MANUFACTURING SALES & OPERATIONS PLANNING

PERFORMANCE BLUEPRINT
APPLICATION BRIEF

A WEB-BASED PERFORMANCE
MANAGEMENT APPLICATION

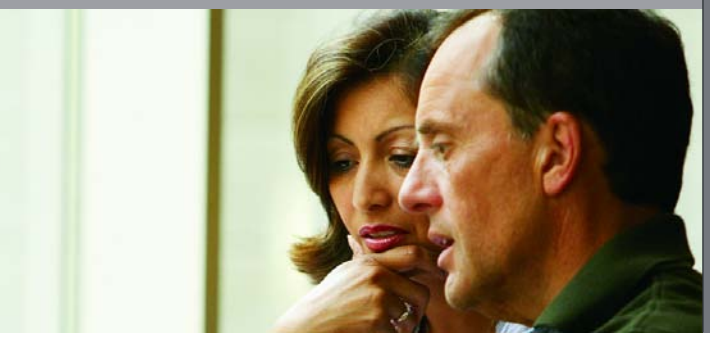
COGNOS | INNOVATION CENTER
for Performance Management™

INTRODUCTION

Manufacturing Sales & Operations Planning (S&OP) has captured much attention as a result of the globalization and the dual requirements of meeting customer demand and providing optimal operational efficiencies. Traditionally, the marketing, sales, and manufacturing groups within an organization have operated in "silos" with different goals, which may threaten overall enterprise objectives. But increasingly, companies are recognizing the need for a robust S&OP model that allows the various groups to jointly address operational issues affecting overall corporate goals.

Basic to an S&OP application are:

- The requirement for an integrated model which gives all groups within the company both visibility and the ability to respond to one another.
- The requirement for quick response and delivery to customers and distributors in order to remain competitive.
- The requirement to quickly incorporate and plan for new products, so that ever-increasing demand for the "latest and greatest" can be met.
- The ability to plan and distribute manufacturing operations in the most cost- and time-efficient manner.
- The ability to plan for third-party—such as off-shore or contractor—sourcing.



BLUEPRINT OBJECTIVE

The *Cognos Sales & Operations Planning Blueprint* offers an integrated performance management model that allows companies to effectively plan sales and operations across manufacturing plants. Both top-down and bottom-up planning are enabled. The *Blueprint* ensures that plans align with corporate goals and enables information-sharing and more efficient analysis among the various groups.

Key Cognos Planning Benefits

- Flexible model development to support a wide variety of planning models.
- Web- or Excel-based deployment of models for data collection and consolidation.
- Easy version control.
- Real-time workflow to enhance collaboration.
- Real-time consolidation.
- Real-time reporting.
- Real-time browser-based calculation to provide immediate results.
- Audit and user text annotations at cell, worksheet, and model levels to further improve collaboration.
- Drop-down validation lists to ensure data consistency.
- Scalable architecture with proven deployments to thousands of users.
- Linking functionality to provide divergent, yet interrelated components of planning environment.
- Off-line capabilities.
- Custom dating capabilities with no limit on time dimensions, allowing planning by the week, season, period, quarter, or year.
- Unique multi-directional calculation engine allows input across any dimension at detail or total levels.

OVERVIEW

Production planning is often the primary focus of a manufacturer's profit-and-loss statement. Forward-looking collaboration must occur so that sales demand can be profitably supported by production capacity.

The *Sales & Operations Blueprint* allows manufacturers to deploy demand planning to the appropriate level in the field sales organization (sales managers, manufacturers' representatives, salespersons, or externally to customers) to plan anticipated demand for a region or selected channel. An easily updated model gives plant managers and production planners the capability to manage production and meet anticipated demand levels. In this model, we assume that production will align with geographic demand.

The *Blueprint* focuses on a golf equipment manufacturer whose plants are assigned one or more product lines. For example, the Moline plant may produce both golf clubs and golf balls. It is realistic to also assume that different plants manufacture the same product or product line and that production allocation decisions are based, not only on capacity, but also on other factors, such as geography or plant production costs.

The *S&OP Blueprint* calculates production costs by product by plant, so that the decision on where to produce can be based on the most efficient model and assumptions. It also allows for the fact that, in some situations, it may be more cost-efficient to outsource production. In many companies, certain product lines are manufactured solely by contractors. This is also true in our example, where it is assumed that clothing is outsourced.

The starting point for the *Blueprint* is the Customer Demand application, which focuses on demand forecasting and pricing. The field sales organization will see a current-year baseline forecast together with prior year's forecast by product. They make adjustments to this forecast based on their intimate knowledge of the market. Corporate provides an overall pricing and promotions plan. Regional sales managers can also plan their own promotions. Once these are input, the demand forecast is completed and ready for submission and approval.

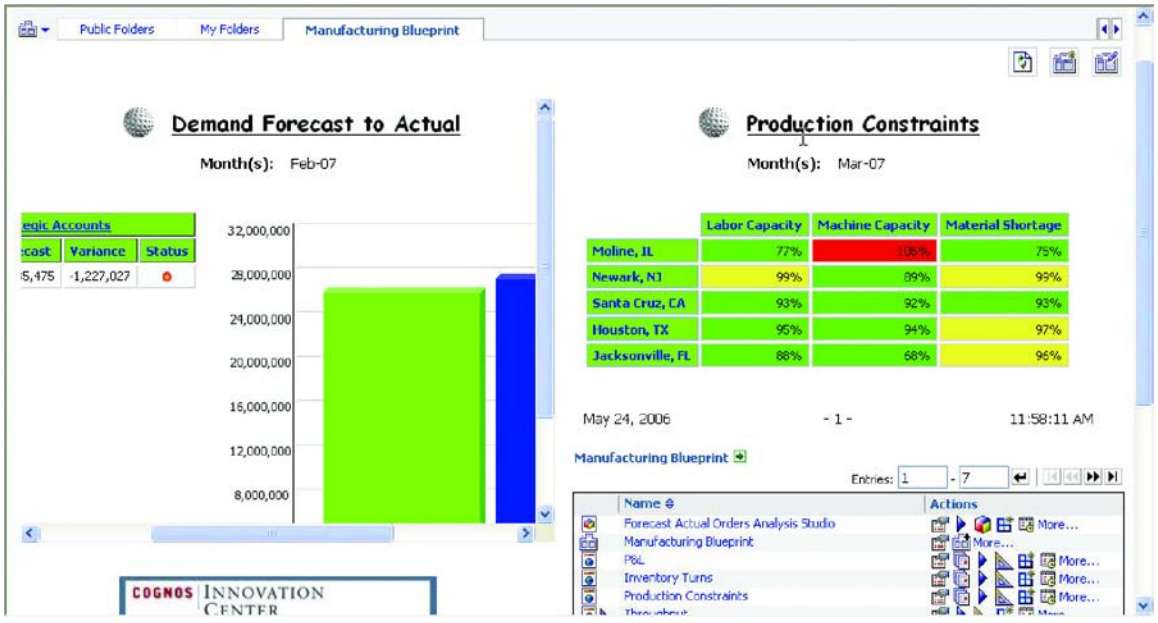
When the demand forecast has been submitted, it is linked to the Operations application. The Operations application requires very little manual input from manufacturing plant managers. Most of the production factors such as labor, machine capacity, and material requirements will be linked in from an ERP system. The percentage of production allocated to specific plants will be decided upon and input by a master planner through centrally controlled assumptions. Based on this determination, the production capacities required to meet plant demand will be output. It is anticipated that multiple iterations of this plan can be performed by the master planner to accommodate expected customer demand and correctly determine production across plants.

REPRESENTATIVE WORKFLOW

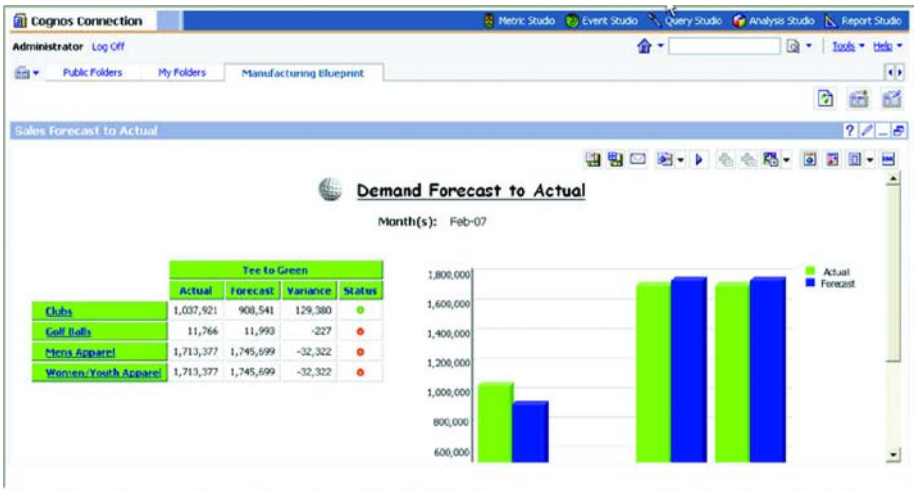
The following sections of this application brief describe the basic workflows in which a sales or manufacturing plant manager might participate during the planning process.

After Cognos Information Portal sign-on, the first screen displayed is a dashboard, which provides significant information.

1. The upper left shows a graphical representation of actual and forecast sales demand for the current month.
2. To the right is a "heat map" providing immediate alerts to operational constraints on production facilities.
3. An area at the bottom shows other key reports as well as links to customer demand and operational planning models.



Clicking on this graphic reveals more detail about specific customers and products. You can see, for example, that actual sales for both men's and women's apparel is lower than was forecast.

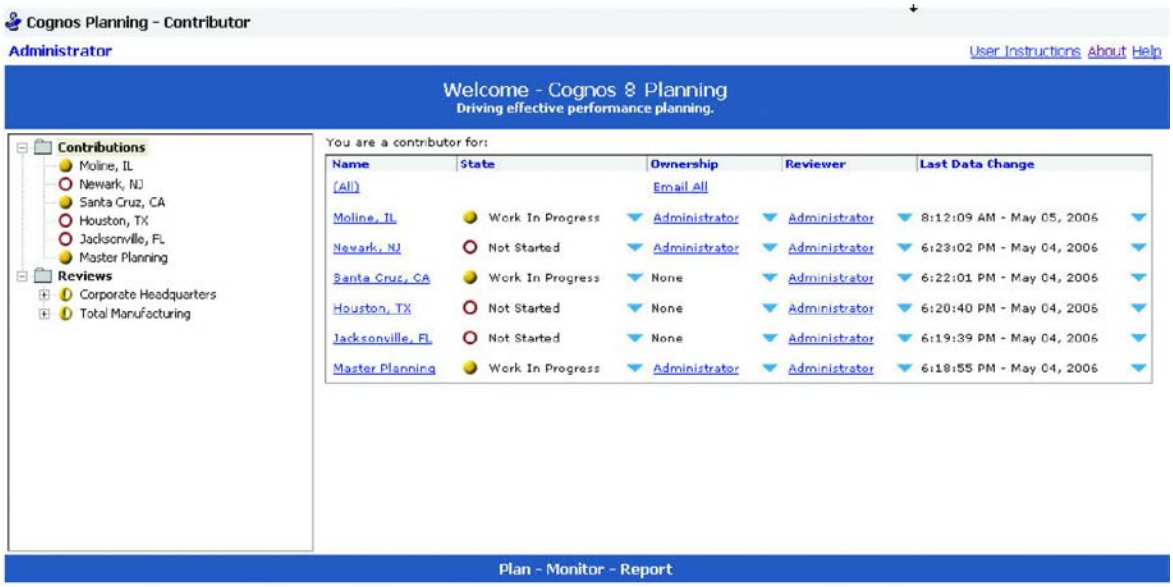


The heat map on the right identifies the nature and location of any operational constraints. Here, the Moline plant is unable to support its allotted production due to machine constraints. By allocating some production to Newark, demand can still be met.

REAL-TIME WORKFLOW VISIBILITY

The master planner has real-time, company-wide visibility—either as a "parent" or reviewer—to the workflow status of each plant. As workflow status changes, data consolidation and aggregation occur in real-time—without batch processing—driving down the time needed to perform the planning iteration.

Before data is entered, the plan is **Not started**. Once saved, it becomes a **Work in Progress** and remains accessible for editing. When ready for review and submitted, the plan is **Locked** and no more changes can be made. A reviewer can review the plan in any state, but can only reject a locked item. When rejected, it is again a work in progress.



REPRESENTATIVE WORKFLOW

The *Sales & Operations Performance Blueprint* is designed to be used collaboratively by sales, marketing, master planning/scheduling, and plant managers to enable sales demand to be met by manufacturing plants. The *Blueprint* provides a real-time view of the plants' capacities to meet forecast demand. It allows all groups to plan with the goal of achieving overall company targets.

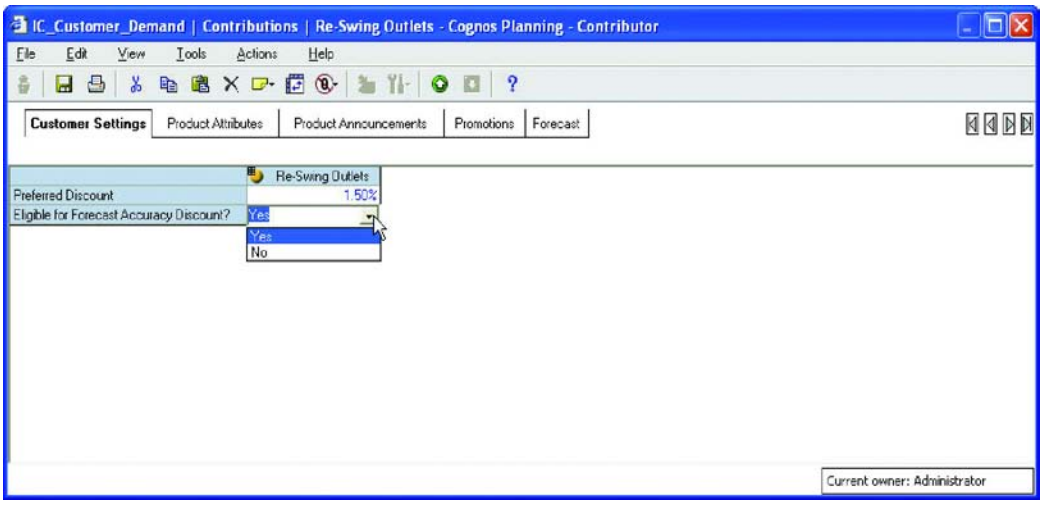
The following sections of this document describe the basic workflows in which:

- Field sales organization inputs demand forecast and promotions by product.
- Master planner links and loads sales demand by product from the customer demand model.
- Demand is adjusted by the master planner and allocated among plants.
- Plant managers can link to the master plan to view allocated plant demand.
- Plant managers determine capacity to meet volume demand by adjusting labor, material, and machine assumptions.
- Master planner views all plant capacities and as necessary reallocates demand among the plants or outsources to contractors.

FIELD SALES ORGANIZATION VIEW

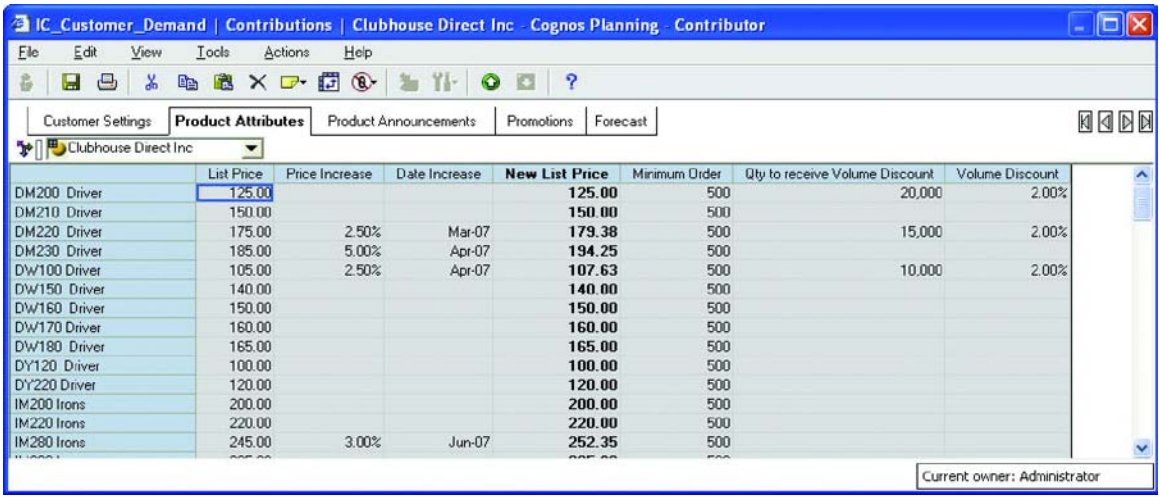
Customer Settings

This tab is used to input customers' Preferred Discount amount and eligibility for a Forecast Accuracy Discount, which rewards key customers and distributors if they provide accurate demand to the manufacturing organization. A sales associate inputs the discount percentage and simply selects *Yes* or *No* from the drop-down. No input is necessary if there is no customer or applicable forecast accuracy discount.



Product Attributes

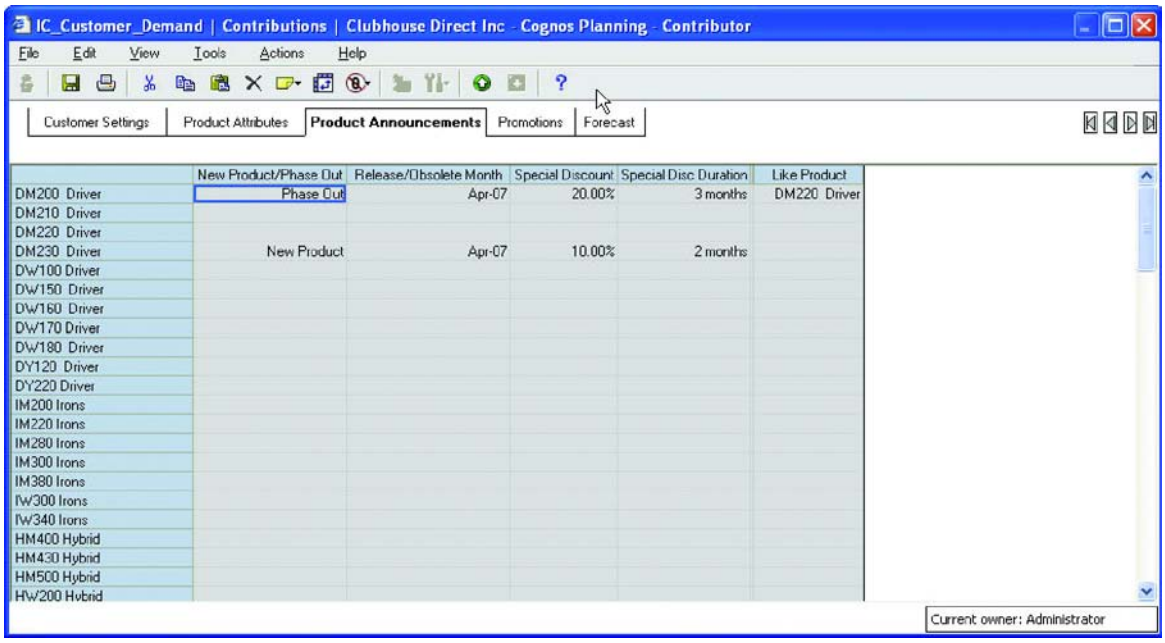
This tab contains the corporate List Price, anticipated Price Increases, Minimum Order, and Volume Discounts by product. The tab is provided for informational purposes and to display assumptions used in other tabs. No input is required.



	List Price	Price Increase	Date Increase	New List Price	Minimum Order	Qty to receive Volume Discount	Volume Discount
DM200 Driver	125.00			125.00	500	20,000	2.00%
DM210 Driver	150.00			150.00	500		
DM220 Driver	175.00	2.50%	Mar-07	179.38	500	15,000	2.00%
DM230 Driver	185.00	5.00%	Apr-07	194.25	500		
DW100 Driver	105.00	2.50%	Apr-07	107.63	500	10,000	2.00%
DW150 Driver	140.00			140.00	500		
DW160 Driver	150.00			150.00	500		
DW170 Driver	160.00			160.00	500		
DW180 Driver	165.00			165.00	500		
DY120 Driver	100.00			100.00	500		
DY220 Driver	120.00			120.00	500		
IM200 Irons	200.00			200.00	500		
IM220 Irons	220.00			220.00	500		
IM280 Irons	245.00	3.00%	Jun-07	252.35	500		

Product Announcements

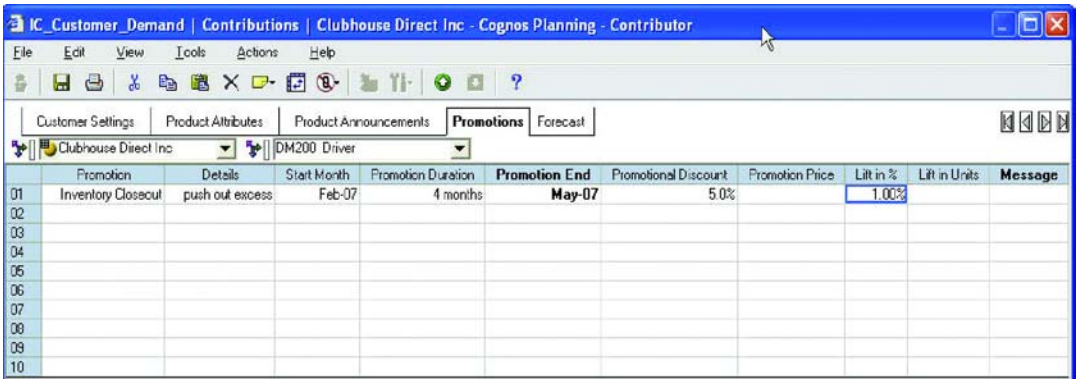
No input required. The tab displays company-wide assumptions regarding new products, existing product phase-outs, and obsolescence. If a product will become obsolete, the tab shows its available replacement.



	New Product/Phase Out	Release/Obsolete Month	Special Discount	Special Disc Duration	Like Product
DM200 Driver	Phase Out	Apr-07	20.00%	3 months	DM220 Driver
DM210 Driver					
DM220 Driver					
DM230 Driver	New Product	Apr-07	10.00%	2 months	
DW100 Driver					
DW150 Driver					
DW160 Driver					
DW170 Driver					
DW180 Driver					
DY120 Driver					
DY220 Driver					
IM200 Irons					
IM220 Irons					
IM280 Irons					
IM300 Irons					
IM380 Irons					
IW300 Irons					
IW340 Irons					
HM400 Hybrid					
HM430 Hybrid					
HM500 Hybrid					
HW200 Hybrid					

Promotions

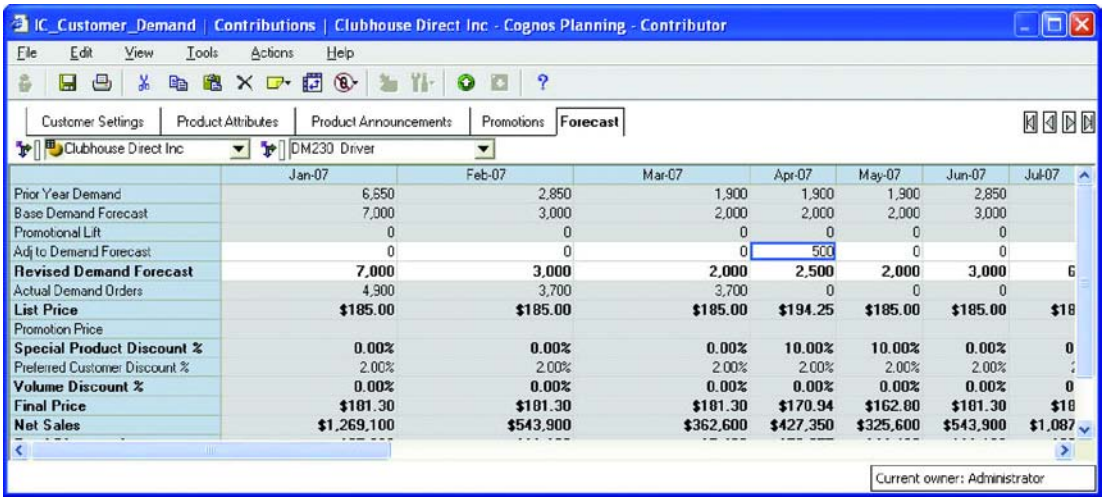
This tab is used to detail specific planned promotions. It allows sales managers to input ten different promotions at the product detail level and specify the anticipated % Lift or Unit Lift in demand from these promotions.



	Promotion	Details	Start Month	Promotion Duration	Promotion End	Promotional Discount	Promotion Price	Lift in %	Lift in Units	Message
01	Inventory Closeout	push out excess	Feb-07	4 months	May-07	5.0%		1.00%		
02										
03										
04										
05										
06										
07										
08										
09										
10										

Forecast

This tab may be used to enter adjustments in Demand to the Base Forecast. These are adjustments in addition to the Promotional "lift" from the Promotions tab. As can be seen in this example, the planner anticipates higher demand for the *DM230 Driver* in April. This type of adjustment is usually based on specific knowledge about customers that was not reflected in the Base Demand. If the product is no longer available, feedback will be given and a similar product is recommended.

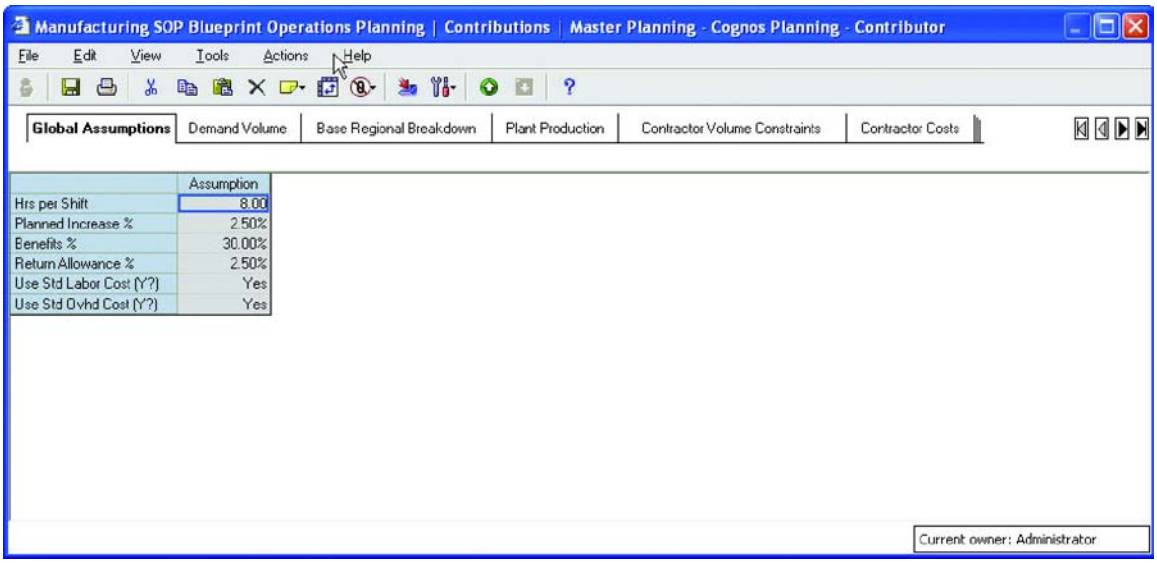


	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07
Prior Year Demand	6,650	2,850	1,900	1,900	1,900	2,850	
Base Demand Forecast	7,000	3,000	2,000	2,000	2,000	3,000	
Promotional Lift	0	0	0	0	0	0	
Adj to Demand Forecast	0	0	0	500	0	0	
Revised Demand Forecast	**7,000**	**3,000**	**2,000**	**2,500**	**2,000**	**3,000**	**6**
Actual Demand Orders	4,900	3,700	3,700	0	0	0	
List Price	**$185.00**	**$185.00**	**$185.00**	**$194.25**	**$185.00**	**$185.00**	**$18**
Promotion Price							
Special Product Discount %	**0.00%**	**0.00%**	**0.00%**	**10.00%**	**10.00%**	**0.00%**	**0**
Preferred Customer Discount %	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	
Volume Discount %	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0**
Final Price	**$181.30**	**$181.30**	**$181.30**	**$170.94**	**$162.80**	**$181.30**	**$18**
Net Sales	**$1,269,100**	**$543,900**	**$362,600**	**$427,350**	**$325,600**	**$543,900**	**$1,087**

MASTER PLANNER VIEW

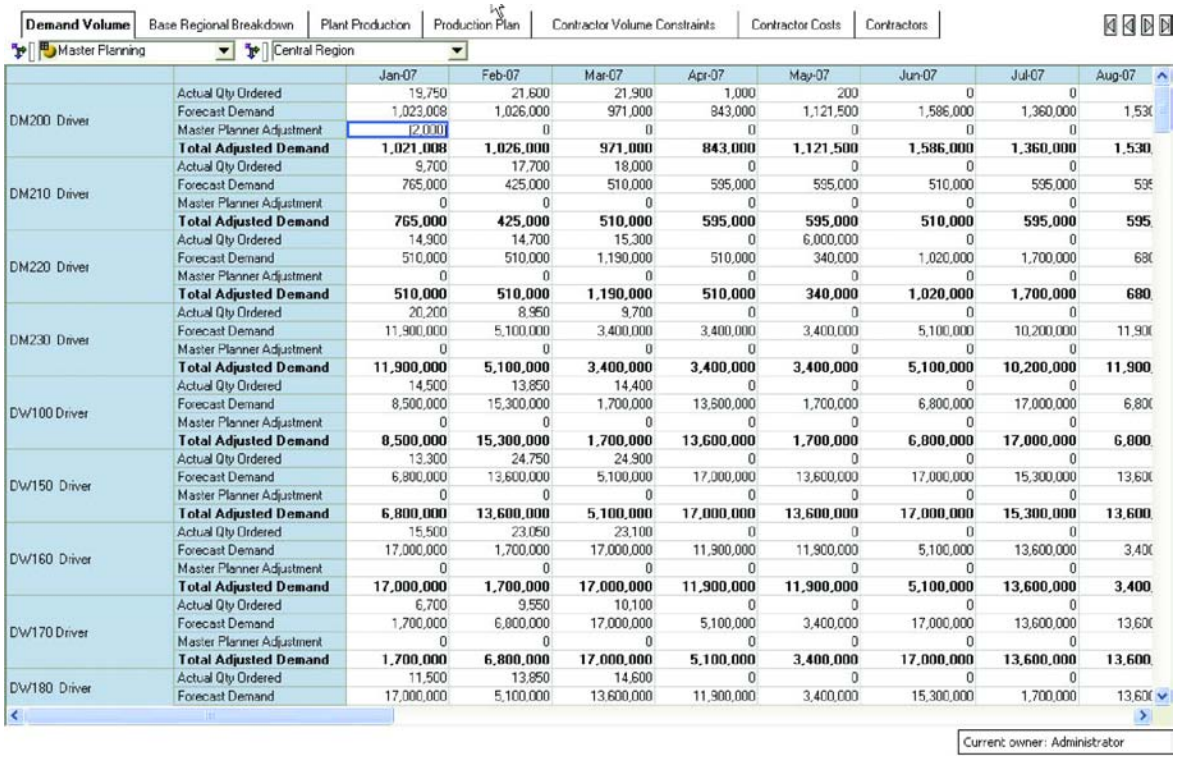
Global Assumptions

The first tab seen by all users in this model is *Global Assumption*s. It displays corporate assumptions for all planners. Included are drivers as well as costing provisions.



Demand Volume

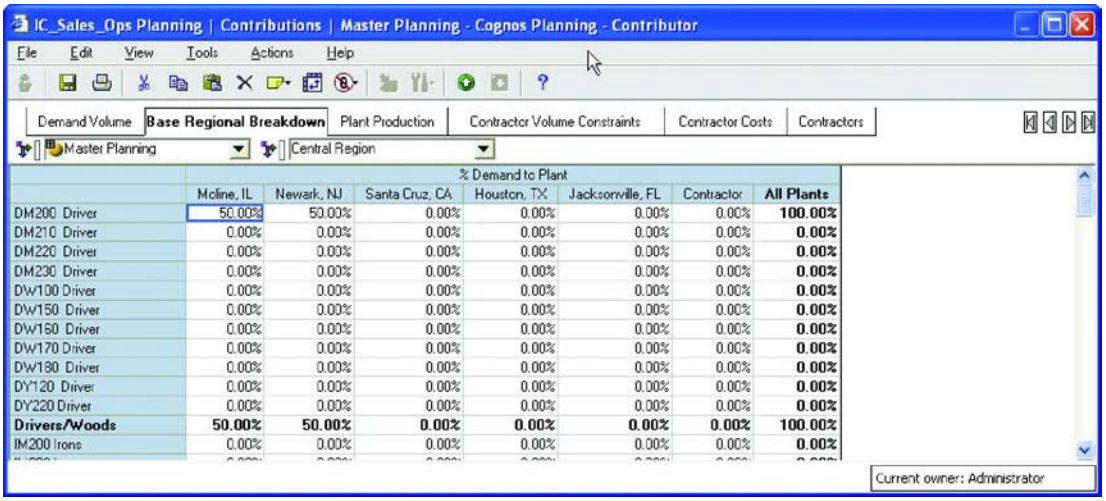
This tab illustrates the master planner's view derived from the *Forecast* tab in the *Customer Demand* model. It shows product demand both by region and at the aggregated Total Company level. The master planner has "View" rights into the *Customer Demand* application. If the plan is satisfactory to both the sales and operations groups, the master planner can run a real-time link from the *Customer Demand* model to the *Demand Volume* tab in the *Sales & Operations Planning* model. The total company demand by product can now be apportioned across manufacturing plants.



		Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07
DM200 Driver	Actual Qty Ordered	19,750	21,600	21,900	1,000	200	0	0	
	Forecast Demand	1,023,008	1,026,000	971,000	843,000	1,121,500	1,586,000	1,360,000	1,53
	Master Planner Adjustment	12,000	0	0	0	0	0	0	
	Total Adjusted Demand	**1,021,008**	**1,026,000**	**971,000**	**843,000**	**1,121,500**	**1,586,000**	**1,360,000**	**1,530**
DM210 Driver	Actual Qty Ordered	9,700	17,700	18,000	0	0	0	0	
	Forecast Demand	765,000	425,000	510,000	595,000	595,000	510,000	595,000	595
	Master Planner Adjustment	0	0	0	0	0	0	0	
	Total Adjusted Demand	**765,000**	**425,000**	**510,000**	**595,000**	**595,000**	**510,000**	**595,000**	**595**
DM220 Driver	Actual Qty Ordered	14,900	14,700	15,300	0	6,000,000	0	0	
	Forecast Demand	510,000	510,000	1,190,000	510,000	340,000	1,020,000	1,700,000	68
	Master Planner Adjustment	0	0	0	0	0	0	0	
	Total Adjusted Demand	**510,000**	**510,000**	**1,190,000**	**510,000**	**340,000**	**1,020,000**	**1,700,000**	**680**
DM230 Driver	Actual Qty Ordered	20,200	8,950	9,700	0	0	0	0	
	Forecast Demand	11,900,000	5,100,000	3,400,000	3,400,000	3,400,000	5,100,000	10,200,000	11,90
	Master Planner Adjustment	0	0	0	0	0	0	0	
	Total Adjusted Demand	**11,900,000**	**5,100,000**	**3,400,000**	**3,400,000**	**3,400,000**	**5,100,000**	**10,200,000**	**11,900**
DW100 Driver	Actual Qty Ordered	14,500	13,850	14,400	0	0	0	0	
	Forecast Demand	8,500,000	15,300,000	1,700,000	13,600,000	1,700,000	6,800,000	17,000,000	6,80
	Master Planner Adjustment	0	0	0	0	0	0	0	
	Total Adjusted Demand	**8,500,000**	**15,300,000**	**1,700,000**	**13,600,000**	**1,700,000**	**6,800,000**	**17,000,000**	**6,800**
DW150 Driver	Actual Qty Ordered	13,300	24,750	24,900	0	0	0	0	
	Forecast Demand	6,800,000	13,600,000	5,100,000	17,000,000	13,600,000	17,000,000	15,300,000	13,60
	Master Planner Adjustment	0	0	0	0	0	0	0	
	Total Adjusted Demand	**6,800,000**	**13,600,000**	**5,100,000**	**17,000,000**	**13,600,000**	**17,000,000**	**15,300,000**	**13,600**
DW160 Driver	Actual Qty Ordered	15,500	23,050	23,100	0	0	0	0	
	Forecast Demand	17,000,000	1,700,000	17,000,000	11,900,000	11,900,000	5,100,000	13,600,000	3,40
	Master Planner Adjustment	0	0	0	0	0	0	0	
	Total Adjusted Demand	**17,000,000**	**1,700,000**	**17,000,000**	**11,900,000**	**11,900,000**	**5,100,000**	**13,600,000**	**3,400**
DW170 Driver	Actual Qty Ordered	6,700	9,550	10,100	0	0	0	0	
	Forecast Demand	1,700,000	6,800,000	17,000,000	5,100,000	3,400,000	17,000,000	13,600,000	13,60
	Master Planner Adjustment	0	0	0	0	0	0	0	
	Total Adjusted Demand	**1,700,000**	**6,800,000**	**17,000,000**	**5,100,000**	**3,400,000**	**17,000,000**	**13,600,000**	**13,600**
DW180 Driver	Actual Qty Ordered	11,500	13,850	14,600	0	0	0	0	
	Forecast Demand	17,000,000	5,100,000	13,600,000	11,900,000	3,400,000	15,300,000	1,700,000	13,60

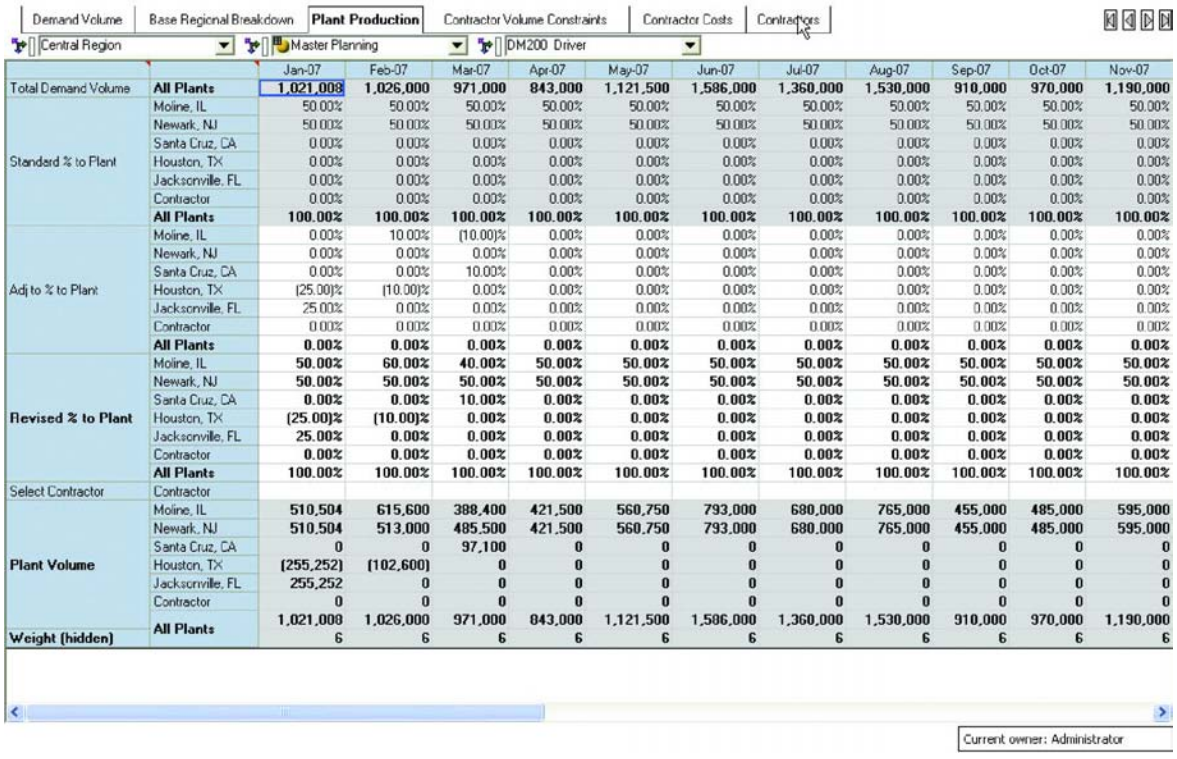
Base Regional Breakdown

This tab represents the default regional production allocation. It is based on the correspondence between demand geography and plant geography. The view shows the apportionment of production among plants in the Central Region. This data may be preloaded from historical information.



Plant Production

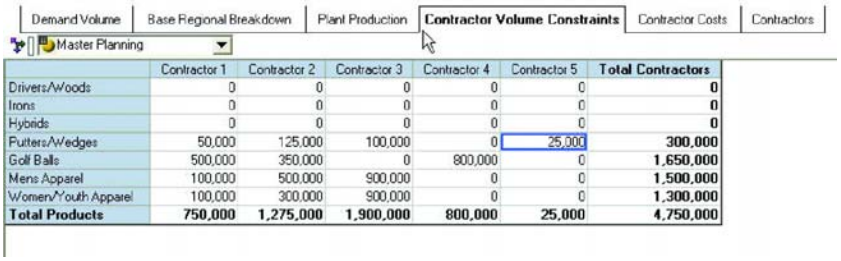
This tab enables the master planner to make adjustments to the *Base Regional Breakdown* tab. In the example below, while most plants manufacture golf clubs, while clothing is outsourced, nothing prohibits plants from manufacturing either golf balls or clothing. The master planner may revise the allocation to plants by input to the field "Adj to % to Plant." It is also possible to adjust this allocation by entering the total percentages in "Revised % to Plant." These will breakback (allocate) the adjustment percents.



		Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07
Total Demand Volume	**All Plants**	**1,021,008**	**1,026,000**	**971,000**	**843,000**	**1,121,500**	**1,586,000**	**1,360,000**	**1,530,000**	**910,000**	**970,000**	**1,190,000**
Standard % to Plant	Moline, IL	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
	Newark, NJ	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
	Santa Cruz, CA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Houston, TX	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Jacksonville, FL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Contractor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	All Plants	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Adj to % to Plant	Moline, IL	0.00%	10.00%	(10.00)%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Newark, NJ	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Santa Cruz, CA	0.00%	0.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Houston, TX	(25.00)%	(10.00)%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Jacksonville, FL	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Contractor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	All Plants	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Revised % to Plant	Moline, IL	**50.00%**	**60.00%**	**40.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**
	Newark, NJ	**50.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**	**50.00%**
	Santa Cruz, CA	**0.00%**	**0.00%**	**10.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
	Houston, TX	**(25.00)%**	**(10.00)%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
	Jacksonville, FL	**25.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
	Contractor	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
	All Plants	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Select Contractor	Contractor											
Plant Volume	Moline, IL	**510,504**	**615,600**	**388,400**	**421,500**	**560,750**	**793,000**	**680,000**	**765,000**	**455,000**	**485,000**	**595,000**
	Newark, NJ	**510,504**	**513,000**	**485,500**	**421,500**	**560,750**	**793,000**	**680,000**	**765,000**	**455,000**	**485,000**	**595,000**
	Santa Cruz, CA	**0**	**0**	**97,100**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Houston, TX	**(255,252)**	**(102,600)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Jacksonville, FL	**255,252**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Contractor	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Weight (hidden)	**All Plants**	**1,021,008** **6**	**1,026,000** **6**	**971,000** **6**	**843,000** **6**	**1,121,500** **6**	**1,586,000** **6**	**1,360,000** **6**	**1,530,000** **6**	**910,000** **6**	**970,000** **6**	**1,190,000** **6**

Contractor Volume Constraints

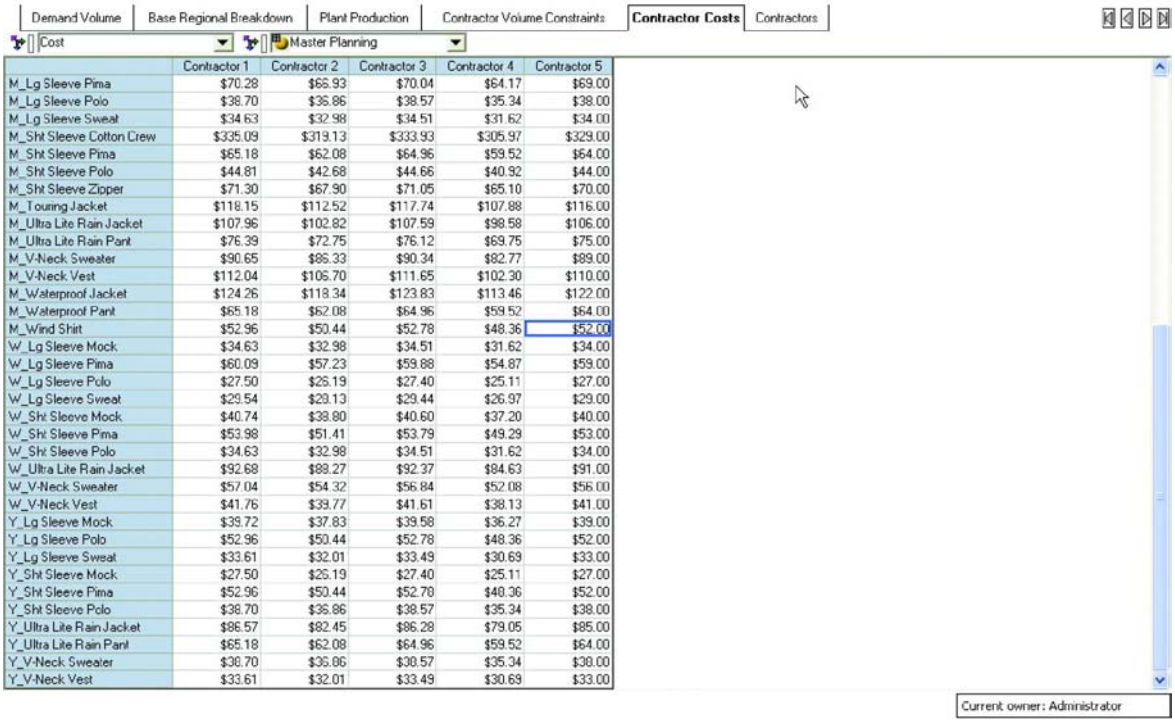
This tab is used to input contractor constraints by product line, which is used to determine capacities.



	Contractor 1	Contractor 2	Contractor 3	Contractor 4	Contractor 5	Total Contractors
Drivers/Woods	0	0	0	0	0	**0**
Irons	0	0	0	0	0	**0**
Hybrids	0	0	0	0	0	**0**
Putters/Wedges	50,000	125,000	100,000	0	25,000	**300,000**
Golf Balls	500,000	350,000	0	800,000	0	**1,650,000**
Mens Apparel	100,000	500,000	900,000	0	0	**1,500,000**
Women/Youth Apparel	100,000	300,000	900,000	0	0	**1,300,000**
Total Products	**750,000**	**1,275,000**	**1,900,000**	**800,000**	**25,000**	**4,750,000**

Contractor Costs

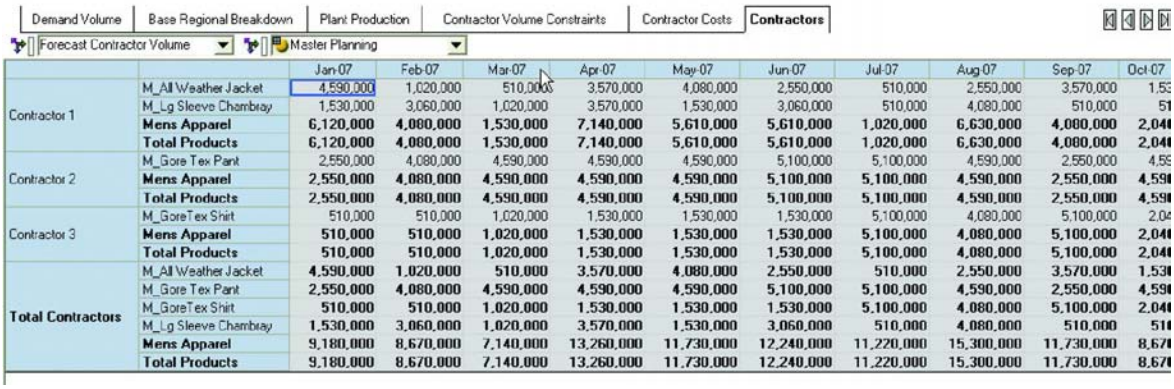
This tab represents the average cost per product by contractor. It is assumed that the data from this tab will be linked in from an external source such as Purchasing.



	Contractor 1	Contractor 2	Contractor 3	Contractor 4	Contractor 5
M_Lg Sleeve Pima	$70.28	$65.93	$70.04	$64.17	$69.00
M_Lg Sleeve Polo	$38.70	$36.86	$38.57	$35.34	$38.00
M_Lg Sleeve Sweat	$34.63	$32.98	$34.51	$31.62	$34.00
M_Sht Sleeve Cotton Crew	$335.09	$319.13	$333.93	$305.97	$329.00
M_Sht Sleeve Pima	$65.18	$62.08	$64.96	$59.52	$64.00
M_Sht Sleeve Polo	$44.81	$42.68	$44.66	$40.92	$44.00
M_Sht Sleeve Zipper	$71.30	$67.90	$71.05	$65.10	$70.00
M_Touring Jacket	$118.15	$112.52	$117.74	$107.88	$116.00
M_Ultra Lite Rain Jacket	$107.96	$102.82	$107.59	$98.58	$106.00
M_Ultra Lite Rain Pant	$76.39	$72.75	$76.12	$69.75	$75.00
M_V-Neck Sweater	$90.65	$86.33	$90.34	$82.77	$89.00
M_V-Neck Vest	$112.04	$106.70	$111.65	$102.30	$110.00
M_Waterproof Jacket	$124.26	$118.34	$123.83	$113.46	$122.00
M_Waterproof Pant	$65.18	$62.08	$64.96	$59.52	$64.00
M_Wind Shirt	$52.96	$50.44	$52.78	$48.36	$52.00
W_Lg Sleeve Mock	$34.63	$32.98	$34.51	$31.62	$34.00
W_Lg Sleeve Pima	$60.09	$57.23	$59.88	$54.87	$59.00
W_Lg Sleeve Polo	$27.50	$26.19	$27.40	$25.11	$27.00
W_Lg Sleeve Sweat	$29.54	$28.13	$29.44	$26.97	$29.00
W_Sht Sleeve Mock	$40.74	$38.80	$40.60	$37.20	$40.00
W_Sht Sleeve Pima	$53.98	$51.41	$53.79	$49.29	$53.00
W_Sht Sleeve Polo	$34.63	$32.98	$34.51	$31.62	$34.00
W_Ultra Lite Rain Jacket	$92.68	$88.27	$92.37	$84.63	$91.00
W_V-Neck Sweater	$57.04	$54.32	$56.84	$52.08	$56.00
W_V-Neck Vest	$41.76	$39.77	$41.61	$38.13	$41.00
Y_Lg Sleeve Mock	$39.72	$37.83	$39.58	$36.27	$39.00
Y_Lg Sleeve Polo	$52.96	$50.44	$52.78	$48.36	$52.00
Y_Lg Sleeve Sweat	$33.61	$32.01	$33.49	$30.69	$33.00
Y_Sht Sleeve Mock	$27.50	$26.19	$27.40	$25.11	$27.00
Y_Sht Sleeve Pima	$52.96	$50.44	$52.78	$48.36	$52.00
Y_Sht Sleeve Polo	$38.70	$36.86	$38.57	$35.34	$38.00
Y_Ultra Lite Rain Jacket	$86.57	$82.45	$86.28	$79.05	$85.00
Y_Ultra Lite Rain Pant	$65.18	$62.08	$64.96	$59.52	$64.00
Y_V-Neck Sweater	$38.70	$36.86	$38.57	$35.34	$38.00
Y_V-Neck Vest	$33.61	$32.01	$33.49	$30.69	$33.00

Contractors

The tab allows the master planner to view all production by product and contractor.



		Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07
Contractor 1	M_All Weather Jacket	4,590,000	1,020,000	510,000	3,570,000	4,080,000	2,550,000	510,000	2,550,000	3,570,000	1,53
	M_Lg Sleeve Chambray	1,530,000	3,060,000	1,020,000	3,570,000	1,530,000	3,060,000	510,000	4,080,000	510,000	51
	Mens Apparel	**6,120,000**	**4,080,000**	**1,530,000**	**7,140,000**	**5,610,000**	**5,610,000**	**1,020,000**	**6,630,000**	**4,080,000**	**2,04**
	Total Products	**6,120,000**	**4,080,000**	**1,530,000**	**7,140,000**	**5,610,000**	**5,610,000**	**1,020,000**	**6,630,000**	**4,080,000**	**2,04**
Contractor 2	M_Gore Tex Pant	2,550,000	4,080,000	4,590,000	4,590,000	4,590,000	5,100,000	5,100,000	4,590,000	2,550,000	4,59
	Mens Apparel	**2,550,000**	**4,080,000**	**4,590,000**	**4,590,000**	**4,590,000**	**5,100,000**	**5,100,000**	**4,590,000**	**2,550,000**	**4,59**
	Total Products	**2,550,000**	**4,080,000**	**4,590,000**	**4,590,000**	**4,590,000**	**5,100,000**	**5,100,000**	**4,590,000**	**2,550,000**	**4,59**
Contractor 3	M_GoreTex Shirt	510,000	510,000	1,020,000	1,530,000	1,530,000	1,530,000	5,100,000	4,080,000	5,100,000	2,04
	Mens Apparel	**510,000**	**510,000**	**1,020,000**	**1,530,000**	**1,530,000**	**1,530,000**	**5,100,000**	**4,080,000**	**5,100,000**	**2,04**
	Total Products	**510,000**	**510,000**	**1,020,000**	**1,530,000**	**1,530,000**	**1,530,000**	**5,100,000**	**4,080,000**	**5,100,000**	**2,04**
Total Contractors	M_All Weather Jacket	**4,590,000**	**1,020,000**	**510,000**	**3,570,000**	**4,080,000**	**2,550,000**	**510,000**	**2,550,000**	**3,570,000**	**1,53**
	M_Gore Tex Pant	**2,550,000**	**4,080,000**	**4,590,000**	**4,590,000**	**4,590,000**	**5,100,000**	**5,100,000**	**4,590,000**	**2,550,000**	**4,59**
	M_GoreTex Shirt	**510,000**	**510,000**	**1,020,000**	**1,530,000**	**1,530,000**	**1,530,000**	**5,100,000**	**4,080,000**	**5,100,000**	**2,04**
	M_Lg Sleeve Chambray	**1,530,000**	**3,060,000**	**1,020,000**	**3,570,000**	**1,530,000**	**3,060,000**	**510,000**	**4,080,000**	**510,000**	**51**
	Mens Apparel	**9,180,000**	**8,670,000**	**7,140,000**	**13,260,000**	**11,730,000**	**12,240,000**	**11,220,000**	**15,300,000**	**11,730,000**	**8,67**
	Total Products	**9,180,000**	**8,670,000**	**7,140,000**	**13,260,000**	**11,730,000**	**12,240,000**	**11,220,000**	**15,300,000**	**11,730,000**	**8,67**

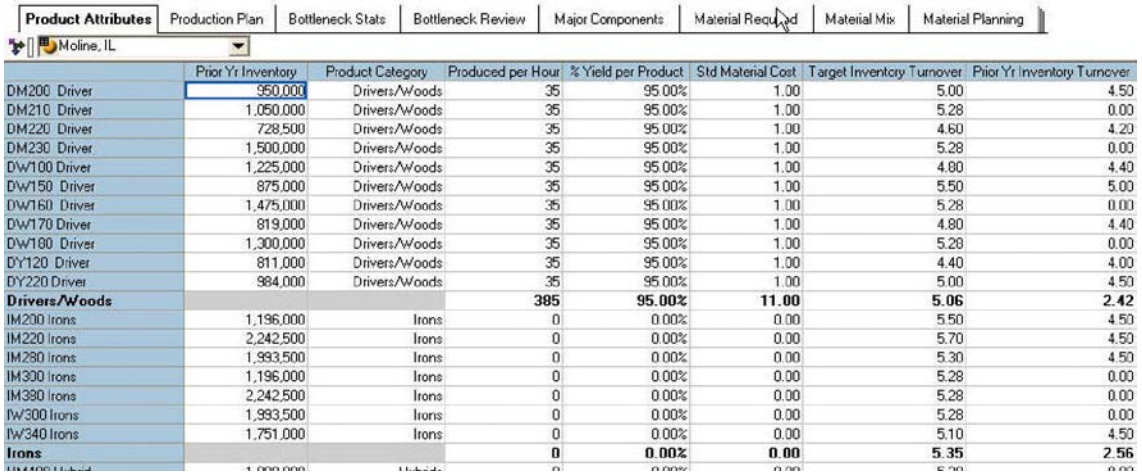
PLANT MANAGER VIEW

The plant manager's view of the model is the same for all manufacturing plants. Each will see only the products or product line(s) specific to that plant. The manager's first task will be to load apportioned product demand from the master planner.

The first tab is *Global Assumptions* (see above).

Product Attributes

The *Product Attributes* tab gives the plant manager a view of current inventory by product as well as metrics for production, yield, standard material cost, target, and historical inventory turnover. Much of this information will be linked from an ERP system. Other data such as target inventory turnover by product may be input.



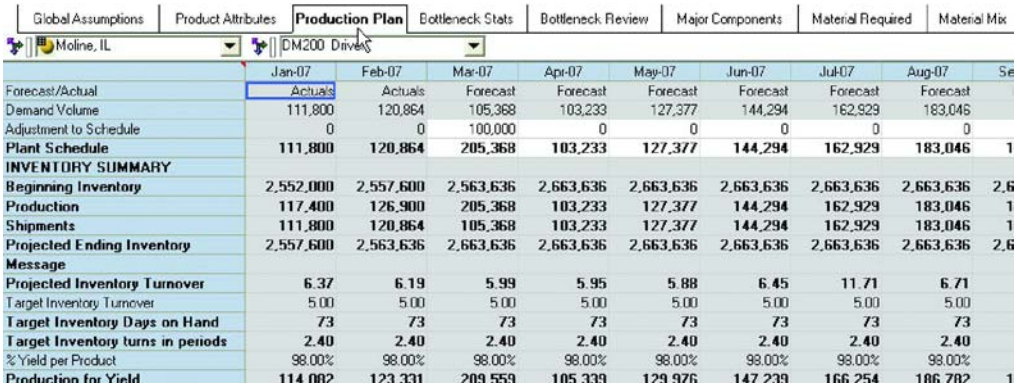
Product Attributes | Production Plan | Bottleneck Stats | Bottleneck Review | Major Components | Material Required | Material Mix | Material Planning

Moline, IL

	Prior Yr Inventory	Product Category	Produced per Hour	% Yield per Product	Std Material Cost	Target Inventory Turnover	Prior Yr Inventory Turnover
DM200 Driver	950,000	Drivers/Woods	35	95.00%	1.00	5.00	4.50
DM210 Driver	1,050,000	Drivers/Woods	35	95.00%	1.00	5.28	0.00
DM220 Driver	728,500	Drivers/Woods	35	95.00%	1.00	4.60	4.20
DM230 Driver	1,500,000	Drivers/Woods	35	95.00%	1.00	5.28	0.00
DW100 Driver	1,225,000	Drivers/Woods	35	95.00%	1.00	4.80	4.40
DW150 Driver	875,000	Drivers/Woods	35	95.00%	1.00	5.50	5.00
DW160 Driver	1,475,000	Drivers/Woods	35	95.00%	1.00	5.28	0.00
DW170 Driver	819,000	Drivers/Woods	35	95.00%	1.00	4.80	4.40
DW180 Driver	1,300,000	Drivers/Woods	35	95.00%	1.00	5.28	0.00
DY120 Driver	811,000	Drivers/Woods	35	95.00%	1.00	4.40	4.00
DY220 Driver	984,000	Drivers/Woods	35	95.00%	1.00	5.00	4.50
Drivers/Woods			**385**	**95.00%**	**11.00**	**5.06**	**2.42**
IM200 Irons	1,196,000	Irons	0	0.00%	0.00	5.50	4.50
IM220 Irons	2,242,500	Irons	0	0.00%	0.00	5.70	4.50
IM280 Irons	1,993,500	Irons	0	0.00%	0.00	5.30	4.50
IM300 Irons	1,196,000	Irons	0	0.00%	0.00	5.28	0.00
IM380 Irons	2,242,500	Irons	0	0.00%	0.00	5.28	0.00
IW300 Irons	1,993,500	Irons	0	0.00%	0.00	5.28	0.00
IW340 Irons	1,751,000	Irons	0	0.00%	0.00	5.10	4.50
Irons			**0**	**0.00%**	**0.00**	**5.35**	**2.56**

Production Plan

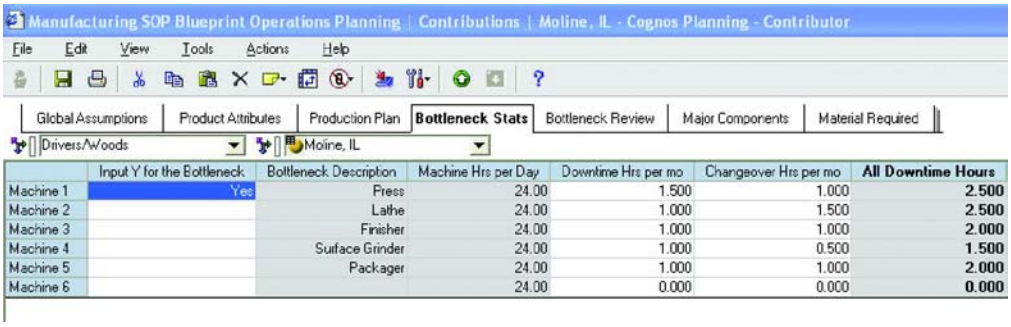
The data for this tab can be populated via real-time links from the *Plant Production* tab in the master planner's view. It shows plant managers their production allocation by product. They are able to make further schedule adjustments, see real-time impact on inventory as adjustments are made, and instantaneously view turnover metrics.



	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Se
Forecast/Actual	Actuals	Actuals	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	
Demand Volume	111,800	120,864	105,368	103,233	127,377	144,294	162,929	183,046	
Adjustment to Schedule	0	0	100,000	0	0	0	0	0	
Plant Schedule	**111,800**	**120,864**	**205,368**	**103,233**	**127,377**	**144,294**	**162,929**	**183,046**	1
INVENTORY SUMMARY									
Beginning Inventory	2,552,000	2,557,600	2,563,636	2,663,636	2,663,636	2,663,636	2,663,636	2,663,636	2,6
Production	**117,400**	**126,900**	**205,368**	**103,233**	**127,377**	**144,294**	**162,929**	**183,046**	1
Shipments	**111,800**	**120,864**	**105,368**	**103,233**	**127,377**	**144,294**	**162,929**	**183,046**	1
Projected Ending Inventory	2,557,600	2,563,636	2,663,636	2,663,636	2,663,636	2,663,636	2,663,636	2,663,636	2,6
Message									
Projected Inventory Turnover	**6.37**	**6.19**	**5.99**	**5.95**	**5.88**	**6.45**	**11.71**	**6.71**	
Target Inventory Turnover	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	
Target Inventory Days on Hand	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**73**	
Target Inventory turns in periods	**2.40**	**2.40**	**2.40**	**2.40**	**2.40**	**2.40**	**2.40**	**2.40**	
% Yield per Product	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	
Production for Yield	**114,082**	**123,331**	**209,559**	**105,339**	**129,976**	**147,239**	**166,254**	**186,782**	1

Bottleneck Stats

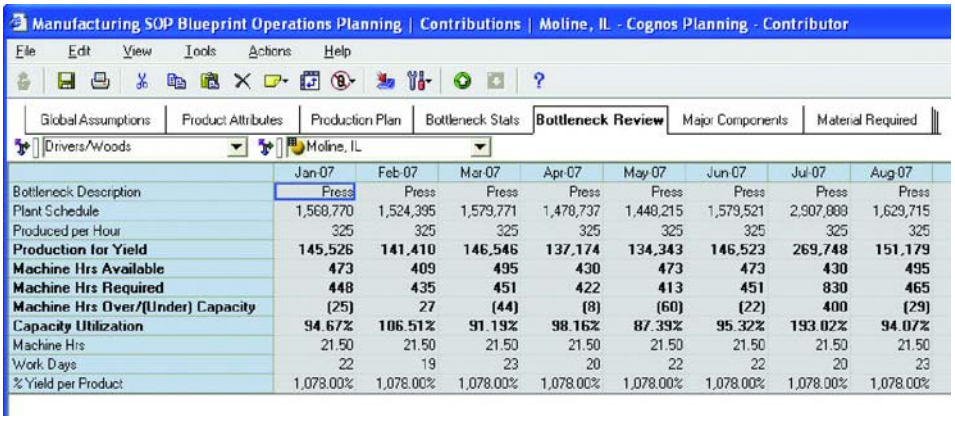
This tab is used to input a plant's machine bottleneck metrics. A manager enters the anticipated bottlenecks along with associated downtime and changeover hours.



	Input Y for the Bottleneck	Bottleneck Description	Machine Hrs per Day	Downtime Hrs per mo	Changeover Hrs per mo	**All Downtime Hours**
Machine 1	Yes	Press	24.00	1.500	1.000	**2.500**
Machine 2		Lathe	24.00	1.000	1.500	**2.500**
Machine 3		Finisher	24.00	1.000	1.000	**2.000**
Machine 4		Surface Grinder	24.00	1.000	0.500	**1.500**
Machine 5		Packager	24.00	1.000	1.000	**2.000**
Machine 6			24.00	0.000	0.000	**0.000**

Bottleneck Review

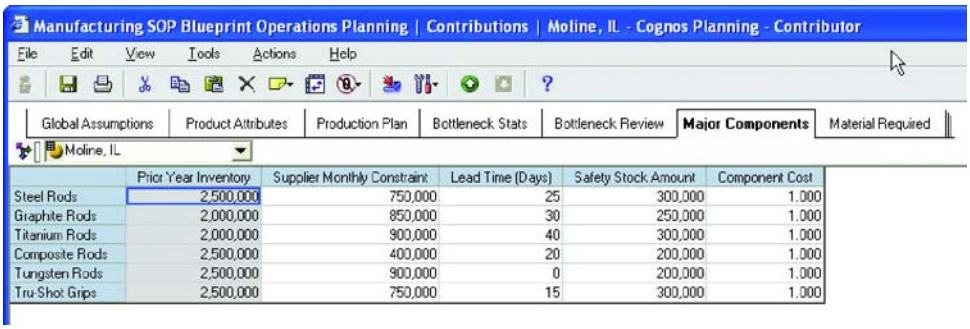
This tab requires no input. It contains assumption data for each machine in the plant. Data from the *Production Plan*, *Product Attributes*, and *Bottleneck Stats* tabs is linked to this cube. Resultant calculations show whether machine capacity is over or under required levels.



	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07
Bottleneck Description	Press	Press	Press	Press	Press	Press	Press	Press
Plant Schedule	1,568,770	1,524,395	1,579,771	1,478,737	1,448,215	1,579,521	2,907,888	1,629,715
Produced per Hour	325	325	325	325	325	325	325	325
Production for Yield	**145,526**	**141,410**	**146,546**	**137,174**	**134,343**	**146,523**	**269,748**	**151,179**
Machine Hrs Available	**473**	**409**	**495**	**430**	**473**	**473**	**430**	**495**
Machine Hrs Required	**448**	**435**	**451**	**422**	**413**	**451**	**830**	**465**
Machine Hrs Over/(Under) Capacity	**(25)**	**27**	**(44)**	**(8)**	**(60)**	**(22)**	**400**	**(29)**
Capacity Utilization	**94.67%**	**106.51%**	**91.19%**	**98.16%**	**87.39%**	**95.32%**	**193.02%**	**94.07%**
Machine Hrs	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50
Work Days	22	19	23	20	22	22	20	23
% Yield per Product	1,078.00%	1,078.00%	1,078.00%	1,078.00%	1,078.00%	1,078.00%	1,078.00%	1,078.00%

Major Components

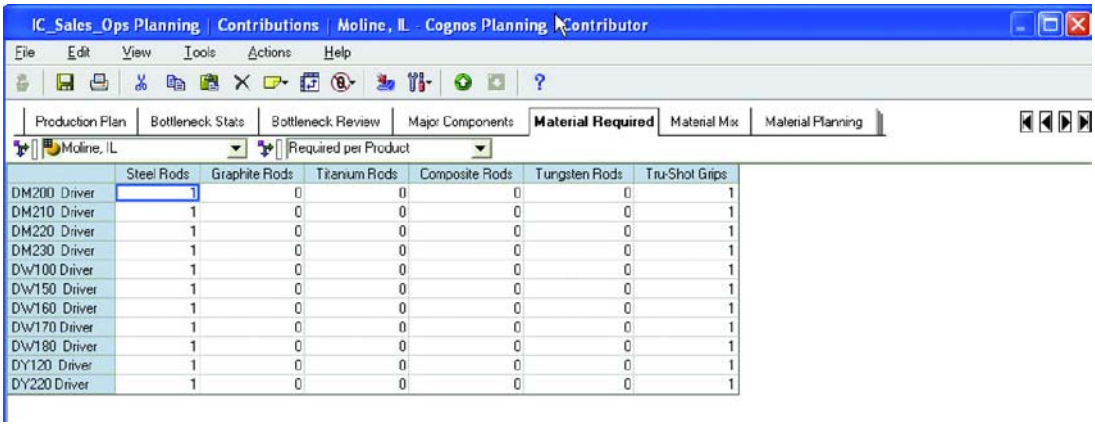
This tab contains information about the five main material components required for production by product, which is imported from source systems.



	Prior Year Inventory	Supplier Monthly Constraint	Lead Time (Days)	Safety Stock Amount	Component Cost
Steel Rods	2,500,000	750,000	25	300,000	1.000
Graphite Rods	2,000,000	850,000	30	250,000	1.000
Titanium Rods	2,000,000	900,000	40	300,000	1.000
Composite Rods	2,500,000	400,000	20	200,000	1.000
Tungsten Rods	2,500,000	900,000	0	200,000	1.000
Tru-Shot Grips	2,500,000	750,000	15	300,000	1.000

Material Required

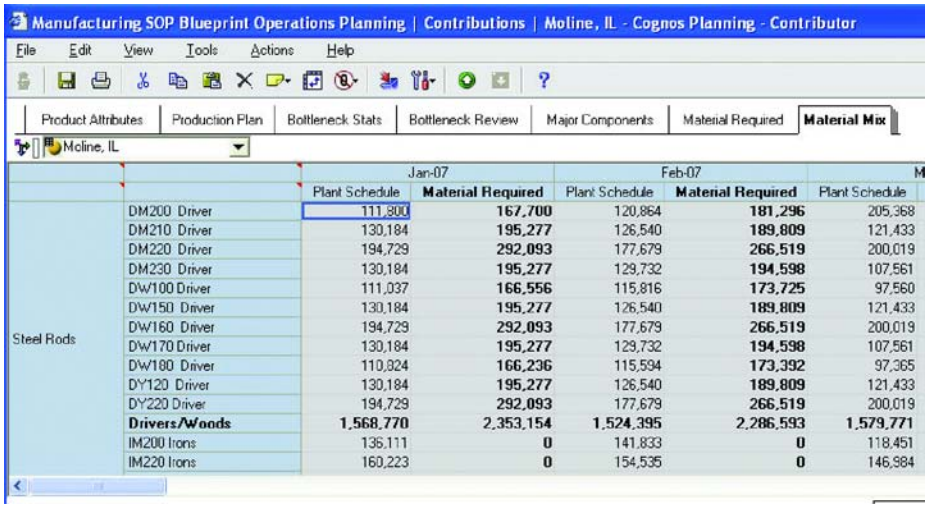
This tab contains information about the material components required for each individual product, which is imported from source systems.



	Steel Rods	Graphite Rods	Titanium Rods	Composite Rods	Tungsten Rods	Tru-Shot Grips
DM200 Driver	1	0	0	0	0	1
DM210 Driver	1	0	0	0	0	1
DM220 Driver	1	0	0	0	0	1
DM230 Driver	1	0	0	0	0	1
DW100 Driver	1	0	0	0	0	1
DW150 Driver	1	0	0	0	0	1
DW160 Driver	1	0	0	0	0	1
DW170 Driver	1	0	0	0	0	1
DW180 Driver	1	0	0	0	0	1
DY120 Driver	1	0	0	0	0	1
DY220 Driver	1	0	0	0	0	1

Material Mix

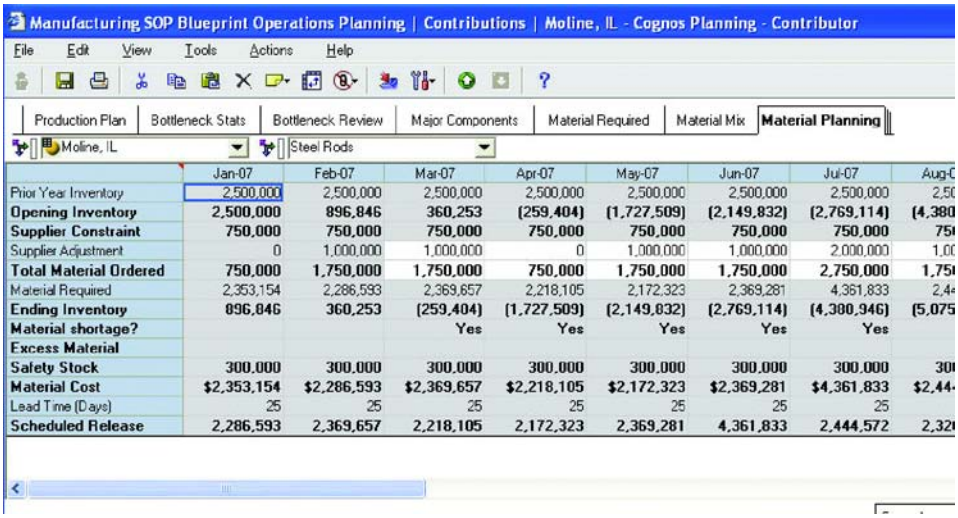
The data in this tab is linked from the *Material Required* and *Plant Volume* tabs. It shows the amount of material by product required to meet current plant demand production.



		Jan-07		Feb-07		M
		Plant Schedule	Material Required	Plant Schedule	Material Required	Plant Schedule
Steel Rods	DM200 Driver	111,800	**167,700**	120,864	**181,296**	205,368
	DM210 Driver	130,184	**195,277**	126,540	**189,809**	121,433
	DM220 Driver	194,729	**292,093**	177,679	**266,519**	200,019
	DM230 Driver	130,184	**195,277**	129,732	**194,598**	107,561
	DW100 Driver	111,037	**166,556**	115,816	**173,725**	97,560
	DW150 Driver	130,184	**195,277**	126,540	**189,809**	121,433
	DW160 Driver	194,729	**292,093**	177,679	**266,519**	200,019
	DW170 Driver	130,184	**195,277**	129,732	**194,598**	107,561
	DW180 Driver	110,824	**166,236**	115,594	**173,392**	97,365
	DY120 Driver	130,184	**195,277**	126,540	**189,809**	121,433
	DY220 Driver	194,729	**292,093**	177,679	**266,519**	200,019
	Drivers/Woods	**1,568,770**	**2,353,154**	**1,524,395**	**2,286,593**	**1,579,771**
	IM200 Irons	136,111	**0**	141,833	**0**	118,451
	IM220 Irons	160,223	**0**	154,535	**0**	146,984

Material Planning

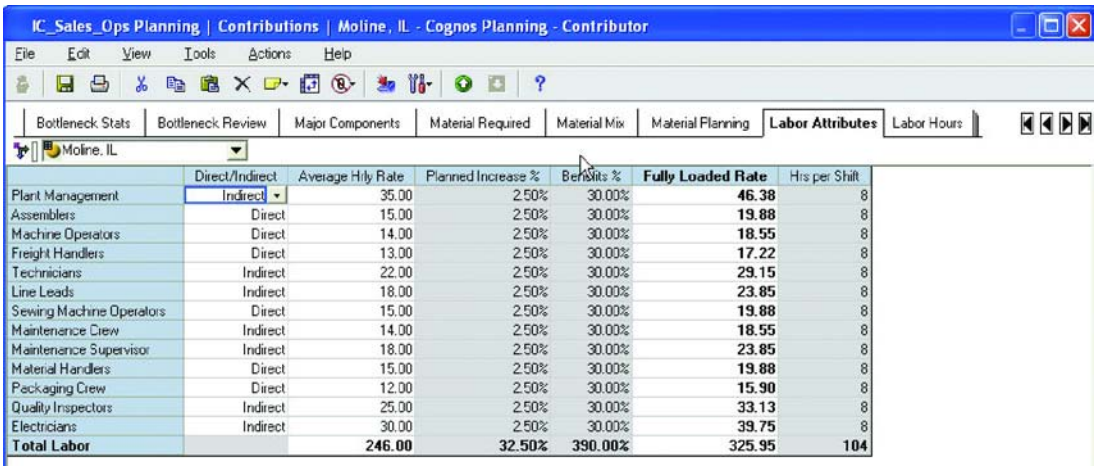
The data in this tab is linked from the previous material tabs to show the final results of material constraints. *Material Planning* allows for further input for material adjustment if the outcome shows material excess or a material shortage.



	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07
Prior Year Inventory	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000
Opening Inventory	**2,500,000**	**896,846**	**360,253**	**(259,404)**	**(1,727,509)**	**(2,149,832)**	**(2,769,114)**
Supplier Constraint	**750,000**	**750,000**	**750,000**	**750,000**	**750,000**	**750,000**	**750,000**
Supplier Adjustment	0	1,000,000	1,000,000	0	1,000,000	1,000,000	2,000,000
Total Material Ordered	**750,000**	**1,750,000**	**1,750,000**	**750,000**	**1,750,000**	**1,750,000**	**2,750,000**
Material Required	2,353,154	2,286,593	2,369,657	2,218,105	2,172,323	2,369,281	4,361,833
Ending Inventory	**896,846**	**360,253**	**(259,404)**	**(1,727,509)**	**(2,149,832)**	**(2,769,114)**	**(4,380,946)**
Material shortage?			**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Excess Material							
Safety Stock	**300,000**	**300,000**	**300,000**	**300,000**	**300,000**	**300,000**	**300,000**
Material Cost	**$2,353,154**	**$2,286,593**	**$2,369,657**	**$2,218,105**	**$2,172,323**	**$2,369,281**	**$4,361,833**
Lead Time (Days)	25	25	25	25	25	25	25
Scheduled Release	**2,286,593**	**2,369,657**	**2,218,105**	**2,172,323**	**2,369,281**	**4,361,833**	**2,444,572**

Labor Attributes

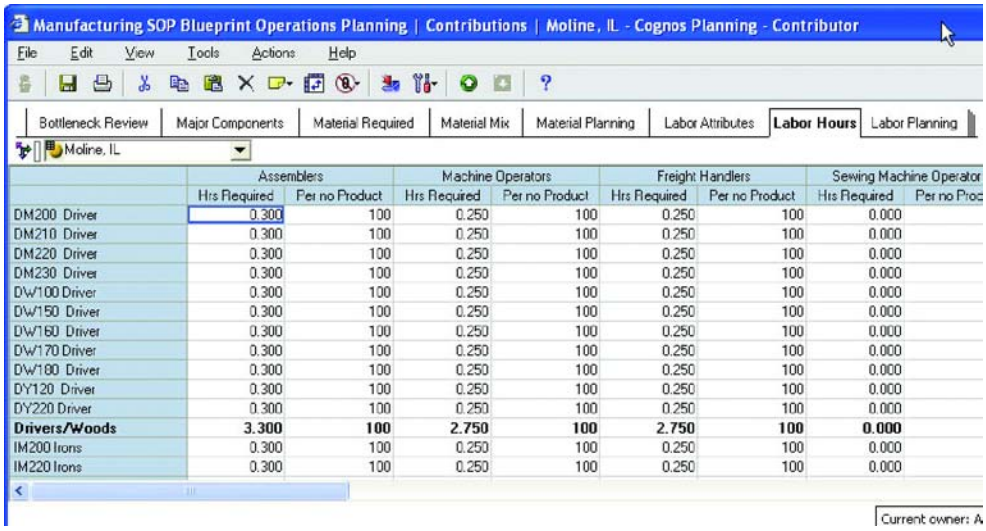
This tab represents the labor data for the major positions at the plant. Information can be imported from source systems or input manually.



	Direct/Indirect	Average Hrly Rate	Planned Increase %	Benefits %	Fully Loaded Rate	Hrs per Shift
Plant Management	Indirect	35.00	2.50%	30.00%	**46.38**	8
Assemblers	Direct	15.00	2.50%	30.00%	**19.88**	8
Machine Operators	Direct	14.00	2.50%	30.00%	**18.55**	8
Freight Handlers	Direct	13.00	2.50%	30.00%	**17.22**	8
Technicians	Indirect	22.00	2.50%	30.00%	**29.15**	8
Line Leads	Indirect	18.00	2.50%	30.00%	**23.85**	8
Sewing Machine Operators	Direct	15.00	2.50%	30.00%	**19.88**	8
Maintenance Crew	Indirect	14.00	2.50%	30.00%	**18.55**	8
Maintenance Supervisor	Indirect	18.00	2.50%	30.00%	**23.85**	8
Material Handlers	Direct	15.00	2.50%	30.00%	**19.88**	8
Packaging Crew	Direct	12.00	2.50%	30.00%	**15.90**	8
Quality Inspectors	Indirect	25.00	2.50%	30.00%	**33.13**	8
Electricians	Indirect	30.00	2.50%	30.00%	**39.75**	8
Total Labor		**246.00**	**32.50%**	**390.00%**	**325.95**	**104**

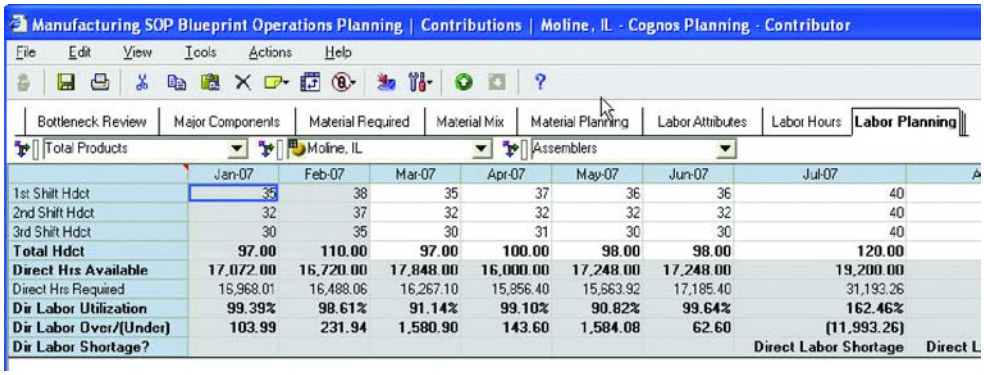
Labor Hours

This tab contains data for labor required by each workforce category for each product. Information may be imported from source systems.



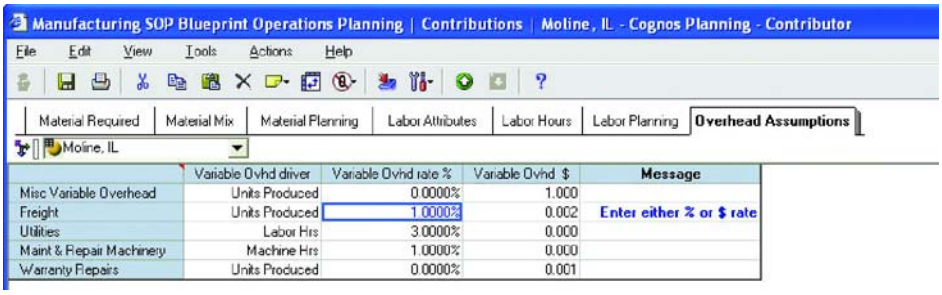
Labor Planning

The final labor tab, *Labor Planning*, contains the calculated results of previous labor- related tabs and shows a plant's final labor constraints. It contains information for both direct and indirect labor as well as labor cost.



Overhead Assumptions

The tab is used to input data for overhead driver and rates. Driver and rate data is applied to all products for the accounts selected. Users can tailor rows or columns to include more, less, or different accounts. In our example, five overhead accounts were selected, including one miscellaneous. A message appears if both rate and dollars are used.



	Variable Ovhd driver	Variable Ovhd rate %	Variable Ovhd $	Message
Misc Variable Overhead	Units Produced	0.0000%	1.000	
Freight	Units Produced	1.0000%	0.002	Enter either % or $ rate
Utilities	Labor Hrs	3.0000%	0.000	
Maint & Repair Machinery	Machine Hrs	1.0000%	0.000	
Warranty Repairs	Units Produced	0.0000%	0.001	

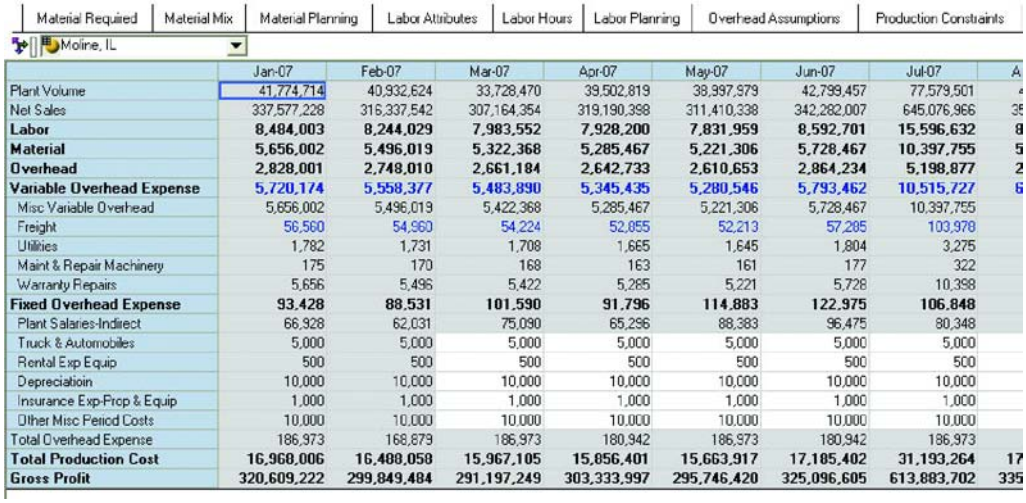
Production Constraints

This tab gives all users (including the master planner) a quick view of plant capacity constraints for material, machines, and labor. It will be used to assess the allocation of production among the various plants. In some cases, a plant manager may be able to change initial assumptions—for example, to hire additional headcount to meet increased demand. Likewise, if material shortages exist, a plant manager may be able to contract with alternate suppliers. Machine constraints may be less flexible. If plant demand does need to be renegotiated, the master planner may be able to shift demand to another plant or to a contractor in order to meet demand.

	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07
Labor Constraint					**Direct Labor Shortage**			**Direct Labor Shortage**	
Machine Constraint									
Material Constraint						**Material Shortage**			
Direct Hrs Required	61,871	74,609	47,073	51,084	67,961	96,109	82,414	92,716	55,145
Direct Hrs Available	68,448	75,264	52,080	51,360	67,704	96,288	84,568	88,784	65,520
Dir Labor Over/(Under)	**6,576.50**	**655.25**	**5,007.16**	**275.55**	**(257.11)**	**178.94**	**2,154.18**	**(3,931.55)**	**10,375.46**
Machine Hrs Required	5,862	7,069	4,460	4,840	6,439	9,106	7,809	8,785	5,225
Machine Hrs Available	4,447	4,015	4,447	4,303	4,447	4,303	4,447	4,447	4,303
Machine Hrs Over/(Under)	**(1,415)**	**(3,054)**	**(13)**	**(537)**	**(1,992)**	**(4,803)**	**(3,362)**	**(4,338)**	**(922)**
Total Material Available	1,550,000	1,550,000	1,550,000	1,150,000	1,150,000	1,550,000	1,550,000	1,550,000	1,350,000
Total Material Required	1,021,008	1,231,200	776,800	843,000	1,121,500	1,586,000	1,360,000	1,530,000	910,000
Material Over/(Under)	**528,992**	**318,800**	**773,200**	**307,000**	**28,500**	**(36,000)**	**190,000**	**20,000**	**440,000**

Plant P&L

The tab shows all plant production costs. Examination of this tab may be useful in assessing plant allocation. It is possible that production costs differ for each plant. Labor costs, for example, may vary by geographic location.



Material Required | Material Mix | Material Planning | Labor Attributes | Labor Hours | Labor Planning | Overhead Assumptions | Production Constraints

Moline, IL

	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	A
Plant Volume	41,774,714	40,932,624	33,728,470	39,502,819	38,997,979	42,799,457	77,579,501	
Net Sales	337,577,228	316,337,542	307,164,354	319,190,398	311,410,338	342,282,007	645,076,966	3
Labor	**8,484,003**	**8,244,029**	**7,983,552**	**7,928,200**	**7,831,959**	**8,592,701**	**15,596,632**	**8**
Material	**5,656,002**	**5,496,019**	**5,322,368**	**5,285,467**	**5,221,306**	**5,728,467**	**10,397,755**	**5**
Overhead	**2,828,001**	**2,748,010**	**2,661,184**	**2,642,733**	**2,610,653**	**2,864,234**	**5,198,877**	**2**
Variable Overhead Expense	**5,720,174**	**5,558,377**	**5,483,890**	**5,345,435**	**5,280,546**	**5,793,462**	**10,515,727**	**6**
Misc Variable Overhead	5,656,002	5,496,019	5,422,368	5,285,467	5,221,306	5,728,467	10,397,755	
Freight	56,560	54,960	54,224	52,855	52,213	57,285	103,978	
Utilities	1,782	1,731	1,708	1,665	1,645	1,804	3,275	
Maint & Repair Machinery	175	170	168	163	161	177	322	
Warranty Repairs	5,656	5,496	5,422	5,285	5,221	5,728	10,398	
Fixed Overhead Expense	**93,428**	**88,531**	**101,590**	**91,796**	**114,883**	**122,975**	**106,848**	
Plant Salaries-Indirect	66,928	62,031	75,090	65,296	88,383	96,475	80,348	
Truck & Automobiles	5,000	5,000	5,000	5,000	5,000	5,000	5,000	
Rental Exp Equip	500	500	500	500	500	500	500	
Depreciatioin	10,000	10,000	10,000	10,000	10,000	10,000	10,000	
Insurance Exp-Prop & Equip	1,000	1,000	1,000	1,000	1,000	1,000	1,000	
Other Misc Period Costs	10,000	10,000	10,000	10,000	10,000	10,000	10,000	
Total Overhead Expense	186,973	168,879	186,973	180,942	186,973	180,942	186,973	
Total Production Cost	**16,968,006**	**16,488,058**	**15,967,105**	**15,056,401**	**15,663,917**	**17,185,402**	**31,193,264**	**17**
Gross Profit	**320,609,222**	**299,849,484**	**291,197,249**	**303,333,997**	**295,746,420**	**325,096,605**	**613,883,702**	**335**

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