



SmartPlant Layout Workshop

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SmartPlant[®]
3D

Prepared by Intergraph EMEA
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SmartPlant Layout Workshop

Introduction:

SmartPlant Layout is a route finding tool, not a pipe designer. The primary purpose of SmartPlant Layout is to find the minimum installed cost route for the pipe. To do this a number of candidate routes are generated for each routing requirement and the one with the lowest "Evaluation Cost" is returned as the possible best route solution. (Other factors might need to be considered while routing).

In order to proceed with these labs, you will need to create a new plant using project administrator. In the following labs, I have named the Plant 'Workshop_Plant'; you can name the plant anything you want. When the plant is created, it is advisable to generate a new catalog using the standard Intergraph supplied template as it will be modified as we proceed. Should you choose to use your own company catalog, then this is OK but create a new version so as not to modify an existing data set.

Lab 1: Copy Symbols and Bulkload SmartPlant Layout Reference Data:

In Lab 1, we are going to add the SmartPlant Layout reference data to a standard SmartPlant 3D catalog.

Several workbooks containing SmartPlant Layout reference data are delivered with the software in the folder:

[Product directory]\SmartPlant\3D\Layout\Bulkload\Datafiles

For a detailed description of the workbooks, please refer to the *SmartPlant Layout Reference Data Guide* or the *SmartPlant Layout Help* file. After reviewing and customizing the contents of these workbooks, you need to bulk load them to your Catalog database. For more information about bulk loading workbooks, refer to *Using the Bulkload Modes: An Overview* section of the *SmartPlant 3D Reference Data Guide*.

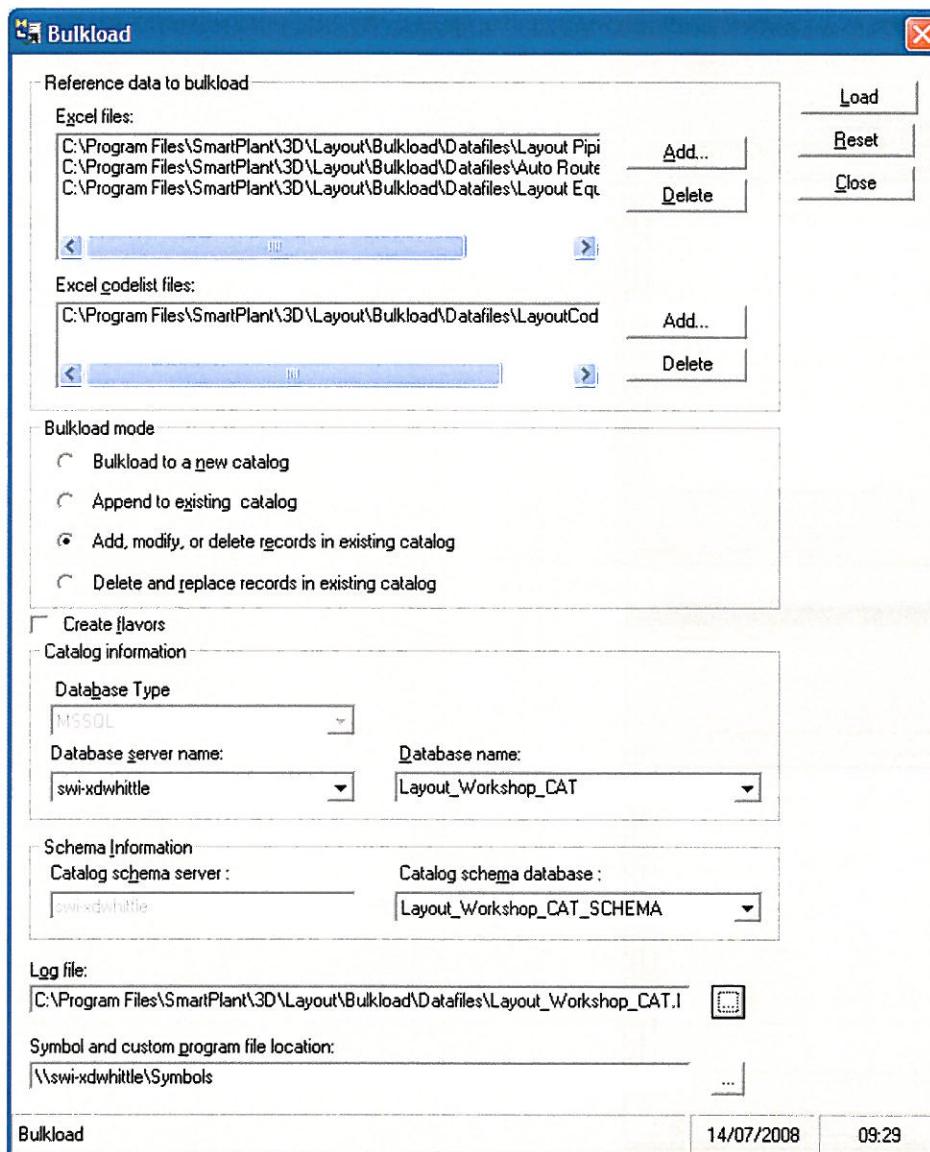
1. On a client computer where you have installed SmartPlant Layout, go to the *[Product Directory]\SmartPlant\3D\Layout\Symbols\SymbolIcons* folder.
2. Select all the .gif files in the folder and copy them to the *symbols\SymbolIcons* folder on your reference data server (*\\\symbols\symbolicons*).
3. On a computer where the Project Management task has been installed, click Start
 > All Programs > Intergraph SmartPlant 3D > Database Tools > Bulkload Reference Data.
4. Click **Add** next to the **Excel files** list.
5. Browse to the *[Product Directory]\SmartPlant\3D\Layout\Bulkload\Datafiles* folder. The default location of the *[Product Directory]* is c:\Program Files.
6. Select the workbooks:
 Auto Router Rules.xls
 Layout Equipment.xls
 Layout Piping Specification.xls
 in the folder, and then click **Open**.
7. Click **Add** next to the **Excel codelist files** list.
8. Browse to the *[Product Directory]\SmartPlant\3D\Layout\Bulkload\Datafiles* folder. The default location of the *[Product Directory]* is c:\Program Files.
9. Select the workbooks:
 LayoutCodeLists_1.xls
 in the folder, and then click **Open**.
10. Select the **Append to existing catalog** option.
11. In the **Database server name** option, select the name of the database server.
12. In the **Database name** option, select the Catalog database.
13. In the **Catalog schema database** option, select the Catalog schema database.
14. Enter a folder path and name for the log file.
15. Check the name of the Symbols share – as in step 2 above.
16. Click **Load**.

Depending on the Catalog database size and your computer speed. The bulk load process could take several minutes. The status bar at the bottom of the dialog box indicates the bulk load progress and when the bulk load is finished.

17. Click **Close**.

18. Review the log file.

See below:

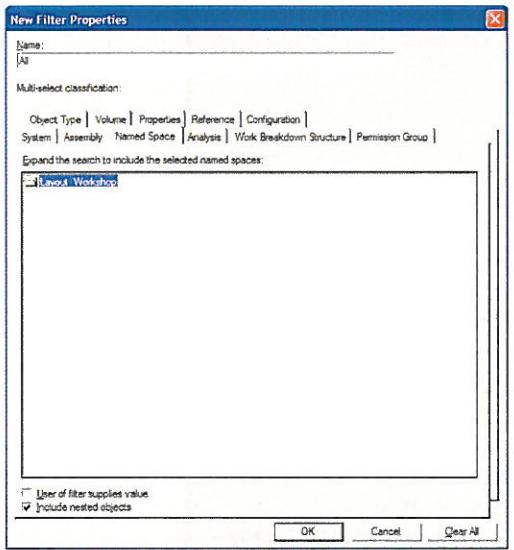
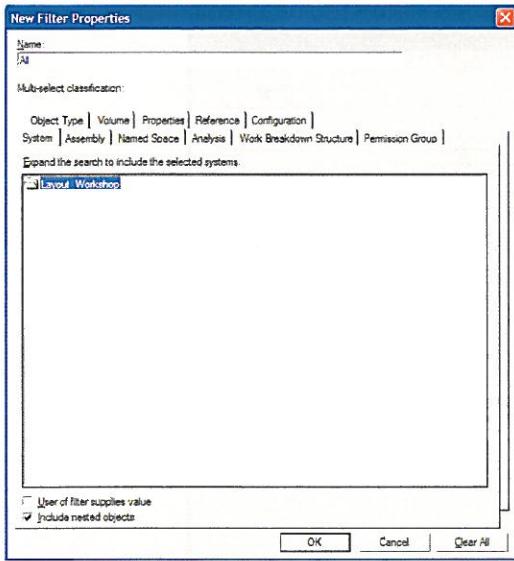


You have now bulkloaded the catalog data – This completes Lab 1.

Lab 2: Setting up Filters and Specifications:

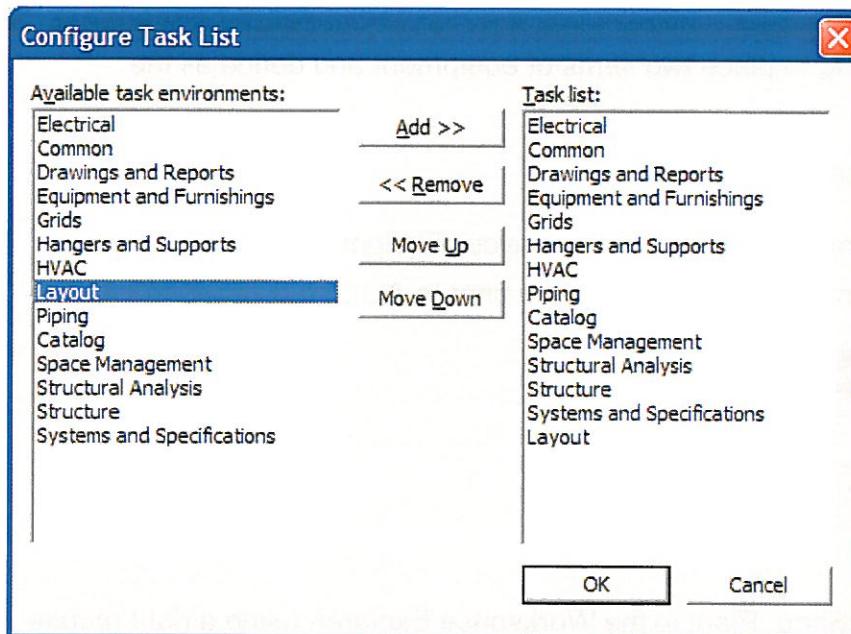
In Lab 2, you are going to specify the filter, define the allowed specifications and add the Layout task to the task list.

Firstly, enter SmartPlant 3D define a filter named 'All' as shown below:



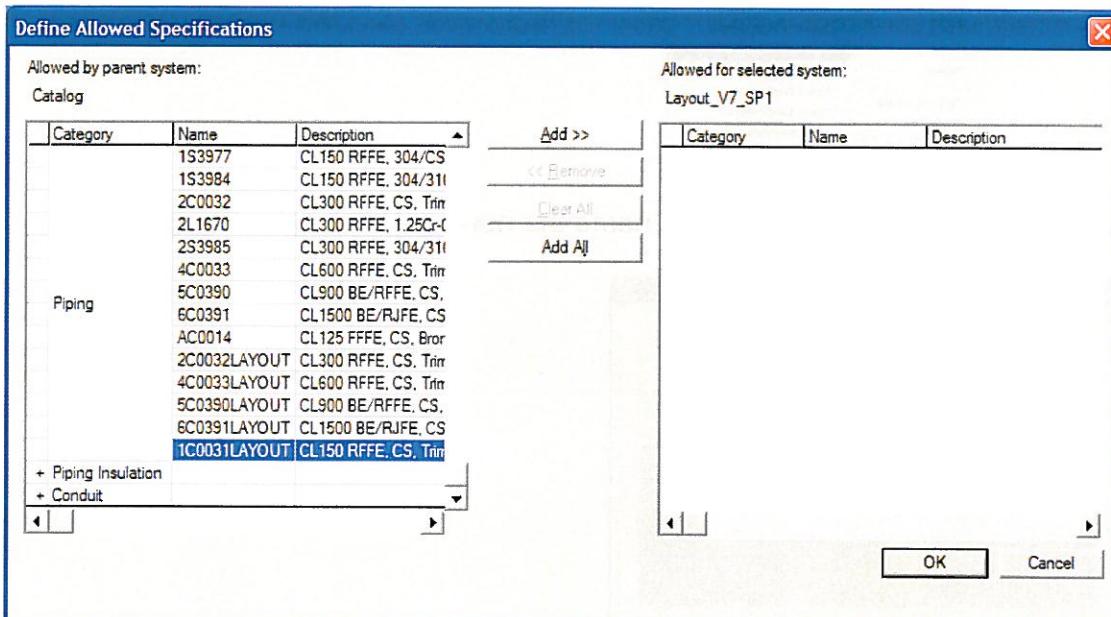
Select the Plant from both the System and Named Space tabs

From the Task menu, select Configure task list and add the 'Layout' task



From the Task List, select the 'Systems and Specifications task' Select the 'Define Allowed Specifications' icon.

Expand the piping category, select the 1C0031LAYOUT specification and select Add>> and click OK:

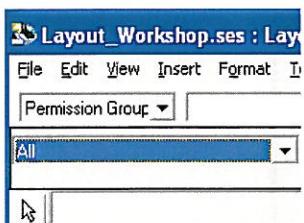


Lab 3: Placing Equipment:

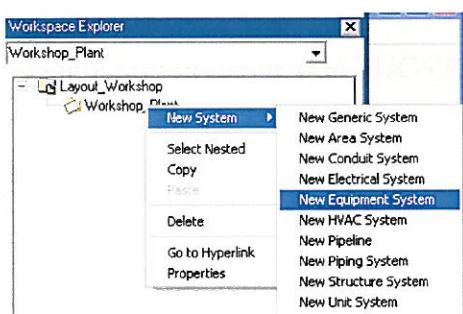
In Lab 3, you are going to place two items of equipment and define all the relevant data.

From the Task List, select the Layout task.

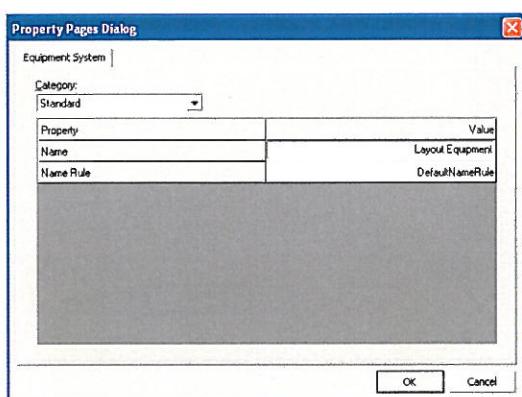
Create a new 'Equipment System' named 'Layout Equipment'. To do this, click the select icon  and then set the selection filter to ALL:



Now select the WorkShop_Plant in the Workspace Explorer, using a right mouse click, select New System / New Equipment System as shown:



A property dialogue will be shown, name the new system Layout Equipment:



Press the OK button.

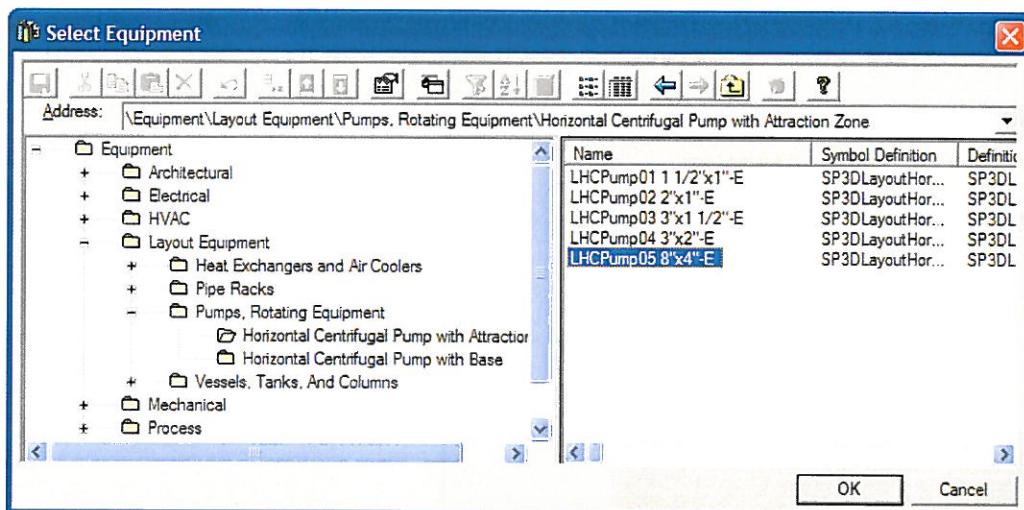
You will notice the Workspace Explorer has now updated:



From the Layout Task toolbar menu on the left hand side of the screen, select the 'Place Equipment icon' .

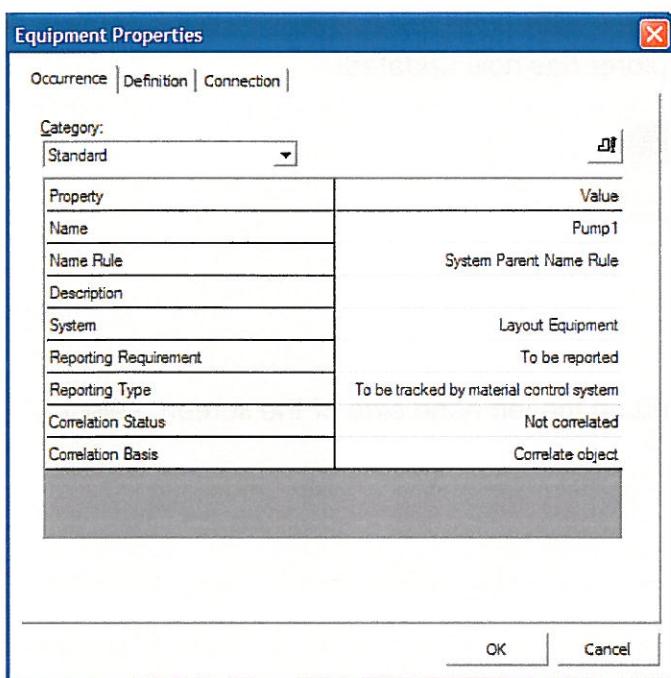


Then from the dialogue, select the *LHCPump05 8"x4"E* pump as shown:

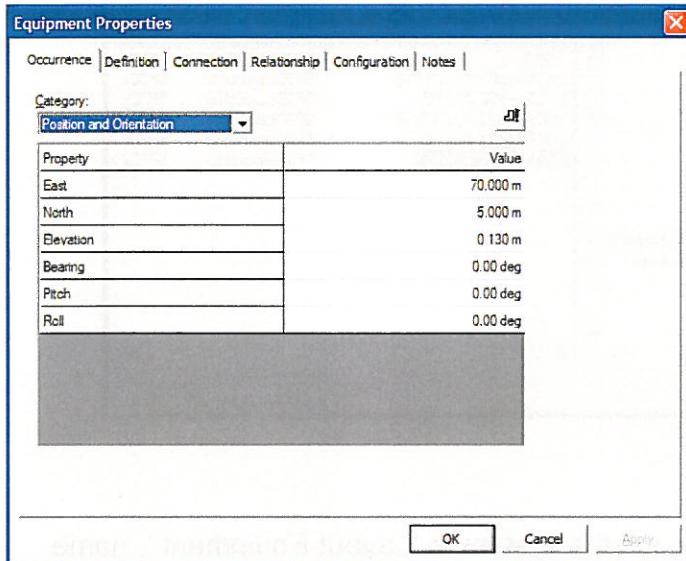


And Select OK.

The Properties tab will be shown, set the system to 'Layout Equipment', name the Pump, 'Pump1'. DO NOT CLICK OK

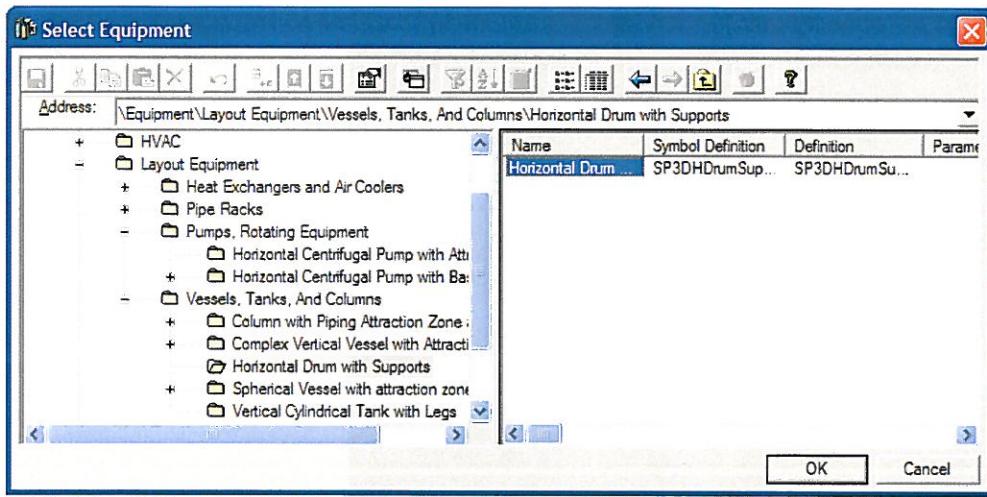


From the Category pull down, select 'Position and Orientation', set the position as: East 70m, North 5m and Elevation 0.130m and the bearing 0 deg as shown below:



Click OK, the pump has now been placed.

Select the 'Place Equipment' icon again this time select the Horizontal Drum with Supports as shown below:



On the subsequent Properties dialogue, set the system ‘Layout Equipment’, name the equipment Tank1 and click OK

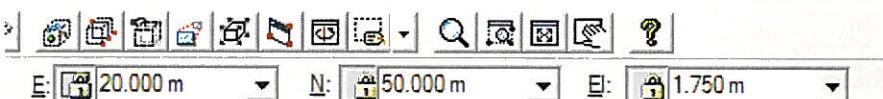
You will see they equipment moving with the mouse.

PinPoint is a generic SmartPlant 3D command, which lets you define a precise point in the 3D space. This is useful in preliminary as well as detailed design, across all 3D Design tasks.

Enable the “pinpoint” command by clicking the button located in the Menu bar



Using PinPoint, enter the co-ordinates East 20m, North 50m, Elevation 1.750m

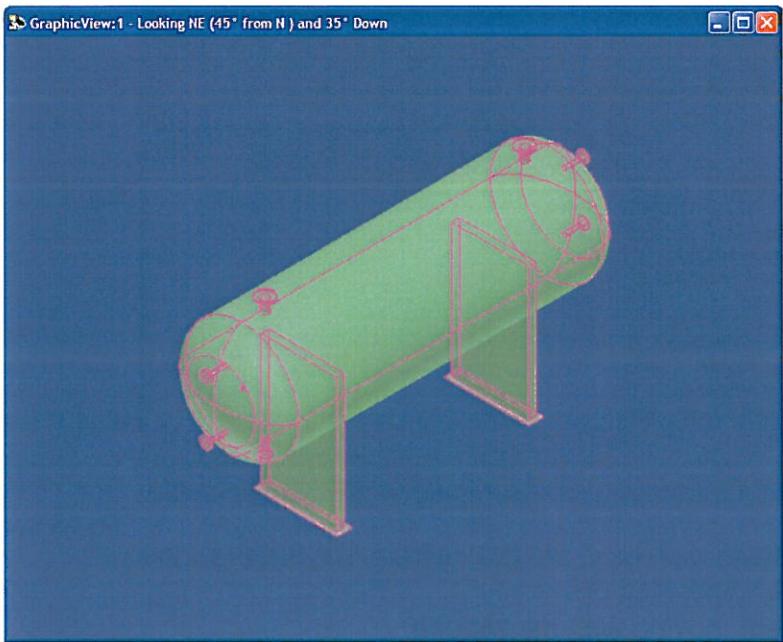


Tip: You can use the ‘tab’ key to move between the pin point items and lock the value. Alternatively click on the Lock icon to lock the co-ordinates.

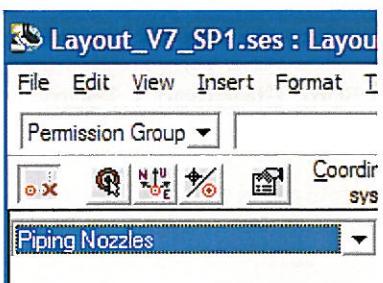
When you have entered and locked the co-ordinates, move the mouse to the graphic window and click the left mouse button to accept the placement.

The tank has been placed at the co-ordinates specified.

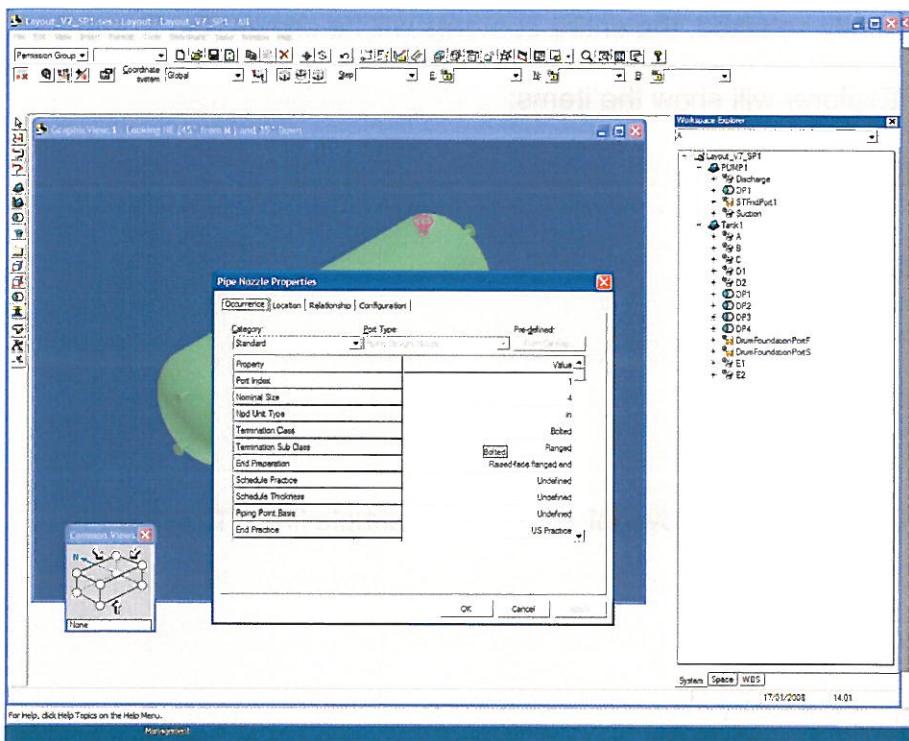
Using the view control icons , select ‘Fit view’ . As the currently selected element is Tank1, the tank will be fitted to the view:



Set the selection filter to 'Piping Nozzles' by first clicking the select icon  and then changing the filter to Piping Nozzles:



Select Nozzle A on Tank1 as indicated. From the edit menu, select Properties (or right click the nozzle and select properties from the menu list) and change the size to 4in and click OK.



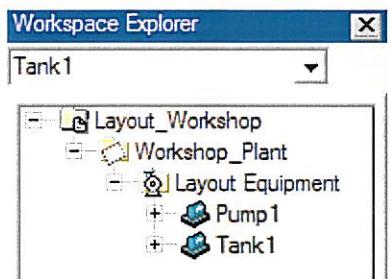
Select a blank area in the graphic window with a right mouse click until nothing is shown selected (nothing is highlighted).

Now click the 'Fit View' icon again 



As nothing is currently selected, the entire contents will be shown (the Pump and the Tank).

The Workspace Explorer will show the items:



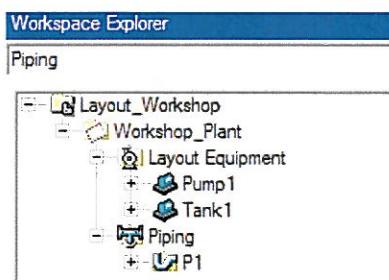
This completes Lab 3. You are now going to route a simple line – Continue to Lab 3A:

Lab 3A: Auto Routing Pipelines:

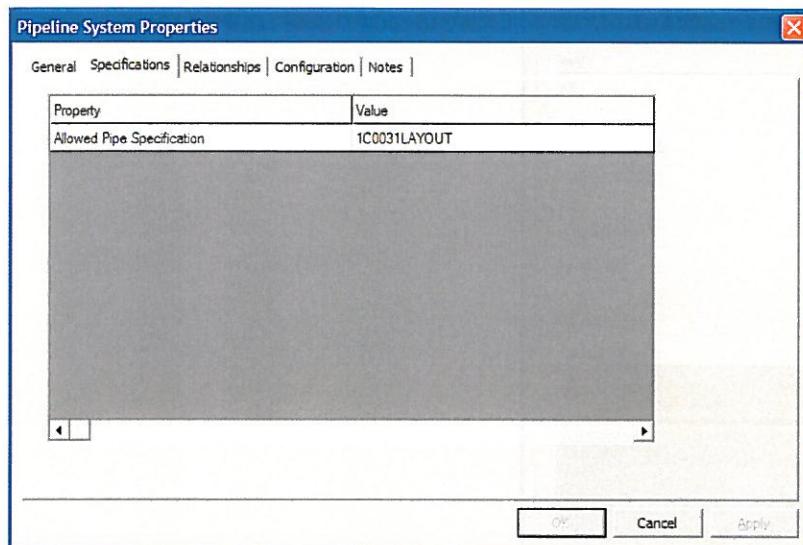
In Lab 3A, we are going to create a very basic pipe run to demonstrate the auto-route capabilities.

In the Workspace Explorer, select the 'Workshop_Plant' item, using a right mouse click, create a new piping system named 'Piping' and then create a new pipeline named 'P1' as shown below:

Note that when creating the Pipeline, you will need to change the naming rule on the properties dialogue from 'Default Name Rule' to 'User Defined', enter the name P1 and click OK.



Select the Pipe P1 and using the right mouse menu, select Properties. Click the Specification tab and ensure that the specification is set:



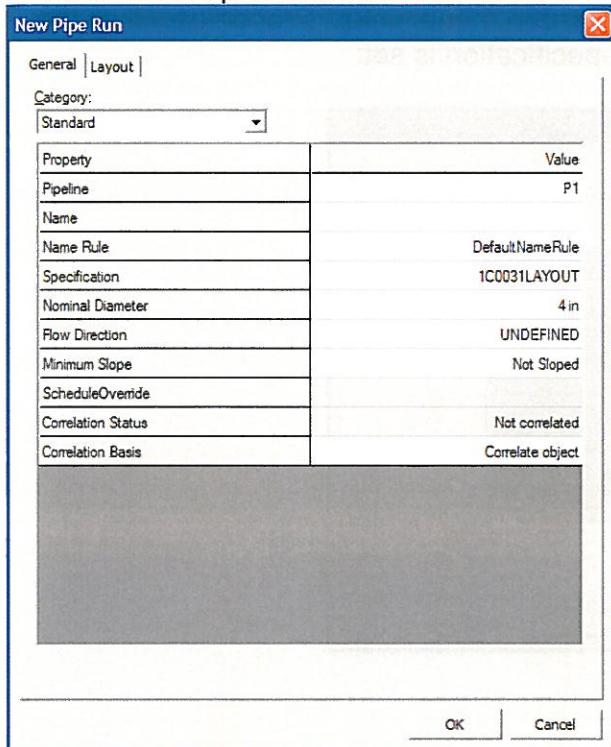
Click Cancel to dismiss the dialogue.

To define the run, click the 'Define Run Connection' icon  from the Layout task.



In the status bar, you will be prompted for the 'Run'. As we have not yet created any Runs, select the 'New Pipe Run' icon  from the Smart Command ribbon.

From the subsequent dialogue, select the 'P1' pipeline and ensure the diameter is 4in and the Specification is 1C0031LAYOUT:



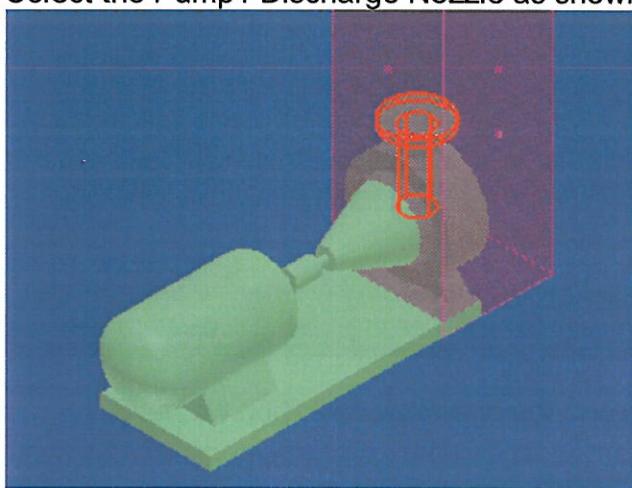
Click the OK button

In the status bar, you will now be prompted for the From Nozzle.

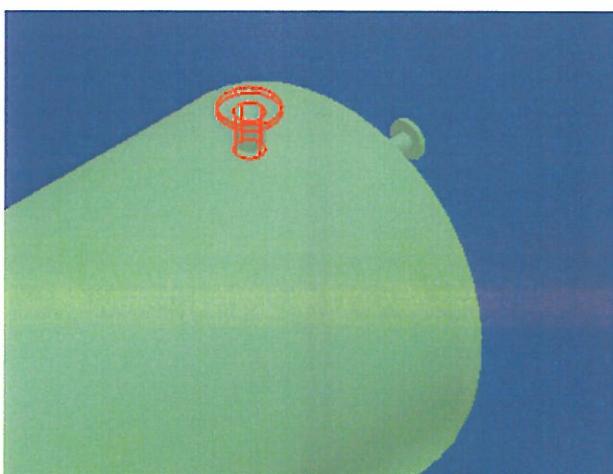
Select the 'Zoom Area' icon  from the View control icons     and zoom to Pump1 as shown:

A right mouse click will terminate the zoom command and place you back in the define run command.

Select the Pump1 Discharge Nozzle as shown:



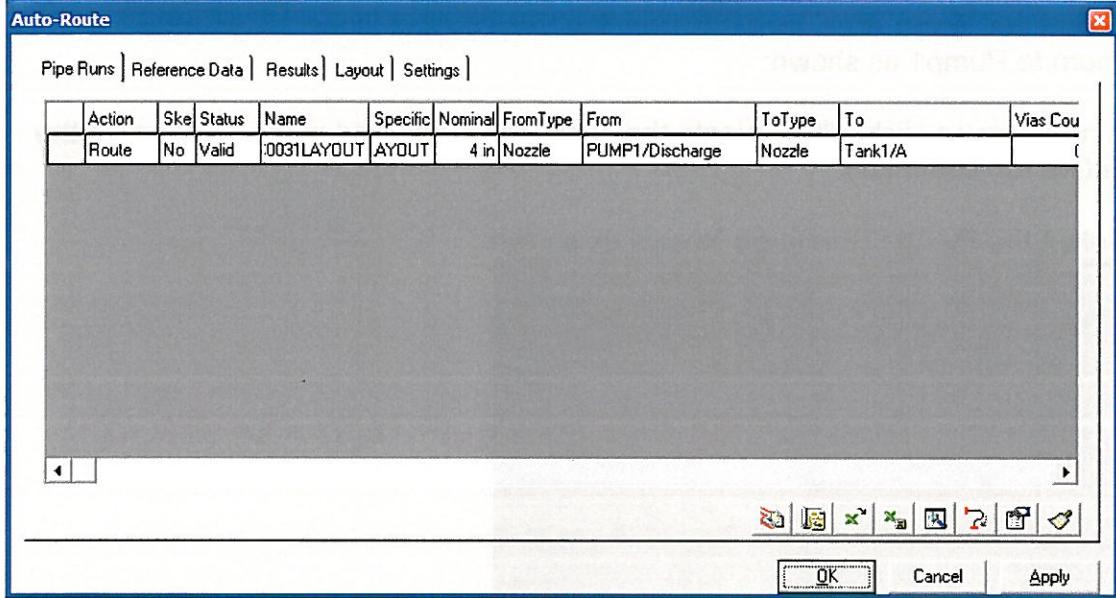
Similarly using the fit view icon  and then the zoom area icon , use a right mouse click to terminate the zoom command. Select the 'To' nozzle 'A' on Tank1:



The 'New Pipe Run' dialogue will now appear again. Click Cancel.

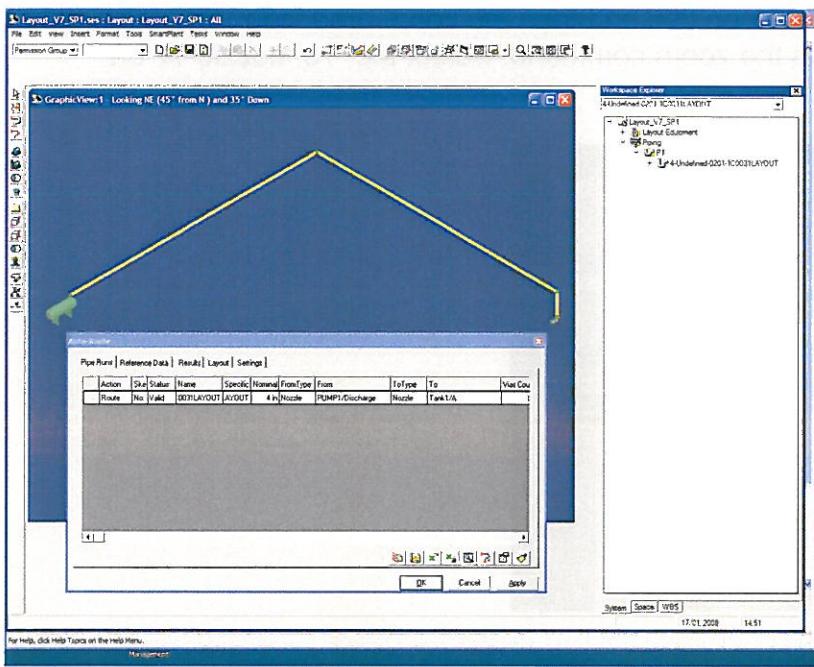
'Fit View' icon  to display the Tank and the Pump

Click the automatically route icon :



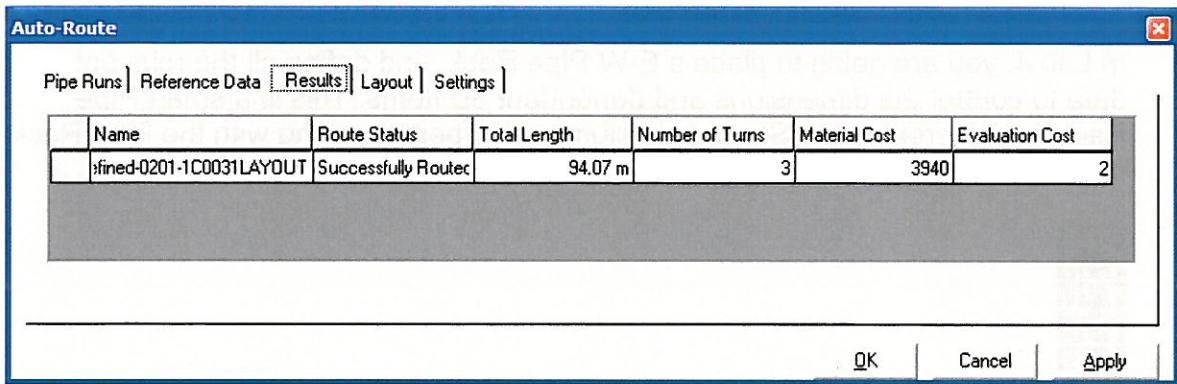
You will set the Auto-Route Dialogue and the one route definition we have created.

Select the 'Preview' icon  on the Auto-Route dialogue:



You will see the route shown:

If you click on the Results Tab, the results are displayed:



Note the Total length of 94.07m (94.065m dependent on the unit's settings for number of decimal places) and the Material Cost of 3940

Click the OK button.

This completes Lab 3A.

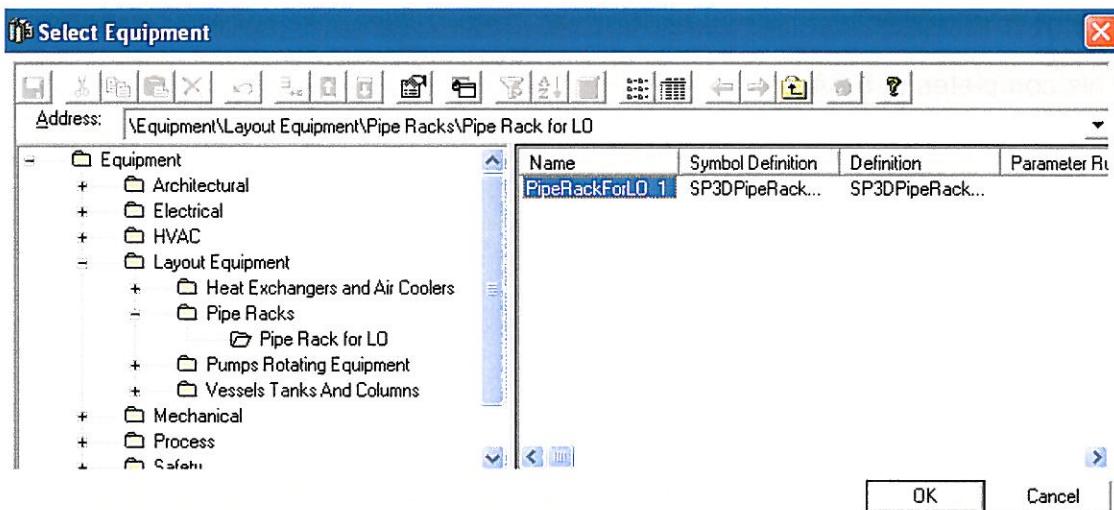
Lab 4: Placing Layout Equipment:

In Lab 4, you are going to place a E-W Pipe Rack, and define all the relevant data to control the dimensions and dependant 3D items. This is a smart Pipe Rack, which creates the Structural columns and beams, along with the Pipe Rack routing zones.



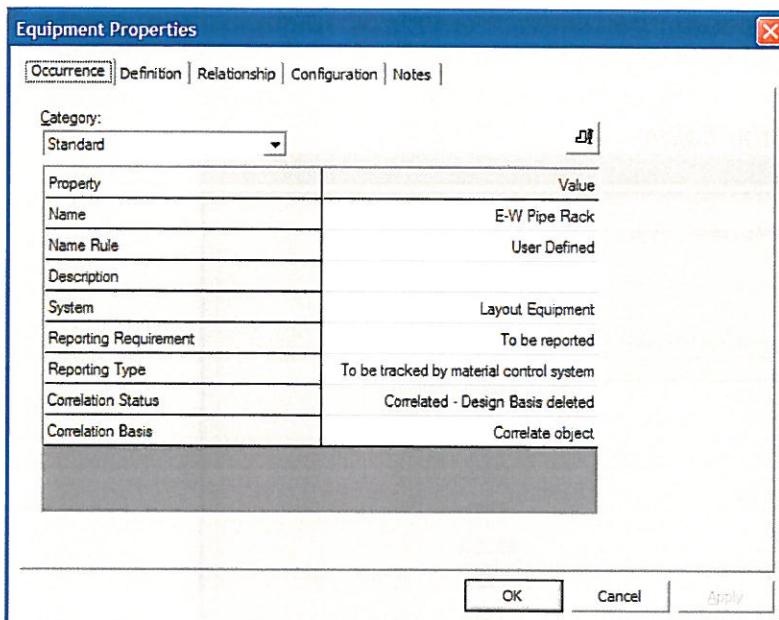
Select the Place Equipment command from the side menu bar.

Traverse the Equipment hierarchy and select Pipe Rack “PipeRackForL0_1” from the Select Equipment dialog box and then click OK.



Fill in Equipment name as “E-W Pipe Rack”; you may also enter a description (optional)

Click “OK” button.



Click the OK button.

Now that the Pipe Rack is in dynamic graphics, enter in the following values in the Pin Point items.

East 0m North 20m Elevation 0m

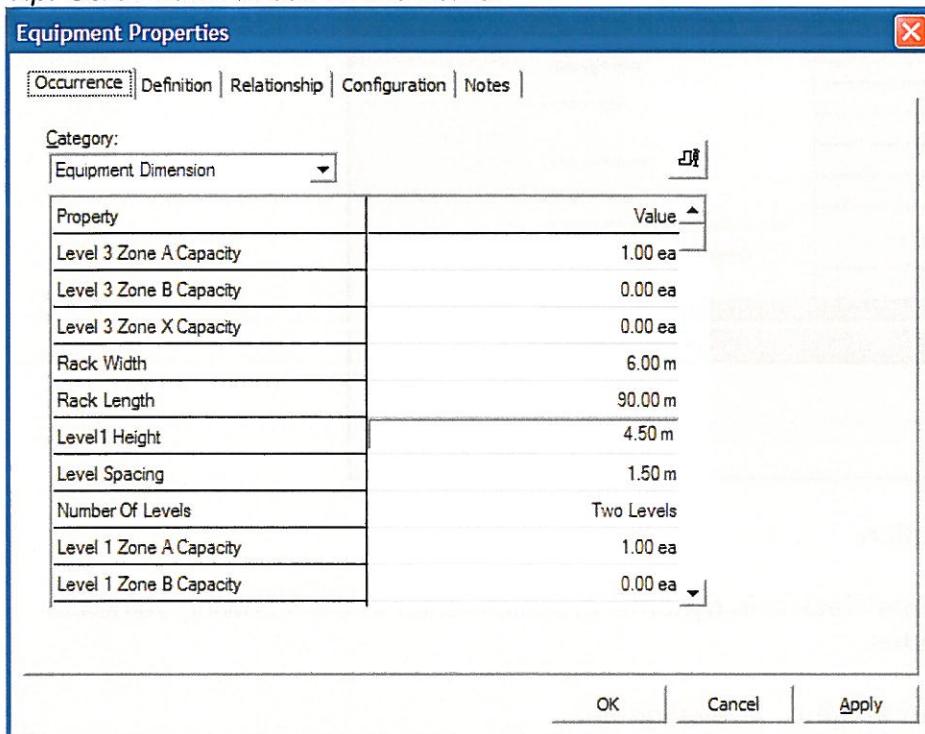
Tip: Input value in the desired field and use "Tab" to proceed to the next field. This will update the value and lock the field.

Click anywhere on the graphics screen to place the Pipe Rack.

Next select the property page button. from the 'Smart Command' line:

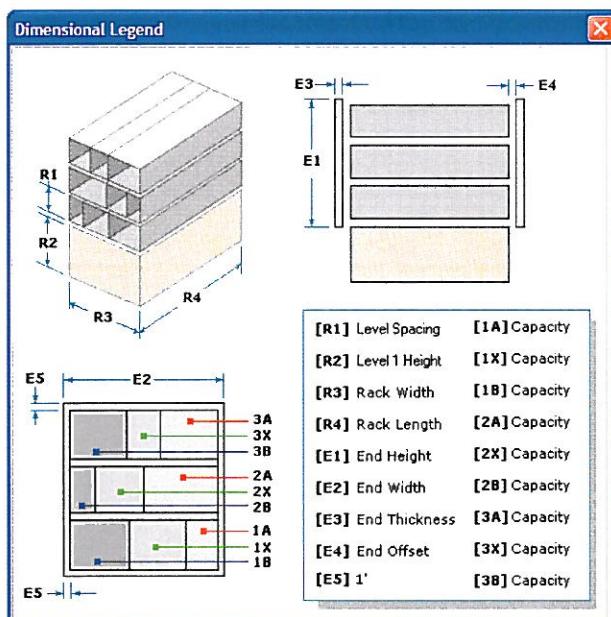
Select the Category of "Equipment Dimension" as shown, and enter in the following values:

Tip: Scroll down to see all the fields.

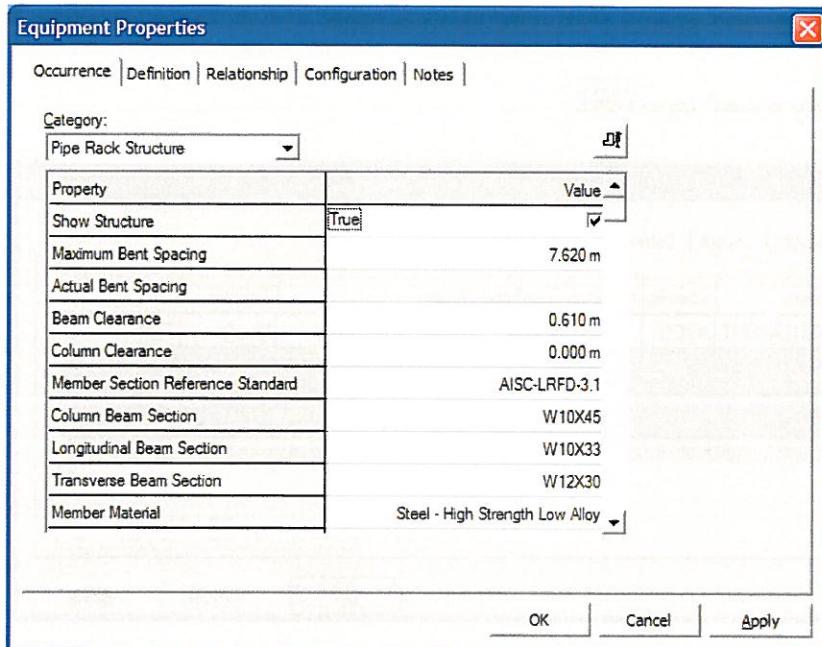


Click the Apply button.

Tip: Use the Preview icon to see the definition:

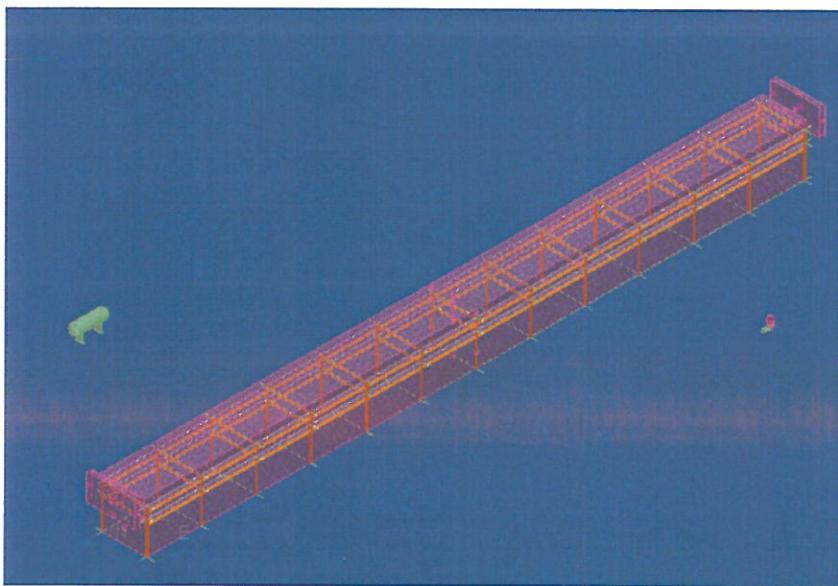


Now switch the category to “Pipe Rack Structure” and enter in the following



Select Apply and then OK.

If you fit the view, you will see the three items:

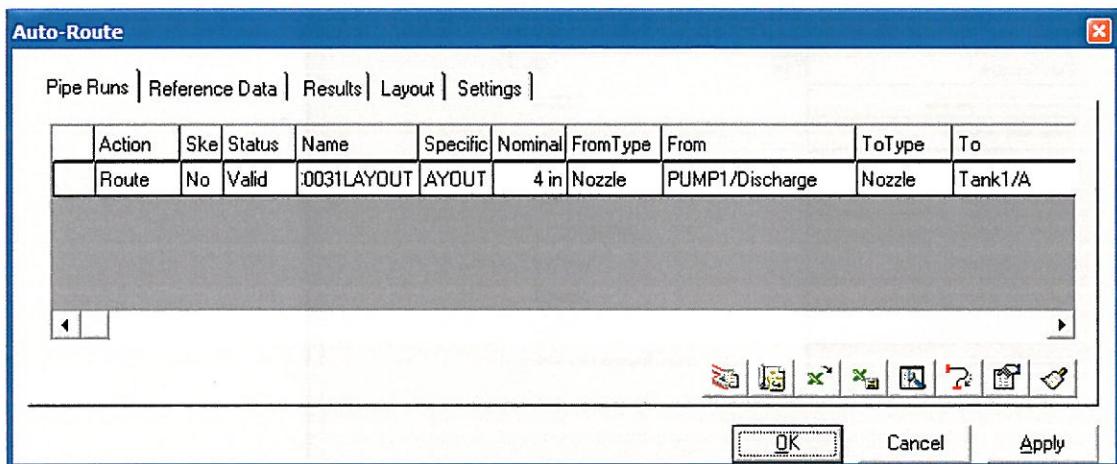


You have now placed the E-W Pipe Rack, which concludes Lab 4 – Continue to Lab 4A.

Lab 4A: Auto Routing Pipelines:

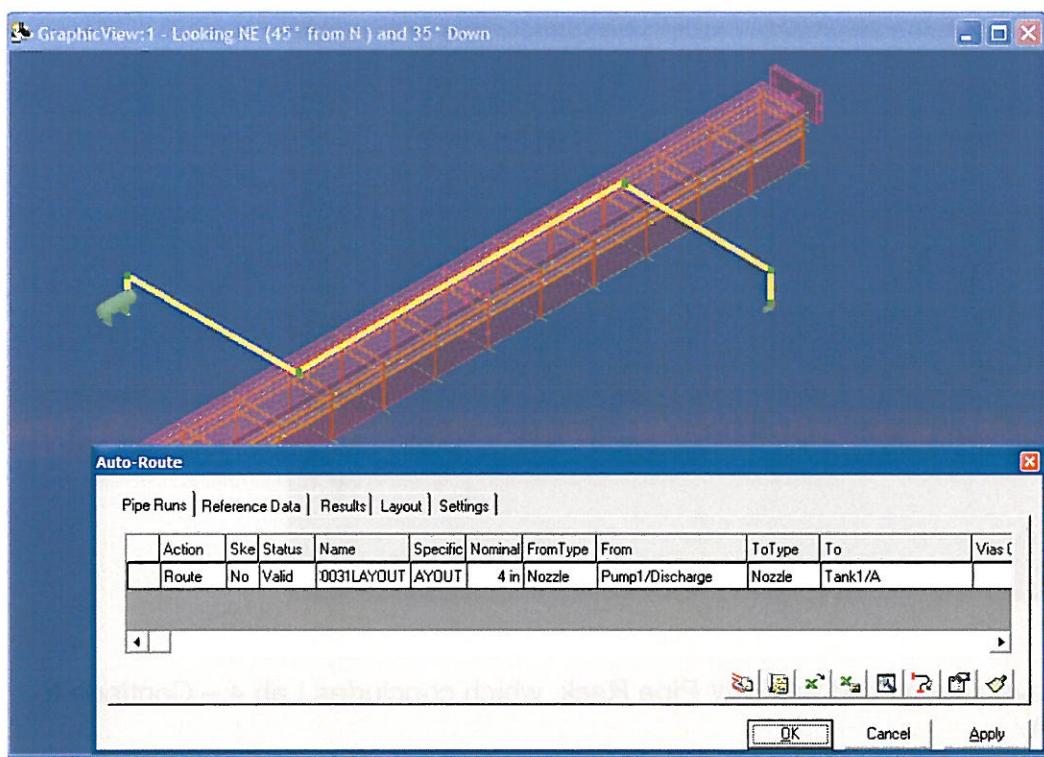
In this Lab, we will re-route the same pipe run using a rack.

Select the 'Automatically route' icon :

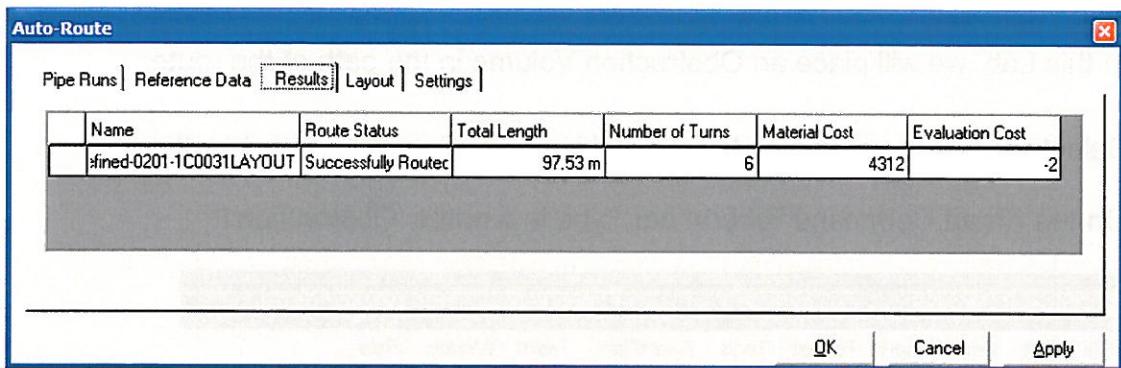


You will notice that the previously defined run is still show.

Click the preview icon  and see the new route:

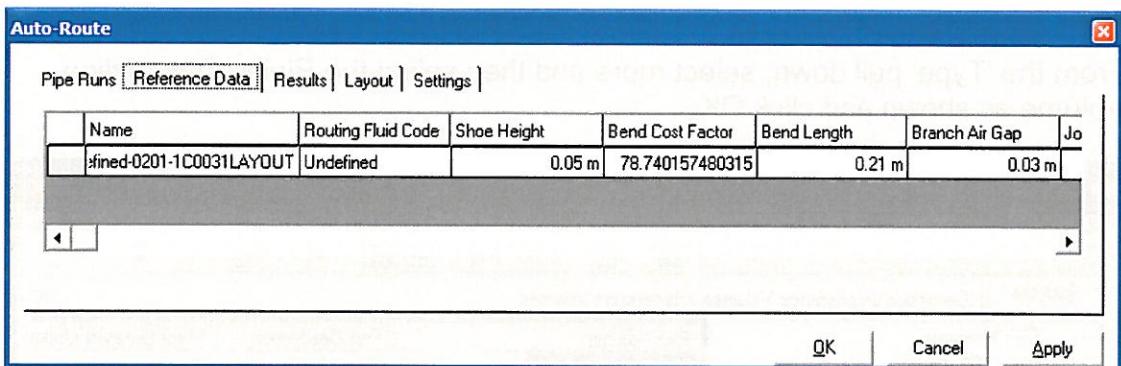


Click on the 'Results' tab:



You will notice that the Total length 97.53m is now greater than before (94.07m).

Click on the 'Reference Data' tab:



Here you will see the parameters used, Linear Cost, Bend Cost

Click OK

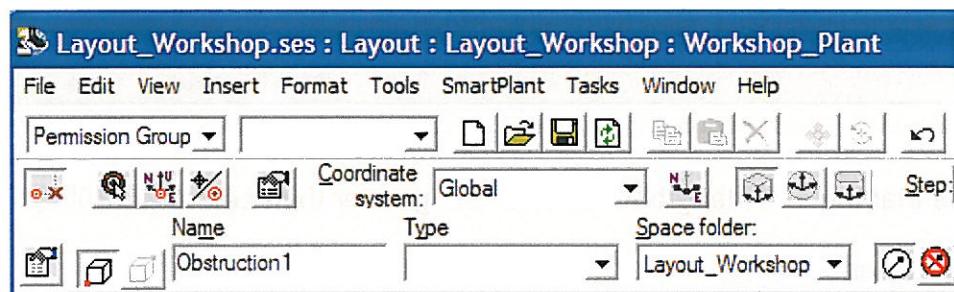
This completes Lab 4A.

Lab 5: Place an Obstruction Volume:

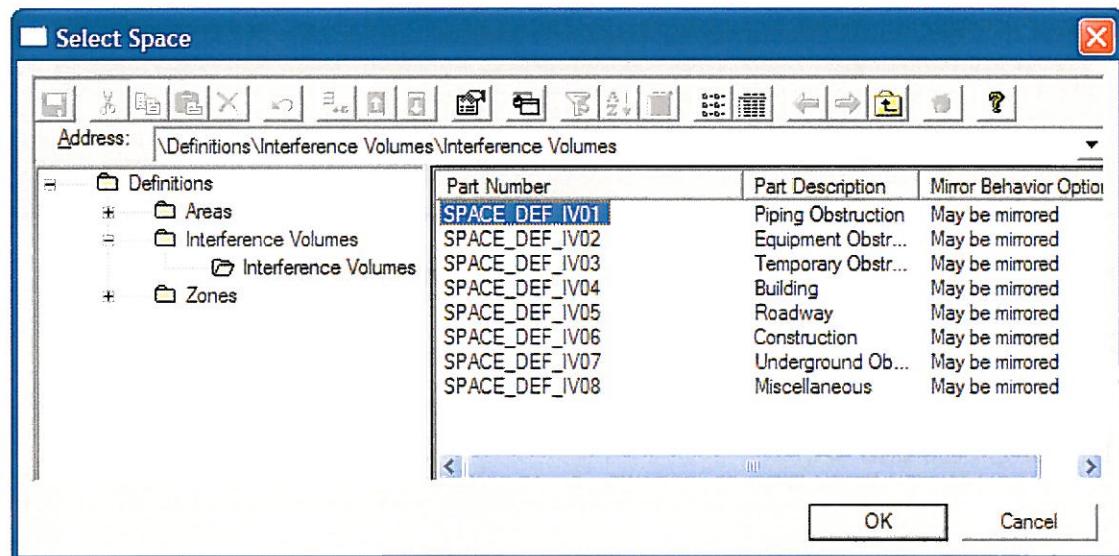
In this Lab, we will place an Obstruction Volume in the path of the route.

Select the 'Place volume by two points' icon  from the Layout toolbar.

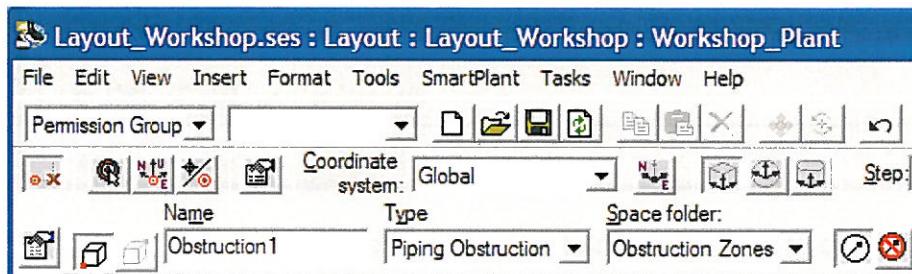
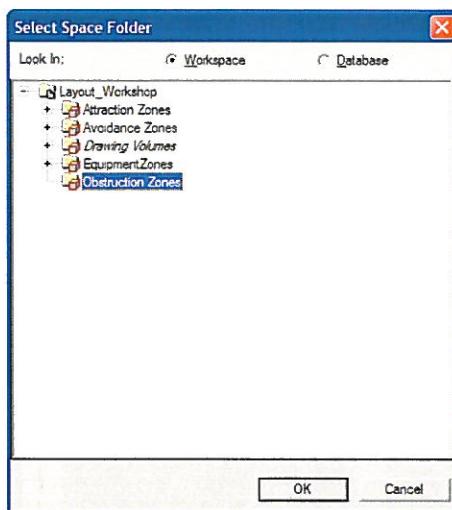
On the Smart Command Ribbon bar, type in a name 'Obstruction1':



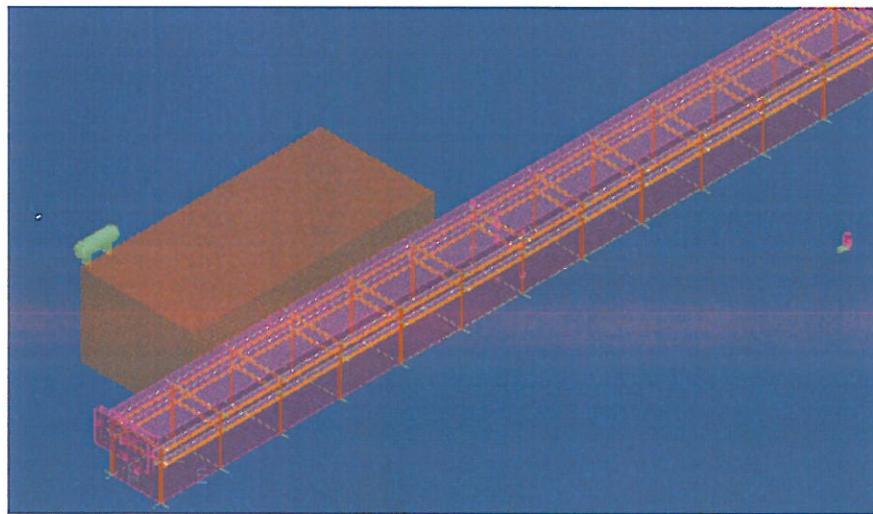
From the 'Type' pull down, select more and then select the Piping Obstruction Volume as shown and click OK:



Select the Obstruction Zones as the Space folder and click OK:



Using Pin-Point, key in the values East 10m, North 26m, Elevation 0m for the first point and click in the graphics to accept. Then enter East 40m, North 40m, Elevation 10m for the second point and again click to accept:



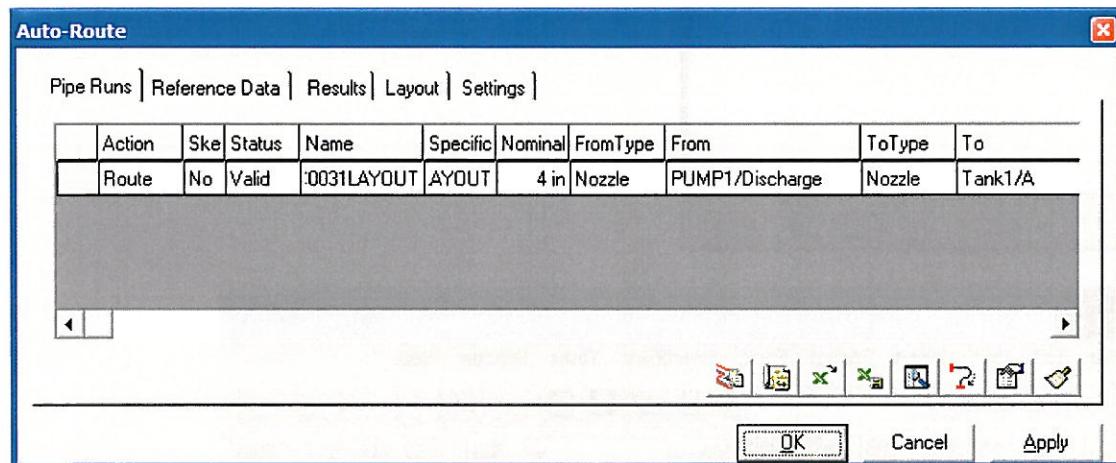
Use a right mouse click to exit the place command.

This Completes Lab 5, continue to Lab 5A:

Lab 5A: Auto Routing Pipelines:

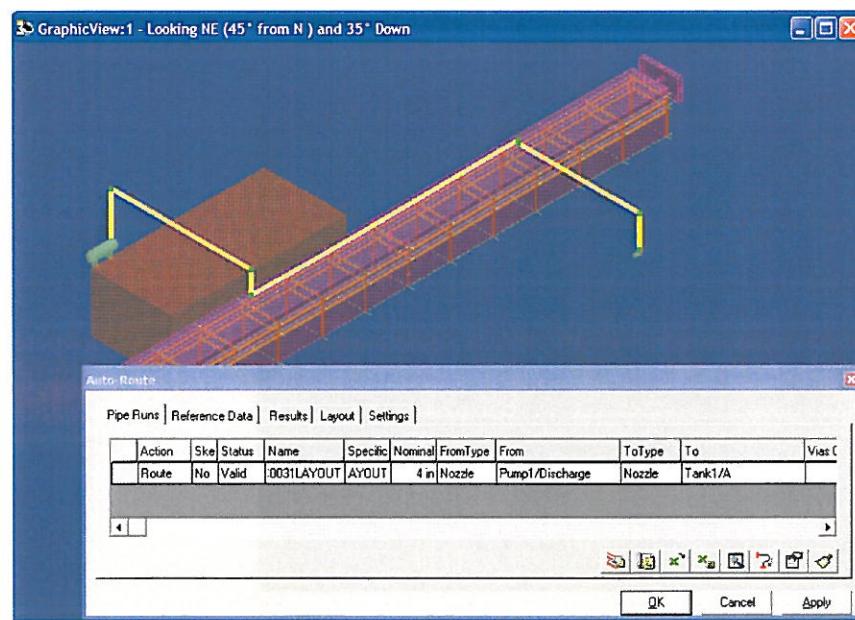
In this Lab, we will re-route the same pipe run using a rack and avoiding the obstruction.

Select the 'Automatically route' icon :



You will notice that the previously defined run is still shown.

Click the Preview  icon:



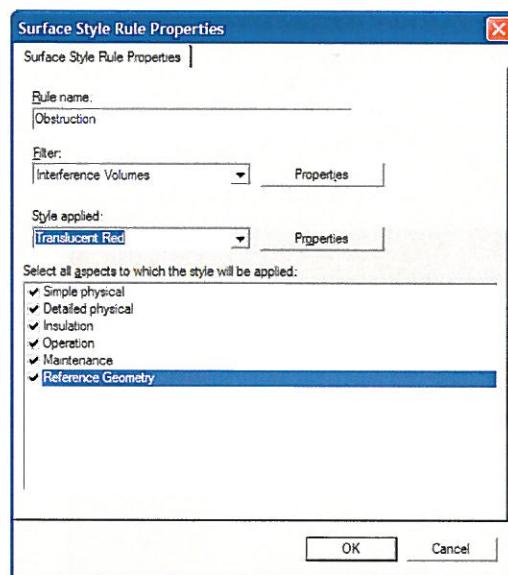
Click the OK button.

This completes Lab 5A.

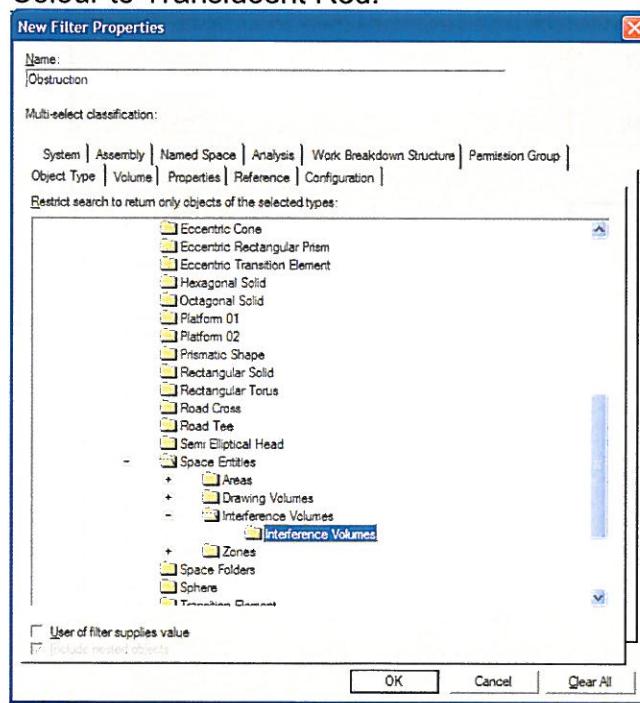
Lab 6: Format Surface Styles:

In this Lab, we will create new surface style rules with which to view the zones.

From the Format menu, select Surface Style rules and from the dialogue, select 'New':



Create an Obstruction style, set the filter to 'Interference Volumes' and the Colour to Translucent Red:



Note That the Object type filters for Interference can be found on the 'Object Tab', under SP3D\Space\Space Entities\Interference Volumes. Whilst the Attraction, Avoidance, Connection and Pipe Rack zones can be found under SP3D\Space\Space Entities\Zones.

Create the following Surface Style Rules:

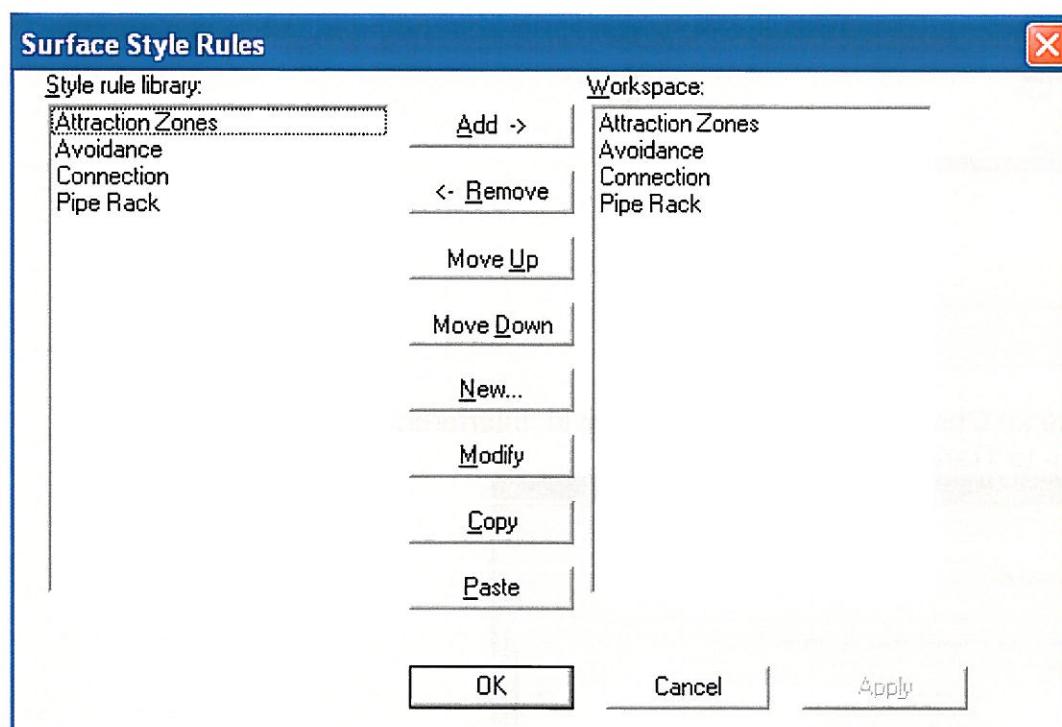
Connection Zones

Avoidance

Attraction

Pipe Rack

Use Translucent Colours for Zone definitions:



This completes Lab 6.

Lab 7: Auto Routing Pipelines:

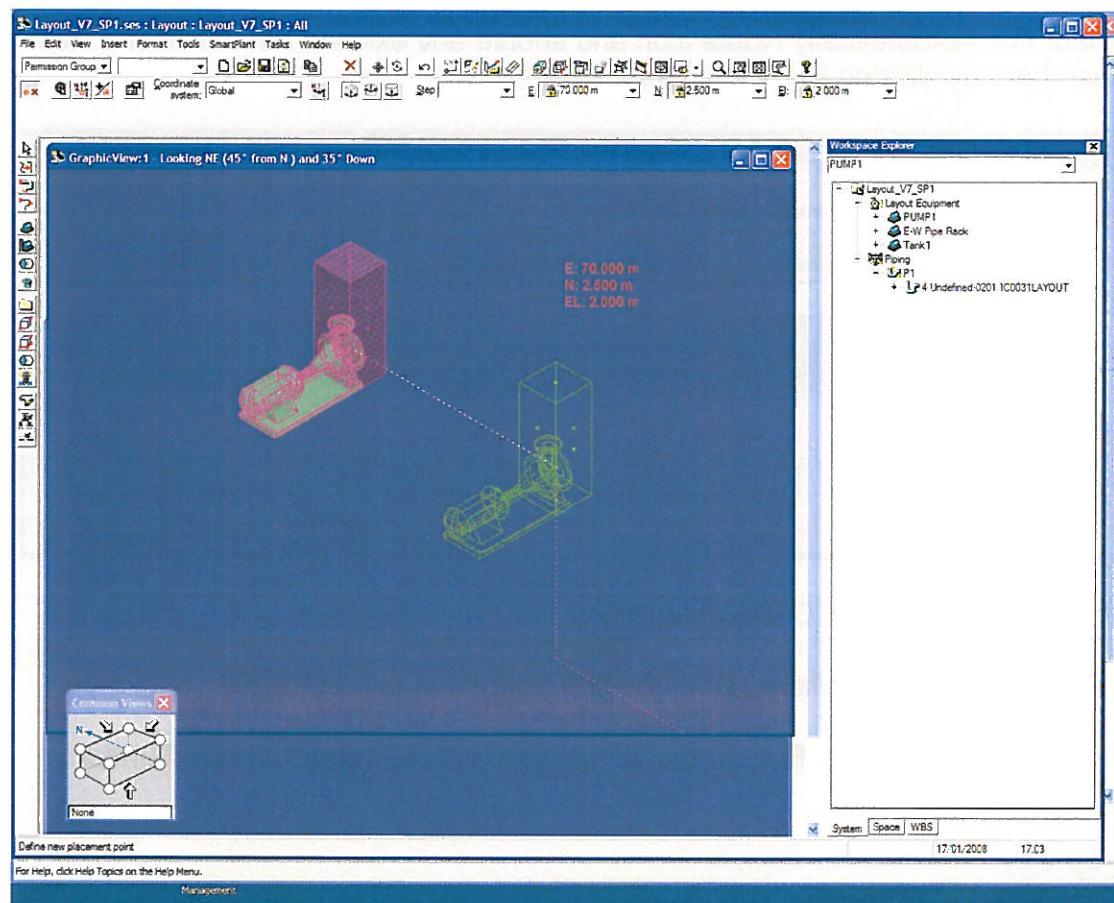
In this Lab, we will create four pipe runs and assign two of them to be routed through the E-W Pipe Rack. The objectives are:

- To understand that Pipe runs can pass through a rack, even when there is no start or end defined. This is especially useful for rack piping.
- That pipe runs can be routed using different start and end types.

Firstly, you will copy the pump we created earlier:

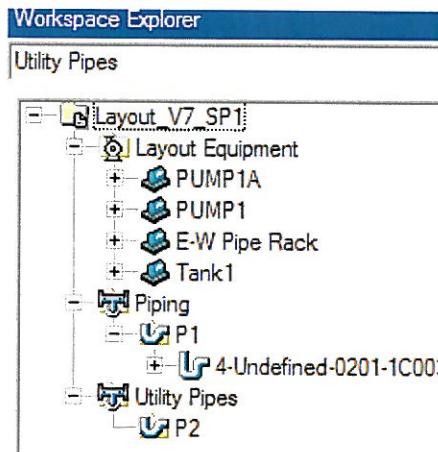
Set the selection filter to Equipment and Select 'Pump 1', select copy and key in a from value of East 70m, North 5m and Elevation 0.130m.

Select paste and deselect the past in place tick box. Using Pin Point, enter the co-ordinates East 70m, North 2.5m, Elevation 0.130m:

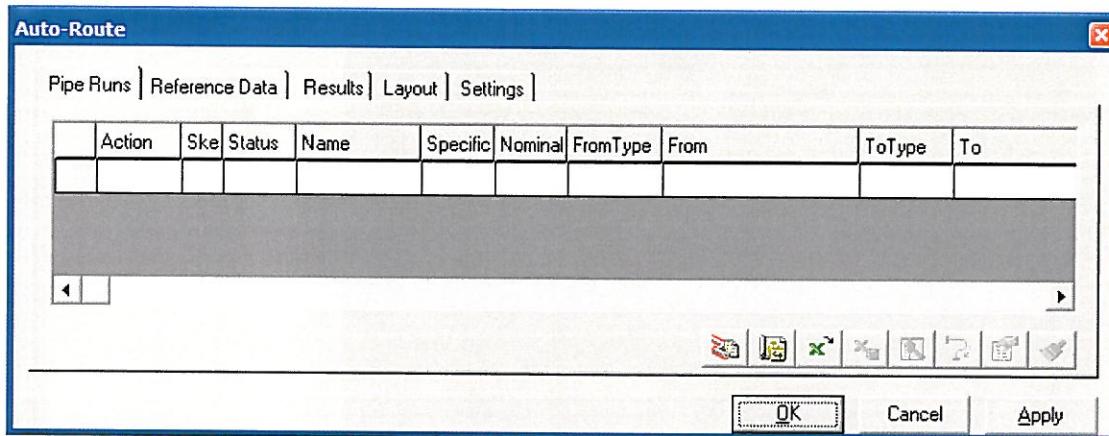


Rename the pump 'Pump 1A'

Secondly, Create a new Pipeline named P2 as a child on a Piping System named 'Utility Pipes' as shown below::



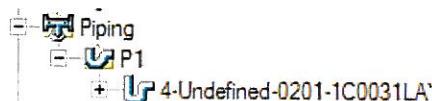
Select The Automatically Route icon and should any existing run definitions exist, clear them by clicking the 'Clear Runs' icon.



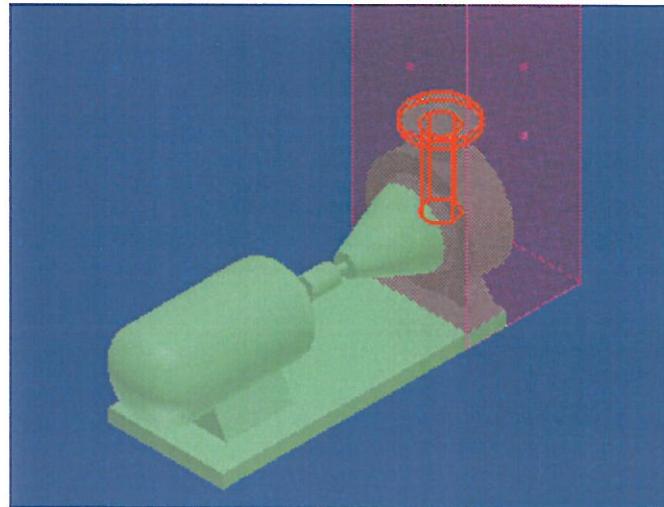
Select the 'Define Run Connection' icon.

Tip: The prompts are displayed in the bottom right of the status bar.

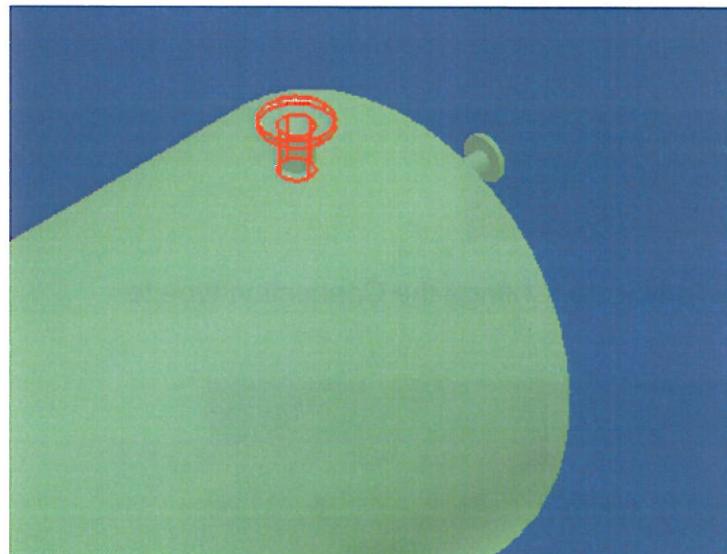
When prompted for the Run, in the workspace explorer, select the Run under Pipe P1



You will now be prompted for the From Nozzle. Select the Pump1 Discharge Nozzle as shown:



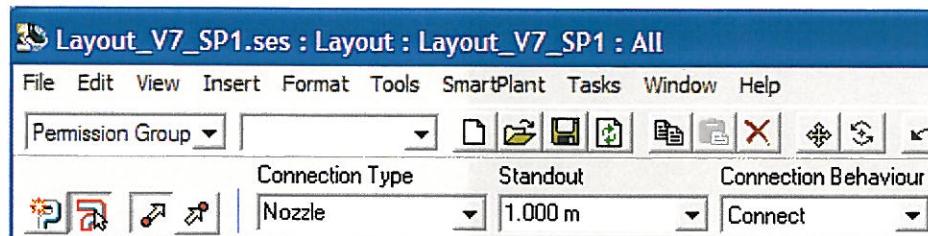
Similarly, the 'To' nozzle 'A' on Tank1:



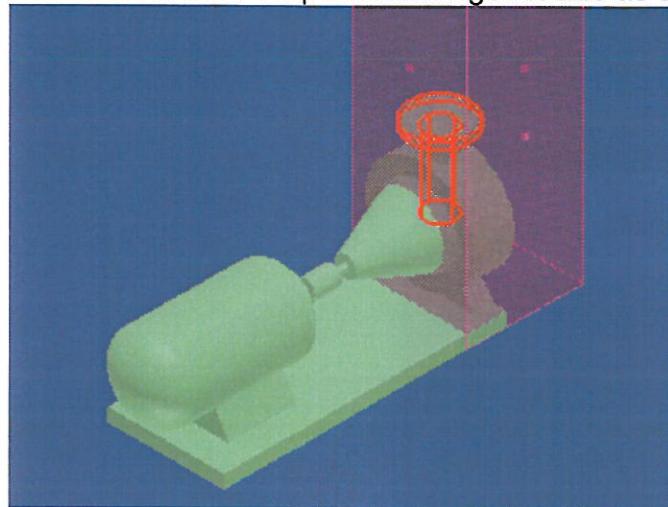
As the command is still running, select the 'Create Run' icon  and create a new run as a child of Pipe P1 with a size of 4in.

Tip: If you don't fill in the pipe run name, Layout will assign a name automatically, using inbuilt naming rules.

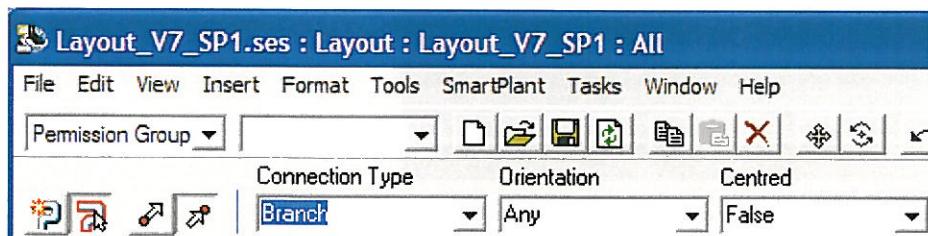
You will now be prompted for the From Nozzle. Change the Standout Distance to 1 m, you will have to type this in:



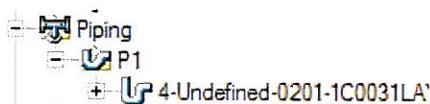
Then Select the Pump1A Discharge Nozzle as shown:



You are now prompted for the To Nozzle. Change the Connection type to Branch:

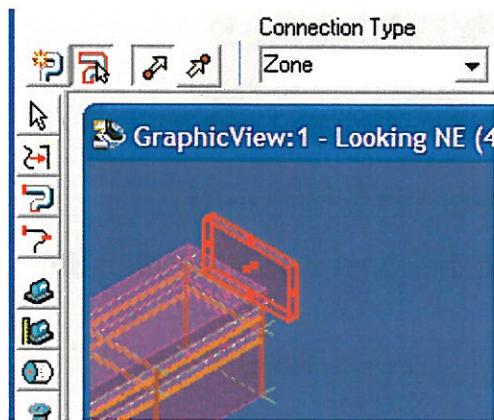


In the Workspace Explorer, Select the Run you defined from Pump1 to Tank1:

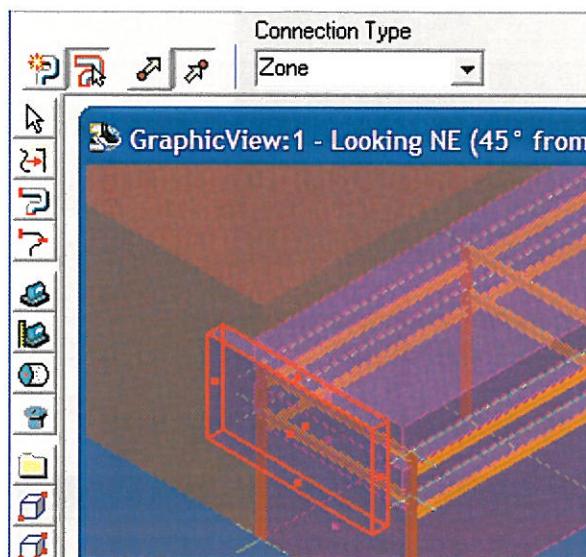


The command is still running, create a run as a child of 'Utility Pipes\P2', set the size to 12in.

When prompted for the 'From', change the Connection type to Zone and select 'PipeConnection-End2' zone as shown:

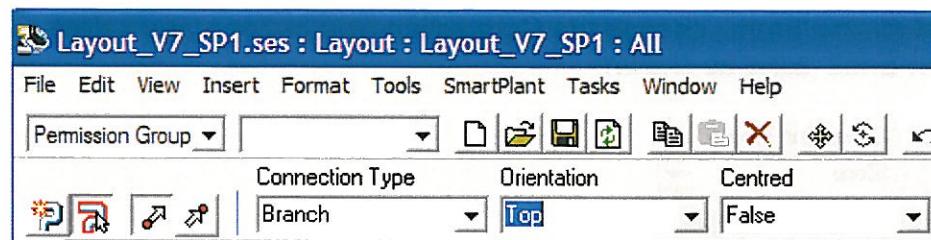


When prompted for the 'To', select 'PipeConnection-End1' zone as shown:



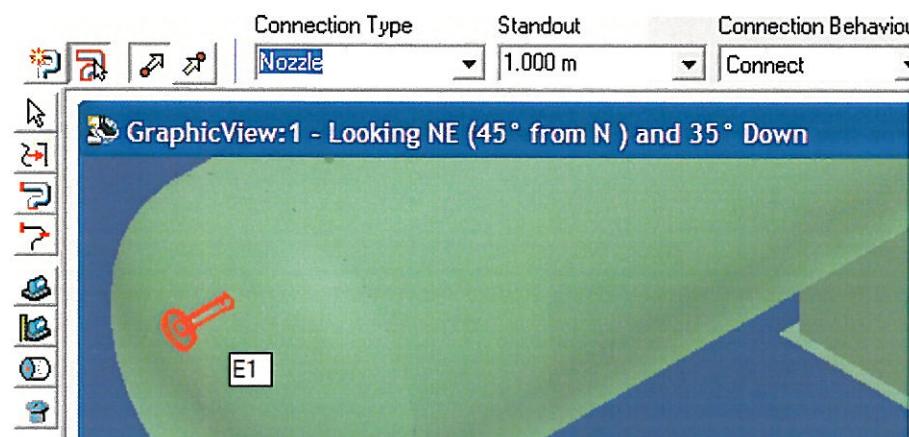
Again you are now prompted for the Run, create a run as a child of 'Utility Pipes\P2', set the size to 2in.

When prompted for the 'From', change the Connection Type to Branch and the Orientation to 'Top':



In the workspace explorer, select the 12in run you previously created.

When prompted for the 'To' connection, Change the connection type to 'Nozzle' and select the Tank1 nozzle 'E1' as shown:



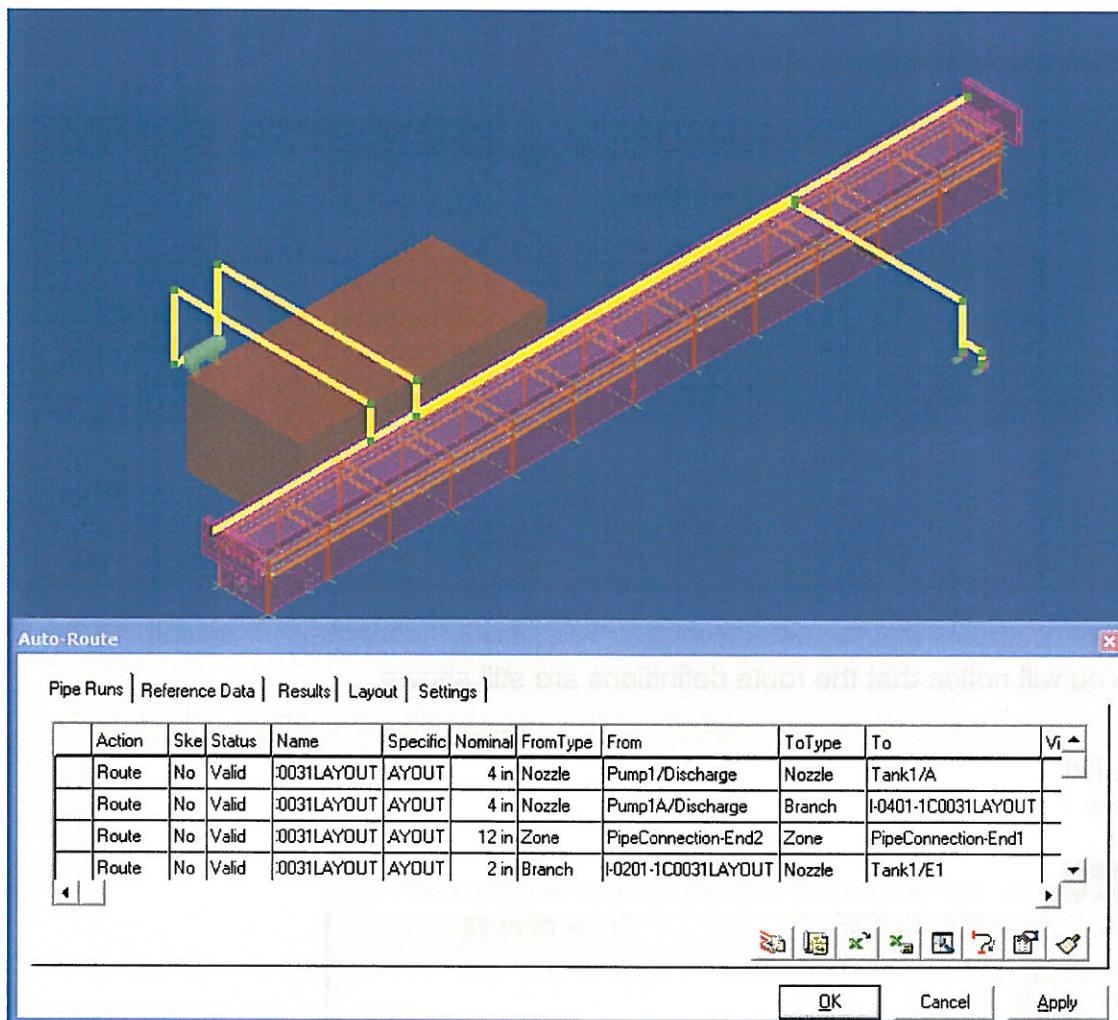
Click Cancel on the 'New Run' dialogue to avoid creating another run. Use a right mouse click to exit the 'Create Run' command.

Select the Automatically Route icon and the route definitions are displayed:

Auto-Route

Action	Ske	Status	Name	Specific	Nominal	FromType	From	ToType	To
Route	No	Valid	:0031LAYOUT	AYOUT	4 in	Nozzle	PUMP1/Discharge	Nozzle	Tank1/A
Route	No	Valid	:0031LAYOUT	AYOUT	4 in	Nozzle	PUMP1A/Discharge	Branch	I-0201-1C0031LAYO
Route	No	Valid	:0031LAYOUT	AYOUT	12 in	Zone	PipeConnection-End2	Zone	PipeConnection-Enc
Route	No	Valid	:0031LAYOUT	AYOUT	2 in	Branch	I-0101-1C0031LAYOUT	Nozzle	Tank1/E1

Click the 'Preview' icon and the routes will be displayed, click the Results tab to see the results:



Tip: If you use the Route icon, the 3D pipes will be created – Do not do this yet.

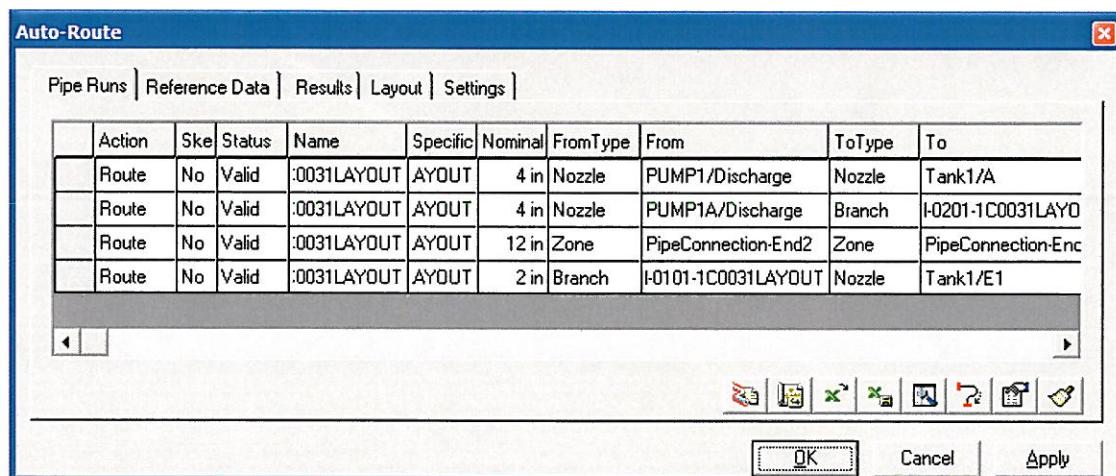
Click the OK button to dismiss the dialog.

This completes the Lab.

Lab 8: Saving Cases:

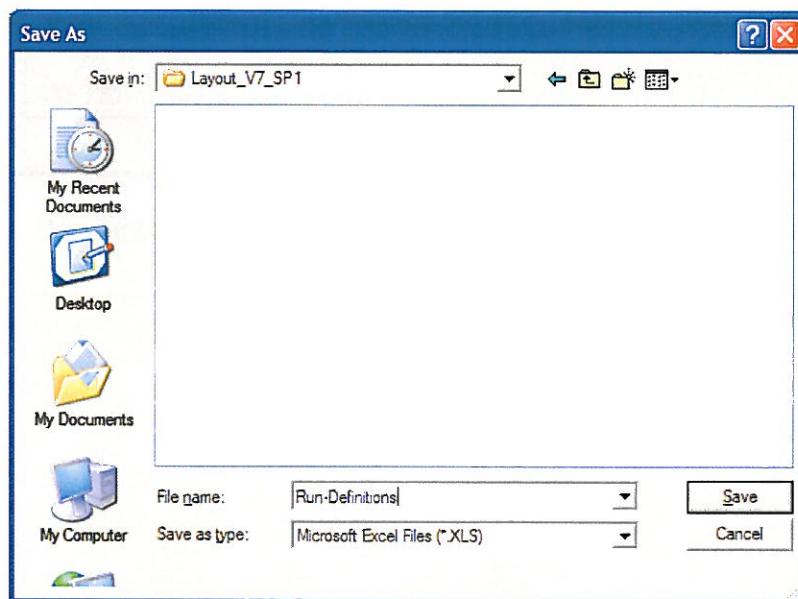
In this Lab, we will save the Equipment Layout and the Route Definitions.

Click the Automatically Route icon:



You will notice that the route definitions are still shown.

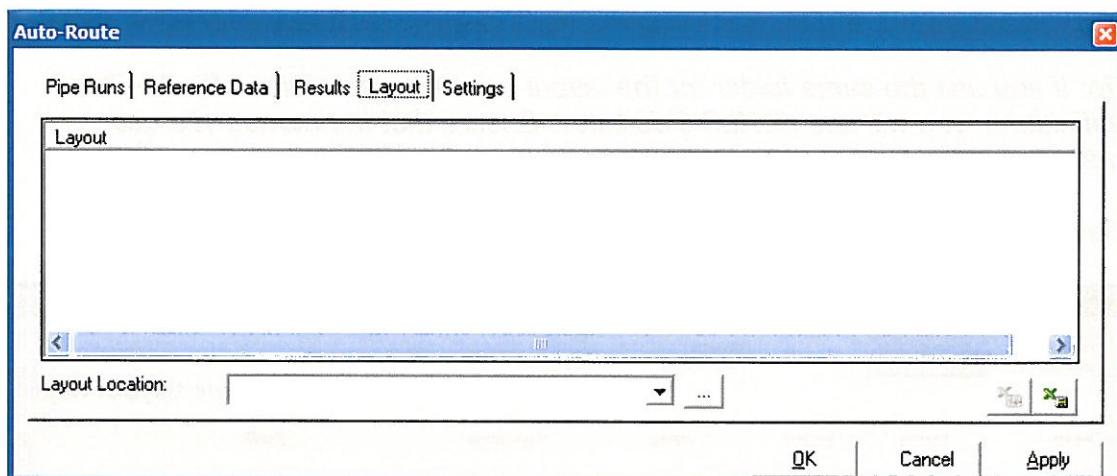
Click the 'Export Runs to Spreadsheet icon' and specify a path and file name:



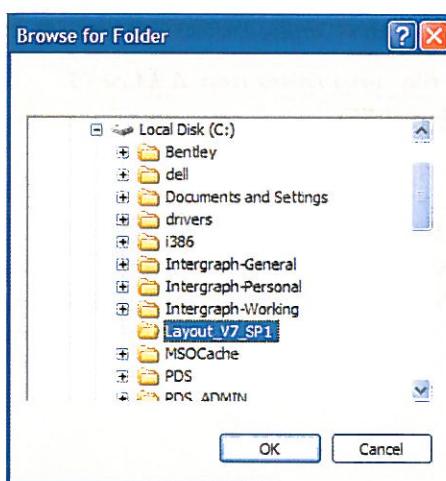
This has saved the Definition of the Runs / Results etc. View the Excel File:

A	B	C	D	E	F	G	H	I	J
1	Plant Name : Layout_V7_SP1		Version :	v07.00					
2	INGRNET\dwuttle		Date & Time:	18/01/2008 09:41:49					
3									
4									
5	Head	Action	Pipeline	Run Name	Pipe Spec	NPD	NPD UnitType	From Type	From Item
6									To Type
7	Start								
8	Route	P1		4-Undefined-0201-11C0031LAYOUT	4 in	Nozzle	PUMP1/Discharge	Nozzle	Tank
9	Route	P1		4-Undefined-0301-11C0031LAYOUT	4 in	Nozzle	PUMP1A/Discharge	Branch	4-Unc
10	Route	P2		12-Undefined-0101-1C0031LAYOUT	12 in	Zone	PipeConnection-End2	Zone	PipeC
11	Route	P2		2-Undefined-0102-11C0031LAYOUT	2 in	Branch	12-Undefined-0101-1C0031L Nozzle		Tank
12	End								

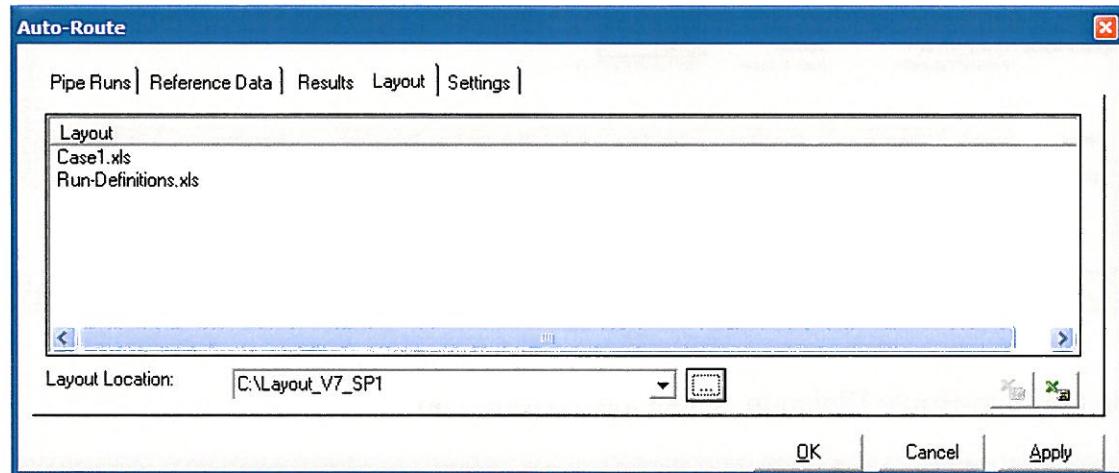
On the Auto-Route Dialogue, select the 'Layout' Tab:



Specify a folder for the Layout location by clicking the 'Browse' button:



Click the 'Save Equipment and Zones' icon  and save as 'Case1':



Tip: If you use the same folder for the layout Location as previous for the Run Definitions, you will see all XLS files listed. Ensure that the names you use indicate a case file or a definitions file.

View the Excel file:

	A	B	C	D	E	F
1	Plant Name :	Layout V7 SP1	Version :	v07 00		
2	User Name :	INGRNET\dwwhite	Date & Time:	18/01/2008 09:47:07		
3						
4						
5	Head	Status	System	Name	Part Name	GUID
6						
7	Start					
8						
9						
10						
11						
12	End					
AutoRoute Layout Rep						
Case1.xls						
Revision History \ Equipments \ Zones /						

Tip: To reload the Equipment and zones from this file, you must use A,M or D (Add, Modify or Delete) in the first column of the Excel file.

This is a manual step

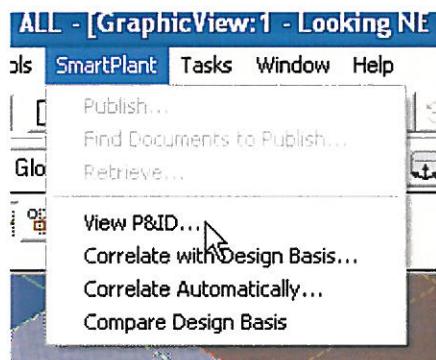
At this stage, modify the equipment locations and save a second case, edit the Case spreadsheets to use M (modify) in the first column and then from the Layout Tab, switch between the two case, using Preview to re-route the pipes, noticing the different results.

This completes Lab 8.

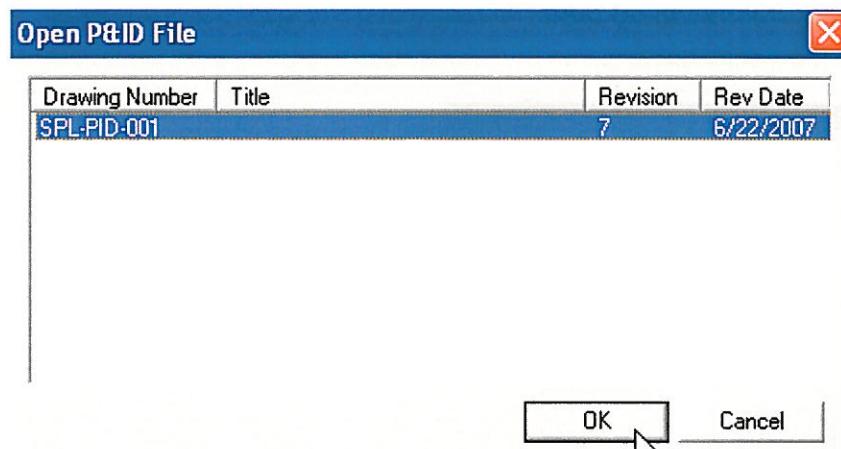
Information: Steps for Routing from a P&ID:

- SmartPlant PFDs and P&IDs provide an easy route to identifying and routing pipe runs required in the layout.
- The following step would be used should a P&ID be available.

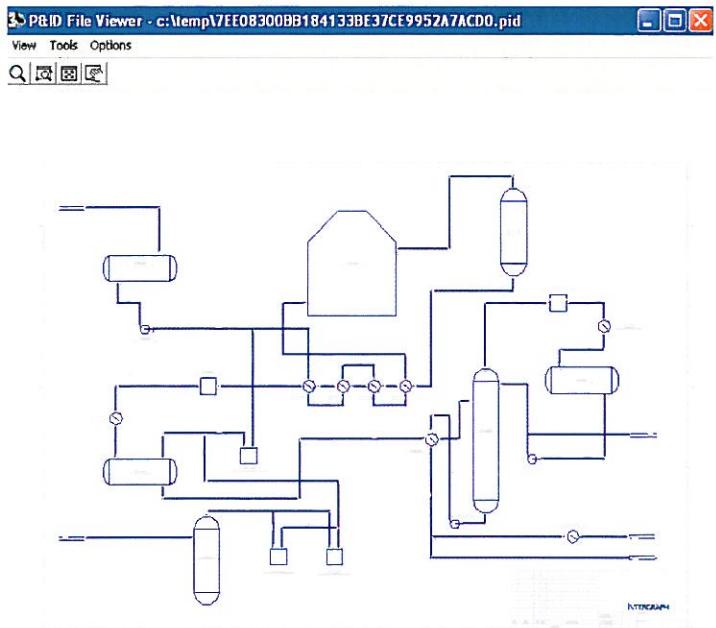
To view the loaded P&ID, select SmartPlant on the menu bar, chose View P&ID and select the P&ID drawing.



Open the P&ID File



View the P&ID

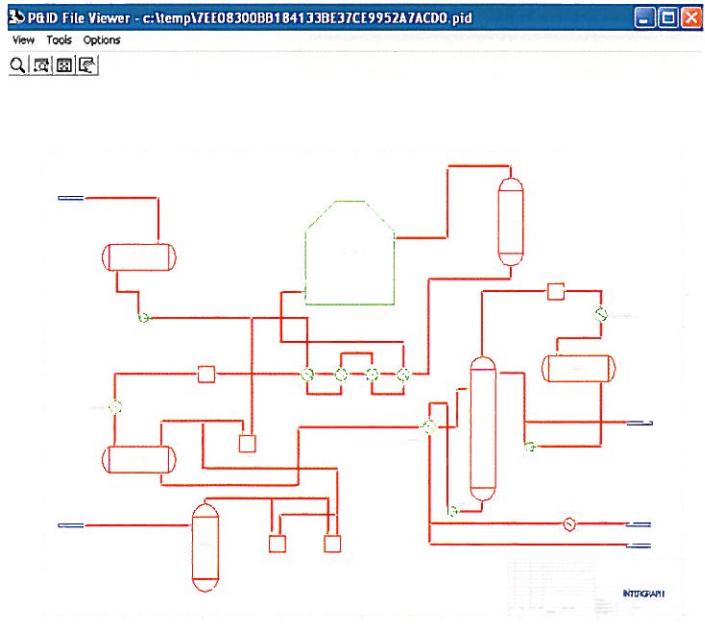


Tip: The P&ID displays and correlates to equipments and pipe runs existing in the Layout model.

Blue: Item not correlated

Red: Item correlated, but mismatching data

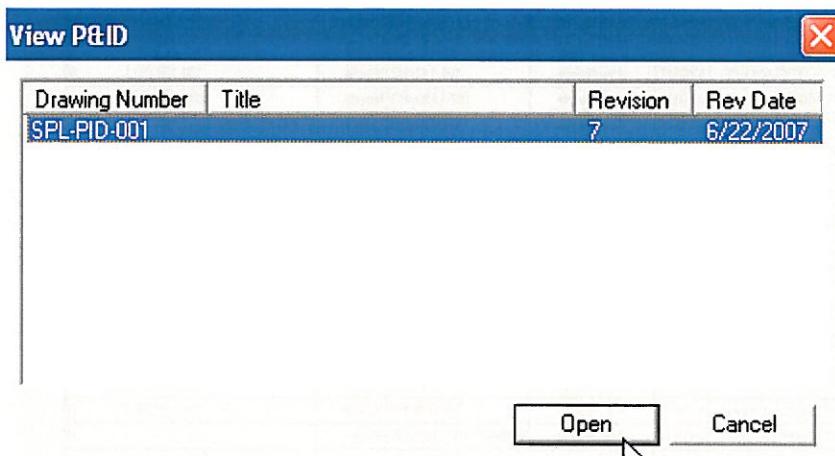
Green: Item and Data are correlated.



Select the Auto-Route command and the select P&ID on the Auto-Router dialog.



When asked to select a P&ID select SPL-PID-001.



This will retrieve in all the P&ID runs along with their To and From.

Check the Status column on the Auto-Router dialog box. You will notice that there are some runs that will have a status of Invalid To Item or Invalid From Item. This is due to runs that are on the P&ID are not connected to anything so we will have to create a To or From for them. This can be achieved by selecting the To or From field and clicking on item appropriate to the start or end of the run.

For the purpose of this workshop, and keeping time constraints in mind, we will continue with the Auto-Route, which will route all the valid Pipe runs.

Auto-Route

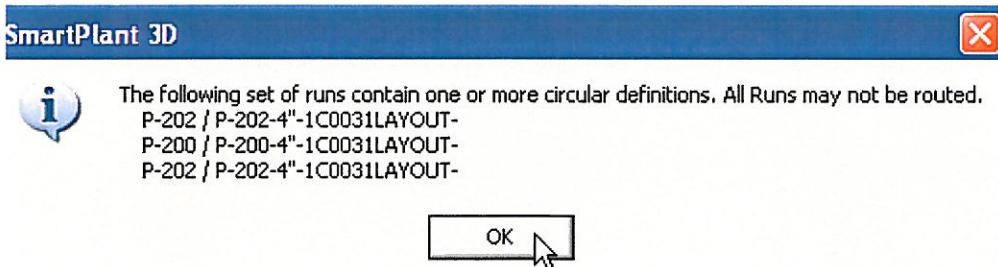
Pipe Runs | Reference Data | Results | Layout | Settings |

Action	Ske	Status	Name	Specific	Nominal	FromType	From	ToType	To	Vias Count
0 Length	No	No From Item.	P-205-4"-1C0031LAYOUT-	AYOUT	4 in	Point		Nozzle	101-128/N1	0
Route	No	Valid	P-217-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	104-139/N2	Nozzle	102-129/N2	0
Route	No	Valid	P-216-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	106-147/N2	Nozzle	104-139/N1	0
Route	No	Valid	P-215-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	107-133A/N3	Nozzle	106-147/N1	0
Route	No	Valid	P-208-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	107-133B/N3	Nozzle	107-133A/N4	0
Route	No	Valid	P-209-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	107-133C/N3	Nozzle	107-133B/N4	0
Route	No	Valid	P-197-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	101-131/N2	Nozzle	107-133D/N4	0
Route	No	Valid	P-196-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	101-141/N2	Nozzle	101-131/N1	0
Route	No	Valid	P-210-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	107-133D/N3	Nozzle	107-133C/N4	0
Route	No	Valid	P-201-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	102-142/N2	Branch	P-218-4"-1C0031LAYOUT-	0
0 Length	No	No From Item.	P-220-4"-1C0031LAYOUT-	AYOUT	4 in	Point		Nozzle	103-148/N2	0
Route	No	Valid	P-199-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	102-150/N2	Branch	P-201-4"-1C0031LAYOUT-	0
Route	No	Valid	P-218-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	102-129/N3	Nozzle	101-140/N1	0
Route	No	Valid	P-193-4"-1C0031LAYOUT-	AYOUT	4 in	Branch	P-195-4"-1C0031LAYOUT	Nozzle	102-150/N1	0
Route	No	Valid	P-195-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	103-148/N1	Nozzle	102-142/N1	0
Route	No	Valid	P-191-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	101-144/N1	Nozzle	105-146/N1	0
Route	No	Valid	P-194-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	103-137/N2	Nozzle	105-130/N1	0
Route	No	Valid	P-192-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	105-146/N2	Nozzle	103-137/N1	0
Route	No	No From Item.	P-203-4"-1C0031LAYOUT-	AYOUT	4 in	Point		Branch	P-204-4"-1C0031LAYOUT-	0
Route	No	Valid	P-204-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	104-145/N2	Nozzle	101-144/N2	0
Route	No	Valid	P-190-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	105-130/N2	Nozzle	104-145/N1	0
Route	No	No To Item.	P-202-4"-1C0031LAYOUT-	AYOUT	4 in	Branch	P-200-4"-1C0031LAYOUT	Point		0
Route	No	Valid	P-200-4"-1C0031LAYOUT-	AYOUT	4 in	Branch	P-202-4"-1C0031LAYOUT	Nozzle	109-138/N2	0
Route	No	Valid	P-202-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	102-136/N2	Branch	P-200-4"-1C0031LAYOUT-	0
0 Length	No	No To Item.	P-198-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	109-138/N1	Point		0
Route	No	Valid	P-188-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	103-149/N2	Nozzle	102-136/N4	0
Route	No	Valid	P-189-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	101-144/N3	Nozzle	103-149/N1	0
Route	No	Valid	P-222-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	102-136/N1	Nozzle	101-144/N4	0
Route	No	Valid	P-221-4"-1C0031LAYOUT-	AYOUT	4 in	Nozzle	102-129/N1	Nozzle	102-136/N3	0

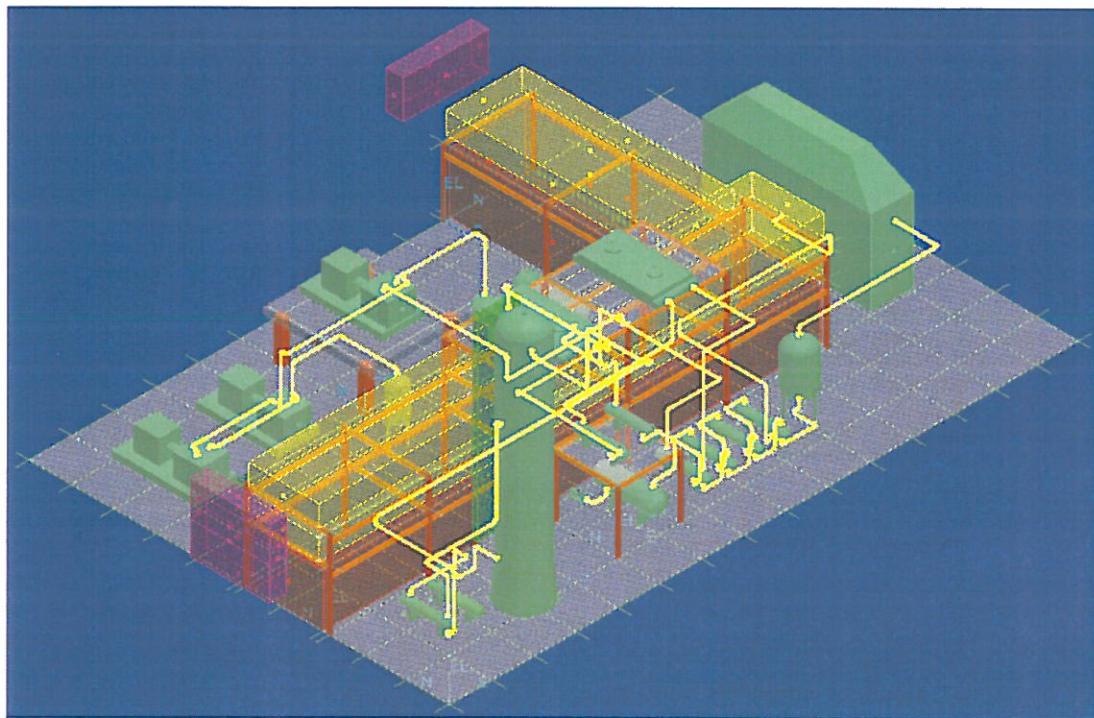
OK Cancel Apply

On selecting the preview or Route button, the system analyses each pipe run and displays a message for the runs which has incomplete or incorrect definition.

Select OK to this message



Once the auto routing is finished, your plant should look like the following:



The auto-routes are those which the system has found itself by evaluating the topology and costs. This can be further constrained by using the via zones (Lab 3) or by changing the equipment positioning.

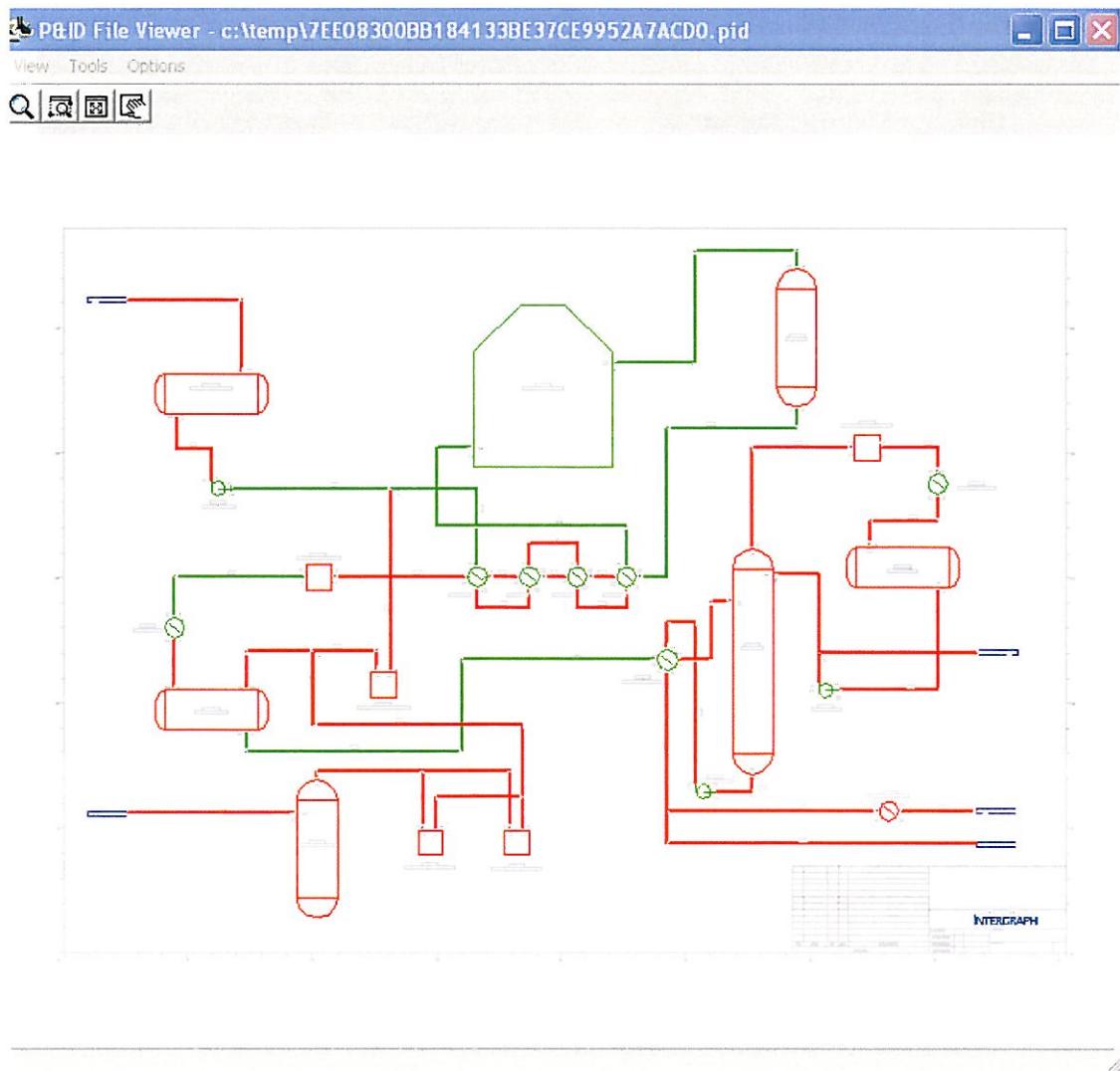
When the Auto-Router is finished check the Results Tab to make sure a Material Cost is defined for each run.

Auto-Route

Auto-Route Results						
	Pipe Runs	Reference Data	Results	Layout	Settings	
1	P-222-4"-1C0031LAYOUT-	Successfully Routed	16.65 m	5	1049	0
2	P-221-4"-1C0031LAYOUT-	Successfully Routed	43.86 m	10	2514	3
3	P-207-4"-1C0031LAYOUT-	Successfully Routed	28.50 m	8	1752	0
4	P-211-4"-1C0031LAYOUT-	Successfully Routed	6.19 m	5	637	0
5	P-212-4"-1C0031LAYOUT-	Successfully Routed	6.23 m	5	639	0
6	P-213-4"-1C0031LAYOUT-	Successfully Routed	6.06 m	5	632	0
7	P-206-4"-1C0031LAYOUT-	Successfully Routed	4.18 m	2	322	0
8	P-218-4"-1C0031LAYOUT-	Successfully Routed	10.14 m	3	635	0
9	P-201-4"-1C0031LAYOUT-	Successfully Routed	13.63 m	4	852	0

Also select SmartPlant -> View P&ID and open SPL-PID-001 to verify all the runs are correlated and routed. You will notice that some will not be green, this is due

to the fact we did not set their To or From as Zones, or they have mismatched data or this connection is not in the P&ID.

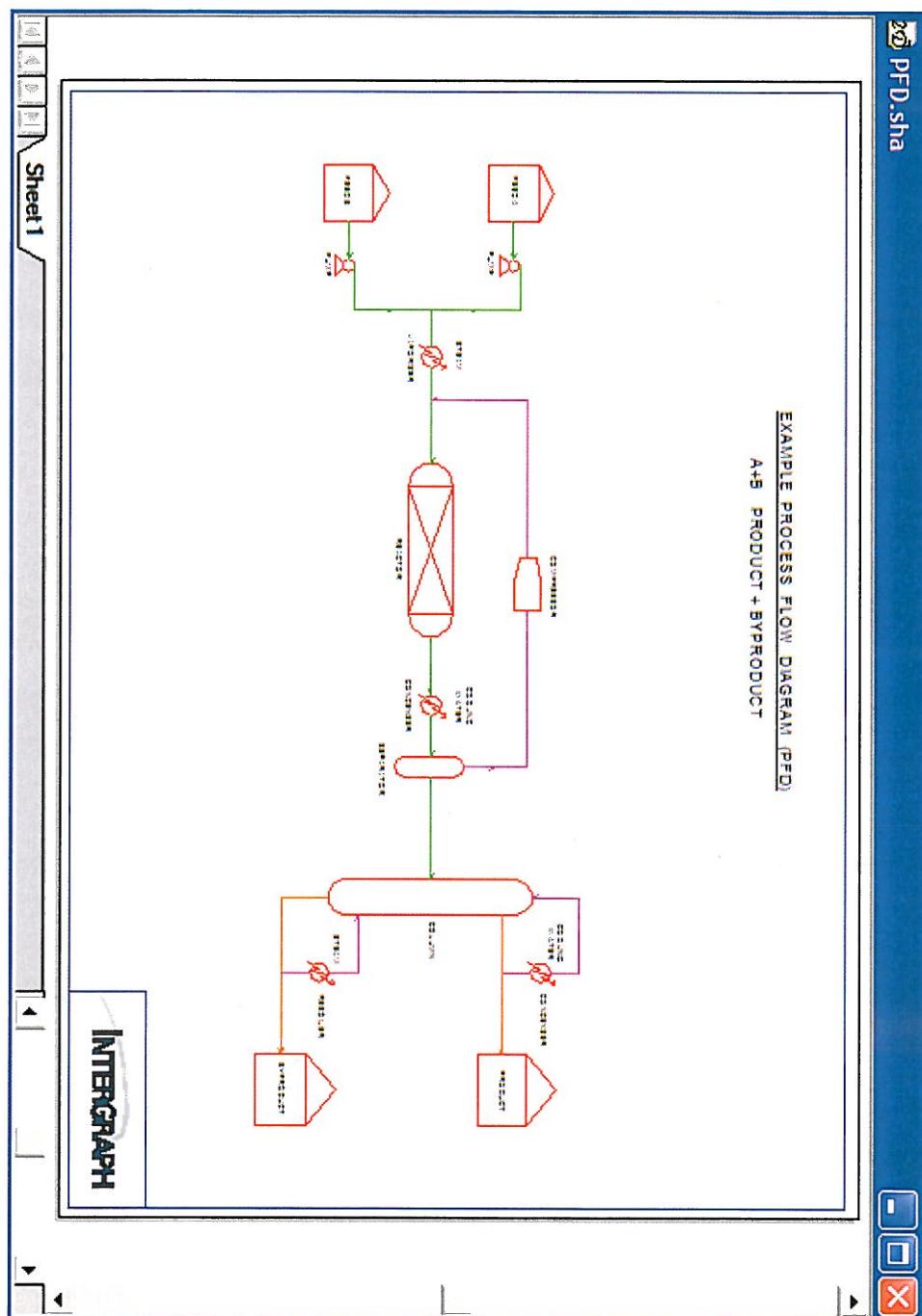


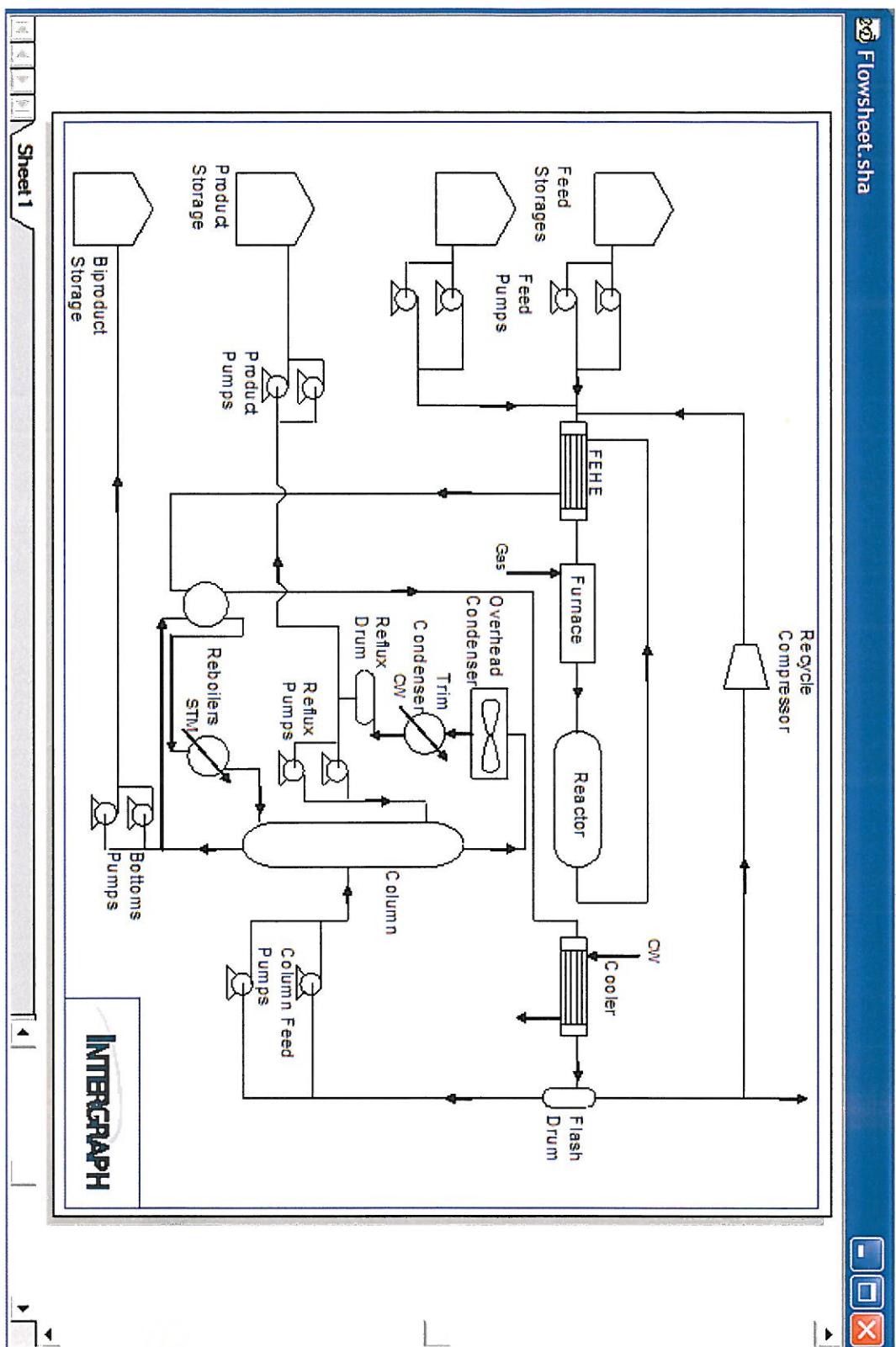
After successfully routing the Pipe runs in P&ID, the equipment and routes can be saved to an excel sheet. Further scenarios and cost estimates can be worked out by moving the equipments and the re-routing the pipe runs.

Lab 9: Practical Exercise:

In this Lab, you will create a model from the given information.

Dependent on time, start with either a PFD or the flow sheet and the Plot Plan as shown:





Co-ordinates etc. are given on the Plot plan:

