

Technical Evaluation of Electrical Grid to Support Nuclear Power Plant

Training Programme: Technical Evaluation of Electrical Grid to Support Nuclear Power Plant

Participants: Grid Study Team, Kenya (15 members)

Organization: Kenya Nuclear Electricity Board



Venue: State Nuclear Electric Power Planning Design & Research Institute (SNPDRI), Beijing, China

Date: 05 June 2016 to 11 June 2016

Day	Activity
05 June 2016	ARRIVAL AT BEIJING, CHINA TRAVEL TO HANGZHOU FROM BEIJING via CONNECTING FLIGHT ARRIVAL AT HANGZHOU, CHINA
06 June 2016	PLANT WALKDOWN: <i>Visit to Qinshin Nuclear Power Plant (NPP), Hangzhou</i> <ol style="list-style-type: none"> Presentation on Overview of Nuclear Power Generation in China and Electrical Grid Structure <i>Overview on nuclear power generation in China, present ongoing projects and future nuclear power projects, electrical grid structure in China and its integration with NPPs</i> Presentation on Qinshin Nuclear Power Plant <i>Overview of Qinshin Nuclear Power Plant, different types of units under operation and its generation capacity, electrical grid structure, electrical equipments & protection, dispatch communication overview.</i> Plant Walkdown to Heavy Water Unit of Qinshin Nuclear Power Plant <i>Visit to heavy water unit of Qinshin NPP, main control room, turbine building, diesel generators, periphery of NPP</i> DEPARTURE FROM HANGZHOU to BEIJING
07 June 2016	TRAINING LECTURE-1: <u>Nuclear Power Plant Interconnection with Grid</u> <ol style="list-style-type: none"> Interconnection Between NPP and Power Grid <ol style="list-style-type: none"> <i>Related Standards of NPP and Nuclear Security Measures</i> <i>Prerequisites for Safe Operation of NPP</i> <i>Influences on Power Grid by Different Interconnection Mode</i> <i>Technology Development of NPP</i> Analysis of Kenya's NPP Interconnection <ol style="list-style-type: none"> <i>Power Grid Development and Nuclear Power Strategic Plan in Kenya</i> <i>Analysis of NPP Interconnection Schemes</i> <i>Operation Security Analysis of Kenya Power Grid with NPP</i> <i>Reserve Capacity and Peaking Capability of Kenya Power Grid with NPP</i>
08 June 2016	TRAINING LECTURE-2: <u>Proposed Protection Configuration</u> <ol style="list-style-type: none"> General <ol style="list-style-type: none"> <i>Power Grid in China (substations)</i> <i>Power Grid in China (transmission lines)</i> System Protection Solution for Power Grid <ol style="list-style-type: none"> <i>Line protection for double busbar system;</i> <i>Line protection for one and a half CB system ;</i> <i>Line protection channel mode ;</i> Production Introduction <ol style="list-style-type: none"> <i>Nanrui Production;</i> <i>Xuji Production;</i> Protection Technology Development Line Protection Principle for NPP Interconnection <u>Advanced Application of EMS (Energy Management System) and TMR (Tele-Meter Reading System)</u> <ol style="list-style-type: none"> <i>Developing process</i> <i>Scope of business</i> <i>Acquisition and transmission</i> system function <ol style="list-style-type: none"> <i>Architecture of Distribution Management System</i> <i>software Architecture</i>

Day	Activity
	<p>4.3. <i>System Characteristics</i></p> <p>4.4. <i>Platform</i></p> <p>5. SCADA</p> <p>5.1. <i>Data Acquisition</i></p> <p>5.2. <i>Data Processing</i></p> <p>5.3. <i>Supervisory Control</i></p> <p>6. TMR (Tele-Meter Reading) System</p>
09 June 2016	<p>TRAINING LECTURE-3:</p> <p><u>Telecommunicating technology development in power system</u></p> <p>1. Challenges of telecommunication in modern power system</p> <p>1.1. <i>Unreliable Telecommunication Cause Outage</i></p> <p>1.2. <i>Difficult to Prevent and Detect Accident</i></p> <p>1.3. <i>Safety Management and Trouble- shooting</i></p> <p>1.4. <i>Multiple service carried by Telecommunication network</i></p> <p>1.5. <i>Difficult to Maintain Multiple Interfaces</i></p> <p>1.6. <i>Difficult to access in Remote Areas</i></p> <p>2. Telecommunication Solution for Power Transmission</p> <p>2.1. <i>Basic building blocks of telecommunication network</i></p> <p>2.2. <i>Transmission medium of telecommunication network</i></p> <p>2.3. <i>Optical transmission network</i></p> <p>2.4. <i>Supplementary communication solution</i></p> <p>3. Services Requiring</p> <p>3.1. <i>Power system services overview</i></p> <p>3.2. <i>Tele-protection</i></p> <p>3.3. <i>Data Transmission</i></p> <p>3.4. <i>Dispatch Telephone</i></p> <p>3.5. <i>Surveillance Video</i></p> <p>4. Telecommunication technology development</p> <p>4.1. <i>Optical transmission technology development</i></p> <p>4.2. <i>WDM system</i></p> <p>4.3. <i>OTN system</i></p> <p>5. Suggestions on telecommunications system for proposed NPPs</p>
10 June 2016	<p>TRAINING WORKSHOP:</p> <p><u>Training Workshop-1 on Software PSS/E</u></p> <p><i>To understand capability and features of PSS/E, its application and importance;</i></p> <p><i>General overview on how to use the PSS/E software To perform, grid flow studies, steady state and transient analysis, calculations of various parameters;</i></p> <p><i>Few case studies on China Grid System connected to NPPs and Kenya Grid System for future NPPs</i></p>
11 June 2016	DEPARTURE FROM BEIJING, CHINA