Cooperation for the Nuclear Power Plant Development

JAIF international cooperation center (JICC)
Feb. 10, 2011
Purpose
JICC was established in March 2009. Acting as a contact window, JICC plays a core role in providing effective and efficient cooperation to Nuclear Power Plant developing countries.

Role of JICC
JICC promotes the cooperation for NPP development and coordinates various programs of cooperative activities implemented by related organizations, through providing “one-stop” and “tailor-made” services to new comers.

Major Activities in 2009 and 2010
- Dispatching experts (Vietnam, Indonesia, Jordan)
- Workshop, seminar and training in Japan and Overseas (Vietnam, Indonesia, Kazakhstan, Mongolia)
- Invitation of mission for NPP development (Vietnam, Indonesia, Kuwait, Mongolia)
Technical Cooperation Programs by Various Sectors

HRD programs are provided from various technical cooperation programs of specific standpoint on nuclear power plant development.

**JAEA** - from education and research standpoint
**JNES** - from regulation and safety standpoint
  - such as seismic safety seminar, regulatory advices

**FEPC(JAPC)** - from utility’s standpoint
  - Roadmap/Milestone planning for nuclear power plant introduction
  - Planning and implementation of FS
  - Evaluation of site, reactor-type and Utility Requirements Document
  - Plant operation, including operators & maintenance engineers training

**JEMA(suppliers)** – from technical and engineering standpoint
  - current reactor technology and plant construction technology

**<JINED** - from business phase standpoint
  - project proposal for NinhThuan No2 site in Vietnam>
HRD program by Power Utility

<Example: JAPC Training Center>

- From 21 countries, 260 foreign engineers have trained since 1985.

  • **Basic nuclear knowledge education** for engineers.
  • **Nuclear management education** for engineers of future NPP. (Radiation management, Fuel management, Construction management and so on.)
  • **Education for understanding of behavior** of the core & fuel and the plant during the normal & transient events that could occur in the plant, using a NPP control simulator.
  • **Education of safety regulations** for nuclear power plant construction and operation.

JAPC: The Japan Atomic Power Company
<Example: Training courses(1)>

<table>
<thead>
<tr>
<th>TC-1  Basic</th>
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<tbody>
<tr>
<td>- Experiences of 1st Nuclear Power Plant in Japan</td>
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<tr>
<td>- Reactor Physics</td>
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<td>- Regulations on Nuclear Energy Field</td>
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<tr>
<td>- Radiation Control</td>
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<tr>
<td>- Licensing</td>
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<tr>
<td>- Outline of Nuclear Power Plant Design</td>
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<td>- Nuclear Reactor Control Simulator</td>
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<table>
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<tr>
<th>TC-2  Construction Plan and Preparation</th>
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<tr>
<td>- Master plan of nuclear power plant introduction and contents of each items</td>
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<tr>
<td>- Feasibility study and Pre-FS</td>
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<td>- Selection of Power Output</td>
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<Example: Training courses(2)>

**TC-3  Plant Overview**
- Nuclear power plant component and main function
- Safety system/Reactor auxiliary system
- Radioactive waste treatment system
- Main turbine system
- Generator system
- Instrument and control system
- Control of NPP

**TC-4  Nuclear Reactor Control Simulator Training**
- Normal operation
- Behavior at transient and accident

And more lectures and trainings you need
Master Project Plan for NPP Introduction (Standard Case)

Overall procedure for the project is divided into the following four phases:

1. Project Planning Phase (FS): Evaluation of capability and timing for the introduction, screening of candidate sites and reactor types.
2. Project Implementation Phase: Selection of reactor type, bidding, implementation of field survey and environmental impact assessment.
3. Design & Licensing Phase: Facility design and licensing for installation and construction.
Dispatch of experts regarding phase 1&2 of the plan

Topography, geology, ground foundation

**Site area survey:** Identification of topography/geological structure for the site area, Establishment of design base ground motion
(Aerial photo, ground surface reconnaissance, lineament survey, bathymetry and geological structure survey)

**Site survey:** Identification of geological structure for the site and characteristics for the base foundation for the possible reactor building area
(Ground surface geology survey, elastic wave survey, boring survey, test pit survey, rock foundation test, physical characteristics test)

Meteorological and Oceanographic phenomena

**Weather observation:** Obtainment of data for evaluation on dose to the public
(Wind direction, wind speed, solar radiation at the ground level and the stack height, wind tunnel test)

**Survey on current direction/current speed, water temperature/salt content distribution:** Obtainment of data for assumption of thermal effluent diffusion
(Current direction/current speed: Constant current measurement at the fixed point, tracking of tidal current plate, distribution of water temperature/salt content, assumption of thermal effluent diffusion)

**Survey on water temperature, wave direction, wave height:** Obtainment of data for designing of condenser and coastal structures
(Constant measurement of water temperature at fixed point, estimate of storm wave based on the data of oceanographic phenomena for last 10 years, actual measurement of wave direction and wave height)
For operation phase, we can introduce...

- **Nuclear Emergency Plan**
  Central Government and Local Government have Nuclear Emergency Plans.
  To reduce the resident's radiation exposures quickly and efficiently, Emergency Planning Zone (EPZ) is defined on the plan. 8km~10km is Japanese EPZ

- **Radiation Emergency Hospital**
  National Institute of Radiological Sciences (NIRS) has the radiation emergency hospital and so many experiences of past radiation exposure accidents involving the exposures from atomic bombing in Hiroshima and Nagasaki
Training & human resources development

- JICC can contract with JAPC regarding training for persons of new comer countries.

- Training course for public acceptance is developing now. It will be started middle of 2011.