COMMISSIONING AND START-UP ACTIVITIES OF COAL POWER PLANTS:
Preparation, Planning, Pre-Commissioning Checks and Tests, Commissioning Schedule, Detailed Commissioning Procedures and Instructions for each Equipment in a Coal Power Plant, Instrumentation, Trial Run of each Equipment, Safety and Precautions, Commissioning of Coal Power Plant Systems, Safety Rules Clearance Certificates, Procedure for the Control and Handling of Defects, Commissioning Reports

12 – 16 NOVEMBER 2018, KUALA LUMPUR, MALAYSIA

Expert Course Faculty Leader

Has more than 32 years of practical engineering experience with Ontario Power Generation as an Engineering Supervisor and Training Manager, has conducted courses and seminars, to more than 4,000 working engineers and professionals who consistently ranked him as "Excellent" or "Very Good". He has also written 5 books for working engineers from which three have been published by McGraw-Hill, New York.

TOPICS COVERED

- Commissioning Management System
- Commissioning of Boiler and Auxiliaries
- Commissioning of Electrostatic Precipitators
- Commissioning of Fuel Oil System
- Preparation for First Light-up
- Commissioning of Soot Blowers
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Introduction
This seminar provides a comprehensive understanding of all the commissioning and start-up activities of coal power plants. The Commissioning Management System of coal power plants is covered in detail in this seminar. This includes all the commissioning procedures and documents, purpose of commissioning, responsibilities, system description, organization, working parties, test teams, documentation, testing and commissioning schedules, test reports, safety, plant certification, and plant completion report. The seminar provides also a thorough understanding of all the commissioning requirements for boiler and auxiliaries, turbines and auxiliaries, generator and auxiliaries, electrical equipment, switchgear equipment, switchgear, and transformers. All the stages of the commissioning procedure are covered in-depth in this seminar. This includes preparation – planning various activities, pre-commissioning checks and tests, typical commissioning schedule, detailed tests and commissioning procedures and instructions for every component in a coal power plant, instrumentation, trial run of the equipment, safety and precautions, commissioning of coal power plant systems, Safety Rules Clearance Certificates, procedure for the control and handling of defects, Commissioning Reports.

This seminar is a MUST for anyone who is involved in the pre-commissioning or commissioning of any coal power plant equipment because it provides detailed pre-commissioning checks and tests and detailed tests and commissioning procedures and instructions for every component in a coal power plant. In addition, the seminar provides in-depth coverage of all preparation, planning activities, commissioning schedules, trial run of each coal power plant equipment, safety and precautions, Safety Rules Clearance Certificates, Procedures for handling defects, and Commissioning Reports.

Seminar Outcome

- **Pre-Commissioning Checks and Tests, Detailed Tests and Commissioning Procedures and Instructions for Every Equipment in Coal Power Plants**: Gain a thorough understanding of all pre-commissioning checks and tests, and all commissioning procedures and instructions for every equipment in coal power plants
- **Commissioning Management System of Coal Power Plants**: Discover the benefits of the Commissioning Management System of coal power plants including all commissioning procedures and documents, purpose of commissioning, responsibilities, system description, organization, working parties, test teams, documentation, testing and commissioning schedules, test reports, safety, plant certification, and plant completion report
- **Commissioning Procedures and Instructions for Boiler and Auxiliaries in Coal Power Plants**: Learn about the commissioning procedures and instructions for boiler and auxiliaries including all commissioning activities, typical commissioning schedule, hydraulic test and wet preservation, air and gas tightness test, trial run of equipment, electronic precipitators, fuel oil system, preparation for first light up, alkali boil – out, acid cleaning and passivation, thermal flow test of economizer, water walls, and superheater, valves, steam boiling, safety valve setting, and soot blowers.
- **Commissioning Procedures and Instructions for Turbine and Auxiliaries**: Gain a thorough understanding of all the commissioning procedures and instructions for turbine and auxiliaries including acid cleaning of oil pipelines, lubrication and governing system (oil flushing and hydraulic testing), jacking oil system, governing system, regenerative system, barring gear, vacuum tightness test, first rolling of turbine and data logging
- **Commissioning Procedures and Instructions for Generator and Auxiliaries**: Discover all the commissioning procedures and instructions for generator and auxiliaries including generator, seal oil system, hydrogen gas system, stator water system, rolling and payment of generator
- **Commissioning Procedures and Instructions for Electrical Equipment**: Learn about all the commissioning procedures and instructions for electrical equipment including switchyard equipment, switchgear, transformers, and motors
- **Coal Power Plant Equipment and Systems**: Learn about various coal power plant equipment and systems including: boilers, superheaters, reheaters, steam turbines, governing systems, deaerators, feedwater heaters, coal-handling equipment, transformers, generators and auxiliaries
Training Methodology

The instructor relies on a highly interactive training method to enhance the learning process. This method ensures that all the delegates gain a complete understanding of all the topics covered. The training environment is highly stimulating, challenging, and effective because the participants will learn by case studies which will allow them to apply the material taught to their own organization.

Who Should Attend

- Managers
- Technicians
- Maintenance personnel
- Other technical individuals

About Our Expert Course Trainer

The trainer has been a teacher at University of Toronto and Dalhousie University, Canada for more than 25 years. In addition, He has taught courses and seminars to more than four thousand working engineers and professionals around the world, specifically Europe and North America. He has been consistently ranked as "Excellent" or "Very Good" by the delegates who attended his seminars and lectures.

The trainer wrote 5 books for working engineers from which three have been published by McGraw-Hill, New York. Below is a list of the books authored by him:

5. Industrial Equipment (600 pages), Custom Publishing, University of Toronto, University of Toronto, University of Toronto Custom Publishing (1999).

The trainer has received the following awards:

1. The first "Excellence in Teaching" award offered by Poweredge Asia Training center, Singapore, December 2016
2. The first "Excellence in Teaching" award offered by the Professional Development Center at University of Toronto (May, 1996).
3. The "Excellence in Teaching Award" in April 2007 offered by TUV Akademie (TUV Akademie is one of the largest Professional Development centre in world, it is based in Germany and the United Arab Emirates, and provides engineering training to engineers and managers across Europe and the Middle East).
4. Awarded graduation “With Distinction” from Dalhousie University when completed Bachelor of Engineering degree (1983).
The trainer performed research on power generation equipment with Atomic Energy of Canada Limited at their Chalk River and Whiteshell Nuclear Research Laboratories. He also has more than 32 years of practical engineering experience with Ontario Power Generation (OPG - formerly, Ontario Hydro - the largest electric utility in North America). He retired from OPG in November 2016.

While working at Ontario Hydro, he acted as a Training Manager, Engineering Supervisor, System Responsible Engineer and Design Engineer. During the period of time that the trainer worked as a Field Engineer and Design Engineer, he was responsible for the operation, maintenance, diagnostics, and testing of gas turbines, steam turbines, generators, motors, transformers, inverters, valves, pumps, compressors, instrumentation and control systems. Further, his responsibilities included designing, engineering, diagnosing equipment problems and recommending solutions to repair deficiencies and improve system performance, supervising engineers, setting up preventive maintenance programs, writing Operating and Design Manuals, and commissioning new equipment.

Later, he worked as the manager of a section dedicated to providing training for the staff at the power stations. The training provided by him covered in detail the various equipment and systems used in power stations.

The trainer was awarded his Bachelor of Engineering Degree "with distinction" from Dalhousie University, Halifax, Nova Scotia, Canada. He also received a Master of Applied Science in Engineering (M.A.Sc.) from the University of Ottawa, Canada. He is also a member of the Association of Professional Engineers in the province of Ontario, Canada.
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5 Day Course Outline

Day 1 – Commissioning Management System, Commissioning of Boiler and Auxiliaries, Commissioning of Electrostatic Precipitators, Commissioning of Fuel Oil System, Preparation for First Light-up
- Commissioning Procedure and Documents: Purpose of Commissioning, Responsibilities, System Description, Organization, Working Parties, Test Teams, Documentation, Safety, Plant Certification, Plant Completion Report,
- Boiler and Auxiliaries: Commissioning Activities, Preparation – Planning Various Activities, Typical Commissioning Schedule,
- Hydraulic Test and Wet Preservation: Water Filling, Drainable Parts, Hydrostatic Testing, Wet Preservation
- Air and Gas Tightness Test: Procedure for the test, Furnace Zone, Second Pass of Boiler, Electrostatic Precipitator, Forced Draft Fan Ducts, Primary Air Fan Ducts, protocol on smoke generator test of the boiler
- Trial Run of Equipment: Fan, air heaters, Mills
- Commissioning of Electrostatic Precipitator: Pre-commissioning Checks – Mechanical, Pre-Commissioning Checks – Electrical, Before the First Light of the Boiler, Gas Distribution Test
- Fuel Oil System: Flushing of H.S.D Lines with Oil, Tests, constructional Tests, Pre-commissioning Tests, Commissioning Tests
- Preparation for First Light Up: System, Checking of Ignitor System, Check on Oil Characteristics, Check on Equipment in Oil/Air Lines, Pre-Check Before Light-up, Testing Furnace Probe, First Light Up of The Boiler, Expansion Movement of Boiler

Day 2 – Chemical Cleaning of Boiler, Thermal Flow Test for Economizer, Water Walls, and Superheater, Commissioning of Valves, Commissioning of Soot Blowers
- Commissioning of Valves: Check List of Valves, Motorized Valves, Pneumatic-Operated Valves, Control Valves, Safety Valves
- Steam Blowing: Basic Technique Used, Scheme, Reheat Safety Valve Setting, Precautions
- Safety Valve Setting: Constructional Test, Pre-Commissioning Tests, Commissioning, Protocol on Safety Valve Setting
- Commissioning of Soot Blowers: Readings for Operation with Steam (Mechanical), Check Up of Electrical System, Commissioning of Blowers without Steam

Day 3 – Turbine and Auxiliaries, Acid Cleaning of Oil Pipelines, Lubrication and Governing System, Jacking Oil System, Governing System, Regenerative System, Boiler Feed Pump Commissioning, Barring Gear, Vacuum Tightness Test, Check List of First Rolling of Turbine
- Turbines and Auxiliaries
- Acid Cleaning of Oil Pipelines: Passivation and Drying, Final Erection in Position, Safety
- Lubrication and Governing System: Preparation for Oil Filling in Man oil tank, Charging of Oil Systems, Oil Flushing Circuit of a Typical 200/210 MW Turbine Lube Oil System, Oil Flushing, Hydraulic Testing of Oil System, Additional Checks to be Made on Turbine Oil System
- Jacking Oil System: Oil Flushing, Relief Valve Setting, Preparation for Hydraulic Testing, Hydraulic Testing
- Governing System: Checking of Governing System
- Regenerative System: Preparations, Procedure, Shell Sides and Drain Lines of Heaters, Safety and Precaution, HP/LP Heaters
- Boiler Feed Pump Commissioning: Constructional Tests, Pre-Commissioning, Commissioning Tests
- Barring Gear: Preparation, Trial Run of Motor, Preparation for Putting The Barring Gear in Operation
- Vacuum Tightness Test: Preparation of the System Before Filling with DM Water, Vacuum Tightness Test By Filling Up with DM Water, Raising the Vacuum in Condenser
- Check List for First Rolling of Turbine (200/210 MW), Preparation, Preliminary Operation Before Rolling, Operation to Be Carried out For The Units with HP/IP Bypass System, Data to be Collected During Commissioning and Also After Loading to Full Capacity in 200/210 MW Turbine Generator Set

Day 4 – Generator and Auxiliaries, Generator, Commissioning of Seal Oil System, Hydrogen Gas System, Stator Water System, Rolling and Dryout of Generator
- Generator General Inspection and Checks
- Generator: Preliminary Checks of Resistance’ Insulation Resistance, Ohmic Resistances, Generator Stator Winding, Generator Rotor Winding
- Generator Testing: Laboratory Tests, Field Tests
- Laboratory Diagnostic Tests of Stator Winding Insulation: Voltage Endurance Test, Thermal Cycling, Dissection of Coils, Insulation Failure Analysis, Partial Discharge Test, Dissipation Factor, Turn-to-Turn, Multi-Factor stress, Forensic Analysis
- Field Tests: Insulation Resistance Test, DC Winding Resistance Test, Visual Inspection Test, Digital Electromagnetic Core Imperfection Detector (EL-CID), Partial Discharge Data Interpretation and Analysis, Corona Probe Test, Dissipation Factor (tan delta test), AC and DC Hi-pot Test, Wedge Tightness Test, Core Repair, if Loose, Insulation Condition Assessment
- Rotor Testing: Recurrent Surge Oscillograph (RSO), Air Purge Test, Insulation Resistance Test, Winding Resistance Test, Impedance Test, Bolt and Air Tightness Test, Die-Penetrant and Ultrasound Test of the Retaining Rings

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• Seal Oil System: Equipment Inspection, Control Panels, AC Seal Oil Pump Motor Set, DC Seal Oil Pump Motor Set, Oil Injector, Induction Liquid Indicator, Seal Oil Coolers, Seal Oil Filters, Damper Tank, Differential Pressure Regulator, Pressure Oil Regulator, Exhaust Fan and Motor on The Drain Header, Exhaust Fan and Motor on Main Oil Tank, Commissioning of Seal Oil Starting Panel, Commissioning of Seal Oil Signaling Panel, Check with 200 V DC and AC Supplies, Trial Run of Seal Oil Pump Motors, DC Seal Oil Pump Motor, Trial Run of Exhaust Fans, Oil Flushing, Trial Run of AC Seal Oil Pump, Second Stage Flushing, Third Stage Flushing, Fourth Stage Flushing, Fifth Stage Flushing, Commissioning of The System
• Stator Water System: Equipment Inspection, Stator Water Cooling Pumps and Motors, Water Coolers, Water Filter, Magnetic Filter, Expansion Tank, Water Jet Ejector, Stator Water System Piping and Valves, Gas Trap, Instruments, Commissioning of Stator Water Starting Panel, Checks with 220 V DC and AC Supplies, Trial Run of Stator Cooling Water Pump Motor, Flushing of Stator Cooling Water System, First Stage Flushing (By pass all equipment except filters), Second Stage Flushing (Cooler B included), Third Stage Flushing (Cooling A included), Fourth Stage Flushing (Magnetic filters included), Trial Run of Stator Water Pumps (5th stage flushing), Commissioning of The System (Final run)
• Rolling and Dryout of Generator: Requirements for rolling, Requirements for Dryout, Rolling (200/210 MW Turbines) BTPS/SSTPP, Checks During Rolling, Dryout Operation, Hydrogen Filling in The Generator
• Electrical Equipment: Switchyard Equipment, 400 kV Air Blast Circuit Breaker, Pantograph Isolator, Horizontal Centre-Break Isolator, Current Transformers, Capacitor Voltage Transformer, Lightning Arrester, Earthing Switch
• Switchgear: Description, Tests

Day 5 – Transformer Pre-Commissioning Tests, Transformer Commissioning, Electrical Equipment, Commissioning of Circuit Breakers and Switchgear, Commissioning Reports

• Record the Salient Parameters of the Transformer, Pre-Commissioning Checks, General Checks, Winding Temperature Indicator (WTI) and Oil Temperature Indicator (OTI), Buchholtz Relays, General Inspection, Functional Checks
• Transformer Pre-Commissioning Tests: Insulation Resistance Test, Dielectric Absorption and Polarization Index Tests, Two Voltage Test (Step Voltage Test)
• Testing of HV Bushing
• Blocked Cooling System: Thermoscanning of Radiators, Differential Temperature, High Oil Winding Temperature
• Transformer Water Content in Oil and Paper, Dependency Between the Water Content in Mineral Oil and Cellulose Paper
• Relay Tests
• Transformer Commissioning
• Circuit Breakers: SF6 Circuit Breakers, Vacuum Circuit Breakers, Air Blast Circuit Breaker, Oil-Filled Circuit Breaker, Short-Circuit Current
**CANCELLATIONS & SUBSTITUTIONS**

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