

## Task to Training Matrix Design for Decommissioning Engineer on the basis of Systematic Approach to Training Methodology

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### 1. Introduction

Since the first commercial Nuclear Power Plant (NPP) operation in Calder Hall, United Kingdom, most of NPPs have nurtured experienced and qualified employees to guarantee safety and reliability of NPP all over the world. This is reason why a majority of NPPs in every country have founded and maintained their own training institutes, methods and objectives.

In nuclear history, before Chernobyl Accident, Three Mile Island (TMI) Accident was the severest accident. For this reason, to resolve the disclosed or potential possibilities of nuclear accident, more than one hundred countermeasures were proposed by United States Nuclear Regulatory Commission (USNRC). Among various recommendations by USNRC, one suggestion was related to training aspect. It was Systematic Approach to Training (SAT) and this event was the initiation of SAT methodology in the world.

In Korea, upcoming June 2017, Kori Unit-1 NPP is scheduled to be shut down and it will experience NPP decommissioning for the first time. Hence for the success of NPP decommissioning, training sufficient number of knowledgeable and skillful decommissioning engineers is one of the most urgent issues. Therefore, present study aims to establish concrete training foundation for NPP decommissioning engineers based on Systematic Approach to Training (SAT) methodology, in particular, Task to Training Matrix (TTM).

### 2. Systematic Approach to Training

In this chapter, fundamental description about Systematic Approach to Training (SAT) is elucidated including SAT structure. Basically, SAT structure is usually called ADDIE, and it stands for Analysis, Design, Develop, Implementation and Evaluation.

#### 2.1 Origination and application of SAT

In 1979, due to the failure of Auxiliary Feedwater Water (AFW) pump actuation right after Main Feedwater Water (MFW) pump malfunction, the reactor core of TMI Unit-2 was damaged and a great amount of radioactive materials leaked to the environment and it

was proved that there was a possibility of NPP disaster. As a matter of fact, since TMI Accident, the severest accident happened in Chernobyl, the Union of Soviet Socialist Republics (USSR). Thus, after TMI Accident, USNRC suggested more than one hundred NPP improvement plans. In there, one proposition was related to training viewpoint. It was Systematic Approach to Training (SAT). [1]

The year 2009, there was a NPP export contract with United Arab Emirates (UAE). In this contract, one sentence described SAT based training. 'Operating services contractor shall ensure that approved (accredited) training programs are developed, established, implemented and maintained using a systematic approach to training (SAT).' This was an beginning of SAT methodology for NPP employee training in Korea.

#### 2.2. Basic structure of SAT

SAT supplies logical processes from the analysis of performances requested to implement jobs for Analysis, Design, Development and Implementation to carry out competence and subsequent to training evaluation [2]. Fundamentally, SAT is composed of five steps: Analysis, Design, Development, Implementation and Evaluation [3]. Next diagram is succinct elucidation of SAT process. [4]

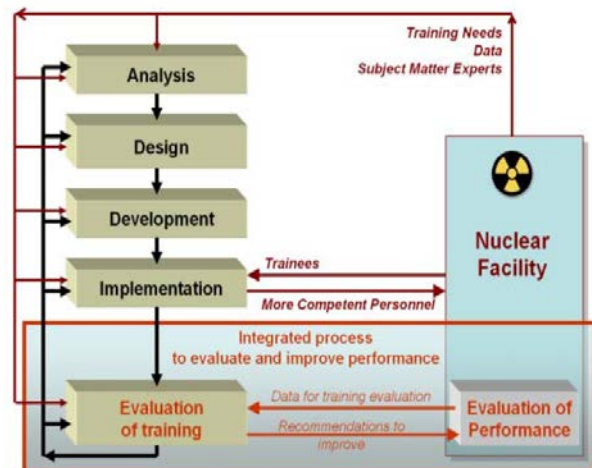


Fig. 1. Diagram of SAT process in NPPs

### 3. Task to Training Matrix

In this section, SAT for the training of NPP decommissioning engineer is displayed. Therefore, as an initial step for the NPP decommissioning engineer training, Job and Task Analysis (JTA) shall be implemented in Analysis stage. After JTA process, additional compulsory data for training are created and summarized in Task to Training Matrix (TTM).

#### 3.1. Analysis for JTA

In Analysis stage, JTA is determined through Need Analysis, Job Analysis and Task Analysis. In the long run, the number of acquired tasks for decommissioning engineer is eighteen. Next Table I shows determined tasks for training.

Table I: Tasks for NPP decommissioning engineer

Task code	Task Name
DE-T001	Consider fundamental knowledge of NPP decommissioning.
DE-T002	Review foreign experiences for NPP decommissioning.
DE-T003	Examine domestic experiences for nuclear facilities decommissioning.
DE-T004	Organize human resources, training and documents of NPP decommissioning.
DE-T005	Describe fundamental policy of domestic NPP decommissioning.
DE-T006	Explain project management of NPP decommissioning.
DE-T007	Review necessary regulations for foreign NPP decommissioning.
DE-T008	Review compulsory regulations for domestic NPP decommissioning.
DE-T009	Establish Decommissioning Planning (DP) for domestic NPP decommissioning.
DE-T010	Review spent fuels management of foreign NPP decommissioning.
DE-T011	Look into spent fuels management of domestic NPP decommissioning.
DE-T012	Suggest technology development roadmap of domestic NPP decommissioning.
DE-T013	Describe dismantling technology for structures and components.
DE-T014	Explain decontamination technology for structures and components.
DE-T015	Consider site remediation at the final stage of NPP decommissioning.
DE-T016	Elucidate radiological characterization through decommissioning activities.
DE-T017	Account for NPP decommissioning wastes management.
DE-T018	Evaluate the cost of NPP decommissioning.

#### 3.2. Design for TTM

After the task decision for NPP decommissioning engineer, the supplementary data for the establishment of TTM are showed in Table II.

Table II : Data for the creation of TTM

No	Items	Description
1	Task Code	Task number
2	Task Name	Task name
3	Element	Segmentation of tasks
4	Condition	Recommendations and circumstance
5	Standard	Reference procedures and document
6	Knowledge and skill	Practical information and experiences
7	Learning objective	Final goals of training
8	Training setting	Type and venue for training

Lastly, the completion of TTM means the end of Design step.

### 4. Conclusions

The objective of this paper is to organize TTM on the basis of SAT for NPP decommissioning engineer. For this reason, eighteen tasks are yielded through Job and Task Analysis (JTA) process. After that, for the settlement of Task to Training Matrix (TTM), various data are determined such as element, condition, standard, knowledge and skill, learning objective and training setting.

When it comes to training in nuclear industry, SAT methodology has been the unwavering principle in Korea since NPPs export to UAE. Therefore, materialization of TTM as an initial step for SAT based training for NPP decommissioning engineer must not be overlooked.

### REFERENCES

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- [3] INPO, ACAD 85-006, Principles of Training System Development, Atlanta, 1993.
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