PS5000: Power & Utilities Operations Simulator

The PS-5000 is a simulation software package with rigorous and detailed simulation models of various units and types of power plants. The benefits of this package are:

For Academic

- Industrial Exposure for Students
- In-depth Process Understanding
- Carry out In-house projects
- Sound Fundamental Concepts of Process Control and safety with DCS Operations
- Understanding the Intricacy & Complexity of process dynamics.
- Employability

For Industries

- Improved Plant Safety
- Smooth Startup & Shutdown
- Evaluation of Operator Proficiency
- Faster Recovery from External/Internal Process Disturbances
- Increased familiarity of Controls & Interlock Systems

The package consists of simulation models for various power & utility plants. Each model simulates the plant with its control, instrumentation and safety systems and field devices. The Instructor can invoke malfunctions, disturbances and instrument failures and evaluate the trainee performance. Trainee can perform normal operations, emergency operations as well as startup / shutdown operations on these models.

PS5030 Boiler Operations Simulator:

This package consists of following independent simulation models of a boiler in a power plant:

- Pulverizer Fuel System
- Oil Firing System
- Flue Gas and Air System
- Super Heater (SH) and Re-heater (RH) Systems
- Boiler Drum
- Superheated Steam Generator

PS5050 Electrical Operations Simulator:

This package consists of following independent simulation models of a generator and electrical sections in a power plant:

- Generator Cooling Water System
- Generator System
- 6.6 KV System Layout
- 415 KV System Layout
- 220 KV Switchyard Layout
- Transmission and Distribution

PS5040 Turbine Operations Simulator:

This package consists of following independent simulation models of a steam turbine in a power plant:

- Condensate system.
- Deaerator System.
- Condenser Vacuum System.
- Circulating Water System.
- Cooling Water System.
- Gland Sealing System.
- HP LP by-pass System.
- Turbine Steam Extraction System.
- Turbine Lube Oil System.

PS-5060 Balance of Plant (BOP):

The balance of plant operation suites consists of the following units:

- **Coal handling system** which transport and deliver the coal by belt conveying to the mill area for further processing.
- **Ash handling system** handle the fly and bottom ashes which are the byproduct of the coal combustion. Two methods of ash disposal systems are employed in general, namely dry and wet ash disposal system.
- **Cooling towers** use the evaporation of water to remove the process heat and cool the working fluid to near wet-bulb temperature. The trainee understand the system and losses such as drift and vaporization losses. All the BOP units has associated control and safety systems.

PS-5070 Utilities Systems:

The Utility systems package consists of the general plant utility simulation models listed as below:

- Water Treatment Plant
- Water Desalination Plant

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PS2018 Gas Turbine:

In Gas Turbine, compressed air and fuel oil or fuel gas are ignited which drives the turbine, which in turn drives the electric generator. In the Generator section, which produces 75 MW electrical power at 3000 RPM, with a voltage of 15.75 KV at 50 Hz. Once the fuel is ignited, the compressor turbine rotation becomes self-sustaining. As the air-fuel mixture bums, the gas of combustion expands and flows across the turbine blading, providing rotation to the shaft to drive the compressor and generator. The gases exhausted from the turbine section flow through the exhaust either out the stack or into the HRSG to produce steam for other plant operations. The generator is an air-cooled 75 megawatt (MW), 15.75 kilovolt (KV) machine whose shaft is driven by the compressor-turbine shaft through a gear box.

PS5014 Combined Cycle Power Plant:

The standard Combined Cycle Power Plant simulator is a comprehensive, dynamic simulation of a typical combined cycle power plant. The model is designed to operate on a simulator, which has a DCS emulation and Instructor Function. Capacity: 450 MW, Fuels: Natural Gas; Fuel Oil. The main equipment and sections simulated are Circulating water pump, Gland steam condenser, Feed water, Condensation, Condenser circulating water, Make up water, Deaerator, Air Compressor, Evaporator, Heat Recovery Steam Generator (HRSG), Burner, Fuel (Gas, oil), Flue gas, Turbine, Generator, DC excitation, Transformer.

PS5015 Thermal Power Plant:

The standard thermal power plant simulator is a comprehensive, dynamic simulation of a power plant and utility system. The model is designed to operate on a simulator, which has a DCS emulation and Instructor Function. Functionally, the simulated plant consists of Boiler Section, Turbine Section, Condensate Section, Steam and Utilities section, Coal Mill, Fuel and Burner System:

The Boiler Section Consist of Steam Drum, SH System, Coal and Fuel gas system, Burner System, Flue Gas & Air System, Induced Draft & Forced Draft fans. Turbine Section consist of Steam Extraction System & Generator System. The Condensate Section consist of Steam Condenser, Condensate Extraction pumps (CEP), Deaerator, Boiler Feed Pumps (BFP), LP & HP Heaters. The Steam Utility section: HP, MP & LP Steam headers and its utilities.

PS5016 Diesel Generator:

The standard Diesel Generator simulator is a comprehensive, dynamic simulation of a Diesel Generator power plant used in industries. The model is designed to operate on a simulator, with a DCS emulation and Instructor Functions. The diesel power plant relies on the diesel engine along with the generator/alternator for the power production and the fuel is diesel and air for combustion inside the engine. The Diesel Generator: Fuel and Air Section, Engine Section and Cooling Water Section.

PS5018 Hydroelectric Power Plant:

The standard Hydroelectric Generator simulator is a comprehensive, dynamic simulation of a hydroelectric power plant used in industries. The model is designed to operate on a simulator, with: a DCS emulation and Instructor Functions. The Hydroelectric power plant produces 125MW Power. This model consists of two main systems they are Reservoir & six surge Tank System and Turbine & Generator System. Turbine and the Generator are connected in a single shaft. So as the turbine rotates generator also comes online. Each generator produce 25 MW power and 6th generator is spare.

PS5017 Nuclear Power Plant:

The standard Generic simulator is a comprehensive, dynamic simulation of a Nuclear power plant. The model is designed to operate on a simulator, with a DCS emulation and Instructor Functions. The Nuclear power produces 15MW of Power .This model consist of Condenser, Low Pressure Heater 1(LPH1), Low Pressure Heater 2(LPH2), deaerator, High Pressure Heater 1(HPH1), High Pressure Heater 2(HPH2), Nuclear Reactor, Steam generator, HP turbine, LP turbine and Generator.

PS5019: 100KW Solar Power Plant

This solar power plant model is having a capacity of 100 KW. The model consists of solar panels PV module which converts solar energy into electrical energy. The generated DC power will be converted into AC power using an Inverter and distributed to users.

PS5020: 10MW Wind Mill Farm

This wind mill model consists of 6 units each generating 1.7 MW. Each unit is having wind turbine coupled with generator. The overall power produced by the mills will be distributed to the users and also to grid.

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