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Core Knowledge Preservation & Transfer System Establishment and Utilization for NPP

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1. Introduction

Knowledge is the most important factor in the safe and reliable operation of NPP.

One generation has passed since we began to operate NPP in Korea. And then it became time to retire much experienced personnel in NPP. Although we have many kinds of knowledge sharing systems inside KHNP, we don't have any systematic experience knowledge preservation and transfer systems that are important for the operation of NPP. So we have lost important experience knowledge since we started operating. Especially, KHNP has adopted an internal promotion system as the human resource management policy, which induced frequent job position changes of staff members because there were job positions for a good promotion. Additionally, KHNP doesn't overlap jobs for long enough periods between previous staff and new staff when staff changes occur. With these reasons KHNP could not accumulate experience knowledge inside the company system. Therefore, KHNP could not preserve and transfer to the next generation the experience related to NPP operations systematically. To resolve these issues KNPEI performed a research project from March 2006 to September 2007.

The purpose of this report is to introduce the experience knowledge preservation & transfer system that KNPEI has established and the utilization of the system.

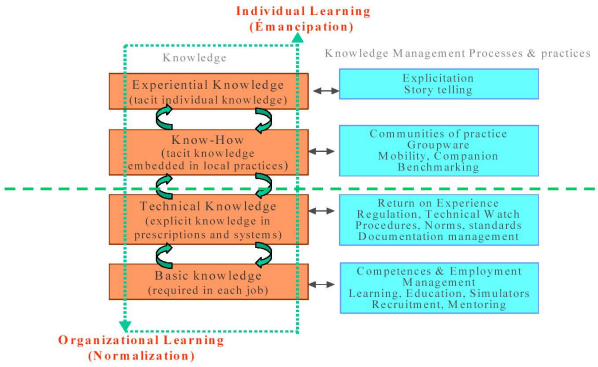
2. Knowledge structures

KHNP has some kinds of knowledge portals like KONIS, but these knowledge portals are for sharing only explicit knowledge. Explicit knowledge is just a part of knowledge. The important knowledge to perform a job is tacit knowledge imbedded in the head of the personnel.

KNPEI has studied the concepts of knowledge as a part of the research activities. EdF in France suggested four layered knowledge structure model at the International Conference on Nuclear Knowledge Management held in France in 2004, which was useful to understand how people learn and create knowledge.

The first layer of the knowledge is basic knowledge required for individual personnel to perform their job. Each personnel could get this knowledge at school or training center through formal training programs or at existing knowledge portals.

The second layer of knowledge is technical knowledge that can be achieved through CAP (Corrective Action Program) process. KHNP already has established CAP. The knowledge of the second layer can be accumulated in the database system through the CAP process.



[Figure 1 Four Layered Structures Knowledge Model (From EdF)]

But we cannot learn and share the knowledge on the third & forth layers with the existing method. So we need a special system to knowledge that is the third & forth layers knowledge. Tacit knowledge can be communicated to each other through face to face contact. So the tacit knowledge portal should have the function of CoP(practice of communities). Face to face contact knowledge sharing system has some restrictions on capacity of knowledge transfer. So it is required to convert the tacit knowledge into explicit knowledge for a large quantity of knowledge transfer.

3. Established core knowledge preservation and transfer system

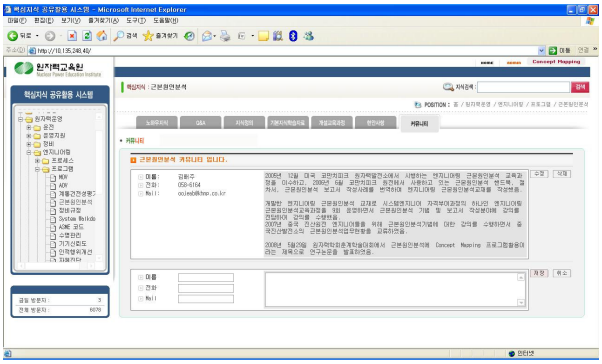
The system for the first and second layers knowledge was already established in KHNP like other companies. But it is required to establish a system for tacit knowledge because the important knowledge to perform a job is tacit knowledge. Two kinds of knowledge preservation and transfer systems were established for the tacit knowledge during these research activities.

3.1 Established tacit knowledge preservation and transfer system

The knowledge of the third and forth layer can be communicated through face to face contact because this type of knowledge is embedded in the brains of people. So it is important to give some opportunities to meet other people with the same duties to communicate their knowledge. But it is difficult to get the opportunity for

frequent face to face contact at KHNP because of the characteristics of the company business. So it is required to make some space to contact each other on-line, like the phone or on a webpage. For this purpose, we extracted 500 core knowledge sections for operating KHNP at first, and then we made web server able to communicate on the web for the 500 core knowledge sections.

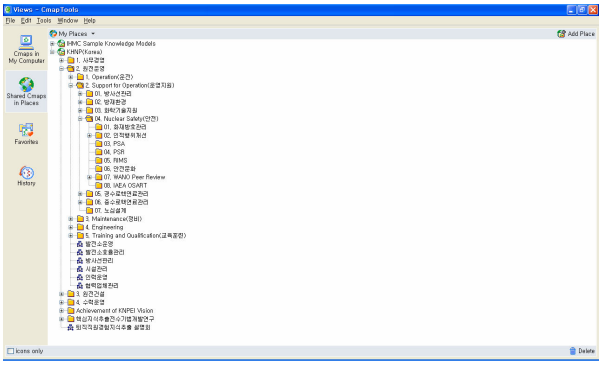
It was made for each expert to register their job experience history, pending issues, learning materials and training programs to be experts for each knowledge section. Each expert can communicate with each other on the web or by phone about the issues registered on the web.



[Figure 2 Tacit Knowledge Preservation & Transfer Portal]

3.2 Established a system to convert tacit knowledge into explicit knowledge

Face to face contact knowledge transfer method has some restrictions on large scale knowledge dispersion. So it needs to convert the tacit knowledge into explicit knowledge for large scale dispersion with electronically.



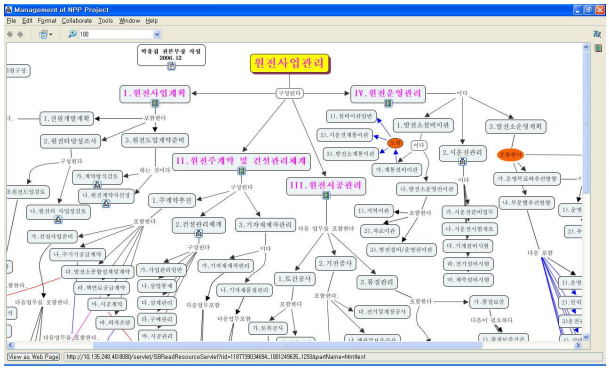
[Figure 3 Established Concept Mapping Server]

KNPEI introduced a Concept Mapping Program that was excellent in presenting conceptual knowledge and set up a Concept Mapping server to capture experience knowledge of experts. This program has functions to link all kinds of data electrolyzed, which makes possible it present to the knowledge presented by storytelling.

4. Utilization of knowledge preservation and transfer system

4.1 Knowledge Capture of Retired Personnel

We have captured experience knowledge of five retired peoples with the Concept Mapping program and storytelling method as a part of the research activities. The captured knowledge was registered on the Concept Mapping Server.



[Figure 4 a Sample of Captured Knowledge with Concept Mapping Tool]

4.2 Real Time Knowledge Capture

We tried to do real time knowledge capturing with the Concept Mapping program for rare jobs like WANO peer review activities. The next peer reviewer uses the captured knowledge registered on the Concept Mapping Server.

5. Conclusions

The actual knowledge needed to perform a job is the tacit knowledge, like know-how or experience knowledge. But it has not been managed until this time systemically. KNPEI established two tacit knowledge management systems, which were the tacit knowledge preservation & transfer portal and the Concept Mapping server program. The human resource management system of KHNP has some pitfalls on tacit knowledge preservation and transfer issues. These two tacit knowledge management systems can be a solution in managing the problems of experience knowledge loss at KHNP.

REFERENCES

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[2] EPRI TR1009581 'Real-Time Expert Knowledge Acquisition and Transfer' November 2004