SAT application in Daya Bay Nuclear Power Operations and Management Co., Limited (DNMC)
Self-introduction

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Daya Bay Nuclear Power Operations and Management Co., Limited (DNMC) was established in March 2003 through the joint investment of Guangdong Nuclear Power Joint Venture Co., Ltd. (GNPJVC, GNPS owner) and Ling Ao Nuclear Power Co., Ltd. (LANPC, LNPS Phase I owner).

Entrusted by GNPJVC and LANPC, DNMC is responsible for the operations and management of the four 1000MWe PWR units of Guangdong Daya Bay Nuclear Power station (GNPS) and Ling Ao Nuclear Power Station (LNPS) Phase I.

Entrusted by Ling Dong Nuclear Power Co., Ltd. (LDNPC), DNMC is responsible for the operations preparation and, after commercial operation, operations management of the two 1000MWe PWR units of LNPS Phase II.

In April 2008, Yang Jiang Local Office was established to be responsible for the operations preparation and operations management of the six 1000MWe units of Yangjiang Nuclear Power Station.

In March 2009, DNMC Fangchenggang Local Office was set up. The site is planned with 6 1000MWe class PWR units which are of the joint investment of CGNPC and Guangxi Investment Group with the former responsible for project construction and operations management.
I. Brief introduction of DNMC training

II. DNMC training system base on SAT

III. A example of SAT application
I. Brief introduction of DNMC training
### DNMC training facilities (1)

| General facility | 31 classrooms (ordinary and special ones), facilitate 900 persons’ training at the same time. E-learning system/training management platform/the equipments for making multi-media training materials. |

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**DNMC training facilities (1)**

[Image of DNMC training facilities]
| Operational training facility | 2 full-scope simulator and 1 elementary simulator – another 2 full-scope simulator to be ready by 2009. |
### DNMC training facilities (3)

| Skill training/Behavior training facility | 12000 m², 38 labs for 8 specialties, 70 program could be organized, with another 20 by 2010 for a construction area of about 8000 m². |

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![Image of training facilities](image_url)
DNMC Training organization chart

GM

Operational Education and Training Committee

NTC (Training centre)

Training supervisors/Training engineers from branches

- Develop training needs
- Individual OJT
- Organize OJT
- Support NTC training activities

- Plan training activities
- Prepare training plan
- Establish training systems
- Carry out training courses
- Provide trainers
- Offer training facilities
- Check into OJT

- Develop training policies
- Ascertain organization and program
- Mobilize & allocate training resources
Basic requirements for personnel in DNMC

In four aspects:

- Be knowledgeable in NPP theories in a general and systematic way (fundamental & equipment and system principles)
- Be competent in terms of working skills as required by positions
- Be vigilant on safety and quality
- Be proper in ways of thinking & codes of behavior
Training objectives for personnel in DNMC

- Update and explore knowledge for staff
- Reinforce & upgrade job performance
- Cultivate safety & quality awareness
- Improve codes of behavior

Highly qualified personnel (knowledge, skill, attitude, behavior)

Good equipment conditions

To ensure safe and stable operating of NPP

Besides, training for DNMC operators shall meet the requirements of national nuclear safety regulation as well as industry guidelines, RO and SRO shall hold license issued by regulatory authority, others shall get certificate as a proof of qualification for certain post or a specific task.
Training aspects for personnel in DNMC

Training Org.

Behavior and Safety culture

Job skills training
Simulator training

Tech. theories
Safety authorization

Standard codes of behavior
Safety culture

Enhance and upgrade skills

Operation staff
Config. control
Incidental handling
Outage blocking

Mainten. staff
 Equip. repair
Maintenance
Spare part prep.

Tech. engineering staff
 System surveillance
Check equipment
Functional test
Engineering mod.

Mgt. crew
Safety mgt.
Quality mgt.
RP mgt.

Basic and equipment & system theory

Safety & quality awareness

Operational Org. (by branches)
On-job training

On-job training

Behavior and Safety culture

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DNMC training course structure

Operational training course structure

**Basic safety Authorization training**
- Industrial safety course
- Nuclear safety course
- RP course
- Special course

**Theory training**
- NPP systems & equipment Operations training course
- Maintenance training course
- Technical management course
- CPR1000

**Management training**
- Training course for administrative staff
- Management knowledge and skill training course

**Expanding training**
- Pedagogical course
- General knowledge training

**Simulator training**
- Licensed operator training course
- Non-licensed operator training course
- CPR1000 training course

**Skills training**
- Skill training course for operating staff
- Skill training course for maintenance staff
- Skill training course for technical staff

**Behavior training**
- Behavior training course for operating staff
- Behavior training course for maintenance
The way to professionalism for DNMC trainer

- **Strict selection from each branch**
- **Theoretical trainer**
- **Simulator trainer**
- **Skills training trainer**
- **Behavior training trainer**
- **Swap with specialty branches regularly**

- **Full-time trainers**

- **For professionalism**

- **Appraisal & authorization prior to work**

- **Part-time trainers from branches**
- **Trainer hired from univ. & scientific research organ.**
DNMC training managing procedure

Training organization management
C-AD/TRA/000 DNMC Training Management
C-IP/ORG/109 NTC Organizational Structure and Posts Standards

Training authorization and users interfaces
C-IP/TRA/011 Basic safety training authorization
C-IP/TRA/012 Operations licensing people training authorization
C-IP/TRA/013 Operational staff skill training and technical authorization
C-IP/TRA/014 Contractor training authorization
C-IP/TRA/015 Management cadre Training
C-IP/TRA/016 Occupation identification Management
C-IP/TRA/017 Training appraisal for people to special work types

Training management
C-IP/TRA/021 Operational simulator training
C-IP/TRA/022 Surveillance on OJT training
C-IP/TRA/023 Training to new comers
C-IP/TRA/024 External training management
C-IP/TRA/025 Cultivation on professional trainer

Need/Course/Implementation/Assessment
C-IP/TRA/031 Training needs analysis
C-IP/TRA/032 Training course development
C-IP/TRA/033 Preparation for training materials
C-IP/TRA/034 Training progress management
C-IP/TRA/035 Training evaluation and experience feedback

Other training related procedure
C-IP/TRA/041 …………………
C-IP/TRA/042 …………………
……………………………………
The serial number is for departmental training procedure.
II. DNMC training system base on SAT
From the operations training perspective, DNMC has applied the Systematic Approach to Training (SAT) which is very popular in NPP training field.

- **Needs Analysis**
  
  Considering a typical post, identifying the training needs and the competences required to perform a particular job, then determining the training needs.

- **Training Program Design**
  
  In this phase, competences should be converted into training objectives, these objectives should be organized into a training plan.

- **Training preparation**
  
  According the training program demands, training materials should be prepared so that the training objectives can be achieved.

- **Implementation of training**
  
  Including organization, preparation for courses, trial test, conducting and appraisal.

- **Evaluation of training effectiveness**
  
  All aspects of the training program should be evaluated on feedback collected in each phase. Further improvement or revision will be carried out based on these results.
Systematic Approach to Training (SAT)

- SAT is focused on overall competency as required by a specific post. It is to train personnel of all these requirements by preparation and implementation of training program including assessment on the whole process.
- SAT is in fact a way of management by ensuring staff engaged in operations, maintenance, tech. support and operational mgt. obtain and enhance their qualification & competency through a high quality training process.
- SAT training methodology is featured by its quality assurance (QA).
Operational training system has gone through a process of learning, planning till implementation, it is improved on a continuous basis. The training system is unique in its mode as authorization-to-work, all staff training, lifelong education. It covers six training authorization program:

- Training & Authorization system for managers
- Training & Authorization system for operations personnel
- Training & Authorization system for engineering and technical personnel (MTA)
- Training & Authorization system for maintenance personnel (ETA)
- Contractors and authorization
- Test, modification, RP

Key training systems in NPP

Operational training system has gone through a process of learning, planning till implementation, it is improved on a continuous basis. The training system is unique in its mode as authorization-to-work, all staff training, lifelong education. It covers six training authorization program:

- Staff job training program
- Individual training program on a yearly basis

All employee

Plant Basic Safety Authorization Training System
Flowchart for employee training authorization

From campus

New employee

Social recruitment

Entrance safety package examination

Basic safety authorization system

Training & Authorization system for Operations personnel

Training & Authorization system for maintenance personnel (MTA)

Training & Authorization system for engineering and technical personnel (ETA)

Training & Authorization system for managers

Training at specific training org.

Basic safety authorization
Tech. theories
Job skills
Simulator
Safety culture
Behavior

OJT for specialty branches

individual annual training plan (ITP)

Job training program for plant staff
Basic authorization requirement (ATR)

ITP

Completing basic authorization and necessary training courses

Proposing basic authorization

Self-acceptance

TTC’s review

Approval and issuance of basic authorization

Qualified for entering the NPP field

Proposing renewal of basic authorization

Retraining

Annual summarizing, exam, ITP updating

Basic authorization is an official acceptance (by the NPP manager or his representative) of the employee who basically has knowledge and awareness of safety and quality. Employees working at the field are required to have related post qualification, i.e. they need to have authorizations in the areas of operation or maintenance or engineering. Basic authorization is a prerequisite to obtaining the post authorization.

4 single authorizations and 1 comprehensive practice authorization

Nuclear safety (NS), industrial safety (IS), radiation protection (RP), special authorization (SA) and practice authorization (PA)
Operation post is one of the most important posts in the NPP; the operation level of operators has direct effect on safety and economic indicators of the Unit. GNPS has established a complete set of systems for selection of operators, training, exam, licensing, retraining, authorization-to-work and post enhancement. It takes at least 3-5 years to foster a qualified RO, and 6-7 years for a qualified SRO.
NNSA

DNMC license applying committee

Training centre

Senior operator license examination

Senior operator

Deputy shift supervisor

Shift supervisor

Plant management coordination general trial arrangement accident analysis

Outage coordination isolation manager

Operator

Grid coordination control Nuclear controlling Waste controlling

Field operator

Basic systems operations and accident handing

New people

Operating systems and equipment skills

On-job-training

Operations knowledge trainings at training centre

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Training & authorization for maintenance staff

Tasks classification → Training requirement determination → Implementing training → exam → Technical authorization → Technical post

5level
4level
3level
2level
1level

Task1
Task2
Task3
......
N

Single task1
Single task2
Single task3
......

Integrated with each single tasks

Other factors for raising

B8
B7
B6
B5
B4
B3
B2
B1
B0
Training & authorization for engineering and technical staff

Technical post → Needs analysis → Determine competence needs → Determine training content → Determine courses → Implementing → exam → Technical post

- Primary task:
  - B1
  - B2
  - B3

- Secondary task:
  - B4
  - B5
  - B6

- Senior task:
  - B7
  - B8

- Other factors for raising

- One of the basic factor for raising

- Competence identification

- Skill training courses
  - On-job training courses
  - Special training courses

- Technical authorization

On 2009-6-9
III. A example of SAT application
Process of course establishment in NPP

1. Training Task Book
2. Course Description List
3. Training Plan
4. Teaching Material
5. Examination Syllabus
6. Test Paper
7. Trainee questionnaire
Thank You

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