Introducing International Research Institute for Nuclear Decommissioning (IRID)

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1. Foundation and Overview of IRID

Revision of Mid-and-Long-Term Roadmap and Background of Foundation of IRID

Overview of revised Mid-and-Long Term Roadmap
(Council for the Decommissioning on June 27, 2013)

1. Acceleration of the schedule for each unit corresponding to the respective condition.
- Multiple plans were developed aiming at the fuel debris retrieval for initial unit to be conducted ten years later to be flexible with each unit.

2. Enhance communication with local community
- Establish “Fukushima Advisory Board (tentative name)”
- Provide opportunity to find the corporation in Fukushima in order to collaborate for decommissioning work, and revitalize regional economy by encouraging local corporations supplying equipment/tools.

3. Full scale maintenance of structure to gather knowledge and ideas from around the world.
- Establish R&D organization and arrange system to receive advice from overseas experts.
- Enhance collaboration with IAEA review mission, and proactive promotion of international joint research.

In addition to the above, following items will be stipulated and addressed in the Mid-and-Long Term Roadmap.
- Reports the countermeasures on control of groundwater inflow by “Contaminated Water Treatment Committee.”
- Secure safety of ”Specified Reactor Facility” and measures on regulations, such as of arrangement of new standards. (improve reliability of equipment and facilities, and operation safety for operator and radiation safety etc.)

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Process of Foundation and Role

Foundation

- August 1, 2013: Approved by Mr. Motegi, the Minister of Economy, Trade and Industry, according to the Research & Development Consortium Act of Japan.
- August 8, 2013: General Meeting and the Board of Directors were held to start the consortium. Launched as the International Research Institute for Nuclear Decommissioning.

Basic Role

- Fully committing to technology R&D that helps the decommissioning project of Fukushima Daiichi NPS as an urgent subject, based on which enhancing the technological basis for nuclear decommissioning for the future.

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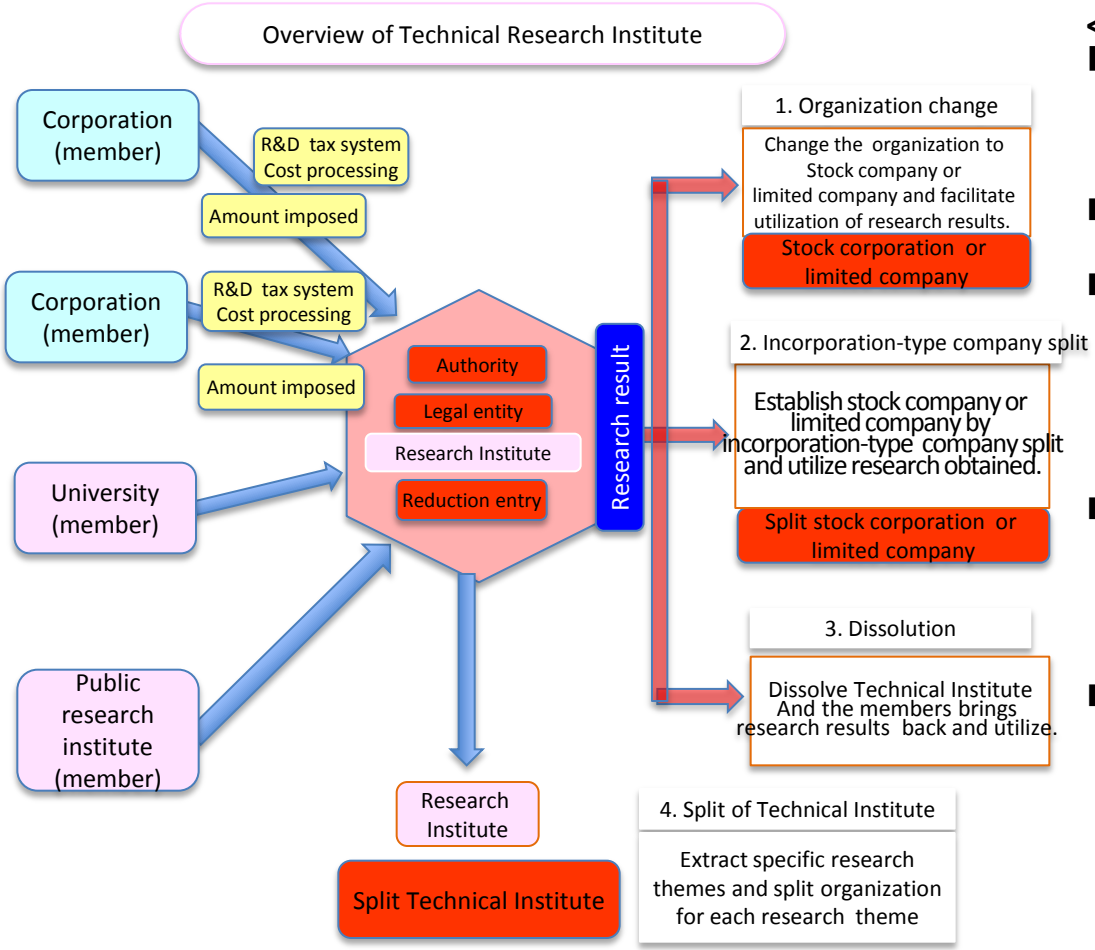
Technical Research Institute

Technical research association is an organization for mutual support where the members conduct joint research on the technologies used for the industrial activities for themselves（non-profitable mutual benefit corporation established in accordance with the Research & Development Consortium Act of Japan).



<Features of Technical Research Association>

- Each member provides researchers, research fund, facilities etc., and manage and utilize those result together.
- Joint research organization with legal personality, independent from the members.
- Improve transparence and reliability of organizational operation through the registration and application for authorization for establishment for the competent minister, and members' general conference and the board of directors.
- Person or party（including domestic corporation, individuals, foreign corporation and foreigner ）that utilizes the results of joint research directly or indirectly can be a member of this organization.
- This organization can be utilized as a place of cooperation among government, industry and academia since the universities and independent administrative corporation of test research, technical college, local public body, foundation mainly aiming at the test research etc. members can take part in.

(Excerpts from METI website)

IRID

Outline of IRID

1. Name

Research & Development Consortium,
"International Research Institute for Nuclear Decommissioning" ("IRID " in brief)

2. Location of Main Office

6F, Parkplace, 5-27-1, Shimbashi, Minato-Ku, Tokyo, 105-0004, Japan
(http://www.IRID.or.jp)

3. Founding members (17)

- Incorporated administrative agencies:
  Japan Atomic Energy Agency, National Institute of Advanced Industrial Science and Technology.
- Manufacturers:
  Toshiba Corporation, Hitachi-GE Nuclear Energy, Ltd., Mitsubishi Heavy Industries, Ltd., ATOX (since May 29, 2014)
- Electric utilities etc :
  Hokkaido Electric Power Company (hereinafter called as EPC), Tohoku EPC, Tokyo EPC, Chubu EPC, Hokuriku EPC, Kansai EPC, Chugoku EPC, Shikoku EPC, Kyushu EPC, The Japan Atomic Power Company, J-POWER, Japan Nuclear Fuel Limited.

4. Board of directors

President: Dr. Yamana, Vice President: Dr. Arai, and Mr. Kenda, Executive Director: Mr. Suzuki
Director: Mr. Oikawa, Mr. Moriyama, Mr. Uozumi , Mr. Hatazawa, Mr. Seto
Mr. Fukuda and Mr. Kadokami
Auditor : Mr. Konashi

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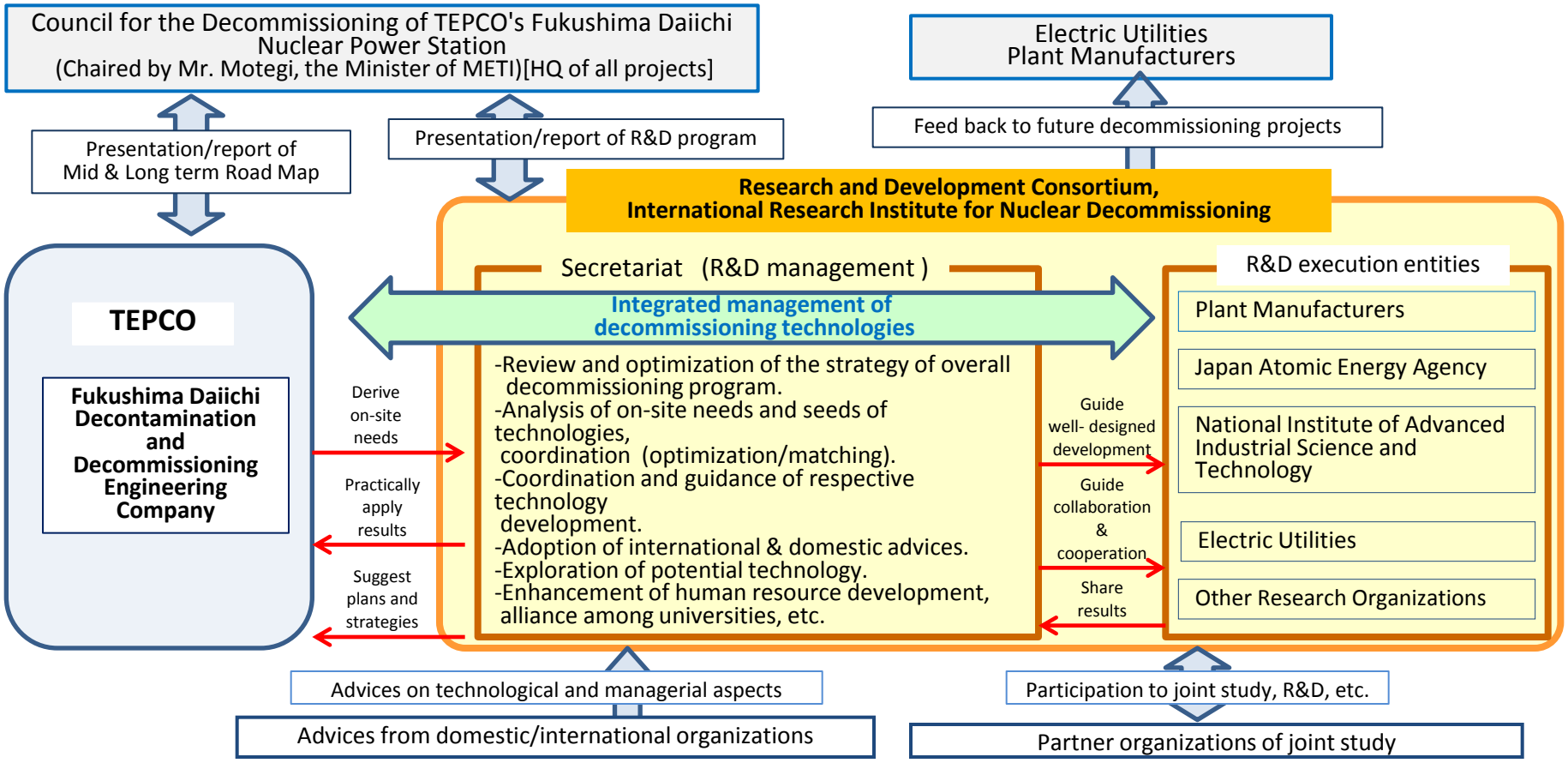
Schematic image of IRID's function

<With perspective of enhancing technological basis for reactor decommissioning, focusing on clear and present challenges of Fukushima Daiichi NPS decommissioning.>

-Accelerating the decommissioning of Fukushima Daiichi NPS, securing its safety and restoring its environment.
-Early recovery of the Fukushima area and the confidence building among the nation.

-Preparation for future decommissioning and enhancing its safety level.
-Incubating , accumulating and improving the related technologies.



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2. Overview of R&D activities

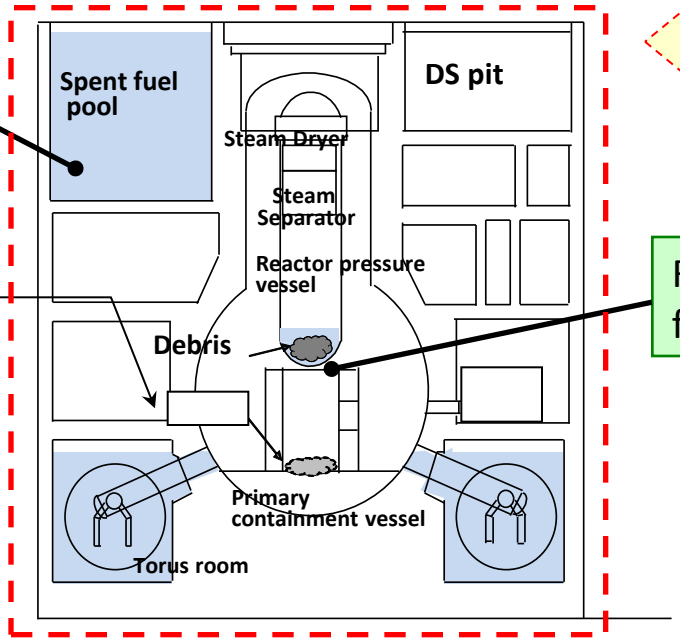
R&D Activities of IRID

■ R&D activities to be carried out in order to meet <u>severe conditions</u> of reactor buildings at Fukushima Daiichi.

High dose rate	High temp.	High humidity	Rubble
Elevated places	Underwater	Narrow places	Injection of sea water

R&D for fuel removed from spent fuel pools

R&D for treatment and disposal of R/W

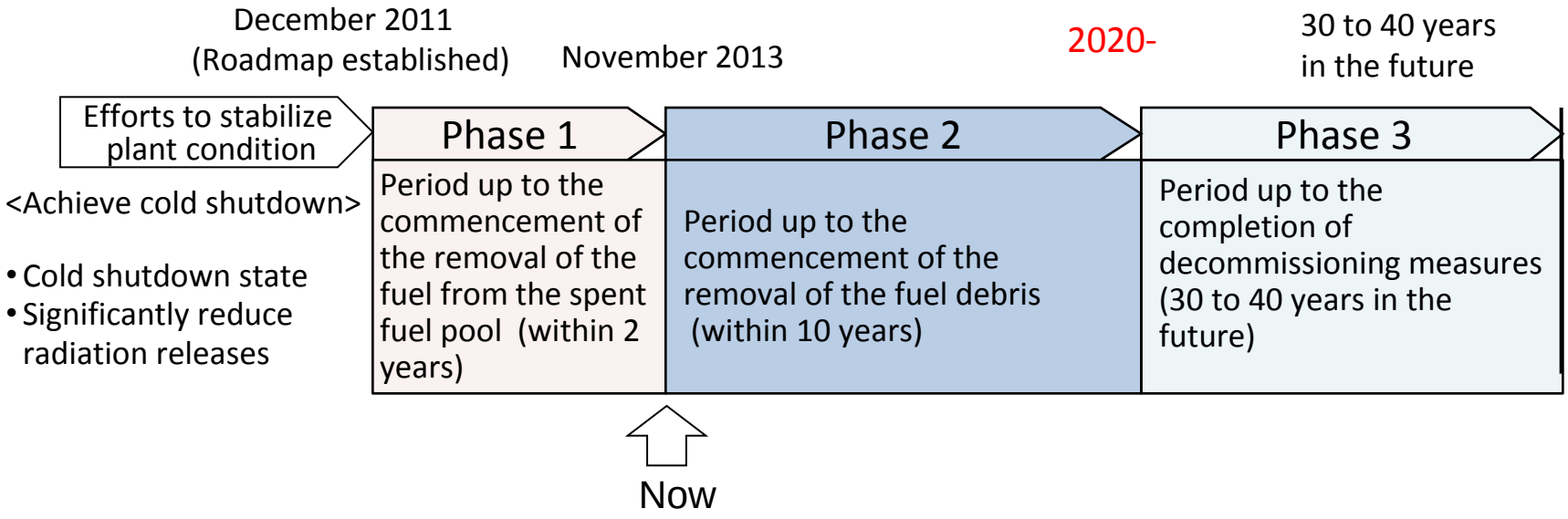


R&D for preparation for fuel debris removal

R&D schedule

Having completed Phase 1 of Mid-and-Long-Term Roadmap, R&D will be addressed as follows from the Phase 2.

1. Promotion of long-term R&D in response to the start of fuel removal from spent fuel pool.
2. Development of multilateral・multilayered method and equipment for full scale preparation of fuel debris retrieval(1) - Submersion method-
3. Development of multilateral・multilayered method and equipment for full scale preparation of . fuel debris retrieval(2) - Alternative method-
4. Stable promotion of R&D inconsideration of treatment and disposal of radioactive waste, and decommissioning.



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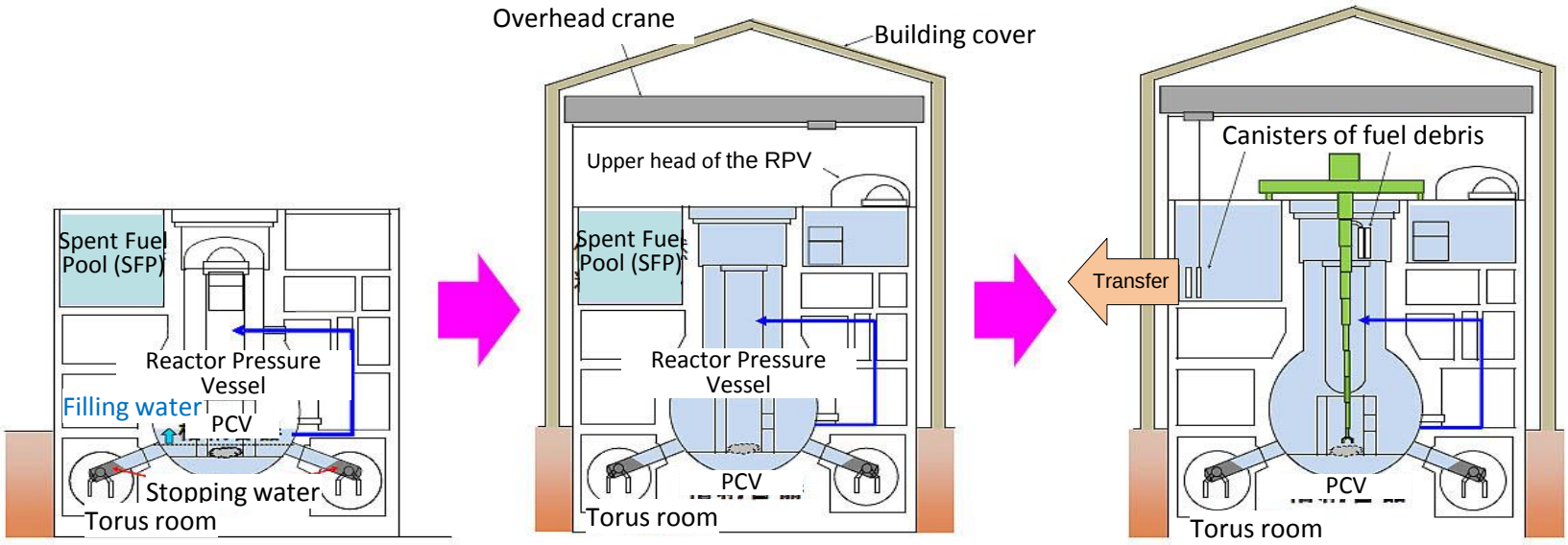
Operation image of the fuel debris removal

- The approach of removing the fuel debris submerged in water is the safest approach from the standpoint of minimizing exposure of workers.
- The primary containment vessel (PCV) will be examined and repaired for filling the PCV with water. Furthermore, R&D for the fuel debris removal and storage will be implemented.



Repairing lower section of the PCV (water stoppage)
- Filling lower section with water

(Reference) This figure is based on the documents of the Council for the Decommissioning of TEPCO's Fukushima Daiichi NPS on June 27, 2013.

retrieving the fuel debris

Explanatory CG

-Submersion Method-

Purpose of Request for Information (RFI)

- **IRID has been entrusted by Agency for Natural Resources and Energy with technical investigation on Innovative Approach for Fuel Debris Retrieval and conducted Request for Information (RFI) as part of this technology investigation.**
- In this RFI, we verify innovative approach for Fuel debris retrieval which was proposed in the Mid-long-term roadmap[*1] Thus we collect information from wide range of organization from the industry to academic institutions to government agencies to determine the technology required.
- Information collected will be utilized for Conceptual Study (C/S) and technological Feasibility Study (F/S)[*2] in the future.
- Also, we hope this RFI will be the opportunity for the people involved in this project to collaborate with link to other parties around the world.

*1:"The technology to submerge up to the upper part of a reactor containment affected by a severe accident has difficult challenges in its many steps. Therefore it is assumed that it might be difficult to submerge up to the upper parts of the reactor containments. In addition, methods of retrieving the fuel debris without filling the PCVs with water will be studied as alternative methods." (from Mid-long-term roadmap)

＊2:To be held in Spring/Summer of 2014 depending on the condition of government budget.

Contents of RFI

Topic A: Internal PCV/RPV investigation

A-1:Conceptual study of method (following are samples)

1. Method of inserting investigation device such as cameras inside.
   a. Utilize current throughbore such as piping/penetration.
   b. Create new throughbore .
   c. Methods of Shielding penetrations and of equipment operation in terms of reduction of radiation exposure.
2. Method of detecting fuel debris location by measurement outside, etc.

A-2:Required technologies (following are samples)

1. Advanced measurement technology (camera, dosimeter, thermometer etc.)
   a. High performance optical equipment(camera etc.), other measurement technology (ultrasonic, laser etc.)
   b. Control technology of measuring instrument, and information transmission technology .
2. Technology to detect whether the substance in the reactor is fuel debris or not.

Topic B: Fuel debris retrieval

B-1:Conceptual study of method (following are samples)

1. Access to fuel debris from the top of PCV underwater
2. Access to fuel debris from the top of PCV in the air*1
3. Access to fuel debris from the side of PCV in the air*1
4. Access to fuel debris from the bottom of PCV in the air*1

*1 including partial submergence

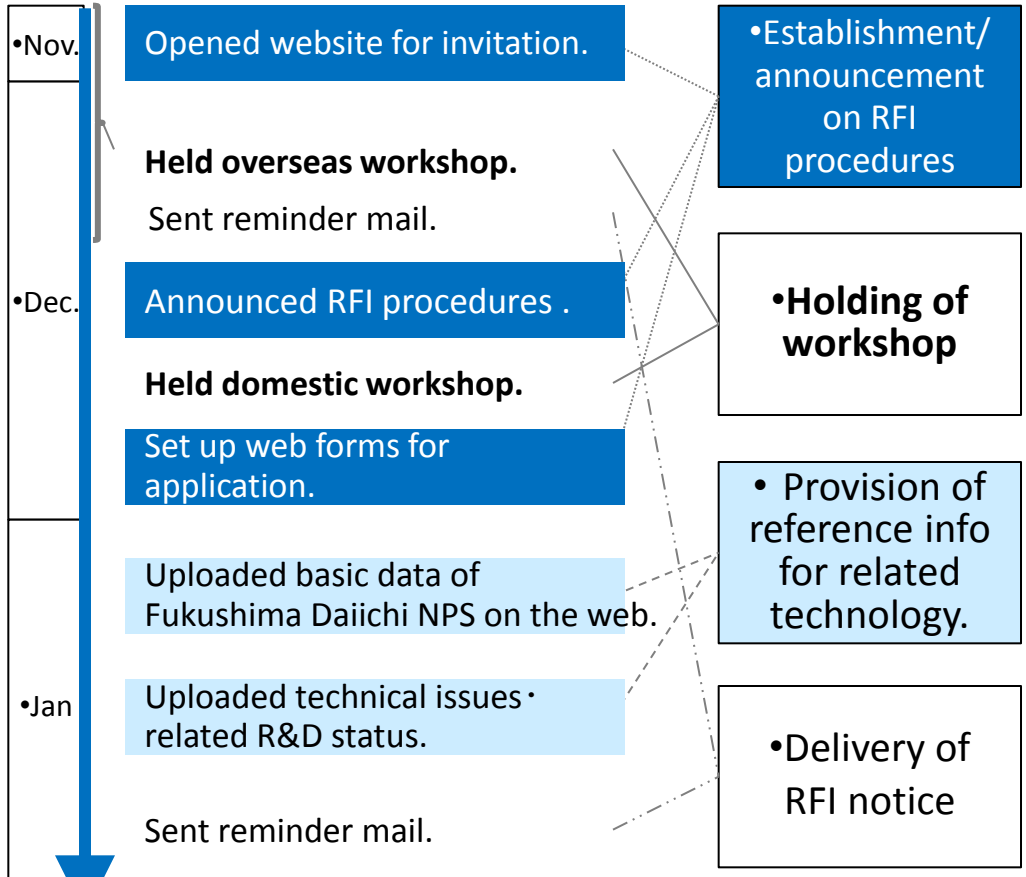
B-2:Required technologies (following are samples)

1. Technology regarding fuel debris retrieval (cutting, suction).
2. Equipment/device such as remote control manipulator, with superior control capability from long distance.
3. Technology of shielding against fuel debris with high radiation.
4. Device and equipment under the high radiation environment.
5. Equipment/device to create a borehole on the building concrete and PCV to access from the side or bottom of the PCV.
6. Technology to store fuel debris safely in PCV/RPV before retrieving.

Announcement on RFI procedures and promotion for invitation

IRID has been promoting publication and application for RFI, and announcement of RFI procedures since fall of 2013 as well as providing reference information necessary for the study.

Announcement of RFI procedures and Promotion activity of RFI invitation



Outline of activities

- Established **Entry form** as well as opened **website for application** and announced procedures for RFI for applicant's convenience.
- **Held workshop in Japan and overseas for the publication of background and purpose of RFI and promoted invitation.**
  Venue : UK, France, US, Canada, Germany and Japan.
  - Tens of people attended from related company, R&D agency for each workshop.
    About 130 participants from Japan.
- **Disclosed reference technology data on the website for information collection for RFI**
  - Basic data of Fukushima Daiichi NPS (Structure /external dimension etc.)
  - Technical issues and status of R&D in Japan/overseas.
- Made announcements regarding implementation of RFI and uploading of reference information for followings.
  - Overseas and domestic related academic meeting , and industry organization.
  - Companies participated in previous workshop .

Results of RFI

About 40% from total 194 items of information was from overseas countries.

•Field of information for RFI		Total	Breakdown by country							
			JPN	US	UK	GER	FRA	BEL	CAN	RUS
Topic A Internal PCV/RPV investigation	A-1 : Conceptual study for the method.	33	20	7	3	-	2	-	1	-
	A-2 : Required technology	58	32	6	10	6	2	2	-	-
Topic B Fuel debris retrieval	B-1 : Conceptual study for the method	43	23	8	3	2	5	-	1	1
	B-2 : Required technology	60	41	7	3	4	2	2	-	1
Total (No. of items of information)		**194**	116	28	19	12	11	4	2	2
Total (No. of organizations) *		**95**	61	13	8	4	4	1	2	2

* Counted as one if there're same organizations but different departments.

Workshop in Japan

Workshop for R&D on Innovative Approach for Fuel Debris Retrieval

IRID has been entrusted technical research on the design of Innovative Approach for Fuel Debris Retrieval and conducted Request for Information (RFI) by Agency for Natural Resources and Energy (ANRE) last year.

We are co-hosting workshop for R&D project of Innovative Approach for Fuel Debris Retrieval with Mitsubishi Research Institute (MRI) as Management Office for the Project of Decommissioning and Contaminated Water Management appointed by ANRE.

The workshop is for reporting the results of collected proposals for RFI and giving an overview of Request for Proposal (RFP) planning in the mid June.

Date and Time: Friday, April 25, 2014 13:30-16:30
Venue: Bellesalle Onarimon Ekimae

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3. Summary

Summary - 1

1. IRID was established in Aug. 2013 as an integrated organization to conduct researches by gathering knowledge around the world according to the Mid-and-Long-Term Roadmap.
2. As for R&D, IRID conducts an integrated management to promote multiple R&D projects effectively. Fields of the R&D consists of following three. IRID also plans a total strategy of the technologies required for the decommissioning by optimizing the on-site needs and technological seeds.

   (1) Removal of fuel from spent fuel pool
   (2) Preparation of fuel debris retrirval
   (3) Treatment and disposal of radioactive materials

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Summary – 2

3. For the purpose of gathering knowledge around the world , IRID advances the foundation of a structure to receive advise from the experienced experts around the world through **“**International Advisors”, “Technology Advisory Committee” and “International Expert Group”, as well as considering the involvement in the joint research project through OECD/NEA and responding to the IAEA review. Also, conduct Request for Information (RFI) internationally for the countermeasures on contaminated water and fuel debris retrieval.
4. Hold workshops to build a structure to promote basic researches in collaboration with research institutes and universities with Mid-and-Long-Term human resource development in consideration**.**

IRID

ENGLISH

Google™カスタム検索

TOP | 理事長挨拶 | 組織概要 | 研究概要 | 活動

IRID=アイリッドは国内外の叡智を結集し、
廃炉のための研究開発に
一元的な

Thank you very much for your kind attention.

Please visit IRID website !
http://www.irid.or.jp/