

- **This IRP imposes International Collaboration Requirements with Japan**
  - The project team must include at least two Japanese educational institutions. The team must include a lead Principal Investigator from a U.S. educational institution and personnel from a U.S. national laboratory. The project team shall include a Co-Principal Investigator from Japan. The scope of work for each collaborating institution must be clearly defined.
  - All U.S. funds provided under this award must be used to support the efforts of U.S. educational institutions and their non-university partners
  - Participation by Japanese researchers will be funded by the Government of Japan
    - *Japanese researchers must apply for a designated program*
    - *Japanese researchers are allowed to allocate budget outside the designated program such as funding by GOJ or self funding*
- **Facility Sharing**
  - U.S. NSUF offers a wide range of material irradiation and material characterization facilities, and nuclear materials and fuels libraries
    - *These facilities and resources are of great interest to Japanese researchers*
  - Japan will make available their material research facilities to US researchers and share expertise and resources of mutual interest
  - Facility use may include R&D/material irradiation for development of next generation nuclear reactor designs, nuclear fuel and/or materials

# Project Deliverables

- **Project deliverables**
  - Detailed project schedule
  - Verification and validation plan for software (if any is developed)
  - Final project report which includes
    - *Statement of the problem and description of solution*
    - *The extent to which the problem was solved and any follow-on work needed*
    - *Description of the extent to which the project was successful in supporting education, development and training in multiple technical disciplines associated with nuclear energy*
    - *Lessons learned and suggestions that can be used by DOE-NE and Japan in future work*

- **If it is anticipated that intellectual property (IP) will be generated, the applicant must describe how IP will be handled**



*M. Nakahara (JAEA) at ANL*

*Materials and Fuels Complex*

*JOYO*

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# Potential Researchers

**Potential Japanese Researchers include:**

- **KITO Keiko(JAIF, Nuclear R&D infrastructure WG)**
- **KOYAMA Tadafumi(CRIEPI, PO of MEXT-DOE collaboration research)**
- **NAGAI Kosuke(Professor, Tohoku U.)**
- **NAKAJIMA Ken(Professor, Kyoto U., Nuclear R&D infrastructure WG)**
- **SEKINE Takashi(JAEA(Joyo))**
- **TADA Nobuo(JEMA, Nuclear R&D infrastructure WG)**
- **TACHIBANA Yukio(JAEA(HTTR))**
- **TERAI Takayuki(Professor, U. of Tokyo, Nuclear R&D infrastructure WG)**
- **UESAKA Mituru(Professor, U. of Tokyo, the President of Atomic Energy Society of Japan)**
- **YAMAGUCHI Akira(Professor, U. of Tokyo, Nuclear R&D infrastructure WG)**

**United States:**

**Names would be provided by U.S. universities that are selectees for the FOA.**

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# Japanese Programmatic Contacts and Schedule for Funding

- **Japanese Programmatic Points of Contact**
  - Japanese funding program: Shoji Kasuga, kokusai-genshiryoku@mext.go.jp
  - JAEA facilities
    - *Kazumasa Hioki, Director, Office of Strategy and International Affairs, JAEA, (hioki.kazumasa@jaea.go.jp)*
    - *Tsukasa Yamamura, Deputy Director, Office of Strategy and International Affairs, JAEA (yamamura.tsukasa@jaea.go.jp)*
  - Other facilities:
    - *Kokusai Genshiryoku, International Nuclear and Fusion Energy Affairs Division, MEXT (kokusai-genshiryoku@mext.go.jp)*

- **Schedule for Japanese Collaborators to Obtain Their Funding from Japan**
  - Call for proposals: January 2019
  - Deadline for application: February-March 2019
  - U.S. PI should confirm that collaborative researchers from Japan will apply for the designated Japanese funding program
    - *Contact Shoji Kasuga for information on the Japanese funding program and appropriate collaborators*

# Contact Information

## Thank You.

## Questions, Comments?

Federal Point of Contact: Janelle Eddins
Janelle.Eddins@nuclear.energy.gov

Technical Point of Contact: Bob Hill
bobhill@anl.gov

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# Background Information

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# US/Japan Bi-lateral Collaborations Working Group Structure

**Civil Nuclear Energy R&D Working Group (CNWG)**

*Co-Chairs*: U.S.: Ed McGinnis, Principal Deputy Assistant Secretary for Nuclear Energy, DOE
Japan: Masaaki Tanaka, Director-General for Research and Development Bureau, MEXT
Shin Hosaka, Deputy Commissioner for Agency for Natural Resources and Energy, METI

*Deputy Co-Chairs*: U.S.: John Herczeg, DAS, DOE-NE; Ed McGinnis, DAS , DOE-NE
Japan: Shuichiro Itakura, MEXT; Shinjiro Takeda, METI; Yutaka Sagayama, JAEA

*Participating Agencies*: U.S.: DOE-NE, DOS, and NNSA
Japan: MOFA, MEXT, METI, and JAEA

**Secretariat**
U.S. Coordinator, Craig Welling
Japan Coordinator, Seiichi Shimasaki, MEXT
(Yuta Tonegawa, METI)

**Advanced Reactor R&D Sub-WG**
U.S. Lead, Craig Welling
Japan Lead, Seiichi Shimasaki, MEXT
Hiroyuki Ohshima, JAEA
- Fast Reactors
- Small Modular Reactors/Small and Medium Reactors
- High Temperature Reactors
- Metal-Fueled Fast Reactor Accident Analysis

**Light-Water Reactor R&D Sub-WG**
U.S. Lead, Damian Peko
Japan Lead, Shinjiro Takeda, METI
- Light-Water Reactor Sustainability
- Accident Tolerant Fuels*
- Severe Accident Code Assessment
- Probabilistic Risk Assessment
- Examination of Fukushima Daiichi Reactors for Improvement of Nuclear Safety
- Material Aging

**Fuel Cycle R&D and Waste Management Sub-WG**
U.S. Lead, F. Goldner
Japan Lead, Seiichi Shimasaki, MEXT
Seiichiro Maeda, JAEA
- Separations
- Advanced Fuels
- Systems Engineering and Analysis
- Waste Management
- Waste Treatment and Electrochemical Reduction

* Managed in U.S. as part of Advanced Fuels Program