



## **Merit Order Dispatch**

Product brochure

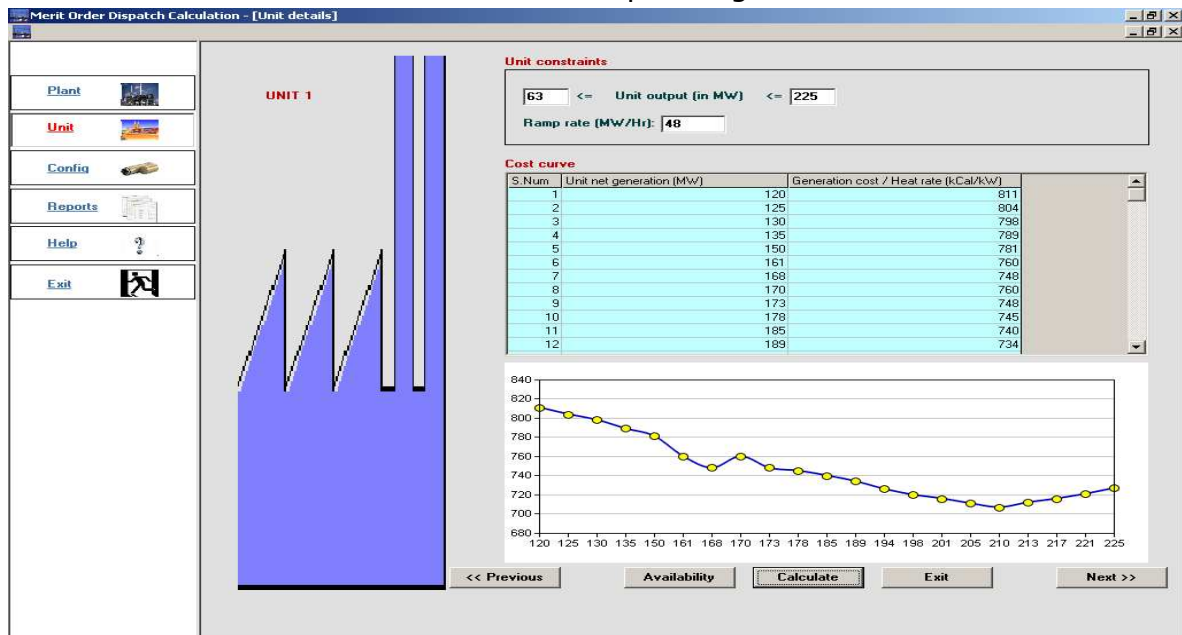
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## Merit Order Dispatch

In the deregulated electricity market, the objective of generating utilities has changed from maximum production to optimal production. Merit Order Dispatch (MOD) solution from Power Generation Applications group is a valuable tool that enables a multiple unit power plant (including combined cycle as well as co-generation utilities) to identify optimum loading for each unit and this realize huge savings in operation costs.

constraints are imposed on the system in terms of minimum and maximum loads for each units, unit ramp rate constraints etc. The MOD solution has to identify an optimum set of operating points for the units such that the total generating cost for a given station load is minimum without violating any of the unit constraints.

The unit commitment problem is closely related to the Merit Order dispatch. Here the objective is to identify which units shall be brought online / offline so that the plant demand is met at minimum operating cost.



In simple mathematical terms, the MOD can be presented as an optimization problem for a system of multi-variable non-linear equations subject to a set of inequality constraints. From historical plant data available cost of generation (expressed in terms of heat rate or currency) can be modeled as a non-linear (typically polynomial) function of the generator output. Non-linear

## Key benefits

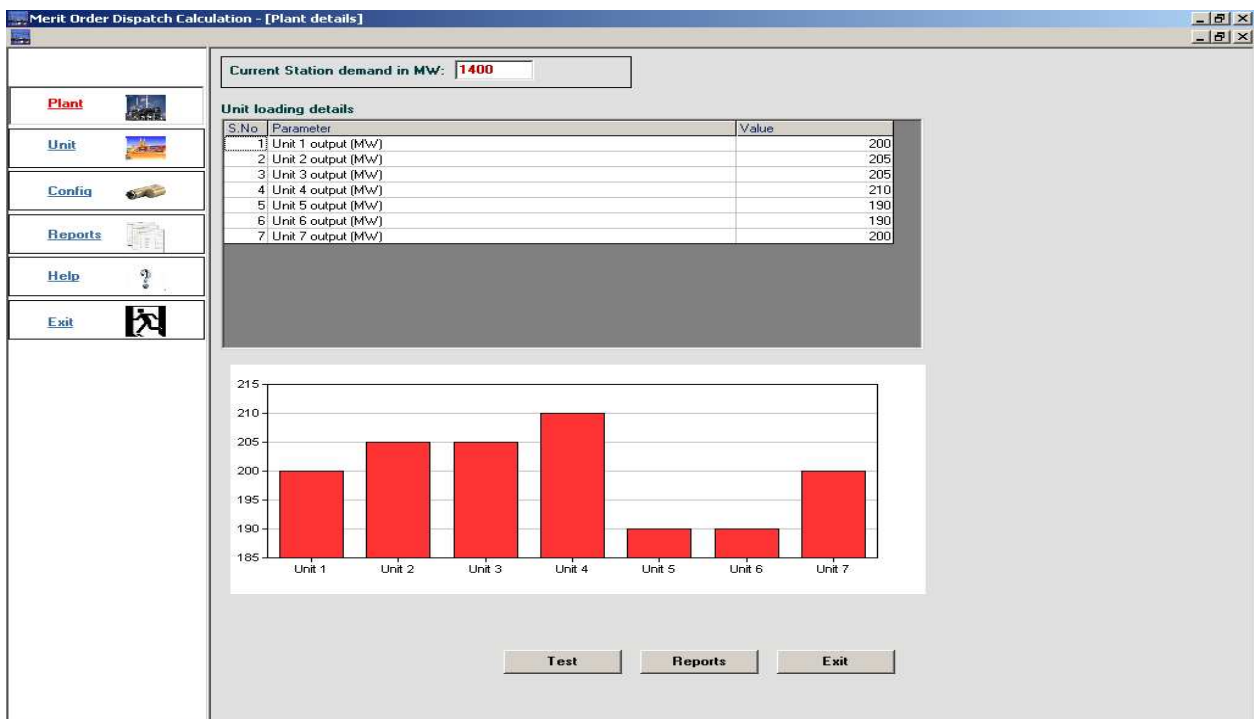
Key advantages offered by the MOD solution from include:

- An efficient curve fitting algorithm that can process large data sets in negligible time allowing for better precision cost curves

- An adaptive and efficient optimization algorithm that uses a combination of multiple methods to ensure faster and more accurate convergence to a solution.
- With support for both OPC (OLE for Process Control) and DDE (Dynamic Data Exchange), the MOD solution allows for easy and quick integration with most DCS and other third party solutions (including Performance Calculation package from Kalki PGA)

## MOD Solution details

The MOD solution can handle with coal-fired power plants, combined cycle power plants (CPPs) as well as co-generation plant where process steam may be a by-product or the main output. Individual units of the plant can be configured with their historical data and operating constraints. The MOD solution uses the historical data to generate a best-fit cost curve for the unit. Any number of units can be handled by the MOD



- The MOD solution comes with an easy to use configuration utility that makes the task of integration a very simple one
- A multitude of tabular and graphical reports and trends available with the MOD solution enables the user to derive maximum benefit

solution and each unit can have different characteristics such as nominal load, constraints as well as cost curve.

Operator can directly enter the plant demand through the user interface provided. Alternately, plant demand schedule can be read from a spreadsheet where plant demand details can be stored with

up to 15-minute block resolution. The MOD package then executes the optimization algorithm to decide which units need to be online as well as the operating set points of each of the online units.

In addition to the unit operating characteristics, the operator can also enter maintenance schedules for different units, must-run situations as well as minimum up and downtimes to be imposed on each unit. This information will also be handled by the MOD solution in the unit commitment approach.

Once the MOD solution is presented to the user (in tabular and graphical formats), the MOD solution allows the user to perform a "what-if" simulation. User can alter the unit commitments and loading patterns suggested by the MOD package. The solution will point out any constraint violations or maintenance violations that may be present in the altered scenario. In case the altered solution is a viable one (i.e. there are no violation of constraints), the solution will point out the cost implications of the altered solution against the recommended one. This feature allows the operator to take into account a lot of operating and field expertise, which does not fall within the decision-making algorithm of MOD optimization.

## **Technical details**

Platform: Windows 2000  
Software requirements: MS Excel  
Communication Interface: DDE (Dynamic Data Exchange), OPC (OLE for Process Control)

## **Further details**

For further details on PPC, please write to [sales@kalkitech.com](mailto:sales@kalkitech.com). Phone, fax and mailing details can be had from our website <http://www.kalkitech.com/Contactus.htm>. Details on other solutions like Plant Performance Calculation, Availability Based Tariff, Plant Simulation software, Alarm analysis package etc. can be had from the PGA home page at <http://www.kalkitech.com/powergen.htm>