

## Construction of a Fuel Test Loop

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### 1. Introduction

A contract for an installation of a Fuel Test Loop (FTL) was made with a domestic construction corporation in late 2005. A Task Force Team (TFT) was organized to smoothly carry out the FTL installation project at the HANARO organization. The FTL project obtained an approval for construction from the licensing authority. From late July, the FTL construction work begun. General work status including the work diary was posted on the Community of Practice (CoP). The FTL construction is expected to be completed successfully by the end of November this year.

### 2. Construction Work Contents

Worker's safety, preservation of HANARO's integrity, and successful completion of the project were included in the objectives of the project. The scope of the FTL is the following: firstly, manufacturing and installation of the Out-of Pile System (OPS) and its acceptance test, secondly, manufacturing of the In Pile Test section (IPS), installation of in-pool piping supports, etc., finally, modification of the penetration section. Manufacturing of KAERI's supply hardware, the IPS vessel assembly (IVA), the Fuel Inspection Station (FIS), etc. are excluded in the contract.

#### 2.1 FTL Facility

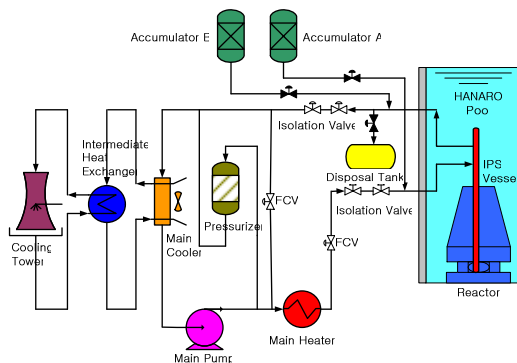


Fig. 1 Schematic Diagram of FTL

The FTL is a facility that can do nuclear fuel irradiation tests by utilizing the HANARO. The FTL consists of the IPS and the OPS as shown in Fig. 1. The IPS is composed of the IVA and the In-pool Piping and its supports. The OPS includes the main cooling water

system, the letdown, make-up and purification system, the intermediate cooling water system, the emergency cooling water system, the penetration cooling water system, etc. for preserving the normal operations of the FTL. The OPS is designed so that the HANARO and the FTL facility can be safely shut down in the cases of accidents (1).

#### 2.2 Construction work contents each room

Construction has been made for several sections such as the #1 room, the #2 room, the FTL control room, the IPS, and the piping penetration. Architectural work of the #1 room includes foundation work for equipment, installation of the safety barrier, drilling of the shield cover, etc. Mechanical installation includes the LMP interchanger and cooler, the main heater, the main cooler, the accumulator, the disposal tank, the pressurizer, etc. Piping and its supports, electricity, I&C, etc. are also constructed.

Construction work at the #2 room includes installation of equipment foundation, the shielding wall and the monorail hoist. The exchanger, the filter, the intermediate heat exchanger, the degasifier, the chemical addition tank etc. are installed as part of the mechanical work. Construction work at the FTL #1 room and #2 room are illustrated in Fig. 2.

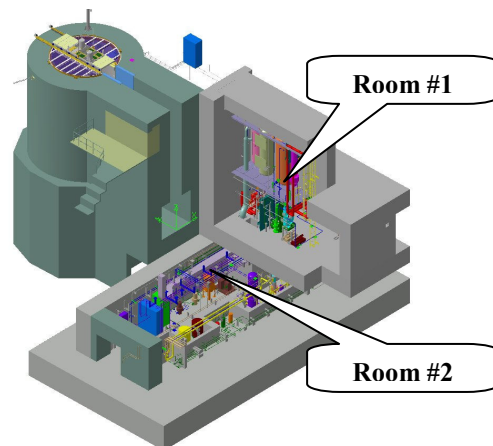


Fig. 2 Modeling of Room #1 and Room #2

Construction work of the FTL control room is an installation of the separation wall between the rooms and the access flow, the penetration and so on. There is mechanical work of an air conditioner installation, HVAC duct modification, etc. The I&C systems include the Process Control System (PCS), the Data Acquisition

System (DAS), the Radiation Monitoring System (RMS), the protection panel, the operation station, the Data Logger Station (DLS), etc. Instruments, tubing and its supports, electric conduits, cables, lightings, ground connections, CCTV's, etc. are also installed.

The FTL control panel is installed on the floor at the HANARO control room. The penetration work is included in the room.

Construction work of the IPS and its penetration can be divided into the HANARO pool area and the piping gallery area, respectively. Firstly, in the HANARO pool, which is the main area of the IPS, are installed the modified piping and its supports, the IR1 flow tube, the lower bracket & mounting plate, the IPS vessel assembly, etc.(2).

This radiation control area is for the reactor which has been operated for more than 10 years and much attention must be paid so as not to affect the HANARO Reactor core. The IPS construction is shown in Fig. 3. Secondly, the pipe gallery construction work improves the penetration piping and its insulation material.

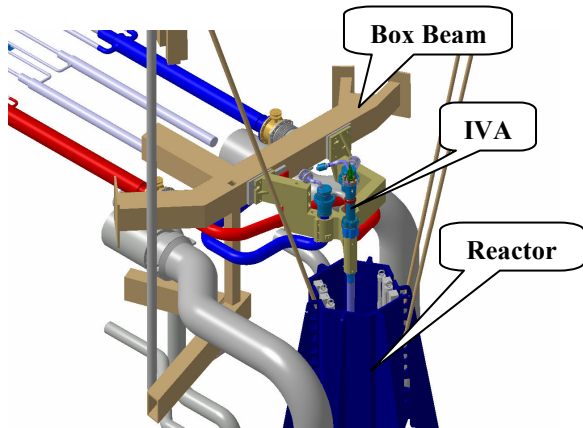


Fig 3 Installation of In-Pile Section

### 3. TFT organization and CoP management

The Task Force Team (TFT) for the FTL installation construction work was organized in July 2006. The TFT consists of engineers for a safe supervision, technical management, HANARO interferences and utility management, construction work support, construction work management, radiation management, and a quality assurance.

The technical management team prepared the TFT work procedures for the construction. During the construction, safety guide work was carried out mainly by the Fuel Test Loop team and the HANARO Operation Management.

Safety guiders of each day were posted on the Community of Practice (CoP) on a monthly basis. The construction progress control was made through the work diary, the by-weekly work schedule, and the total construction schedule. On the CoP construction work diary, TFT meeting minutes and safety guiders, progress status, work procedures, design data including P&ID,

etc. are shown. All of the KAERI staff involved in the FTL installation work can access the CoP. Fig. 4 shows the contents of the CoP.

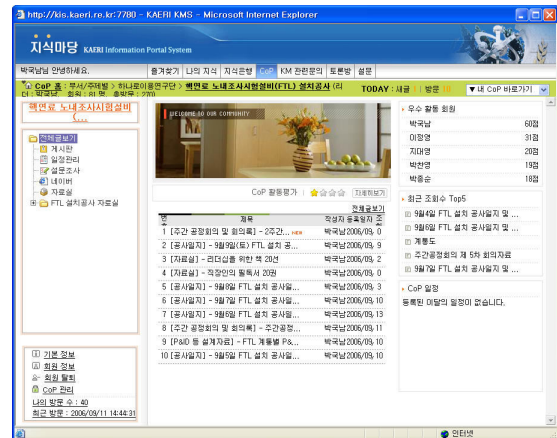


Fig.4 Bulletin of Community of Practice

### 4. Construction work results

Construction work and mechanical installation at Room #1 and Room #2 have been completed as of the middle of this September. Piping work, electricity and I&C work will be next. At the FTL control room and the HANARO control room only equipment installation and electric work remain unfinished. IPS installation work and penetration modification will be started from late September,

### 5. Conclusion

1. A contract for the FTL installation project was made with a domestic corporation at the end of 2005.
2. In July 2006, the FTL installation was approved from KINS.
3. A TFT for the project execution was organized. Construction progress and status were posted on the CoP on the daily basis.

In late November 2006, the FTL installation project is expected to be completed successfully.

### REFERENCES

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[2] Kook Nam Park, Jong Min Lee, Bong Shick Sim, Dae Young Chi, Su Ki Park, Soung Ho Ahn, Chung Yong Lee, Young Jin Kim, The Design of In-Pile Test Section for Fuel Test Loop, Korean Nuclear Society, Spring Meeting 2004