

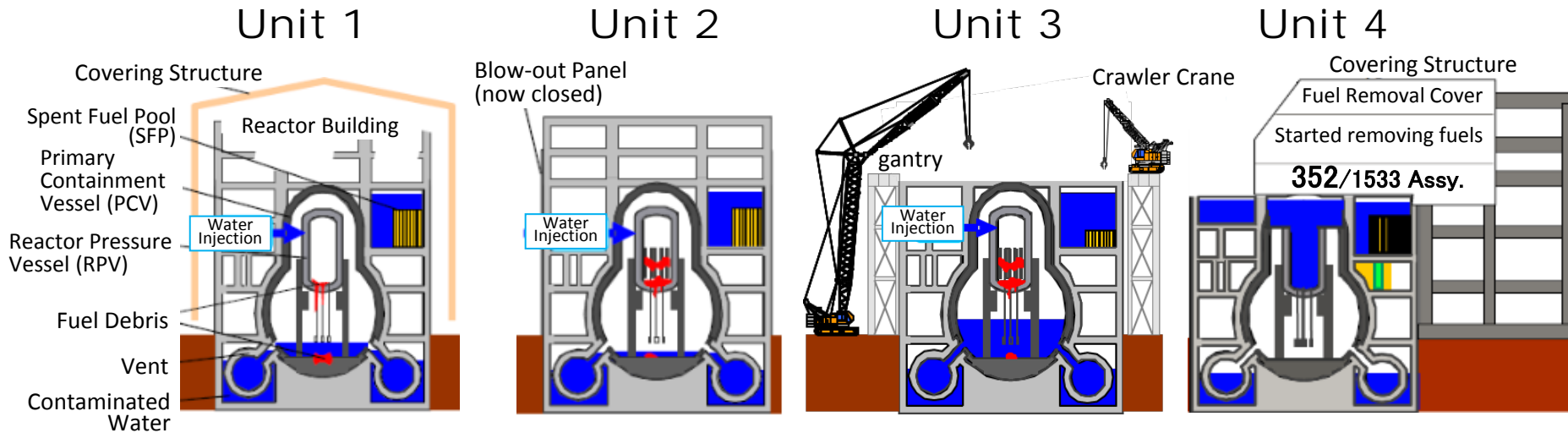
Importance of Innovation for D&D at Fukushima Daiichi NPS

March 5, 2014

Kazuhiro Suzuki

International Research Institute for
Nuclear Decommissioning

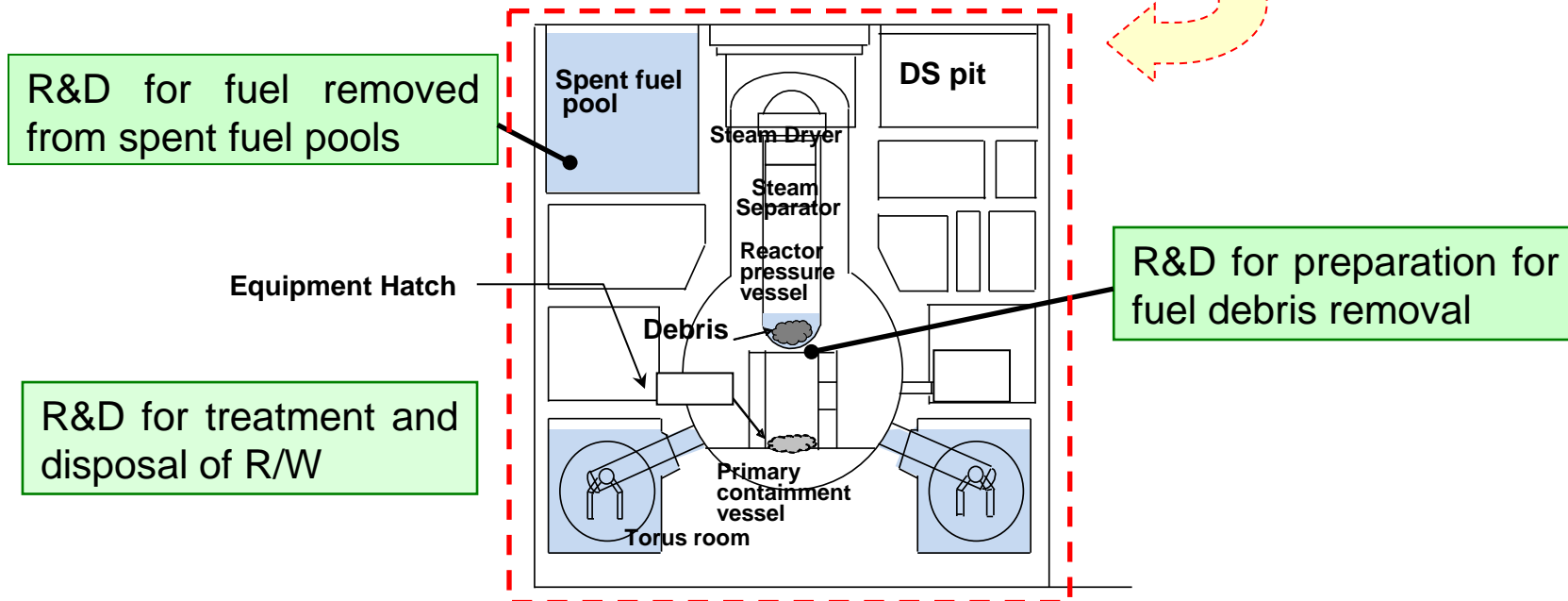
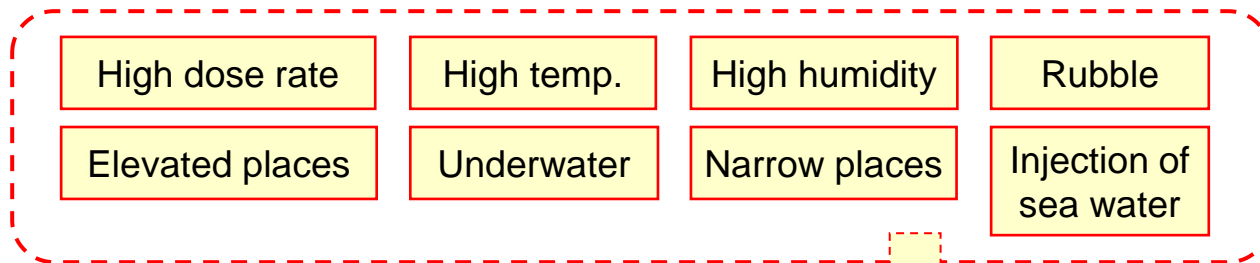
Overview of Units 1 - 4



Electrical output	460MW	784MW	784MW	784MW
Date of commercial operation	1971/3	1974/7	1976/3	1978/10

R&D Activities of IRID

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



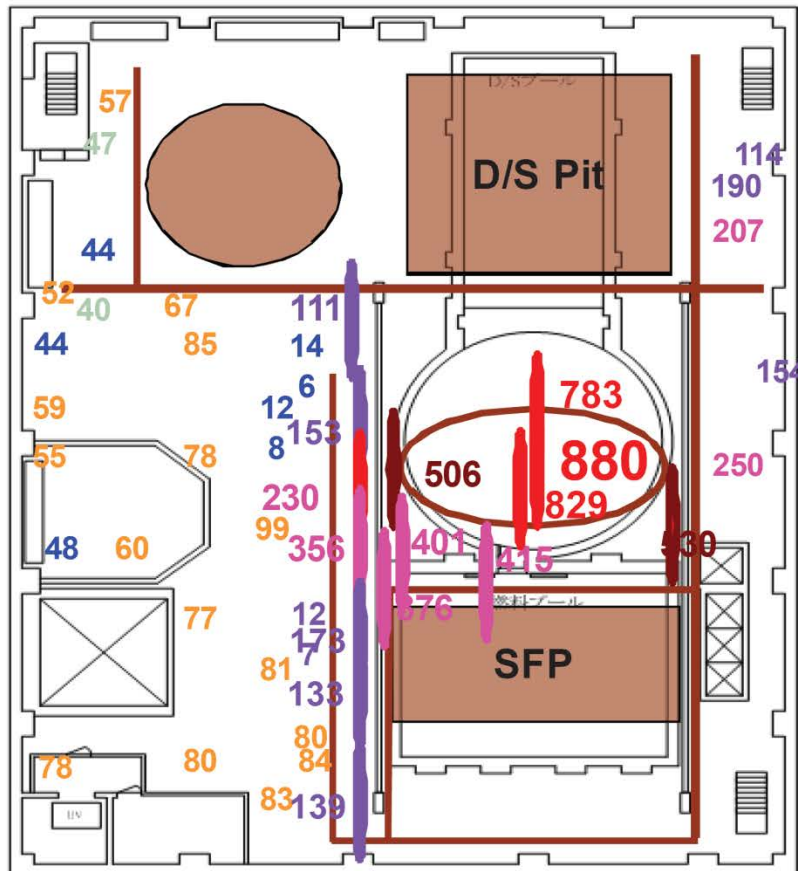
Major Challenges for Fukushima Decommissioning

	Fukushima Daiichi NPS	TMI-2
R/B Damage	Damaged by H ₂ explosion (Units 1, 3 and 4)	Limited
Water Boundary	Both RPV/PCV damaged (Units 1-3)	RPV remained intact
Fuel Debris Location	Possibly fallen out from RPV	Remained in RPV
Bottom of Vessel	Complex structure with control rod drives	No structure

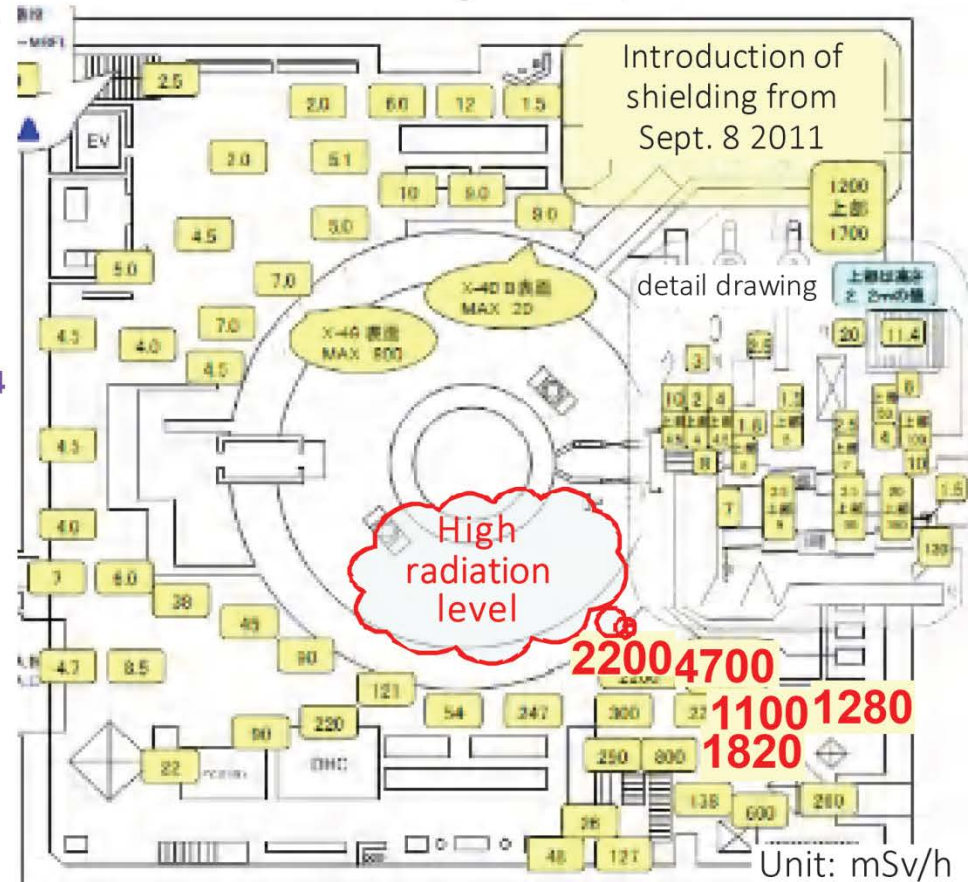
High Dose Rate inside Reactor Building

- High dose rate in reactor building makes it difficult to approach into PCV.
(Approx. 4,700mSv/h at 1st floor of Unit 1, 880mSv/h at top floor of Unit 2.)

Reactor Building Operating Floor, Unit 2

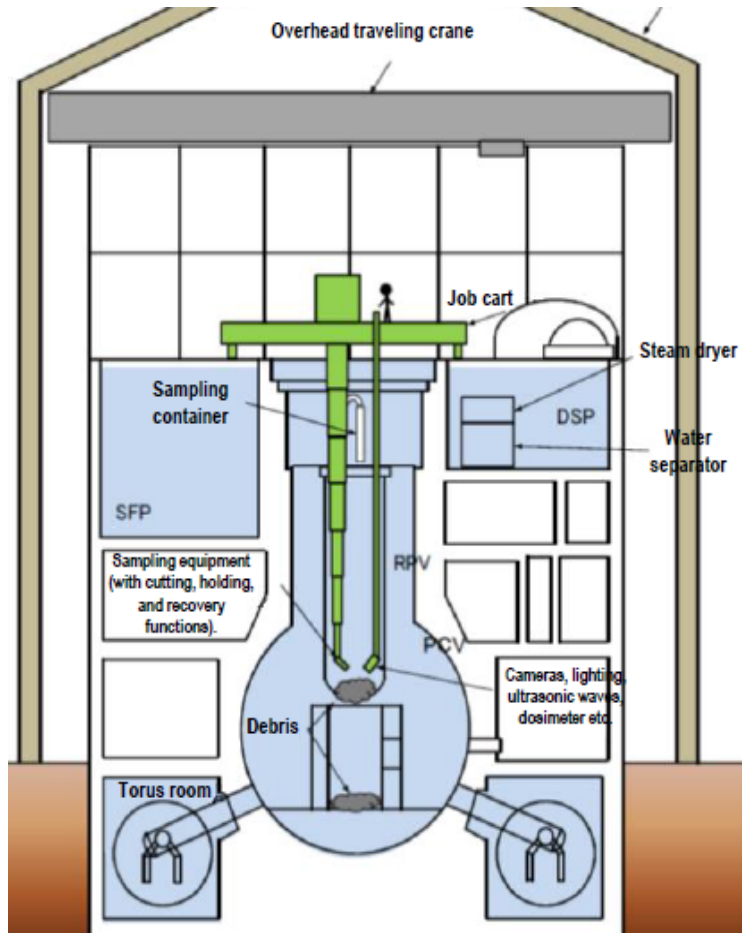


Reactor Building 1st Floor, Unit 1

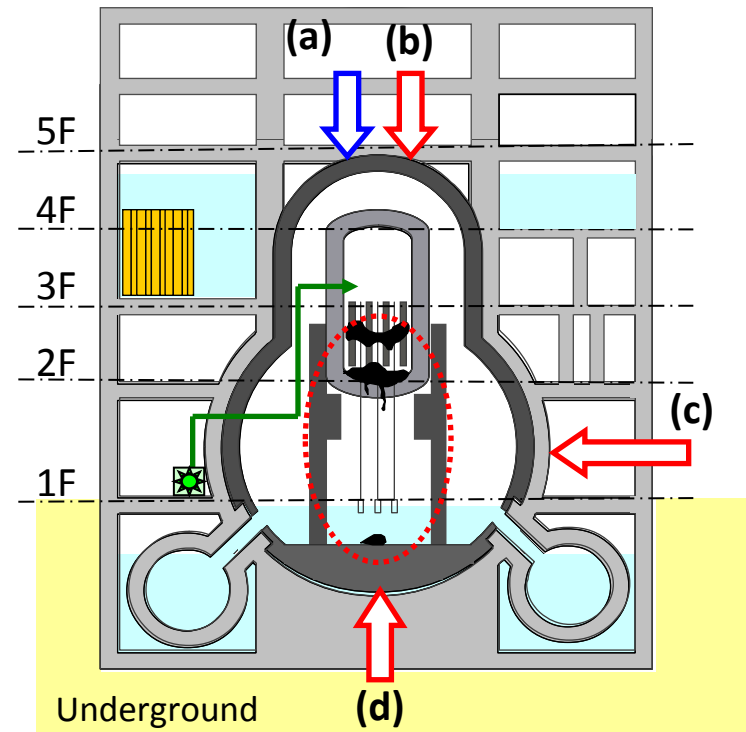


Development of Fuel Debris Retrieval Technology

Ongoing approach



Innovative approach

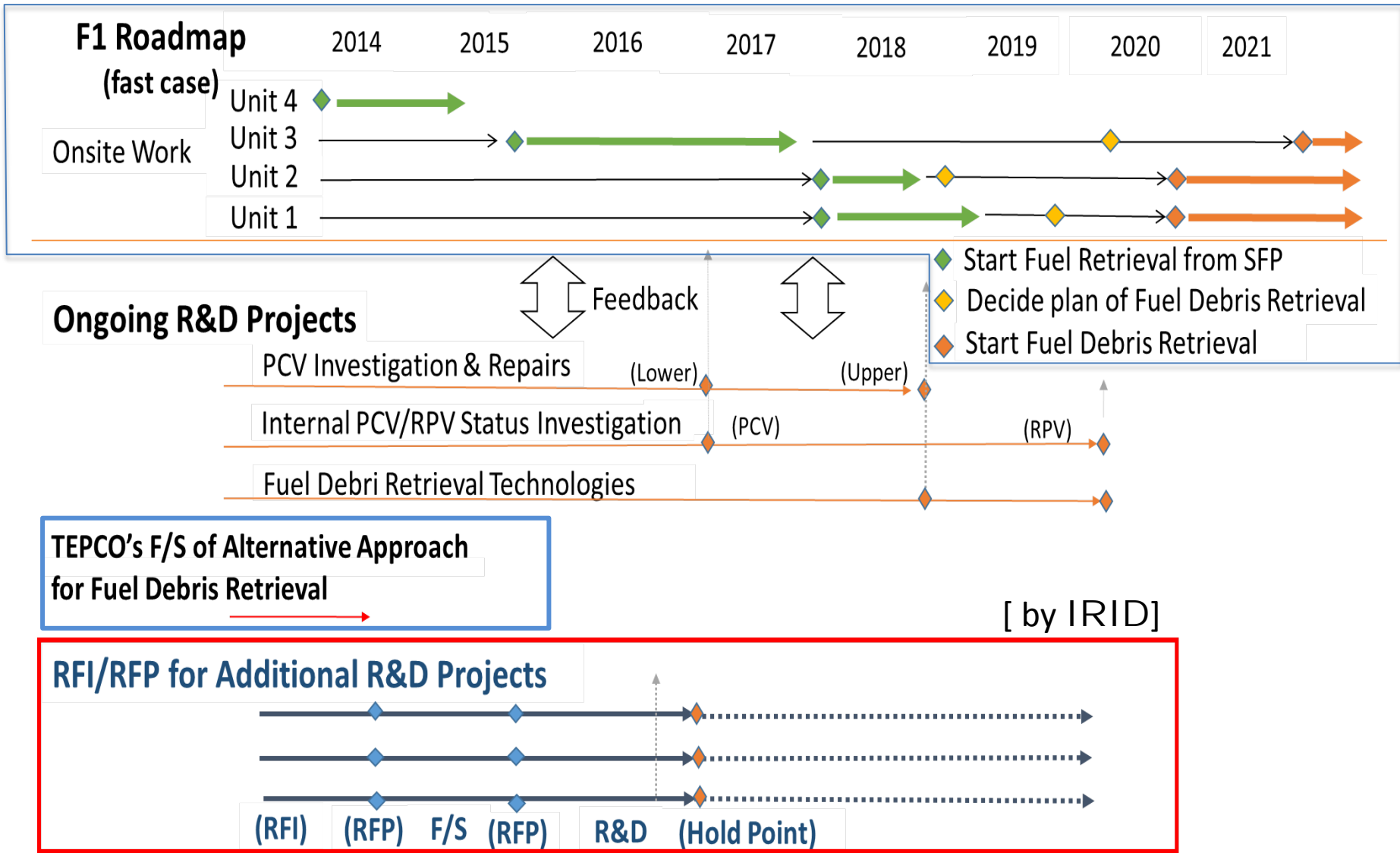


- (a) from Top side under water
- (b) from Top side in atmospheric condition
- (c) from lateral side in atmospheric condition
- (d) from bottom side in atmospheric condition

RFI for Fuel-Debris Retrieval

- Purpose of the RFI is to solicit information from industry, academia, and government-affiliated agencies on issues related to design of innovative approaches to fuel debris retrieval.
- RFI is not a funding opportunity. Responses to RFI will be used only for planning additional R&D programs. Preceding conceptual study (C/S) and technology feasibility study (F/S) will be initiated from spring/summer of 2014, subject to governmental /Japan's Diet direction in regard to budgeting and approval.
- In addition, intention of RFI is to initiative and encourage collaboration and alliances.

R&D program on Fuel Debris Retrieval



Phased Approach

Phase 1:

- RFI for conceptual study (C/S) & feasibility study (F/S)

<Project Workshop>

- Planned in Spring 2014
- Objectives
 - ✓ Share latest updates of decommissioning activities of Fukushima Daiichi NPS and relevant R&D outcomes.
 - ✓ Discuss next steps based upon responses to the RFI.
 - ✓ Encourage collaborations/alliances among respondents.

Phase 2:

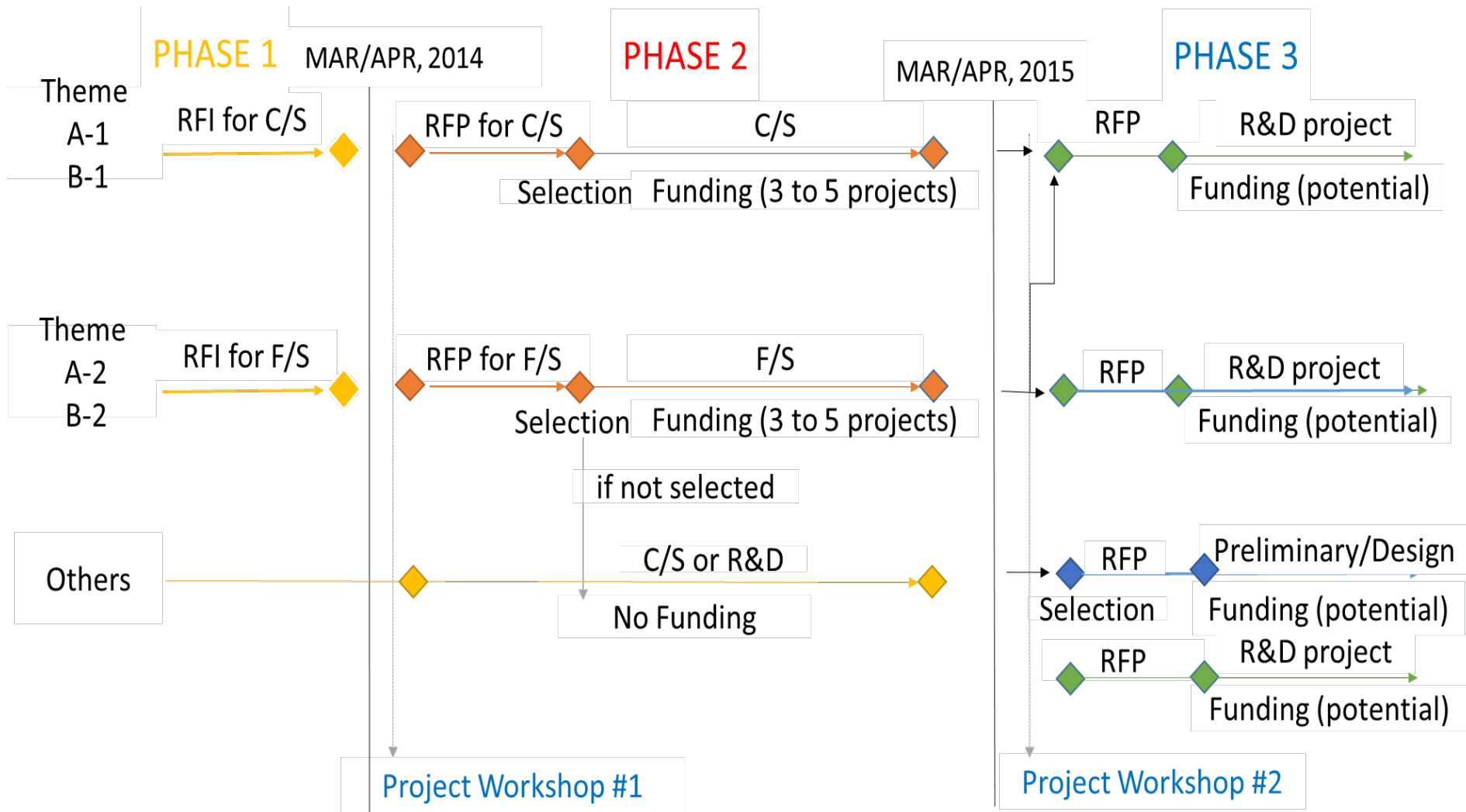
- RFP and Implementation of C/S & F/S

<Project Workshop>

Phase 3:

- RFP and Implementation of R&D program

Program Structure



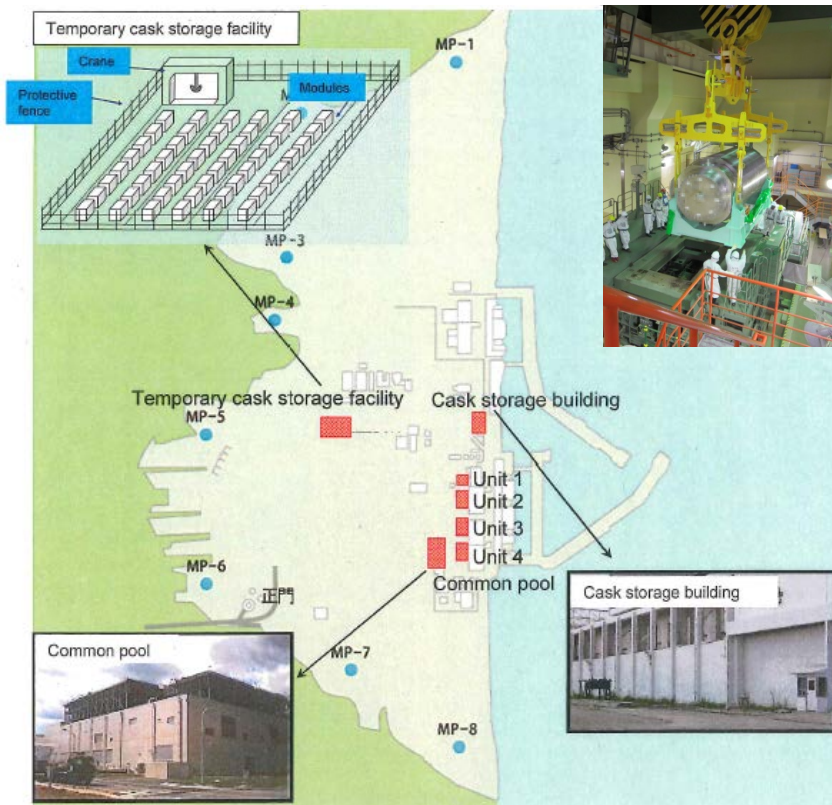
Status of Information Collection from RFI

Field of proposal for RFI		No.	Country							
			JP	US	UK	DE	FR	BE	CA	RU
Topic A Internal PCV/RPV Investigation	A-1 : Internal PCV/RPV Investigation Conceptual study for innovative approach.	33	20	7	3	-	2	-	1	-
	A-2 : Internal PCV/RPV Investigation Technology required for innovative approach.	58	32	6	10	6	2	2	-	-
Topic B Fuel debris removal	B-1 : Conceptual study for innovative approach to fuel debris removal.	43	23	8	3	2	5	-	1	1
	B-2 : Technology required for innovative approach to fuel debris removal .	60	41	7	3	4	2	2	-	1
No. of cases		194	116	28	19	12	11	4	2	2
No. of Organizations/Institutions*		95	61	13	8	4	4	1	2	2

* : No. of organizations/institutions : same organizations/institutions with different department are counted as one.

Spent Fuel and Radioactive Waste Safely Stored on Site

Spent fuel



Radioactive waste



Waste Storage Volume

Key	Waste	Storage Volume
	Contaminated / Treated water (Water storage tanks)	500,000 m ³
	Secondary waste from contaminated water treatment	745 vessels
	Miscellaneous waste	71,000 m ³
	Felled trees	71,000 m ³
	Contaminated soil	Under evaluation

Contaminated / Treated water, Secondary waste as of 21 January 2014
 Miscellaneous waste, Felled trees as of 30 November 2013

Site map as of end of September 2013

