Rebuilding the Strategy for the Decommissioning of Fukushima Daiichi NPP

(Recent Situation of NDF's new Approach)

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Where we are from and are now?

Fukushima Daiichi Accident

2011.03.11

Emergency Response Headquarters

Cold Shutdown
2011.12.16

1st Road Map
2011.12.26

Change of Administration
2012.12

Road Map Revised
2012.07.30

Inter-Ministerial Council for Contaminated Water and Decommissioning

Road Map Revised
2013.06.27

Government's "New Energy Strategy"
2014.04

Reinforce Decommissioning Strategy

Contaminated Water Troubles
mid-2013~

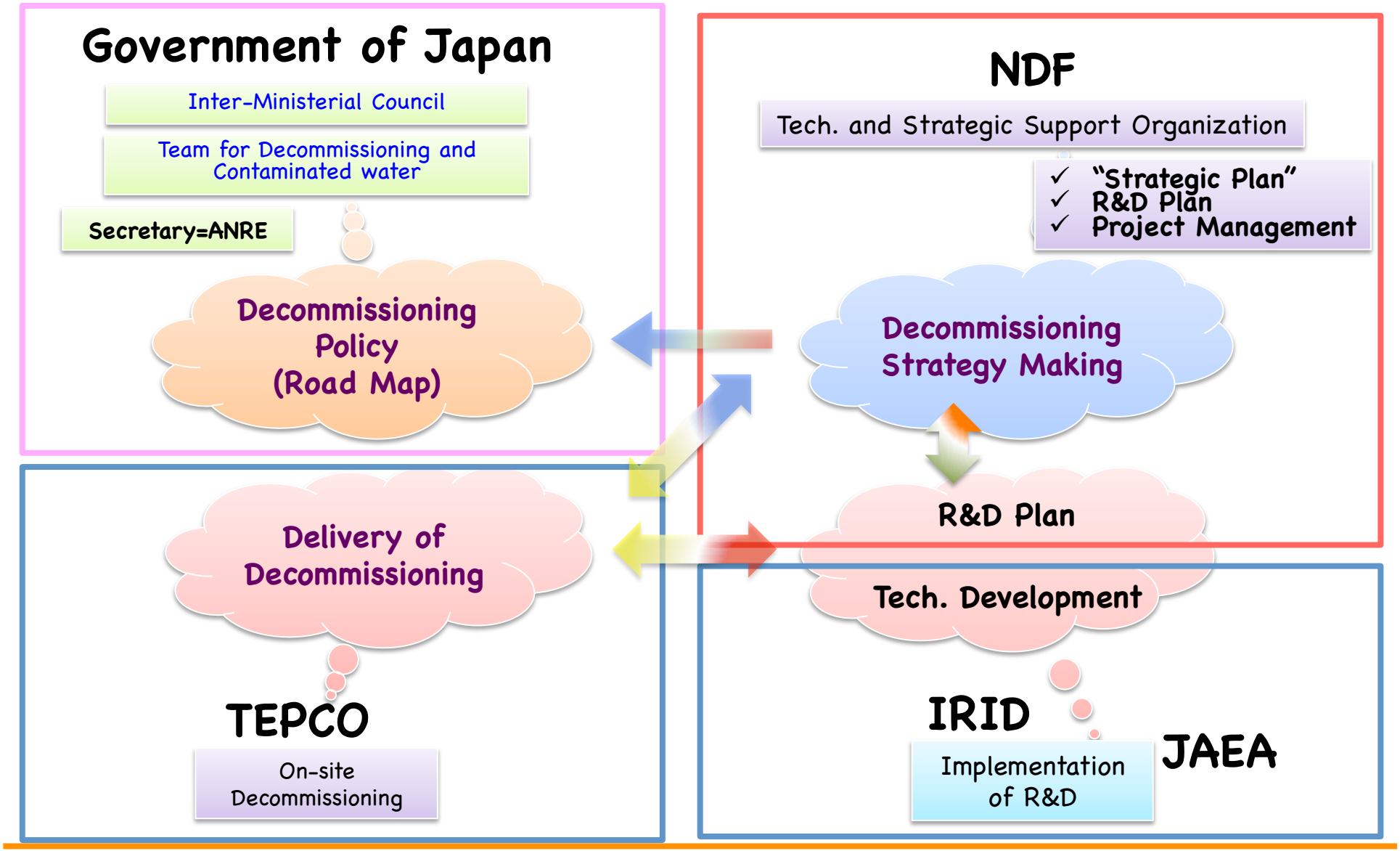
ALPS Troubles
2014.05~

Reinforce R&Ds

IRID
2013.08.01

NDF
2014.08.18

Players for Fukushima Decommissioning



Approaches by NDF

Formulate "Strategic Plan" as technical Basis for Mid-and-Long Term Road Map

"Strategic Plan" ?

TSSO
Technical and Strategic Support Organization

- PDCA on Decommissioning and R&D
- Risk-based Decommissioning Strategy
- Multiple Fuel Debris Retrieval Methods
- Launch on the Study of radioactive Waste Management Strategy
- Establish R&D Plan for Decommissioning
- Enhance international Alliance
- Closer and more intensive Dialogues for technical Harmonization among ANRE, TEPCO, IRID and NDF

Select the most reliable Retrieval Method for Fuel Debris until the end of 2016

Difficulties of Fukushima Decommissioning

Guiding principles for finding solutions:
(1) Safe, (2) Reliable, (3) Reasonable, (4) Speedy, (5) Site-reality oriented

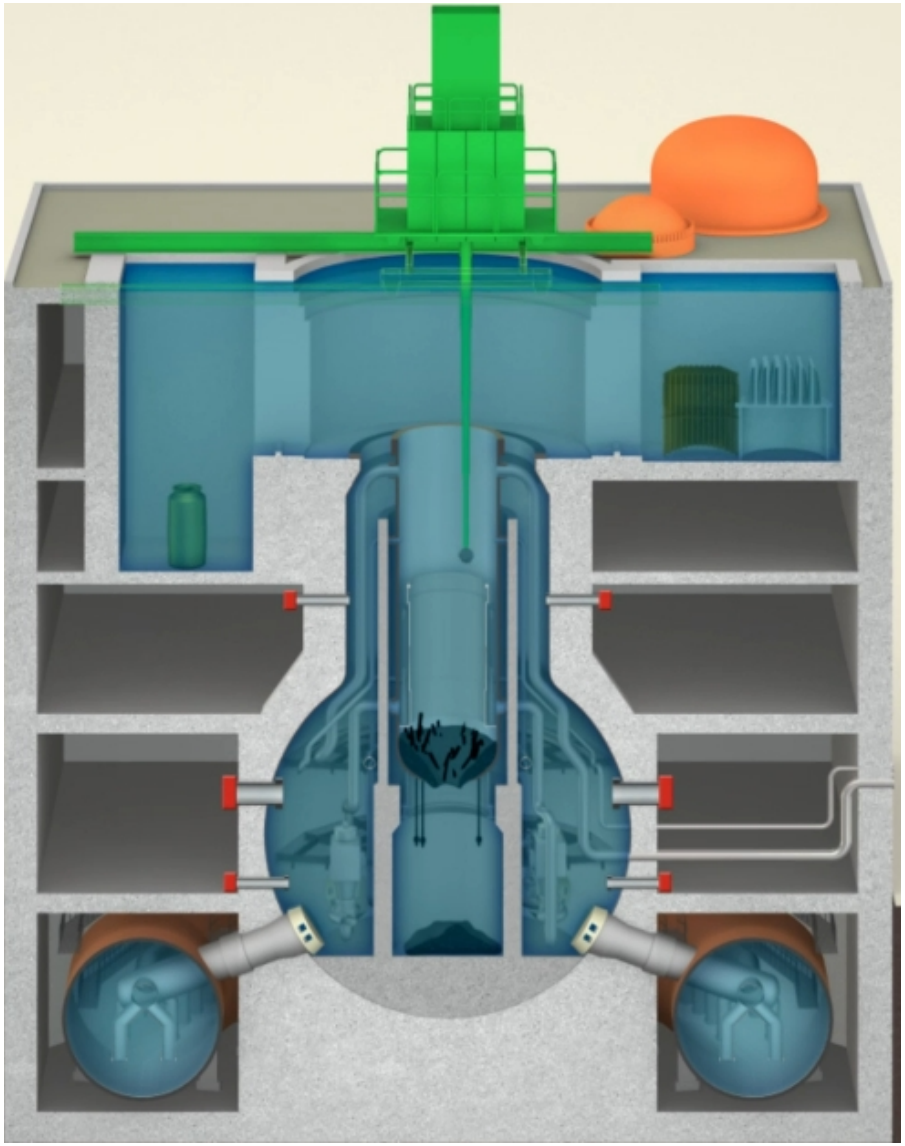
Difficulties

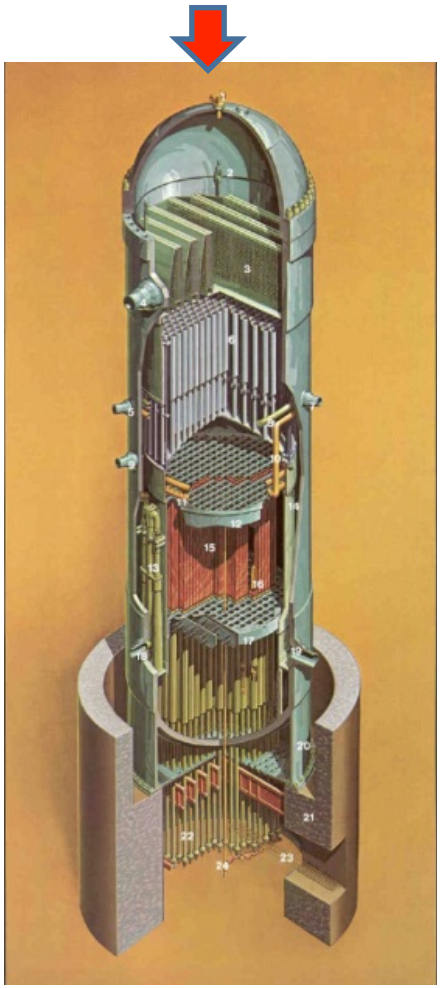
- Difficult human access
- Lack of in-Core Information
- Huge Uncertainties
- Extremely severe conditions imposed to the technological devices
- Difficulty to cope with environmental Challenges
- Encompassing Limits and Requirements by the Society
- Social and institutional Systems unprepared
- Lack of Experts

What should be done

- Maximum utilization of Theory and Calculation
- Best available well founded conjecture by Maximum Likelihood estimation
- Innovative Engineered approach
- Continued Acquisition of Data
- Acquire Knowledge based on Experiences
- Accumulation of every available resources and brain

Submersion Method for Fuel Debris Retrieval





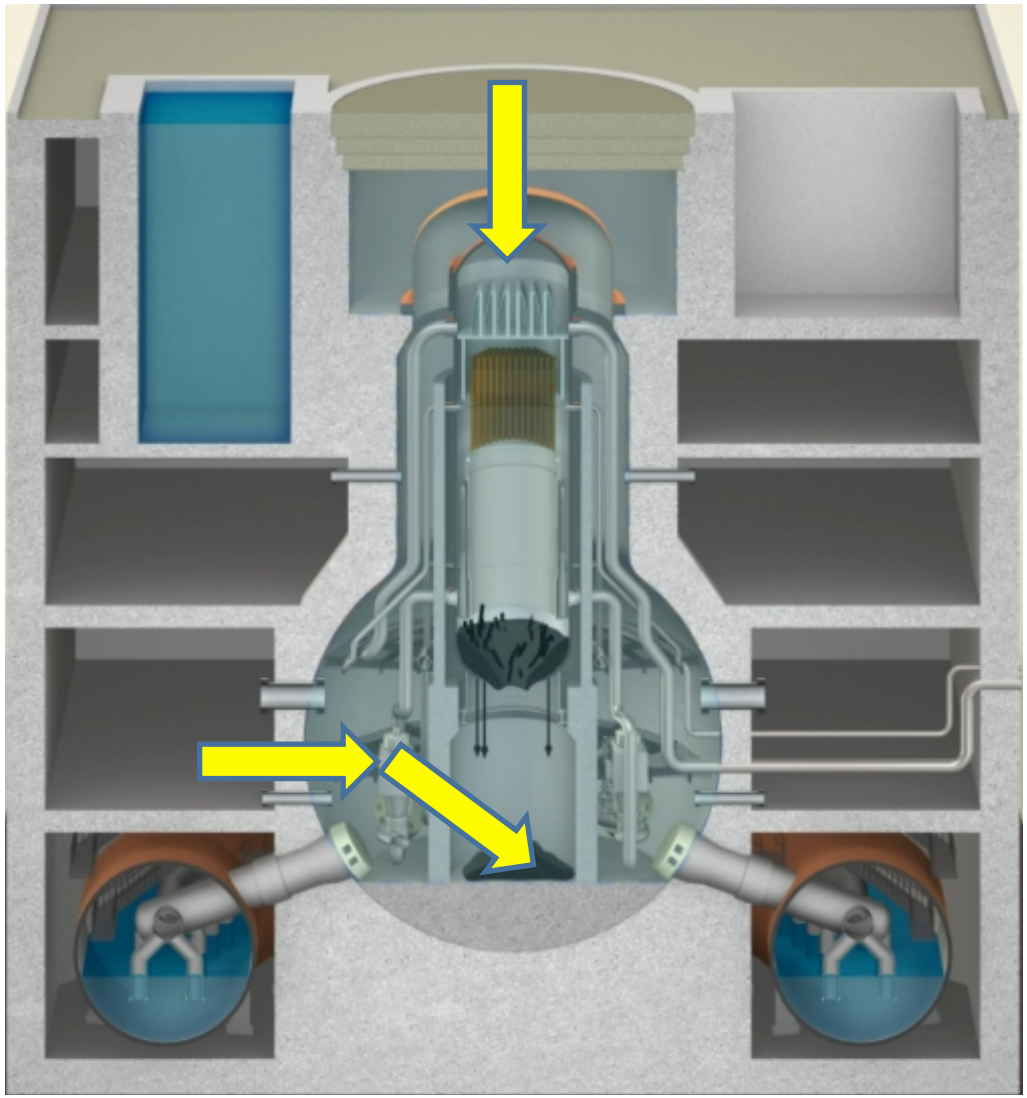
Method to submerge and to cool down Fuel Debris, prevent the Dispersion of radioactive Material and shield high Dose Rate.

Major Challenges;

- **Repair of PCV for Submersion**
- **Sub-criticality at the time being submerged**
- **Seismic-resistance after Submersion**
- **Stoppage of contaminated Water after Flooding**

Origin; NRC

Other Fuel Debris Retrieval (dry)



Origin; IRID

Method to retrieve Fuel Debris without submergence; (In-air retrieval by combination of vertical and horizontal Access)

Major Challenges

- **Shielding from the high Dose Rare of Fuel Debris etc.**
- **Prevention of Dispersion of Dust at the time of Fuel Debris Retrieval**
- **Cooling of Fuel Debris**
- **Availability of high-dose resistant Devices (Visual, Measurement, Retrieval)**

Risk-informed Approach in "Strategic Plan"

To define the Risk

(i) Risk of radioactive materials

- Risk = level of effect x probability of occurrence

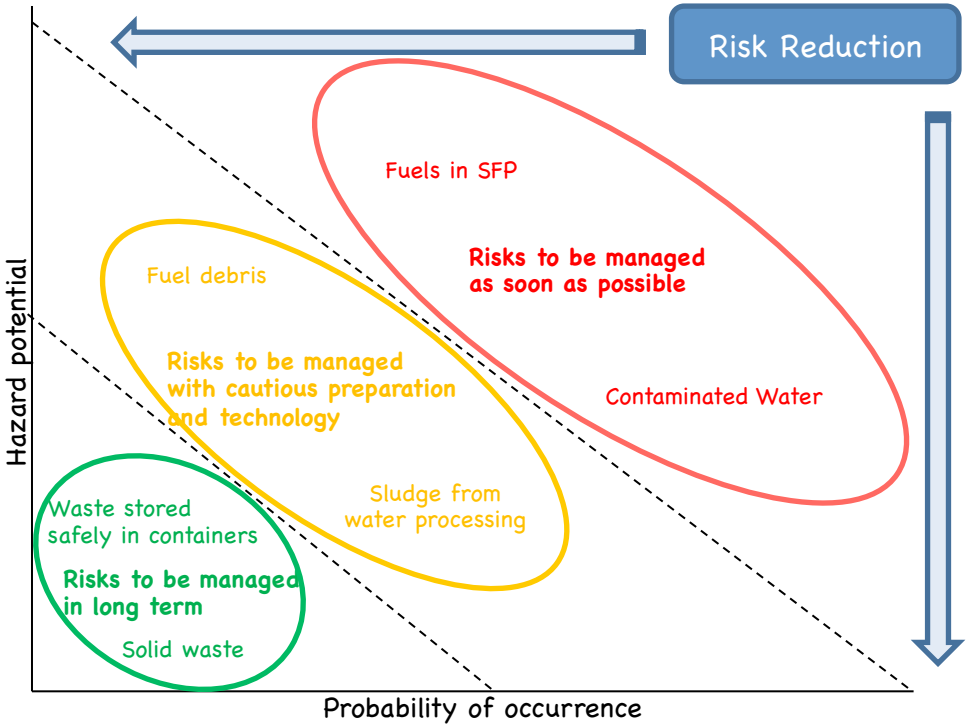
(ii) Level of effect

- If the containment function is lost, radiation effects (exposure, environmental contamination) occur.
- Level of effect = level of activity x physical state (solid, liquid or gas)

(iii) Probability of occurrence

- Factors for the loss of the containment function include natural phenomena, failures and improper operations.
- The vulnerability of the facility to the above factors needs to be considered.
- Probability of occurrence = possibility of occurrence of the factor x vulnerability of the facility

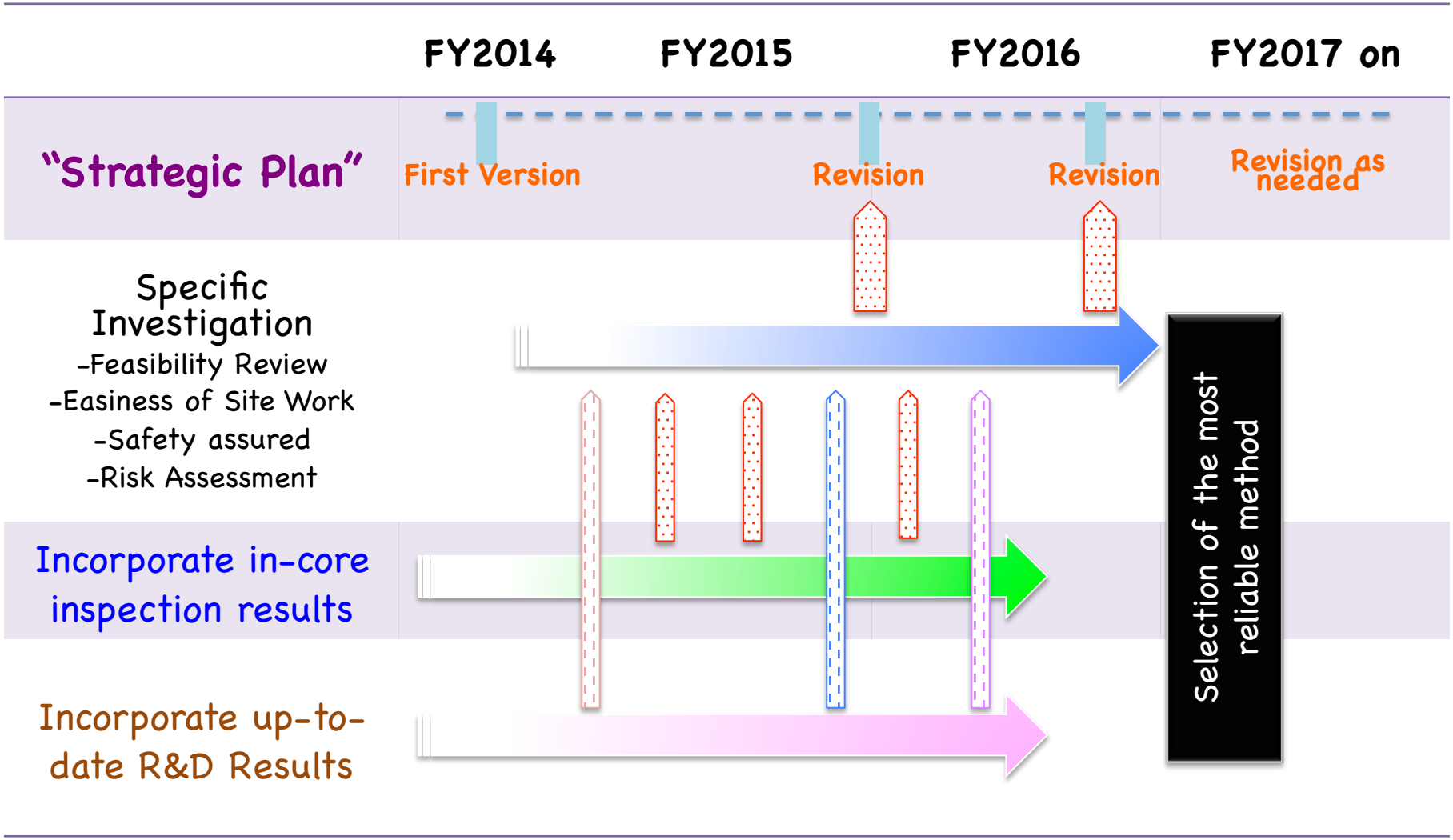
(iv) Risk assessment of Fukushima Daiichi Nuclear Power Plant



(v) How to reduce risk

- Move radioactive materials to a safer and more stable facility.
  → Reduce the probability of occurrence.
- Decay of radioactivity and change in the physical state
  → Reduce the level of effect.

Expected Development of "Strategic Plan"



Enhanced international Alliance

Cooperation with CEA, NDA and DOE

Active Support by NDF's International Special Advisors

Assistance to international Advisors for IRID and TEPCO

Active Participation to the Projects by IAEA and OECD/NEA

IAEA	Technical Meeting on Decommissioning and Remediation of Damaged nuclear Facility (DAROD)	participating
	International Decommissioning Network (IDN)	hope for participation
OECD/NEA	Senior Expert Group on Safety Research Opportunities Post-Fukushima (SAREF)	participating
	Benchmark Study of the Accident at the Fukushima Daiichi Nuclear Power Plant (BSAF) Project	participating
	Expert Group on Fukushima Waste Management and Decommissioning R&D (EGFWMD)	participating
	Working Party on Decontamination and Dismantling (WPDD)	hope for participation

Enhanced international Alliance
→ NDF's Strategic Activities with high Priority

Looking forward to continuing unchanged cooperative Relationship with IAEA

Thank you for your Attention