

Concept Study of Innovative Approach for Fuel Debris Retrieval

<AREVA ATOX D&D SOLUTIONS>

Purpose and Goal

Concept study of innovative approach to conduct fuel debris retrieval in the air instead of submersing based on the conditions of PCV/RPV of each reactor building at Fukushima Daiichi NPS.

Purpose of this C/S is to establish the scenario for a series of process from making a preparation through transferring to the storage canister and cleaning up the venue from the viewpoint of the radiation risk reduction, dispersion of radioactive substances, and seismic safety in order to apply the technologies required for fuel debris retrieval in the air without filling by the water at Fukushima Daiichi NPS.

Overview and Feature

1. Organizational structure

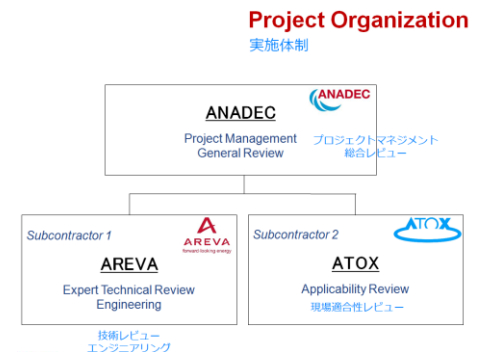
- ANADEC controls overall projects as a primary contractor and AREVA which has a lot of experiences in decommissioning of the major nuclear power facilities in the world conducts specific technology study and professional technology review, and ATOX which has a lot of experiences on the site at Fukushima Daiichi NPS reviews site applicability to promote the project appropriately and efficiently.

2. Project overview

- Study the access from both the upper section and the side surface of the RPV. For the access from the upper section, a rotating platform which can be equipped with the cutting tool and collection basket tool is installed on the RPV, and to collect fuel debris. It approaches to the bottom of the RPV and the bottom part of the PCV where fuel debris are assumed to be located.
- In this case, since long distance approach will be required to access the bottom of the PCV, the method to cut the upper part of the PCV and RPV using wire saw is studied in advance.
- To apply these technologies to the Fukushima Daiichi NPS, we establish the scenario of the process from making preparation to the cleaning up the venue considering the radiation risk, boundary, and seismic safety.

3. Features of this project

- (1) Combination of access from the upper section and the side surface of the building
- (2) Cutting scenario for RPV/PCV upper part
- (3) Rough cutting of fuel debris inside the RPC/PCV (in the air)
- (4) Removal of internal structures and collection of fuel debris
- (5) Calcification, resize and final storage of wastes inside the SFP(underwater)



Output so far/Output expected

4. Output so far (as of Dec.2014)

- Currently collecting the data
- Currently analyzing the function
- Currently studying a scenario to access from the upper section
 - Introducing a biological shielding and confinement function to the operating floor
 - Removal of concrete shield plug
 - Cutting the PCV/RPV upper section
- Studying a scenario to access from the side
 - Removal at the bottom section
- Conduct FS for wire cutting

5. Output expected

- The report including fuel debris retrieval procedures, equipment layout, accessing location and method, internal observation, fuel debris cooling method, fuel debris collection method, technical requirements, transferring equipment and waste treatment.
- This report includes the dose reduction, boundary maintenance, securing seismic safety, maintenance and the measure against hydrogen accumulation.
- Development plan toward realization of innovative approach .

Overall Schedule

No	Items	2014		2015		
		Nov	Dec	Jan	Feb	Mar
1	Review レビュー		◇KO ◇RM	◇RM ◇RM	◇RM ◇RM	
2	Reporting 報告書作成		◇M0 ◇M1			Final Report ◇
3	Basic data synthesis 基礎データ集約			◇ Intermediate Report ◇M2		
4	Design deliverables 設計成果物	←—————→				
4.1	① Steps for FDR 燃料デブリ取出しのステップ					
4.2	① Layout of equipment for FDR 機器配置					
4.3	② Access location and method of FDR アクセス位置と方法					
4.4	① Internal observation for FDR 内部監視					
4.5	③④ Fuel debris cooling method 燃料デブリ冷却手法					
4.6	③ Method of collecting the fuel debris 燃料デブリ回収手法					
4.7	①~⑤ Technologies required for FDR 技術的要求事項					
4.8	④⑤ Removal of equipment 機器撤去					
4.9	⑤ Waste disposal 廃棄物処理					
5	Development plan to realize the proposed innovative approach 代替工法実現に向けた開発計画					

←10th Dec.