

# RPMS

## Refinery and Petrochemical Modeling System



The planning challenge for refineries and petrochemical plants is determining what activities to perform and then how to perform them based on constraints ranging from market data to asset capabilities. Critical constraints include availability and cost of raw materials, feedstock and product qualities, and product prices, as well as process unit sub-models and blending correlations and specifications.

The solution to the planning problem must respect all asset operating constraints. It must also take all relevant financial aspects into consideration, such as how, where and when raw materials should be purchased. Clearly, product demands drive this engine to obtain solutions to multiple planning scenarios. Investment in new assets is also a key aspect of the planning process.

Honeywell's Refining and Petrochemical Modeling System (RPMS) is designed specifically to answer the demands of the planning process. Using RPMS, planners can integrate all of the constraints that affect their plans using data from a variety of sources and then develop the optimal solution rapidly and accurately.

### Benefits

- Maximized profitability through development and optimization of non-linear programming (NLP) models
- Accurate evaluation of new asset investments
- Optimal solutions for input into marketing, operating and strategic plans

### Modeling Components

RPMS provides a simple and quick means for developing a mathematical structure (model) representing any physical configuration in the facility. The system allows representation of multi-plant and multi-period models and 0/1 decision making using mixed-integer programming.

### Multi-Plant Modeling

The RPMS multi-plant module generates mathematical models for the solution of supply chain management problems. Each individual operating plant can be represented to any required degree of detail.

### Multi-Period Modeling

The RPMS multi-period processor supports modeling across multiple time periods with user-defined intervals. This option is valuable in a number of applications, including inventory management, analysis of discounted cash flows across time and inclusion of varying processing capacity at intervals within an overall operating plan.

### Mixed-Integer Programming

RPMS lets you build any discrete decision process with ease through the use of mixed-integer programming, a technique that allows you to specify, for example, that a raw material must be purchased at a minimum level or not at all (soft minimum). RPMS includes data entry-driven selection of soft minima for materials purchase and sales, as well as turndown capacities for operating units. Yes/no decision making can be extended to any application involving order and sequencing.

### Handling Non-Linearities

As an example, RPMS provides accurate feedstock selection by means of distributive recursion and error tracking, which enable the LP to see differences in byproduct stream properties. Distributive recursion allows RPMS to associate the effect of changing feedstock with a change in properties of byproducts. This concept is used in various ways to allow representation of non-linear relationships and control convergence to an optimal solution.

### Pooling

RPMS is without equal in its ability to handle process plant pooling problems. Techniques available to perform this task include the following:

- Representation of many different process unit logical operating modes with different byproduct schemes in the same model
- Flexibility to combine or segregate feedstock and/or byproduct streams on a stream-by-stream basis
- Ability to combine streams explicitly for subsequent dispositions while correctly tracking quality effects
- Implicit pooling of byproduct streams to be sent to downstream dispositions in the same proportion as they are produced, without actually combining the streams

**System Components**

**Refining Process Database**

RPMS offers a refining database that provides a comprehensive selection of process unit sub-models and investment-capacity relationships for the most commercially available processes used by the refining industry worldwide. The database contains sub-models for both volume- and weight-based process units, offering complete flexibility in customizing refinery models, middle distillates and fuel oils, and quality data for most intermediate refinery streams.

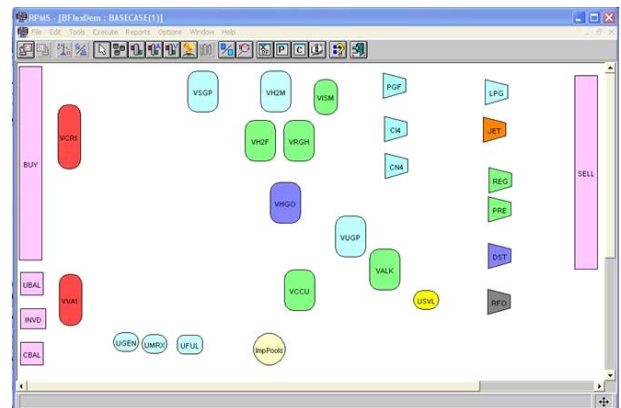
**Chemical Process Database**

The RPMS chemicals database contains a broad range of petrochemical processes and products. Sub-models for more than 100 chemical processing units (and associated investment costs) are included. Finished products include synthetic fibers, synthetic rubbers, resins, plastics, solvents, plasticizers and fertilizers.

**User Interface Components**

**Graphical User Interface (GUI)**

The RPMS GUI uses object-oriented technology to provide a graphical display of the plant model. Each type of unit has a uniquely shaped object that identifies it as a crude unit, vacuum unit or process unit, a blend pool or a supply/demand node. The characteristics of the display can (and should) be modified to provide an intuitive image of the complete model for execution and modification purposes.



Graphical User Interface

**Data Factory**

The RPMS Data Factory is an integrated Microsoft Excel application for displaying and manipulating RPMS model data using Excel worksheets. The usual spreadsheet facilities are available for adding or deleting rows or columns, performing calculations, copying and pasting between worksheets, changing appearance and printing. This table-oriented view complements the GUI object-oriented view of model data. Different views of a table can help to clarify case or period data differences.

**Report Factory**

The RPMS Report Factory is an integrated Excel application that produces the standard RPMS reports, as well as user-designed reports, in the form of Excel worksheets. User-defined reports are designed using regular spreadsheet facilities, and the package includes a library of user functions provided specifically to process GAMMA-related information. The Report Factory is a very powerful application that can produce reports in almost any conceivable format.

Code	Description	Activity	Minimum	Maximum	Obj coef	Red cost
LW	LFO	3085	0	4000	133.8448	
MAL	Reg. Unk. Gase.-5	9554	0	15000	214.216	
MIL	Pre. Unk. Gase.-5	2762	2000	15000	223.276	
RR	Kerosene	500	200	4000	197.888	-4.801
RR	Diesel	7500	2000	7500	205.274	1.187
RZ	Incremental Diesel	0	0	10000	204.262	-0.765
RZ	No. 2 Fuel Oil	0	0	10000	198.507	-3.435
RSC	N.S. Fuel Oil	4284	0	6000	136.500	
SLR	FCCU Slurry Oil	200	200	2000	131.520	-9.993
POF	Plant Fuel Gas	2143	0	0	0.000	
ENS	Liquid Volume Loss	-1136			0.000	
TOTAL		20023				

Sample report from Report Factory

## Project Management Interface

Activated whenever RPMS is started, the Project Management window lists each model and case known to RPMS. This interface is the primary model and case management tool for the system, and handles the creation, activation and deletion of models and cases. The Project Management window also provides a “file cabinet” graphical view of all RPMS models.

## System Requirements

- 1400 MHz or better PC with at least 512 MB RAM
- Windows 2000 or later

## Business FLEX Solutions

RPMS is part of Honeywell's Business FLEX® Solutions, a family of more than 20 Honeywell advanced applications that may be installed individually or together.

Business FLEX applications are designed to serve process plants in the areas of planning, scheduling, monitoring, production management, metrics calculation and analysis, and follow-up.

Business FLEX applications can be used in oil refineries, chemical plants, offshore production platforms, mining and minerals operations, pulp and paper mills, and other process facilities.

Business FLEX® is a registered trademark of Honeywell International Inc.

## More Information

For more information on RPMS or Business FLEX, visit [www.honeywell.com/ps](http://www.honeywell.com/ps) or contact your Honeywell account manager.

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