Conceptual Study of Innovative Approach for Fuel Retrieval＜IHI Corp.＞

Proposal and Goal

- ***To develop feasible and Safe Retrieval Methods with both Top and Side Access.***
- ***To develop approach that Allows Fuel Retrieval in 2020FY in Accordance with the Mid. and Long Term Road Map***

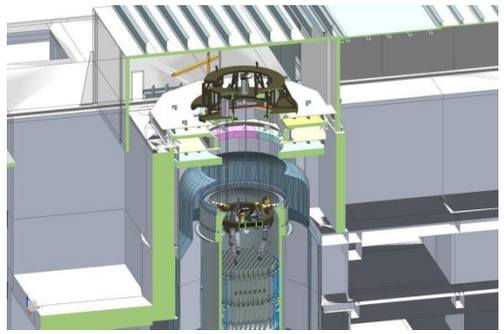
Overview and Feature

- *IHI‘s (and Kurion as a subcontractor) actual experiences in design , fabrication , construction and repair at the Fukushima NPS and JNFL facilities were involved in this project..*
- ***The fluctuation of the fuel debris physical properties can be addressed.***
- ***Second waste can be minimized as much as possible***

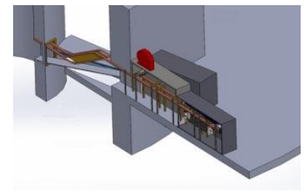
Outcome obtained

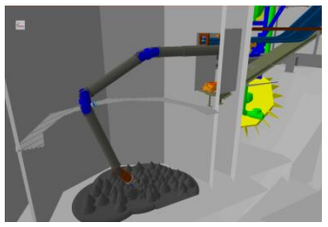
- This design study evaluated many different approaches and then selected the preferred method based on site requirements and past experience. The following are the key elements of the preferred approach:
  - Use of both Top and Side Access methods
  - Flexible tool change systems to provide many tools to address unknown conditions in facility
  - Modular equipment design for quick and remote replacement of key components
  - Rescue and recovery systems for all systems
  - Separate Top Access solid and fuel waste paths to reduce critical path operations
  - Separate Side Access manipulator support rails and waste handling rails for independent and faster operations
  - Previous control system for vitrification system can be applied to this design
  - Configuration of design considers contamination control requirements
- Feasibility of remote and robotic systems in regards to reach, tool operation, cable management and range of motion were considered
- Layout and flow paths for cooling and ventilation air were incorporated
- Enclosures are designed to be modular and prefabricated to reduce on-site installation time
- Design includes segregation of work areas to allow simultaneous work between separate projects
  - Field construction work requirements were evaluated for both the Top and Side Access systems

The equipment for the retrieval are modular type for reducing radiation exposure.



Top access with the Suspended Device





Side Access with multi-joint manipulator

Proven Robot system

図 4.13 アーム先端ツール及びツールチェンジャー 一例

Possible to exchange to suitable tool depend on situation

Fuel Debris

Solid Waste

Separated flow line with fuel debris and solid waste

Challenges and Issues in the future

- **Update Execution Plan.**
- **Conduct R&D on Key Technical Issues including severe environment testing.**
- **Proceed with Site Preparation Activities including removal of obsolete structures, equipment and piping.**