VIEW YOUR MRP DATA EFFICIENTLY FOR GLOBAL MANUFACTURING PLANTS

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Introduction

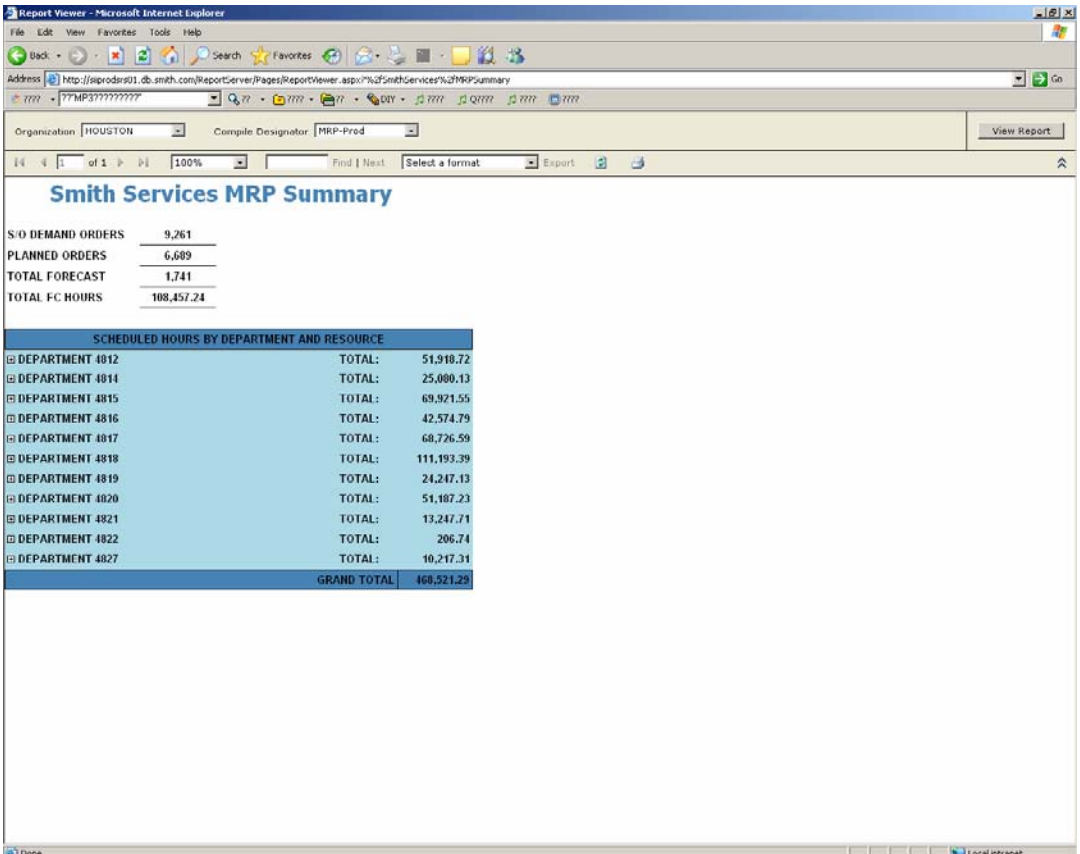
As globalization increases, the need to manage production and materials globally is imperative. The ability to view and analyze the results from multiple MRP plans is critical for the success of the business. This presentation will demonstrate the different ways we extract MRP data from different plants and configure it into a few web reports used by planners, buyers and customer services. Since the plants have internal sales relationships between them, the supply demand information between the plants is handled by MRP by the use of inter-organizational internal orders. The presentation will describe how the data are extracted and the effects these reports have on the related business functions such as scheduling, material control, shop floor management and customer service.

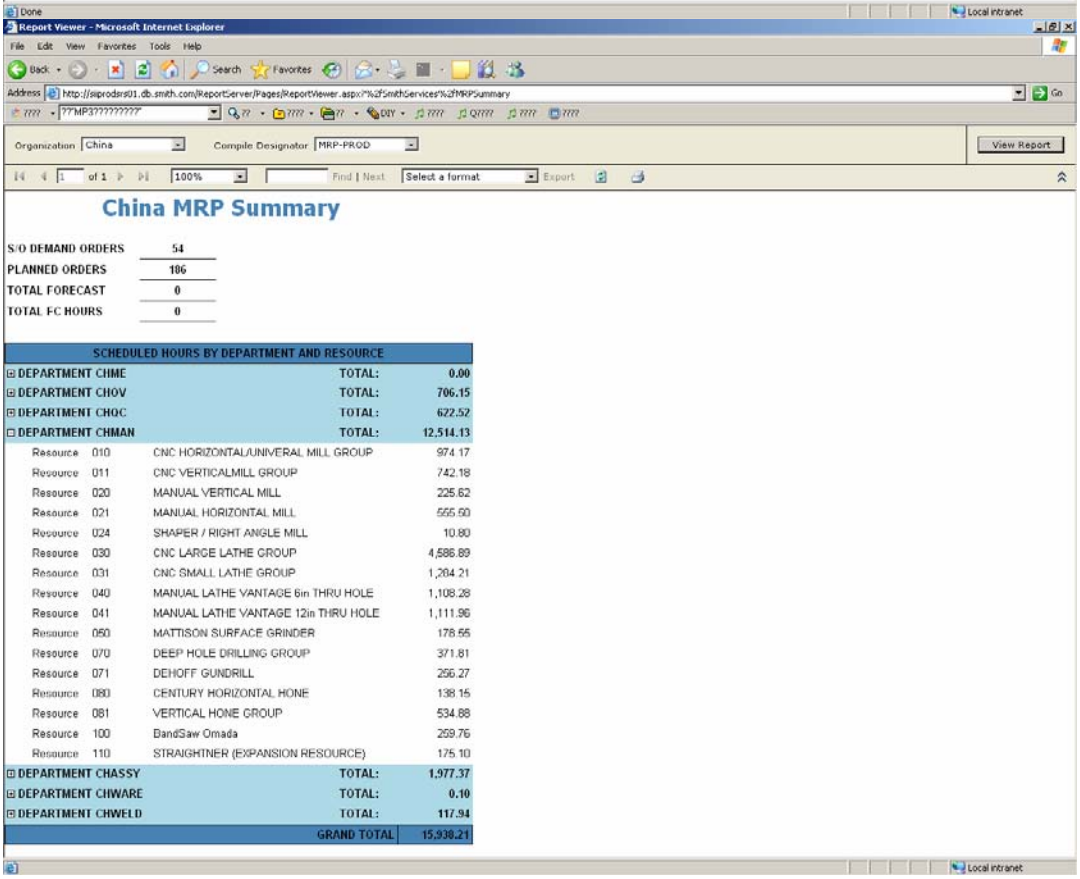
Background

Our business unit has 3 global manufacturing plants running Oracle Manufacturing with MRP nightly. Our MRP plans have soft pegging. Every day after the MRP runs, MRP planner workbench has all the necessary information for the planners to view the material and distribution requirements plans:
item and resources, supply demand, horizontal, material and capacity plan, summary of supply demand, review material and capacity exception, display resource requirements, as well as implement and maintain orders. You can also view the data on workbench by item category or other groups. However, the data retrieving time is long. There is a limit of number of records that can be selected before you can run the horizontal or enterprise views. The data retrieving process could potentially cause runaway session. In order to efficiently use the information provided by MRP, we face the challenge of how to retrieve the data properly and present them in a better format to help our business.

MRP Summary

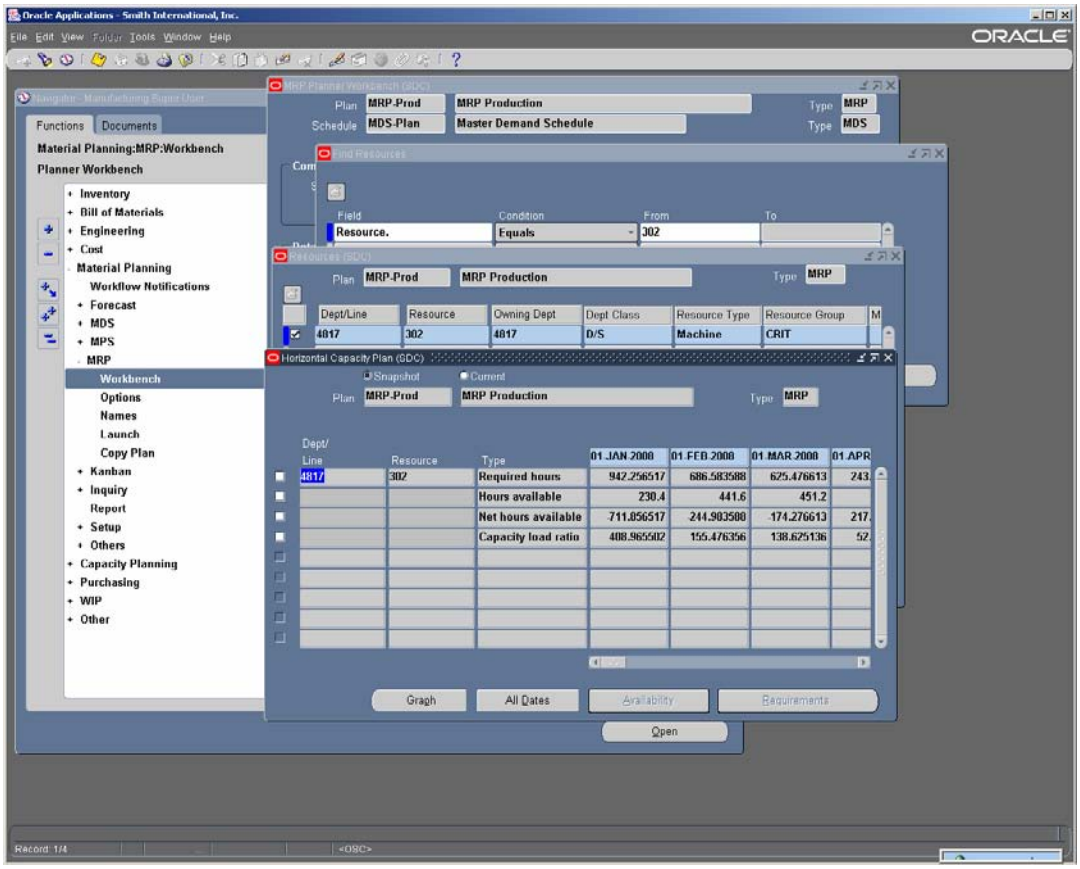
The first question our users ask is what the big picture is. Management wants to know the overall demand and supply: how many sales orders and forecasts, how many planned work orders MRP proposed, and what are the scheduled hours on the resources. Using Microsoft Reporting Services, we extract MRP capacity data to web page for each plant so managers can view the information daily. Users can choose which organization they want to see the data. Our management uses this page every day to monitor the hours loaded to the different plants and balances the demand between them based on this information.


Report Viewer - Microsoft Internet Explorer
Organization HOUSTON
Compile Designator MRP-Prod
View Report
Smith Services MRP Summary
S/O DEMAND ORDERS 9,261
PLANNED ORDERS 6,689
TOTAL FORECAST 1,741
TOTAL FC HOURS 108,457.24
SCHEDULED HOURS BY DEPARTMENT AND RESOURCE
DEPARTMENT 4812 TOTAL: 51,910.72
DEPARTMENT 4814 TOTAL: 25,080.13
DEPARTMENT 4815 TOTAL: 69,921.55
DEPARTMENT 4816 TOTAL: 42,574.79
DEPARTMENT 4817 TOTAL: 68,726.59
DEPARTMENT 4818 TOTAL: 111,193.39
DEPARTMENT 4819 TOTAL: 24,247.13
DEPARTMENT 4820 TOTAL: 51,187.23
DEPARTMENT 4821 TOTAL: 13,247.71
DEPARTMENT 4822 TOTAL: 206.74
DEPARTMENT 4827 TOTAL: 10,217.31
GRAND TOTAL 468,521.29

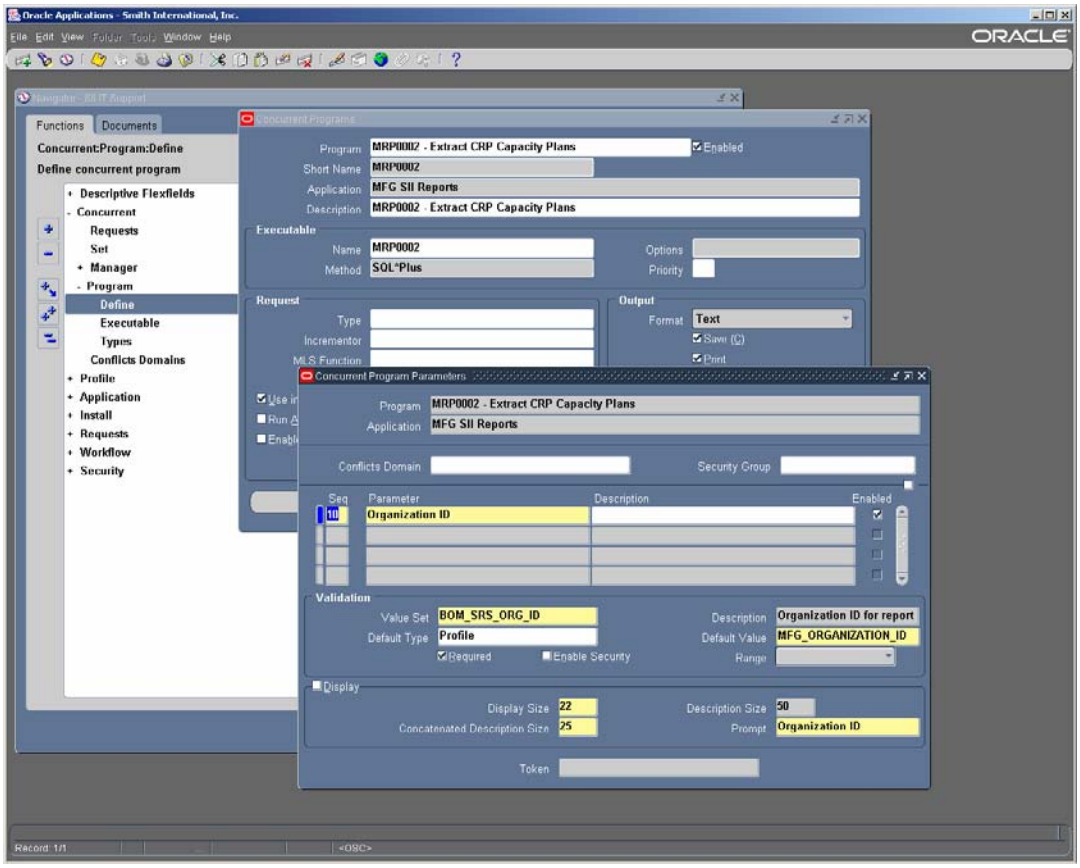

Report Viewer - Microsoft Internet Explorer
Organization China
Compile Designator MRP-PROD
View Report
China MRP Summary
S/O DEMAND ORDERS 54
PLANNED ORDERS 106
TOTAL FORECAST 0
TOTAL FC HOURS 0
SCHEDULED HOURS BY DEPARTMENT AND RESOURCE
DEPARTMENT CHME TOTAL: 0.00
DEPARTMENT CHOV TOTAL: 706.15
DEPARTMENT CHOC TOTAL: 622.52
DEPARTMENT CHMAN TOTAL: 12,514.13
Resource 010 CNC HORIZONTAL/UNIVERAL MILL GROUP 974.17
Resource 011 CNC VERTICALMILL GROUP 742.18
Resource 020 MANUAL VERTICAL MILL 225.62
Resource 021 MANUAL HORIZONTAL MILL 555.60
Resource 024 SHAPER / RIGHT ANGLE MILL 10.80
Resource 030 CNC LARGE LATHE GROUP 4,586.89
Resource 031 CNC SMALL LATHE GROUP 1,264.21
Resource 040 MANUAL LATHE VANTAGE 6in THRU HOLE 1,108.28
Resource 041 MANUAL LATHE VANTAGE 12in THRU HOLE 1,111.96
Resource 050 MATTISON SURFACE GRINDER 178.65
Resource 070 DEEP HOLE DRILLING GROUP 371.81
Resource 071 DEHOFF GUNDRILL 256.27
Resource 080 CENTURY HORIZONTAL HONE 138.15
Resource 081 VERTICAL HONE GROUP 534.88
Resource 100 BandSaw Omada 259.76
Resource 110 STRAIGHTNER (EXPANSION RESOURCE) 175.10
DEPARTMENT CHASSY TOTAL: 1,977.37
DEPARTMENT CHWARE TOTAL: 0.10
DEPARTMENT CHWELD TOTAL: 117.94
GRAND TOTAL 15,938.21

Resource Horizontal Capacity Data

From MRP Planners Workbench, we can choose a resource and see the required hours and hours available for the future time buckets as horizontal plan. This screen will also show us the net hours available for this resource and capacity overload. But we cannot find an Oracle report that reporting this information for all resources or a group of resources. Our users want to see this information in a spreadsheet format and want to be able to compare the load for all the resources in the same department or across the departments.



After researching into Oracle form, we found that Oracle does not store this information directly in any table or view, but instead it dynamically populates a global temp table called crp_capacity_plans when the horizontal plan screen is launched. So every time a new horizontal plan window is open, the query is refreshed and the extract data is only visible to the user session. When the user logs out from Oracle application, the data in crp_capacity_plans is deleted. Using this mechanism we created a SQL script and registered it as a concurrent program to do the following:



1. Delete the snapshot data from our customized table.

2. Insert department, resource and organization_id into mrp_form_query table. This is the resource we are pulling capacity load information.

```
insert into mrp_form_query
(query_id, last_update_date, last_updated_by,
 creation_date, created_by, number1, number2,
 number3)
values
(l_query_id, sysdate, -1 ,sysdate, -1,
 &organization_id,
 &department_id,
 &resource_id);
```

3. Call procedure mrp_crp_horizontal_plan.populate_horizontal_plan to populate crp_capacity_plans table for the resource in mrp_form_query table. After the call, all the capacity load information will be in this temp table for this session only.

```
l_return := mrp_crp_horizontal_plan.populate_horizontal_plan(
     p_item_list_id           => l_query_id,
     p_planned_org            => &organization_id,
     p_org_id                 => &organization_id,
     p_compile_designator     => &compile_designator,
     p_bucket_type            => 3,   --1 daily, 2 weekly, 3 period
     p_cutoff_date            => sysdate + 1080,
     p_current_data           => 0);         -- snapshot
```

4. Copy all the data in the global temp table mrp_capacity_plans table to our customized regular table.

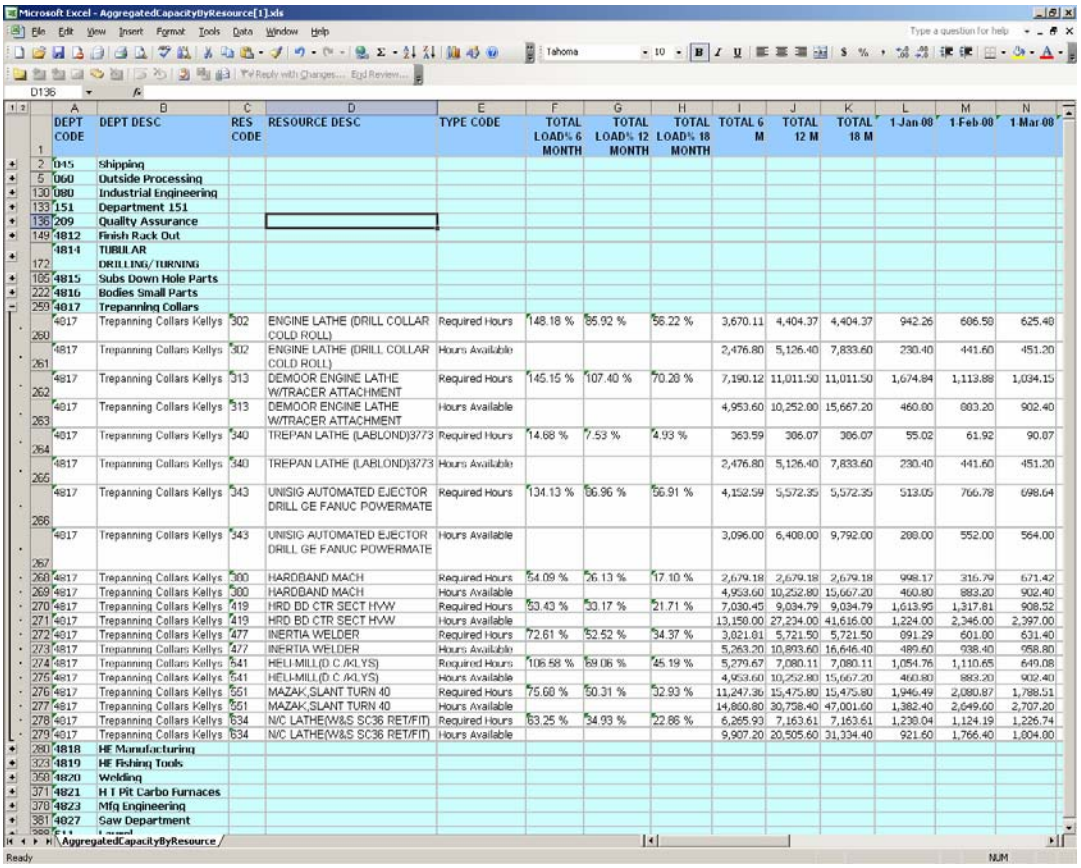
```
INSERT INTO GDL.GDL_CRP_CAPACITY_PLANS
```

```
SELECT *
FROM apps.crp_capacity_plans;
```

5. Delete the data from global temp table crp_capacity_plans so that we can loop back to step 1 for another resource.

6. Loop through all the active resources in the department passed by the parameter organization_id.

After running the concurrent program for 3 plants after the MRP runs, we have the resource capacity data ready for reporting. We used Microsoft Reporting Services to build report based on these data, and they are easily downloaded to Excel spreadsheet. On the web report, we also add the total required hours and hours available for 6 months, 12 months and 18 months, so that we can see the overall load for the different time frame.



Microsoft Excel - AggregatedCapacityByResource[1].xls

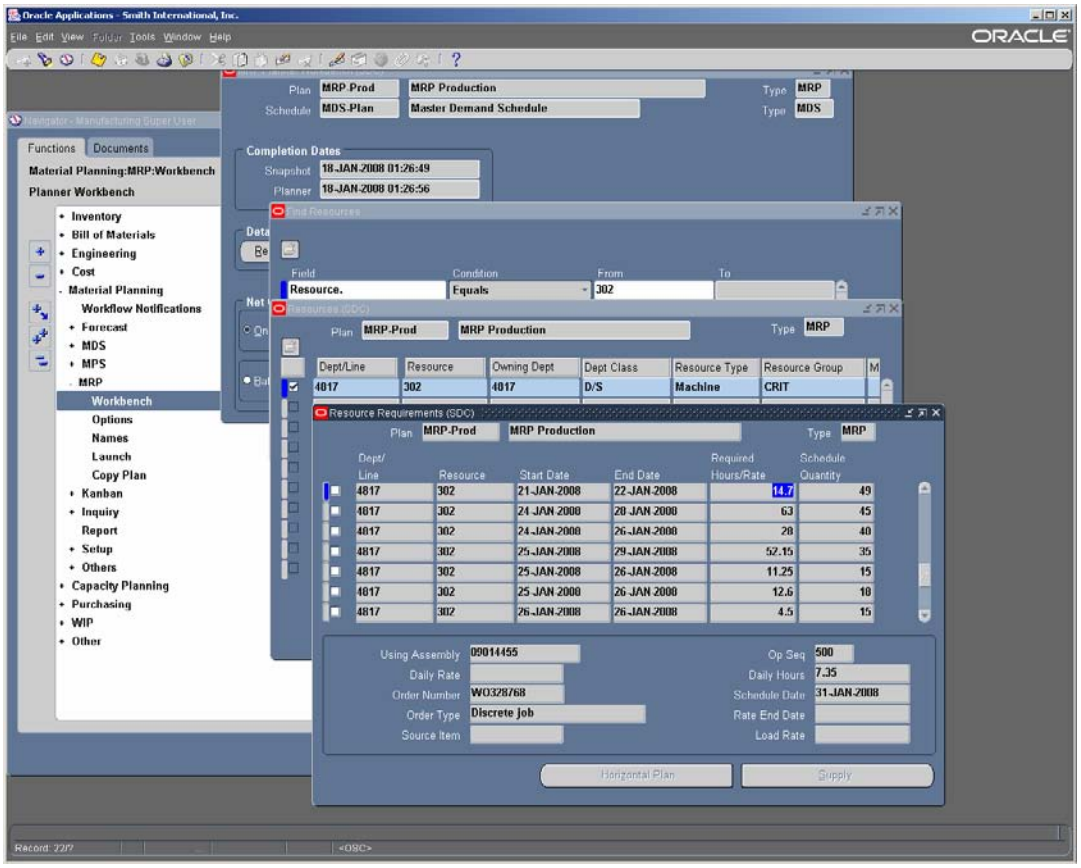
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	DEPT CODE	DEPT DESC	RES CODE	RESOURCE DESC	TYPE CODE	TOTAL LOAD% 6 MONTH	TOTAL LOAD% 12 MONTH	TOTAL LOAD% 18 MONTH	TOTAL 6 M	TOTAL 12 M	TOTAL 18 M	1-Jan-00	1-Feb-00	1-Mar-00
2	045	Shipping												
5	060	Outside Processing												
130	080	Industrial Engineering												
133	151	Department 151												
136	209	Quality Assurance												
149	4812	Finish Rack Out												
172	4814	TUBULAR DRILLING/TURNING												
185	4815	Subs Down Hole Parts												
222	4816	Bodies Small Parts												
259	4817	Trepanning Collars												
260	4817	Trepanning Collars Kellys	302	ENGINE LATHE (DRILL COLLAR COLD ROLL)	Required Hours	148.18 %	85.92 %	56.22 %	3,670.11	4,404.37	4,404.37	942.26	686.58	625.48
261	4817	Trepanning Collars Kellys	302	ENGINE LATHE (DRILL COLLAR COLD ROLL)	Hours Available				2,476.80	5,126.40	7,833.60	230.40	441.60	451.20
262	4817	Trepanning Collars Kellys	313	DEMOOR ENGINE LATHE W/TRACER ATTACHMENT	Required Hours	145.15 %	107.40 %	70.28 %	7,190.12	11,011.50	11,011.50	1,674.84	1,113.88	1,034.15
263	4817	Trepanning Collars Kellys	313	DEMOOR ENGINE LATHE W/TRACER ATTACHMENT	Hours Available				4,953.60	10,252.80	15,667.20	460.80	883.20	902.40
264	4817	Trepanning Collars Kellys	340	TREPAN LATHE (LABLOND)3773	Required Hours	14.88 %	7.53 %	4.93 %	363.59	386.07	386.07	55.02	61.92	90.07
265	4817	Trepanning Collars Kellys	340	TREPAN LATHE (LABLOND)3773	Hours Available				2,476.80	5,126.40	7,833.60	230.40	441.60	451.20
266	4817	Trepanning Collars Kellys	343	UNISIG AUTOMATED EJECTOR DRILL GE FANUC POWERMATE	Required Hours	134.13 %	86.96 %	56.91 %	4,152.59	5,572.35	5,572.35	513.05	766.78	698.64
267	4817	Trepanning Collars Kellys	343	UNISIG AUTOMATED EJECTOR DRILL GE FANUC POWERMATE	Hours Available				3,096.00	6,408.00	9,792.00	288.00	552.00	564.00
268	4817	Trepanning Collars Kellys	380	HARDBAND MACH	Required Hours	54.09 %	26.13 %	17.10 %	2,679.18	2,679.18	2,679.18	998.17	316.79	671.42
269	4817	Trepanning Collars Kellys	380	HARDBAND MACH	Hours Available				4,953.60	10,252.80	15,667.20	460.80	883.20	902.40
270	4817	Trepanning Collars Kellys	419	HRD BD CTR SECT HVW	Required Hours	53.43 %	53.17 %	21.71 %	7,030.45	9,034.79	9,034.79	1,613.95	1,317.81	908.52
271	4817	Trepanning Collars Kellys	419	HRD BD CTR SECT HVW	Hours Available				13,150.00	27,234.00	41,616.00	1,224.00	2,346.00	2,397.00
272	4817	Trepanning Collars Kellys	477	INERTIA WELDER	Required Hours	72.61 %	52.52 %	34.37 %	3,821.81	5,721.50	5,721.50	891.29	601.00	631.40
273	4817	Trepanning Collars Kellys	477	INERTIA WELDER	Hours Available				5,263.20	10,893.60	16,646.40	489.60	938.40	958.80
274	4817	Trepanning Collars Kellys	541	HELI-MILL(D.C./KLYS)	Required Hours	106.58 %	69.06 %	45.19 %	5,279.67	7,080.11	7,080.11	1,054.76	1,110.65	649.08
275	4817	Trepanning Collars Kellys	541	HELI-MILL(D.C./KLYS)	Hours Available				4,953.60	10,252.80	15,667.20	460.80	883.20	902.40
276	4817	Trepanning Collars Kellys	561	MAZAK,SLANT TURN 40	Required Hours	75.60 %	50.31 %	32.93 %	11,247.36	15,475.80	15,475.80	1,946.49	2,080.87	1,788.51
277	4817	Trepanning Collars Kellys	561	MAZAK,SLANT TURN 40	Hours Available				14,860.80	30,758.40	47,001.60	1,382.40	2,649.60	2,707.20
278	4817	Trepanning Collars Kellys	634	N/C LATHE(W&S SC36 RET/FIT)	Required Hours	63.25 %	54.93 %	22.86 %	6,265.93	7,163.61	7,163.61	1,238.04	1,124.19	1,226.74
279	4817	Trepanning Collars Kellys	634	N/C LATHE(W&S SC36 RET/FIT)	Hours Available				9,907.20	20,505.60	31,334.40	921.60	1,766.40	1,804.80
280	4818	HF Manufacturing												
324	4819	HF Fishing Tools												
359	4820	Welding												
371	4821	H T Pit Carbo Furnaces												
378	4823	Mfg Engineering												
381	4027	Saw Department												

AggregatedCapacityByResource

Ready NUM

Resource Requirement Detail

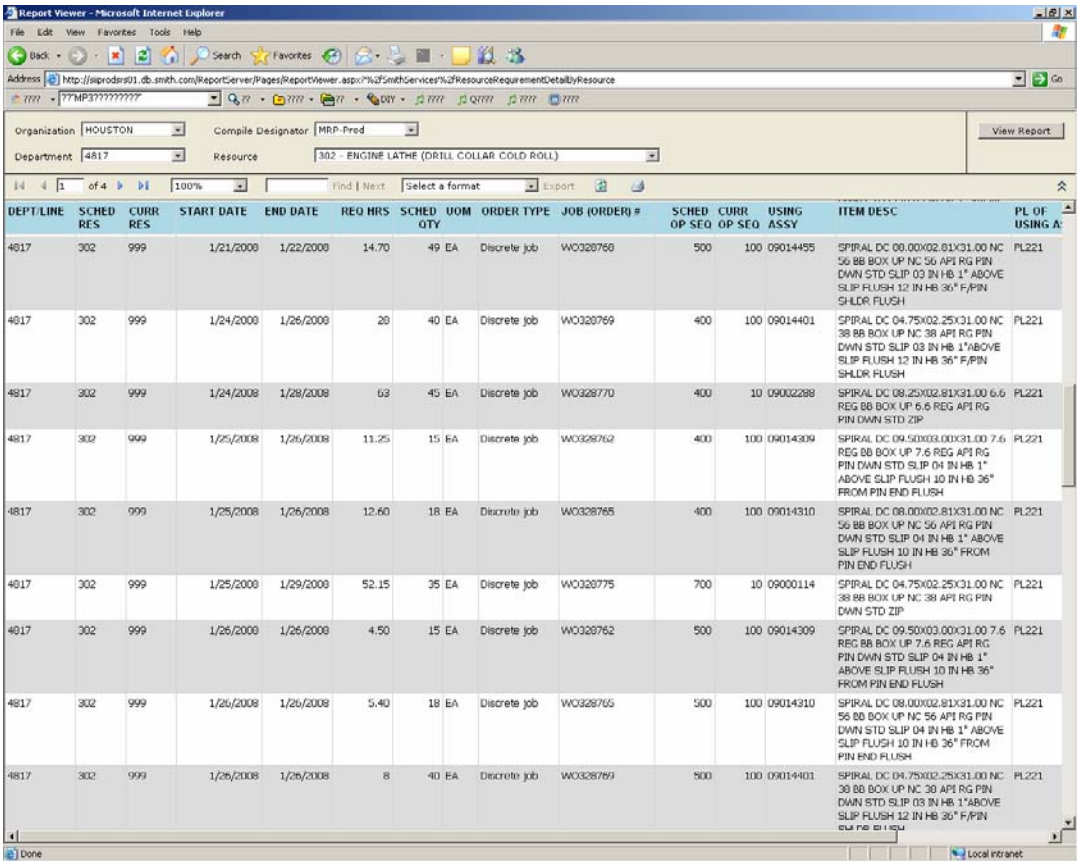
From MRP Planners Workbench, we can choose a resource and see the detail requirements on this resource. This screen is useful but our users want to see more information with the detail requirements: what is the current operation the work order is at, what is the assembly description, assembly product line, and operation description. They also want to save the data in Excel spreadsheet for further analysis.



In Oracle, the key information for resource requirement details is stored in a view called mrpfv_plan_resource_loads.

```
select *
From apps.mrpfv_plan_resource_loads a
where a.organization_code = 'SDC'
and a.plan_name = 'MRP-Prod'
and a.resource_code = '302'
and a.department_code ='4817'
```

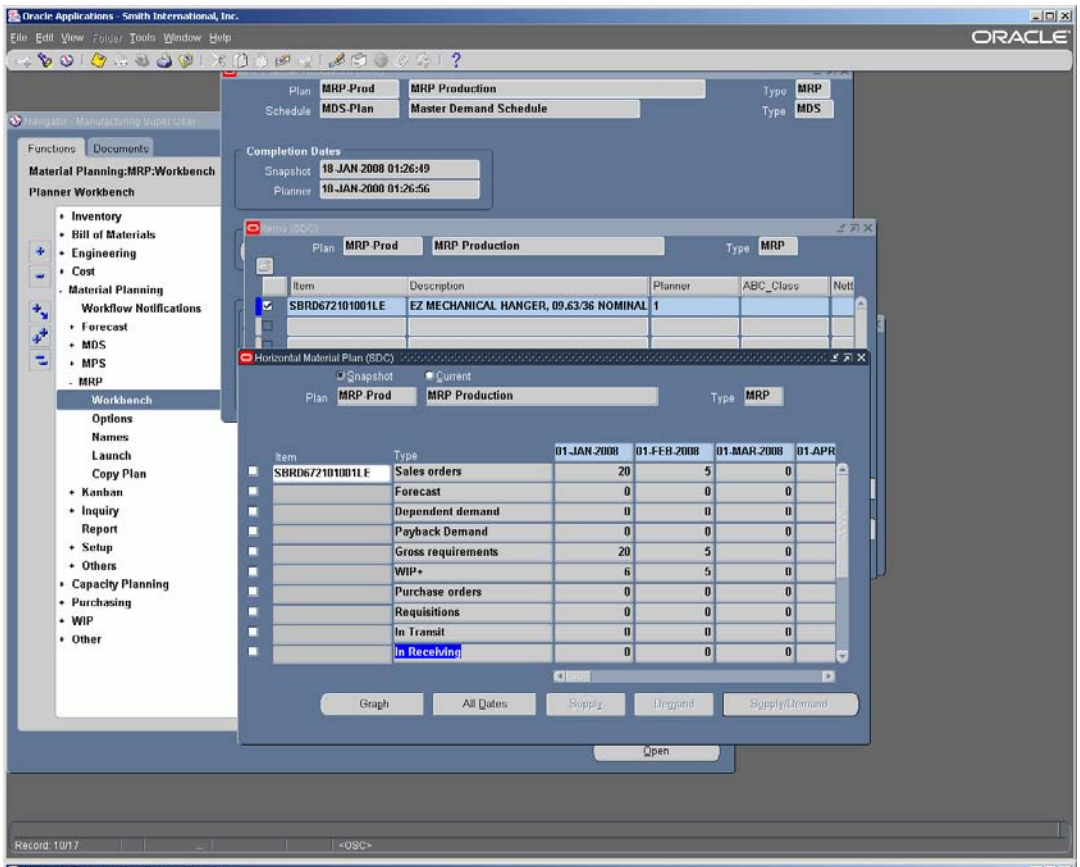
From this view, we join with mrp_recommendation table with transaction_id to get the discrete job and planned order information. Once we have that, we can retrieve and display more critical information on discrete job site, like where the work order is at, and operation description etc.

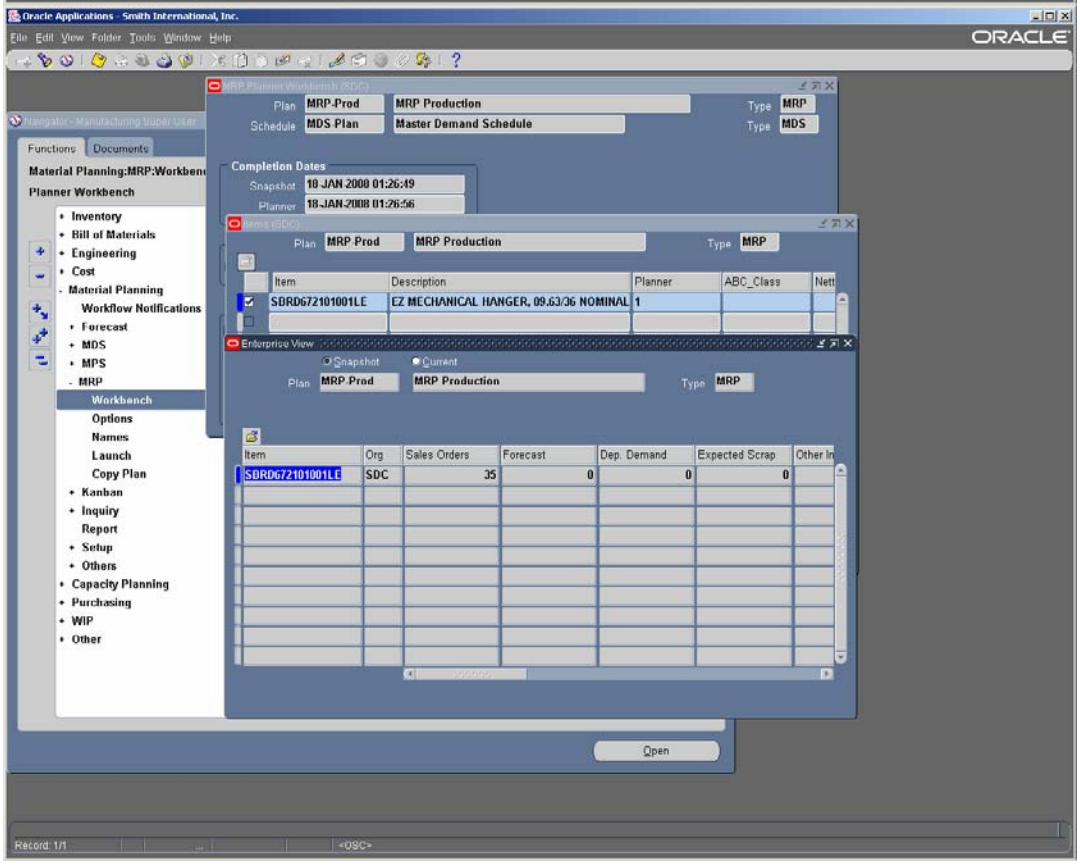


DEPT/LINE	SCHED RES	CURR RES	START DATE	END DATE	REQ HRS	SCHED QTY	UOM	ORDER TYPE	JOB (ORDER) #	SCHED OP SEQ	CURR OP SEQ	USING ASSY	ITEM DESC	PL OF USING A
4817	302	999	1/21/2009	1/22/2009	14.70	49	EA	Discrete Job	WO328760	500	100	09014455	SPIRAL DC 08.00X02.81X31.00 NC 56 BB BOX UP NC 56 API RG PIN DWN STD SLIP 03 IN HB 1" ABOVE SLIP FLUSH 12 IN HB 36" F/PIN SHLDR FLUSH	PL221
4817	302	999	1/24/2009	1/26/2009	28	40	EA	Discrete Job	WO328769	400	100	09014401	SPIRAL DC 04.75X02.25X31.00 NC 38 BB BOX UP NC 38 API RG PIN DWN STD SLIP 03 IN HB 1"ABOVE SLIP FLUSH 12 IN HB 36" F/PIN SHLDR FLUSH	PL221
4817	302	999	1/24/2009	1/28/2009	63	45	EA	Discrete Job	WO328770	400	10	09002288	SPIRAL DC 08.25X02.81X31.00 6.6 REG BB BOX UP 6.6 REG API RG PIN DWN STD ZIP	PL221
4817	302	999	1/25/2009	1/26/2009	11.25	15	EA	Discrete Job	WO328762	400	100	09014309	SPIRAL DC 09.50X03.00X31.00 7.6 REG BB BOX UP 7.6 REG API RG PIN DWN STD SLIP 04 IN HB 1" ABOVE SLIP FLUSH 10 IN HB 36" FROM PIN END FLUSH	PL221
4817	302	999	1/25/2009	1/26/2009	12.60	18	EA	Discrete Job	WO328765	400	100	09014310	SPIRAL DC 08.00X02.81X31.00 NC 56 BB BOX UP NC 56 API RG PIN DWN STD SLIP 04 IN HB 1" ABOVE SLIP FLUSH 10 IN HB 36" FROM PIN END FLUSH	PL221
4817	302	999	1/25/2009	1/29/2009	52.15	35	EA	Discrete Job	WO328775	700	10	09000114	SPIRAL DC 04.75X02.25X31.00 NC 38 BB BOX UP NC 38 API RG PIN DWN STD ZIP	PL221
4817	302	999	1/26/2009	1/26/2009	4.50	15	EA	Discrete Job	WO328762	500	100	09014309	SPIRAL DC 09.50X03.00X31.00 7.6 REG BB BOX UP 7.6 REG API RG PIN DWN STD SLIP 04 IN HB 1" ABOVE SLIP FLUSH 10 IN HB 36" FROM PIN END FLUSH	PL221
4817	302	999	1/26/2009	1/26/2009	5.40	18	EA	Discrete Job	WO328765	500	100	09014310	SPIRAL DC 08.00X02.81X31.00 NC 56 BB BOX UP NC 56 API RG PIN DWN STD SLIP 04 IN HB 1" ABOVE SLIP FLUSH 10 IN HB 36" FROM PIN END FLUSH	PL221
4817	302	999	1/26/2009	1/26/2009	8	40	EA	Discrete Job	WO328769	500	100	09014401	SPIRAL DC 04.75X02.25X31.00 NC 38 BB BOX UP NC 38 API RG PIN DWN STD SLIP 03 IN HB 1"ABOVE SLIP FLUSH 12 IN HB 36" F/PIN	PL221

MRP Material Requirements Data

From Oracle MRP Planner Workbench, we can see material requirements on specific items on a horizontal basis, or see the summarized requirements for the whole time horizon on Enterprise view. Both forms work on single item query basis. If you wan to see multiple items or a group of items at the same time, it is hard to pull a lot of data back without causing run away process. So we looked into how Oracle extracts the material requirement data and came up with our own extraction concurrent program.


Oracle Applications - Smith International, Inc.
File Edit View Folder Tools Window Help
ORACLE
Plan MRP-Prod MRP Production Type MRP
Schedule MDS-Plan Master Demand Schedule Type MDS
Completion Dates
Snapshot 18-JAN-2008 01:26:49
Planner 18-JAN-2008 01:26:56
Functions Documents
Material Planning:MRP:Workbench
Planner Workbench
Inventory
Bill of Materials
Engineering
Cost
Material Planning
Workflow Notifications
Forecast
MDS
MPS
MRP
Workbench
Options
Names
Launch
Copy Plan
Kanban
Inquiry
Report
Setup
Others
Capacity Planning
Purchasing
WIP
Other
Item Description Planner ABC_Class
SBRD672101001LE EZ MECHANICAL HANGER, 09.63/36 NOMINAL 1
Horizontal Material Plan (SDC)
Snapshot Current
Item Type 01-JAN-2008 01-FEB-2008 01-MAR-2008 01-APR
SBRD672101001LE Sales orders 20 5 0
Forecast 0 0 0
Dependent demand 0 0 0
Payback Demand 0 0 0
Gross requirements 20 5 0
WIP+ 6 5 0
Purchase orders 0 0 0
Requisitions 0 0 0
In Transit 0 0 0
In Receiving 0 0 0
Graph All Dates Supply Demand Supply/Demand
Open
Record: 10/17
<OSC>


Oracle Applications - Smith International, Inc.
File Edit View Folder Tools Window Help
ORACLE
Plan MRP-Prod MRP Production Type MRP
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Completion Dates
Snapshot 18-JAN-2008 01:26:49
Planner 18-JAN-2008 01:26:56
Functions Documents
Planner Workbench
Inventory
Bill of Materials
Engineering
Cost
Material Planning
Workflow Notifications
Forecast
MDS
MPS
MRP
Workbench
Options
Names
Launch
Copy Plan
Kanban
Inquiry
Report
Setup
Others
Capacity Planning
Purchasing
WIP
Other
Item Description Planner ABC_Class
SBRD672101001LE EZ MECHANICAL HANGER, 09.63/36 NOMINAL 1
Enterprise View
Snapshot Current
Item Org Sales Orders Forecast Dep. Demand Expected Scrap
SBRD672101001LE SDC 35 0 0 0
Open
Record: 1/1
<OSC>

1. Delete the snapshot data from our customized MRP material requirement table.

2. Insert inventory_item_id with organization_id and compile_designator into mrp_form_query table. We group 100 items into one batch at one time for extraction for performance purpose. These items will be the source items that we are pulling MRP requirement data.

```
   insert into mrp_form_query
        (query_id,
        last_update_date, last_updated_by,
        creation_date, created_by,
        number1, number2, char1)
  select l_counter, sysdate, -1, sysdate, -1,
        inventory_item_id, organization_id, compile_designator
        from apps.mrp_system_items
        where organization_id = &organization_id
        and compile_designator = &compile_designator;
```

3. Call procedure mrp_horizontal_plan_sc.populate_horizontal_plan to populate mrp_material_plans table for the items in mrp_form_query table. Since the parameter Enterprise_view is True, it is extracting the enterprise view data. After the call, all the enterprise load information will be in this temp table for this session only.

```
mrp_horizontal_plan_sc.populate_horizontal_plan(
       item_list_id                => &query_id,
       arg_plan_id                 => &unique_id,
       arg_organization_id         => &organization_id,
       arg_compile_designator      => &compile_designator,
       arg_plan_organization_id    => &organization_id,
       arg_bucket_type             => 3,                -- monthly
       arg_cutoff_date             => sysdate + 1080,
       arg_current_data            => 0,                -- snapshot
       arg_ind_demand_type         => NULL,
       arg_source_list_name        => NULL,
       enterprize_view             => TRUE,             -- enterprise view
       arg_res_level               => 1,
       arg_resval1                 => NULL,
       arg_resval2                 => NULL);
```

   If we call the same procedure with Enterprise_view as False, the procedure is extracting the horizontal view data. After the call, all the horizontal material requirement information will be in this temp table for this session only.

```
mrp_horizontal_plan_sc.populate_horizontal_plan(
       item_list_id                => &query_id,
       arg_plan_id                 => &unique_id,
       arg_organization_id         => &organization_id,
       arg_compile_designator      => &compile_designator,
       arg_plan_organization_id    => &organization_id,
       arg_bucket_type             => 3,                -- monthly
       arg_cutoff_date             => sysdate + 1080,
       arg_current_data            => 0,                -- snapshot
       arg_ind_demand_type         => NULL,
       arg_source_list_name        => NULL,
       enterprize_view              => FALSE,           -- horizontal view
       arg_res_level               => 1,
       arg_resval1                 => NULL,
       arg_resval2                 => NULL);
```

4. Copy all the data in the global temp table mrp_material_plans table to our customized regular table for MRP Enterprise View or MRP Horizontal View depending on whether the extraction is for horizontal or enterprise view.

```
insert into GDL.GDL_mrp_mtl_enterprise_PLANS
```

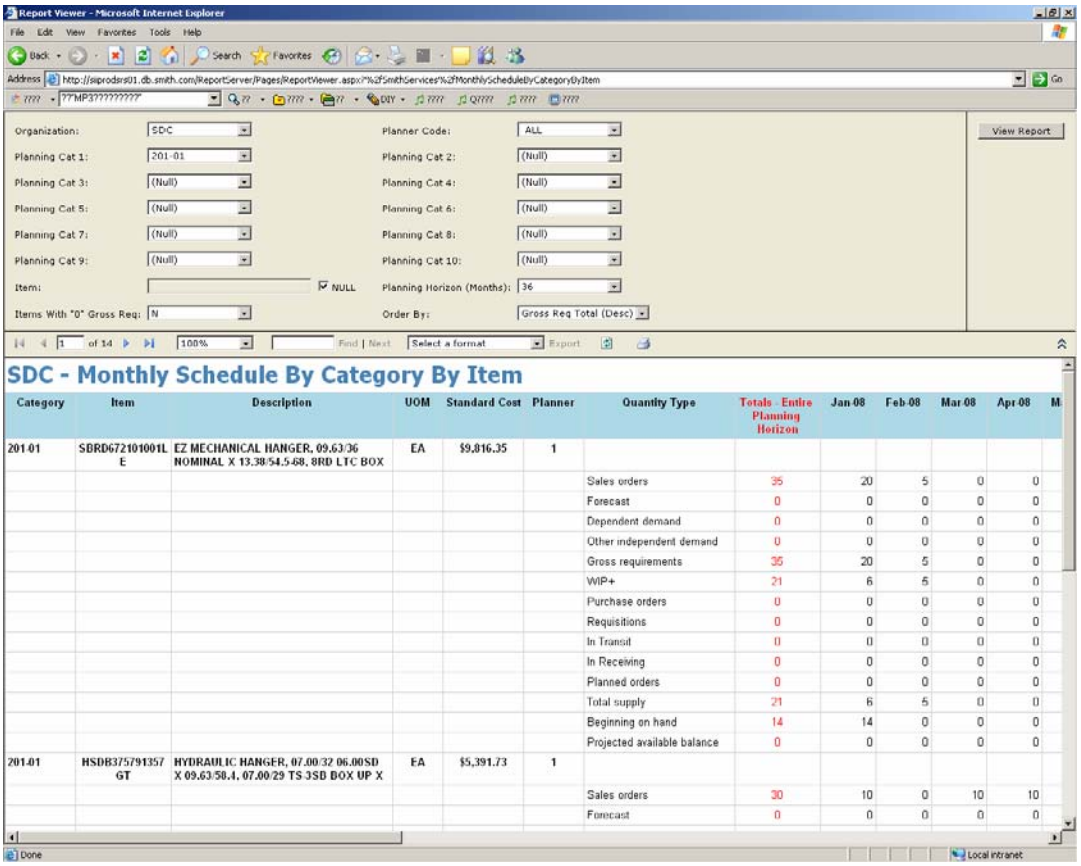
```
SELECT  *
From apps.mrp_material_plans;

insert into GDL.GDL_mrp_mtl_horizontal_PLANS
SELECT  *
From apps.mrp_material_plans;
```

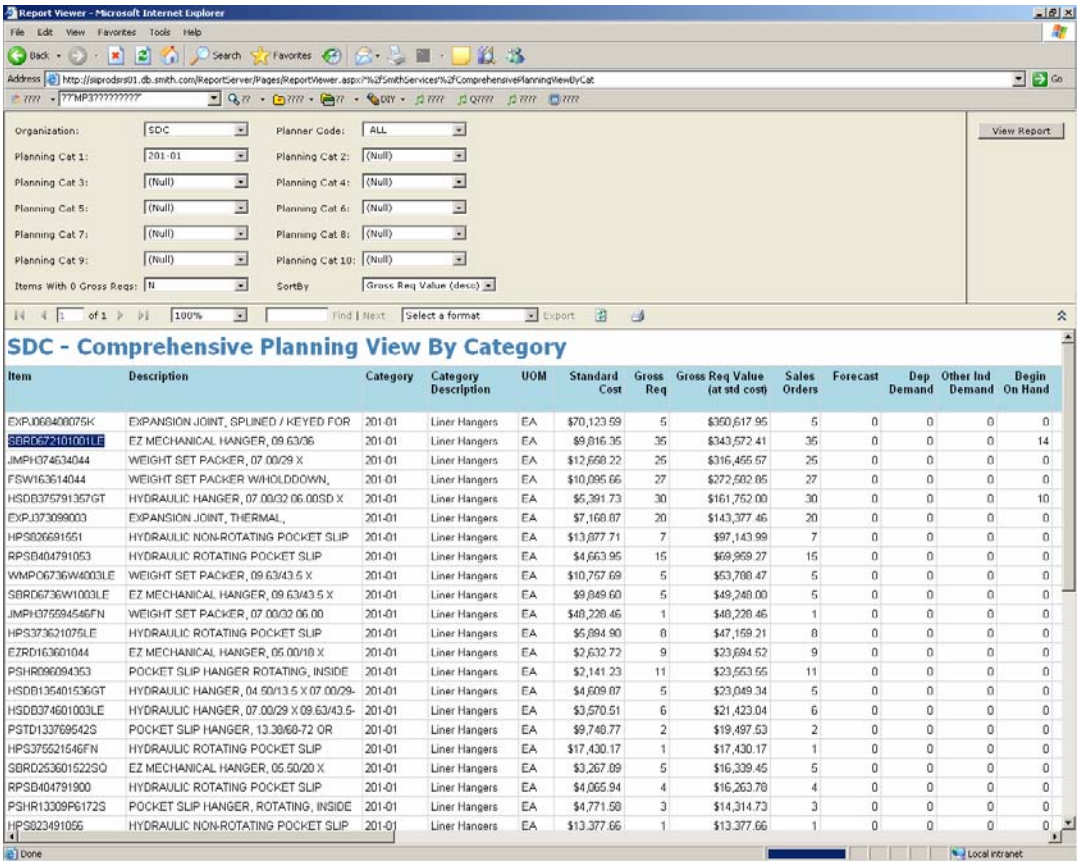
5. Delete the data from global temp table mrp_material_plans so that we can loop back to step 1 for another group of items.

6. Loop through all the items planned by MRP in this organization.

After running the concurrent program for 3 plants after the MRP runs, we have the MRP material requirements data ready for reporting. We used Microsoft Reporting Services to build reports based on these data. The web reports follow the basic formats from Oracle form, but we have the search criteria customized to our business needs. We also added more fields to the reports to help user interpret the data efficiently: planning category, standard cost, planner, organization item attributes, onhand value, WIP value at standard cost. Our planners find these pages much easier to get to, and the information is ready for download to Excel.



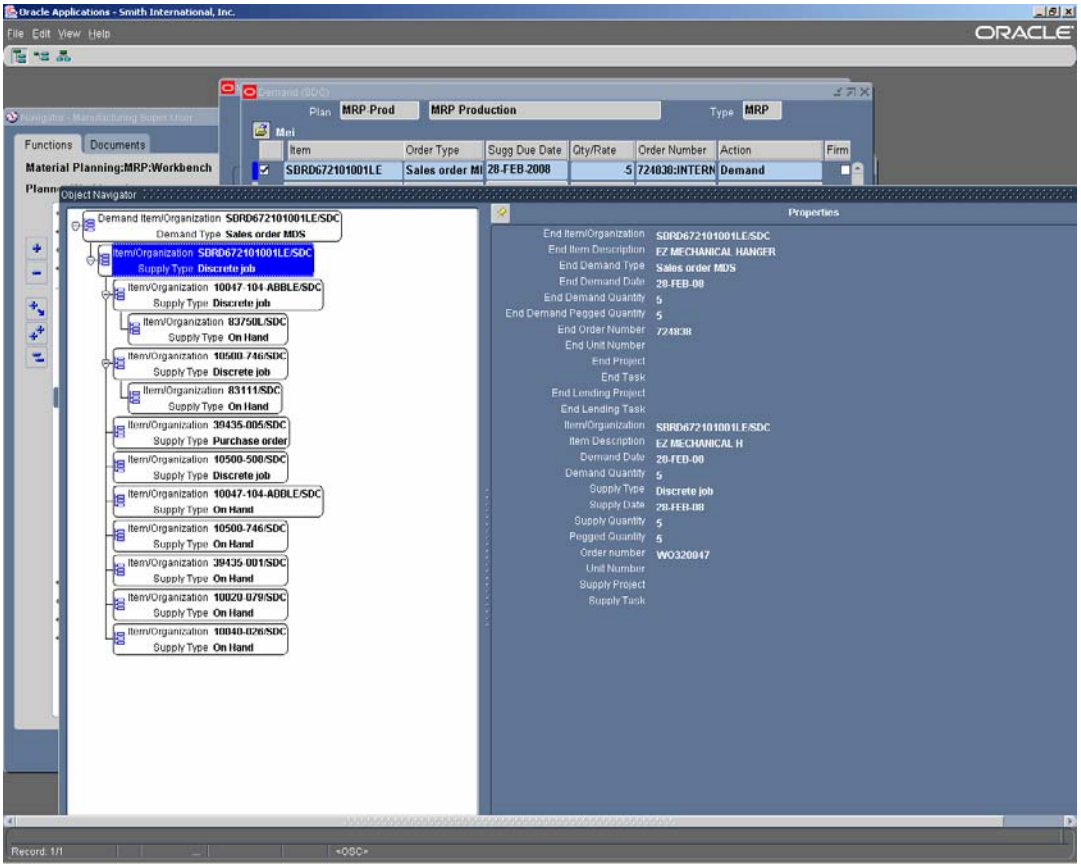
Category	Item	Description	UOM	Standard Cost	Planner	Quantity Type	Totals - Entire Planning Horizon	Jan-08	Feb-08	Mar-08	Apr-08	M
201-01	SBRD672101001LE	EZ MECHANICAL HANGER, 09.63/36 NOMINAL X 13.38/54.5-68, 8RD LTC BOX	EA	$9,816.35	1							
						Sales orders	35	20	5	0	0	
						Forecast	0	0	0	0	0	
						Dependent demand	0	0	0	0	0	
						Other independent demand	0	0	0	0	0	
						Gross requirements	35	20	5	0	0	
						WIP+	21	6	5	0	0	
						Purchase orders	0	0	0	0	0	
						Requisitions	0	0	0	0	0	
						In Transit	0	0	0	0	0	
						In Receiving	0	0	0	0	0	
						Planned orders	0	0	0	0	0	
						Total supply	21	6	5	0	0	
						Beginning on hand	14	14	0	0	0	
						Projected available balance	0	0	0	0	0	
201-01	HSDB375791357GT	HYDRAULIC HANGER, 07.00/32 06.00SD X 09.63/50.4, 07.00/29 TS-3SD BOX UP X	EA	$5,391.73	1							
						Sales orders	30	10	0	10	10	
						Forecast	0	0	0	0	0	



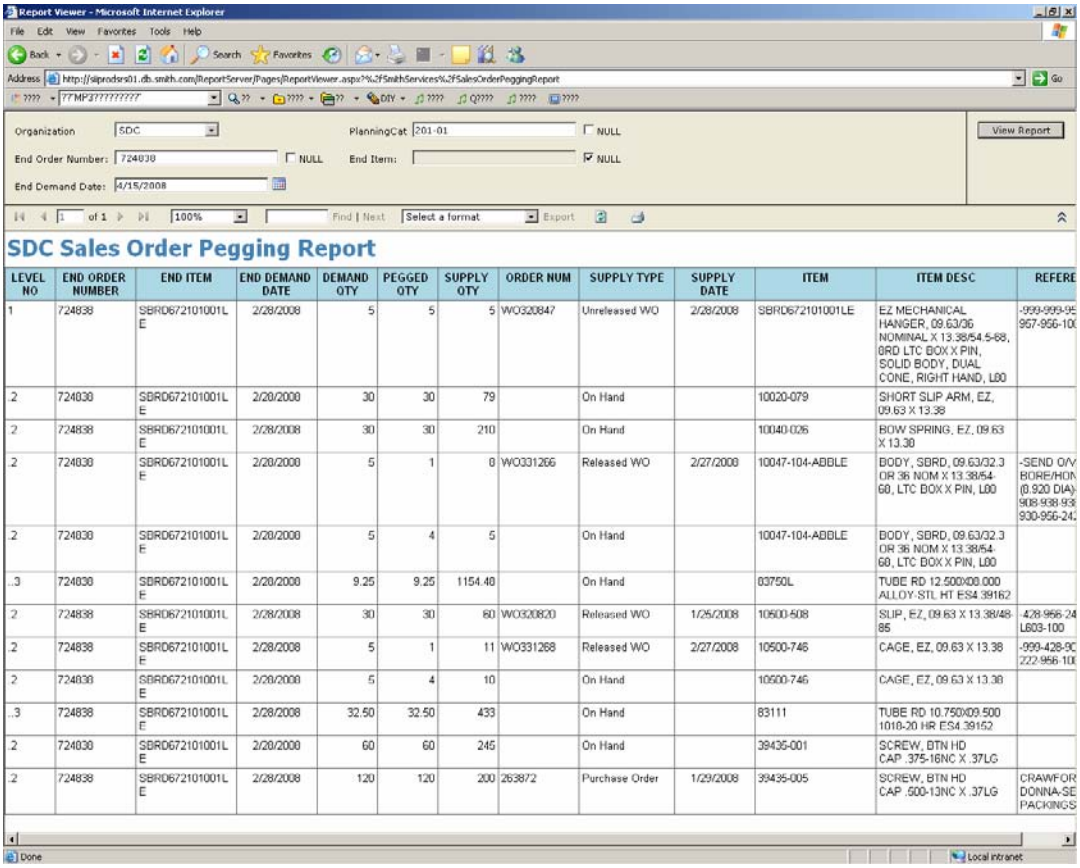
Item	Description	Category	Category Description	UOM	Standard Cost	Gross Req	Gross Req Value (at std cost)	Sales Orders	Forecast	Dep Demand	Other Ind Demand	Begin On Hand
EXPJ068400075K	EXPANSION JOINT, SPLINED / KEYED FOR	201-01	Liner Hangers	EA	$70,123.59	5	$350,617.95	5	0	0	0	0
SBRD672101001LE	EZ MECHANICAL HANGER, 09.63/36	201-01	Liner Hangers	EA	$9,816.35	35	$343,572.41	35	0	0	0	14
JMPH374634044	WEIGHT SET PACKER, 07.00/29 X	201-01	Liner Hangers	EA	$12,668.22	25	$316,455.57	25	0	0	0	0
FSW163614044	WEIGHT SET PACKER WHOLDDOWN,	201-01	Liner Hangers	EA	$10,095.66	27	$272,592.85	27	0	0	0	0
HSDB375791357GT	HYDRAULIC HANGER, 07.00/32 06.00SD X	201-01	Liner Hangers	EA	$5,391.73	30	$161,752.00	30	0	0	0	10
EXPJ073099003	EXPANSION JOINT, THERMAL,	201-01	Liner Hangers	EA	$7,168.87	20	$143,377.46	20	0	0	0	0
HPSB26691651	HYDRAULIC NON-ROTATING POCKET SLIP	201-01	Liner Hangers	EA	$13,877.71	7	$97,143.99	7	0	0	0	0
RPSB404791053	HYDRAULIC ROTATING POCKET SLIP	201-01	Liner Hangers	EA	$4,663.95	15	$69,959.27	15	0	0	0	0
WMPO6736W4003LE	WEIGHT SET PACKER, 09.63/43.5 X	201-01	Liner Hangers	EA	$10,757.69	5	$53,788.47	5	0	0	0	0
SBRD6736W1003LE	EZ MECHANICAL HANGER, 09.63/43.5 X	201-01	Liner Hangers	EA	$9,849.60	5	$49,248.00	5	0	0	0	0
JMPH375594546FN	WEIGHT SET PACKER, 07.00/32 06.00	201-01	Liner Hangers	EA	$48,228.46	1	$48,228.46	1	0	0	0	0
HPS373621075LE	HYDRAULIC ROTATING POCKET SLIP	201-01	Liner Hangers	EA	$5,894.90	8	$47,159.21	8	0	0	0	0
EZRD163601044	EZ MECHANICAL HANGER, 05.00/18 X	201-01	Liner Hangers	EA	$2,632.72	9	$23,694.52	9	0	0	0	0
PSHR096094353	POCKET SLIP HANGER ROTATING, INSIDE	201-01	Liner Hangers	EA	$2,141.23	11	$23,553.55	11	0	0	0	0
HSDB135401536GT	HYDRAULIC HANGER, 04.50/13.5 X 07.00/29-	201-01	Liner Hangers	EA	$4,609.87	5	$23,049.34	5	0	0	0	0
HSDD374601003LE	HYDRAULIC HANGER, 07.00/29 X 09.63/43.5-	201-01	Liner Hangers	EA	$3,570.51	6	$21,423.04	6	0	0	0	0
PSTD133769542S	POCKET SLIP HANGER, 13.38/68-72 OR	201-01	Liner Hangers	EA	$9,748.77	2	$19,497.53	2	0	0	0	0
HPS375521546FN	HYDRAULIC ROTATING POCKET SLIP	201-01	Liner Hangers	EA	$17,430.17	1	$17,430.17	1	0	0	0	0
SBRD253601522SQ	EZ MECHANICAL HANGER, 05.50/20 X	201-01	Liner Hangers	EA	$3,267.09	5	$16,339.45	5	0	0	0	0
RPSB404791900	HYDRAULIC ROTATING POCKET SLIP	201-01	Liner Hangers	EA	$4,065.94	4	$16,263.78	4	0	0	0	0
PSHR13309P6172S	POCKET SLIP HANGER, ROTATING, INSIDE	201-01	Liner Hangers	EA	$4,771.58	3	$14,314.73	3	0	0	0	0
HPS823491056	HYDRAULIC NON-ROTATING POCKET SLIP	201-01	Liner Hangers	EA	$13,377.66	1	$13,377.66	1	0	0	0	0

MRP Pegging Information

In our MRP plans for the 3 manufacturing plants, we are using soft pegging option. Every day Oracle pegs the supply and demand dynamically, and it is very critical for us to understand and utilize the pegging information to manage the shop floor, purchasing and customer services. In MRP Planners Workbench, pegging page is an object navigator. The detailed information is displayed on a separate panel. It is very difficult to download the data to Excel format. Our challenge is to extract the pegging information out to our customized table so that we can use it more efficiently to help our business needs.



The Oracle table that stores pegging information is called mrp_full_pegging. This table stores pegging relation at single level. With prev_pegging_id, we can join this table multiple times to get the full pegging tree. We created a concurrent program to do the join 9 times to get 9 level pegging for all items in each organization and store them in a customized table. We run this job nightly after the MRP runs. Based on this extract, we created a web report for sales order pegging, similar to what Oracle shows on the form, but with much easier access and more customized information. From this report, we can see the lower level supply to one customer order line in Excel format. The supply type, order and pegged quantity are clearly displayed. We can run this report by planning category, sales order or end item.

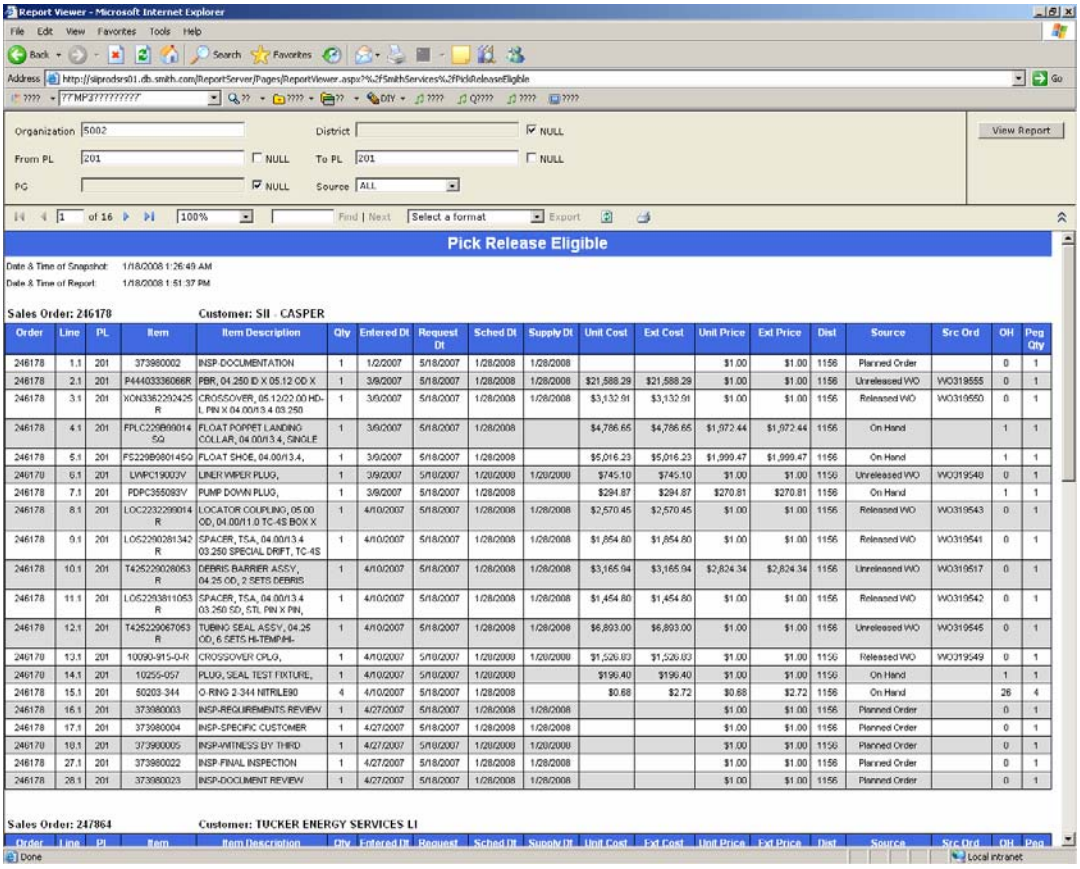


LEVEL NO	END ORDER NUMBER	END ITEM	END DEMAND DATE	DEMAND QTY	PEGGED QTY	SUPPLY QTY	ORDER NUM	SUPPLY TYPE	SUPPLY DATE	ITEM	ITEM DESC	REFERE
1	724838	SBRD672101001LE	2/28/2008	5	5	5	WO320847	Unreleased WO	2/28/2008	SBRD672101001LE	EZ MECHANICAL HANGER, 09.63/36 NOMINAL X 13.38/54.5-68, 6RD LTC BOX X PIN, SOLID BODY, DUAL CONE, RIGHT HAND, L00	-999-999-95 957-956-10
.2	724838	SBRD672101001LE	2/28/2008	30	30	79		On Hand		10020-079	SHORT SLIP ARM, EZ, 09.63 X 13.38	
.2	724838	SBRD672101001LE	2/28/2008	30	30	210		On Hand		10040-026	BOW SPRING, EZ, 09.63 X 13.38	
.2	724838	SBRD672101001LE	2/28/2008	5	1	0	WO331266	Released WO	2/27/2008	10047-104-ABBLE	BODY, SBRD, 09.63/32.3 OR 36 NOM X 13.38/54-60, LTC BOX X PIN, L00	-SEND O/V BORE/HON (0.920 DIA)- 908-938-93 930-956-24
.2	724838	SBRD672101001LE	2/28/2008	5	4	5		On Hand		10047-104-ABBLE	BODY, SBRD, 09.63/32.3 OR 36 NOM X 13.38/54-60, LTC BOX X PIN, L00	
..3	724838	SBRD672101001LE	2/28/2008	9.25	9.25	1154.48		On Hand		03750L	TUBE RD 12.500X00.000 ALLOY STL HT ES4.39162	
.2	724838	SBRD672101001LE	2/28/2008	30	30	60	WO320820	Released WO	1/25/2008	10500-508	SLIP, EZ, 09.63 X 13.38/48-85	-428-956-24 L603-100
.2	724838	SBRD672101001LE	2/28/2008	5	1	11	WO331268	Released WO	2/27/2008	10500-746	CAGE, EZ, 09.63 X 13.38	-999-428-90 222-956-10
.2	724838	SBRD672101001LE	2/28/2008	5	4	10		On Hand		10500-746	CAGE, EZ, 09.63 X 13.38	
..3	724838	SBRD672101001LE	2/28/2008	32.50	32.50	433		On Hand		83111	TUBE RD 10.750X09.500 1018-20 HR ES4.39152	
.2	724838	SBRD672101001LE	2/28/2008	60	60	245		On Hand		39435-001	SCREW, BTN HD CAP .375-16NC X .37LG	
.2	724838	SBRD672101001LE	2/28/2008	120	120	200	263872	Purchase Order	1/29/2008	39435-005	SCREW, BTN HD CAP .500-13NC X .37LG	CRAWFOR DONNA-SE PACKINGS

Sales order pick available page

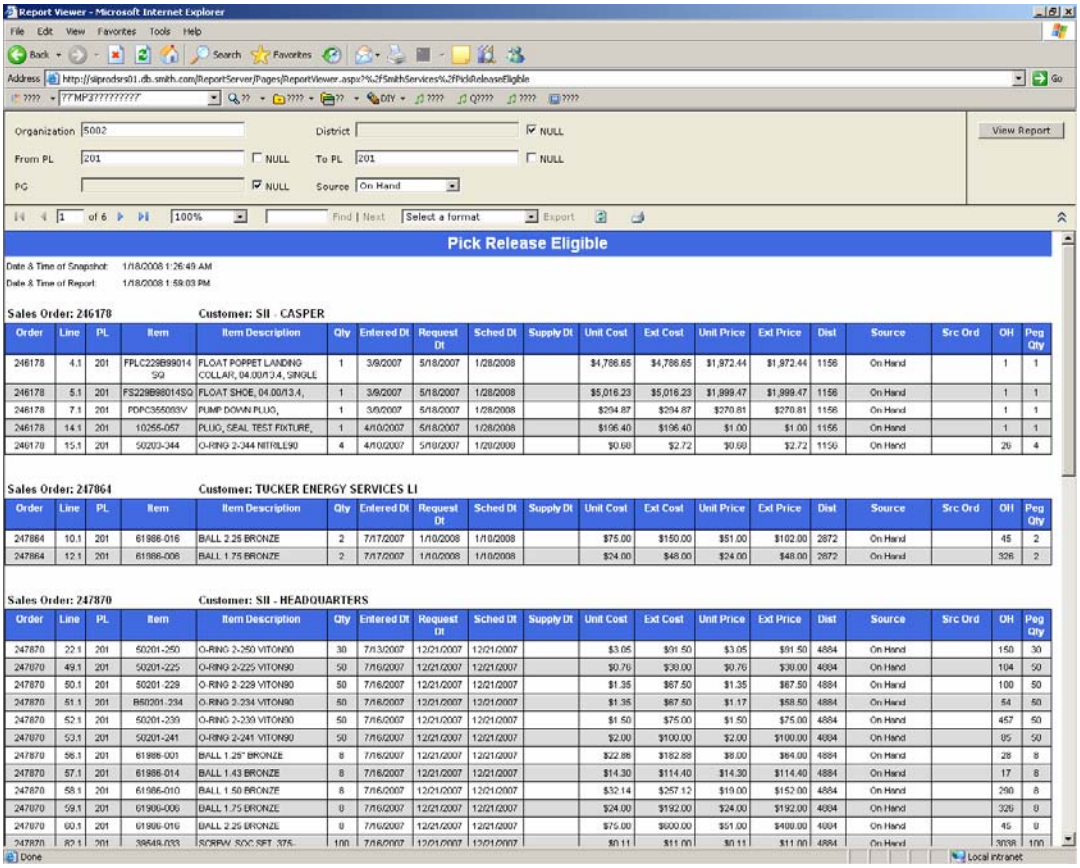
One challenge of MRP planning is the communication between manufacturing and customer services. Some of our subassemblies have demand from sales orders as well as dependent demands from manufacturing orders. In the past, customer services have shipped the parts out that were supposed to be used for work orders, causing material shortage on shopfloor. Now that we have the pegging information extract ready to deploy, we created a web report for customer orders with the pegging information. In the page, you can see all the standard order management information, plus the pegging source order and pegged quantity.

One option to run this report is to show all pegged quantity. We use this option to track where the quantities are for the specific sales order. This information will enable us to have a clear picture on how we are meeting the demand date on the sales order and give us basis to estimate when the assemblies will be completed. We can also spot the bottle neck for the work that in the pipeline.



Order	Line	PL	Item	Item Description	Qty	Entered Dt	Request Dt	Sched Dt	Supply Dt	Unit Cost	Ext Cost	Unit Price	Ext Price	Dist	Source	Src Ord	OH	Peg Qty
246178	1.1	201	373980002	INSP-DOCUMENTATION	1	1/2/2007	5/18/2007	1/28/2008	1/28/2008			$1.00	$1.00	1156	Planned Order		0	1
246178	2.1	201	P44403336066R	FBR, 04.250 ID X 05.12 OD X	1	3/9/2007	5/18/2007	1/28/2008	1/28/2008	$21,588.29	$21,588.29	$1.00	$1.00	1156	Unreleased WO	WO319555	0	1
246178	3.1	201	XON3362292425R	CROSSOVER, 05.12/02.00 HD-L PIN X 04.00/13.4 03.250	1	3/9/2007	5/18/2007	1/28/2008	1/28/2008	$3,132.91	$3,132.91	$1.00	$1.00	1156	Released WO	WO319550	0	1
246178	4.1	201	FPLC229B90145Q	FLOAT POPPET LANDING COLLAR, 04.00/13.4, SINGLE	1	3/9/2007	5/18/2007	1/28/2008		$4,786.65	$4,786.65	$1,972.44	$1,972.44	1156	On Hand		1	1
246178	5.1	201	FS229B90145Q	FLOAT SHOE, 04.00/13.4,	1	3/9/2007	5/18/2007	1/28/2008		$5,016.23	$5,016.23	$1,999.47	$1,999.47	1156	On Hand		1	1
246178	6.1	201	LWPC19003V	LINER WIPER PLUG,	1	3/9/2007	5/18/2007	1/20/2009	1/20/2009	$745.10	$745.10	$1.00	$1.00	1159	Unreleased WO	WO319548	0	1
246178	7.1	201	PDPC355093V	PUMP DOWN PLUG,	1	3/9/2007	5/18/2007	1/28/2008		$294.87	$294.87	$270.81	$270.81	1156	On Hand		1	1
246178	8.1	201	LOC2232290014R	LOCATOR COUPLING, 05.00 OD, 04.00/11.0 TC-4S BOX X	1	4/10/2007	5/18/2007	1/28/2008	1/28/2008	$2,570.45	$2,570.45	$1.00	$1.00	1156	Released WO	WO319543	0	1
246178	9.1	201	LOS2290281342R	SPACER, TSA, 04.00/13.4 03.250 SPECIAL DRIFT, TC-4S	1	4/10/2007	5/18/2007	1/28/2008	1/28/2008	$1,854.80	$1,854.80	$1.00	$1.00	1156	Released WO	WO319541	0	1
246178	10.1	201	T425229028053R	DEBRIS BARRIER ASSY., 04.25 OD, 2 SETS DEBRIS	1	4/10/2007	5/18/2007	1/28/2008	1/28/2008	$3,165.94	$3,165.94	$2,824.34	$2,824.34	1156	Unreleased WO	WO319517	0	1
246178	11.1	201	LOS2293811053R	SPACER, TSA, 04.00/13.4 03.250 SD, STL PIN X PIN,	1	4/10/2007	5/18/2007	1/28/2008	1/28/2008	$1,454.80	$1,454.80	$1.00	$1.00	1156	Released WO	WO319542	0	1
246178	12.1	201	T425229067053R	TUBING SEAL ASSY, 04.25 OD, 6 SETS HI-TEMP/HI-	1	4/10/2007	5/18/2007	1/28/2008	1/28/2008	$6,893.00	$6,893.00	$1.00	$1.00	1156	Unreleased WO	WO319545	0	1
246178	13.1	201	10090-915-0-R	CROSSOVER CPLG,	1	4/10/2007	5/18/2007	1/20/2009	1/20/2009	$1,526.83	$1,526.83	$1.00	$1.00	1159	Released WO	WO319549	0	1
246178	14.1	201	10255-057	PLUG, SEAL TEST FIXTURE,	1	4/10/2007	5/18/2007	1/20/2009		$199.40	$199.40	$1.00	$1.00	1159	On Hand		1	1
246178	15.1	201	50203-344	O-RING 2-344 NITRILE90	4	4/10/2007	5/18/2007	1/28/2008		$0.68	$2.72	$0.68	$2.72	1156	On Hand		26	4
246178	16.1	201	373980003	INSP-REQUIREMENTS REVIEW	1	4/27/2007	5/18/2007	1/28/2008	1/28/2008			$1.00	$1.00	1156	Planned Order		0	1
246178	17.1	201	373980004	INSP-SPECIFIC CUSTOMER	1	4/27/2007	5/18/2007	1/28/2008	1/28/2008			$1.00	$1.00	1156	Planned Order		0	1
246178	18.1	201	373980005	INSP-WITNESS BY THIRD	1	4/27/2007	5/18/2007	1/20/2009	1/20/2009			$1.00	$1.00	1159	Planned Order		0	1
246178	27.1	201	373980022	INSP FINAL INSPECTION	1	4/27/2007	5/18/2007	1/28/2008	1/28/2008			$1.00	$1.00	1156	Planned Order		0	1
246178	28.1	201	373980023	INSP-DOCUMENT REVIEW	1	4/27/2007	5/18/2007	1/28/2008	1/28/2008			$1.00	$1.00	1156	Planned Order		0	1

Another option to run this report is to show only onhand quantity. Customer Service department is more interested in the sales order that are pegged to onhand quantity so that they can ship them out without disrupting the supply to the manufacturing plant.



Conclusion

Our business is growing rapidly. Everyday we face different challenges from different areas: customer order priority, supplier material shortage, and resource capacity issue, just to name a few. It is critical to understand the data from multiple MRP plans timely to react to the rapidly changing environment. With the MRP data extraction and web presentation of data, we have achieved the following goals we set to help our business:

1. Manufacturing to monitor the capacity load on the resources
2. Purchasing to spot material supply problem
3. Pegging is critical to help Planning, Customer Services and Manufacturing to work together to meet the customer demand date
4. Combine OM with Pegging to help Customer Services decide what to ship

Currently our business unit is implementing Advanced Supply Chain Planning module. With the success from MRP data extract project, we are working toward extracting the similar sets of data from ASCP module and present them efficiently from the web to serve our different business functions.