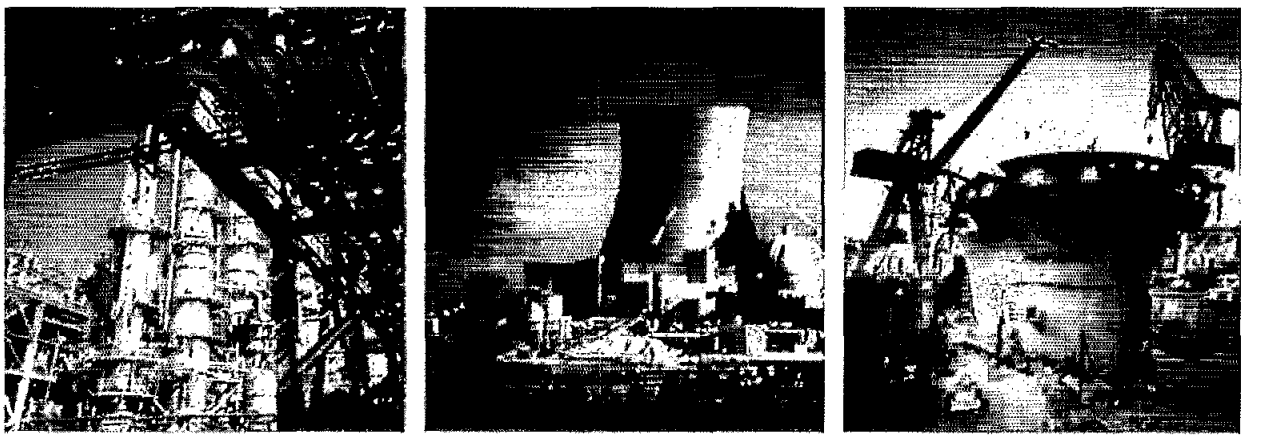
SmartPlant P&ID

Setup and Customization Course Labs

Process, Power & Marine



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Version 2007 February 2007 DPID2-TP-100019A

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Table of Contents

Preface

This document is a course guide for the various SmartPlant Engineering Manager and P&ID User Guides. The content is the similar as the online Help delivered as part of the software with the exception of the Labs.

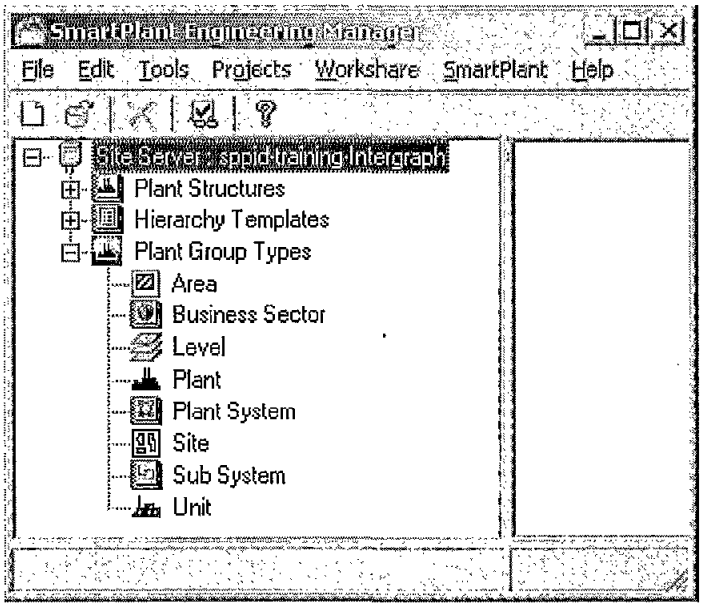
Lab 1 – Plant Group Types

Create a new Plant Group Type

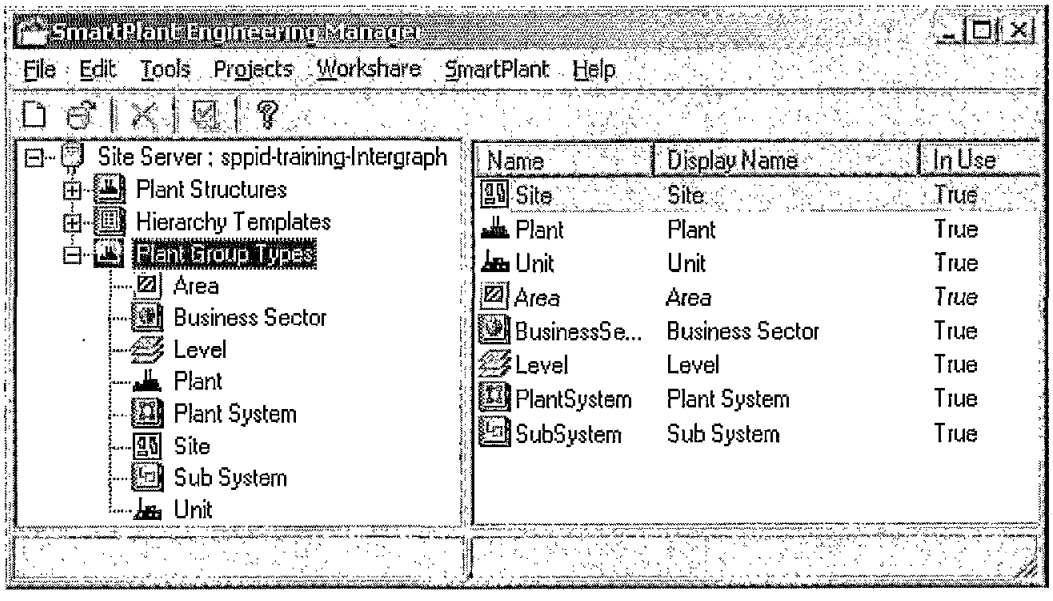
1. Start **SmartPlant Engineering Manager**.

    a. Select **Start** > **Programs** > **Intergraph SmartPlant Engineering Manager** > **Engineering Manager**

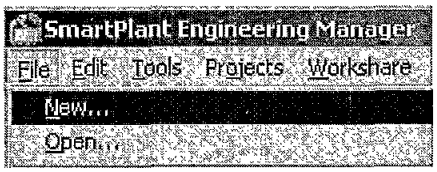
2. Select on the + sign to expand the **Plant Group Types**.



3. Select the **Plant Group Types** node.

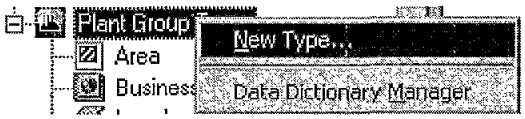


4. Select **File** > **New**

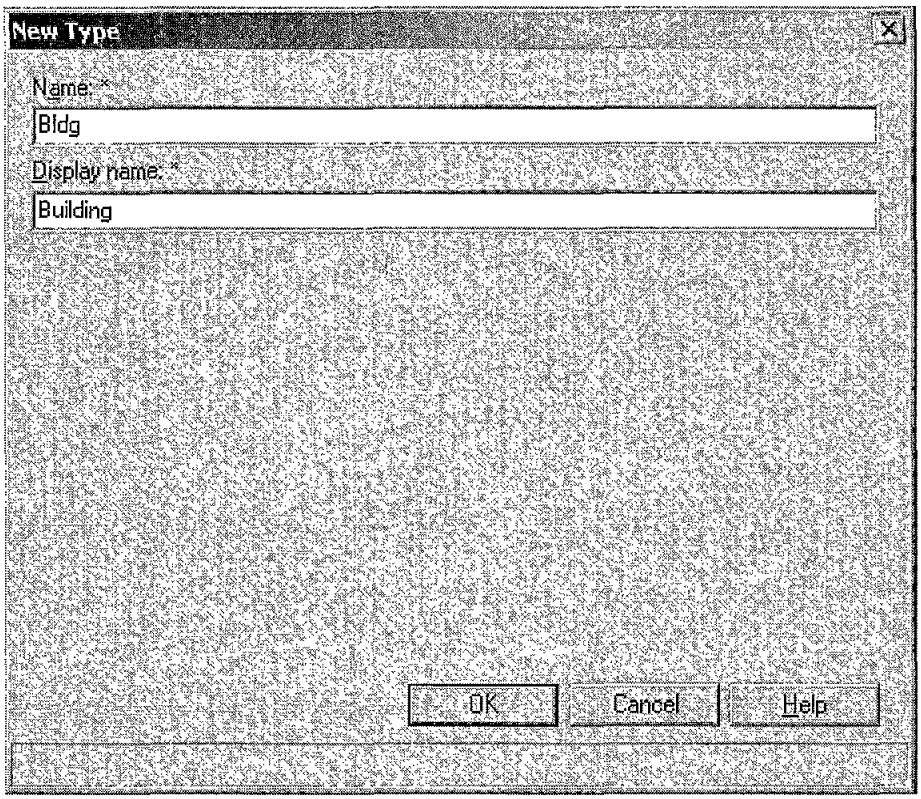


OR

Right-click on the **Plant Group Type** node and select **New Type**.



5. Enter out the following property values and select **OK**.



Notes:

- The * indicates a property value must be defined.

Entering Data Dictionary Manager for the Plant Group Type.

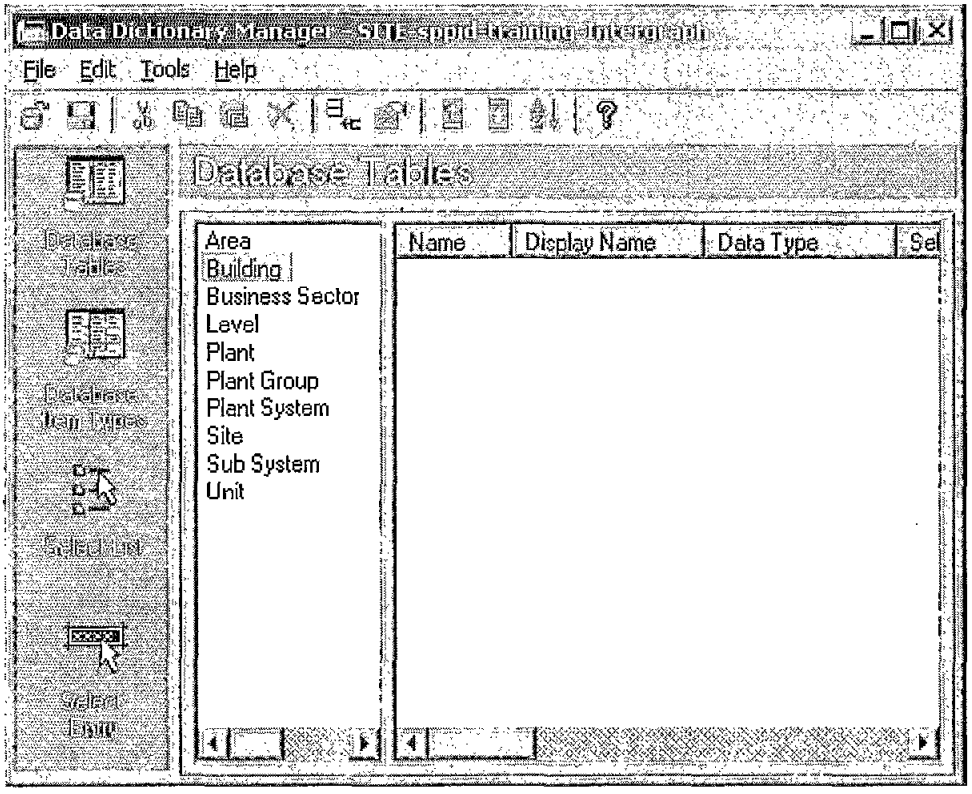
6. Select the **Plant Group Type** node.

a. Select **Tools** > **Data Dictionary Manager**

OR

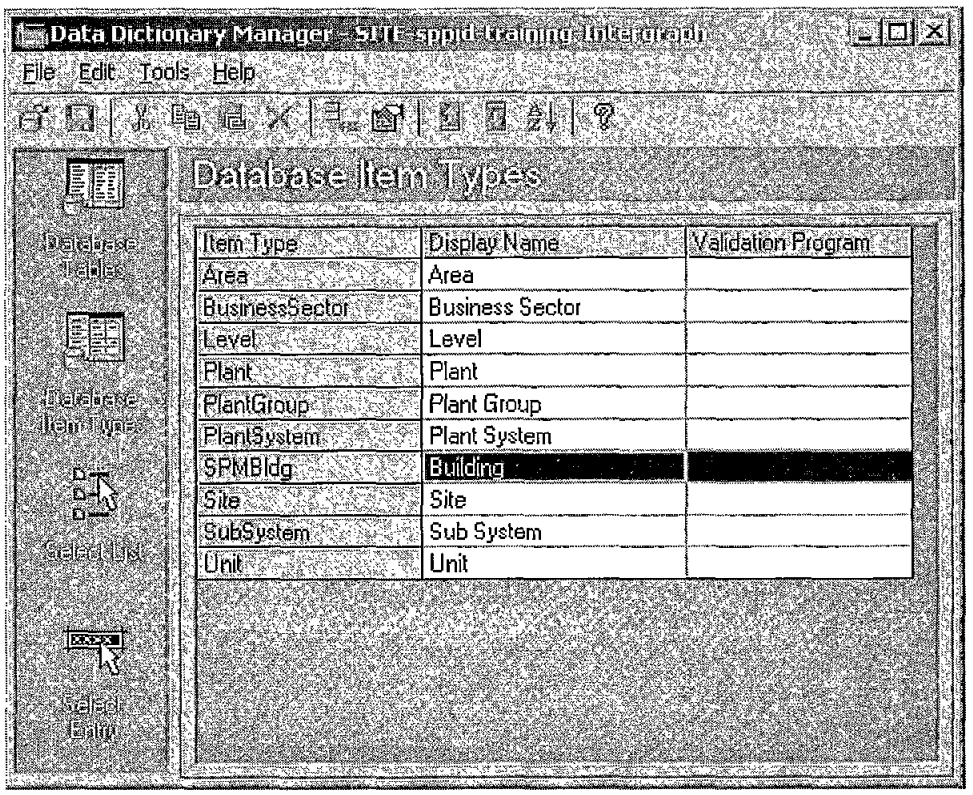
b. Right mouse click on the **Plant Group Types** node and select **Data Dictionary Manager**.

7. Notice the **Building** entry for the **Database Tables** you created previously.



8. Select **Database Item Types** when in **Data Dictionary Manager**.

9. Notice the **Item Type** entry for the **Plant Group Type** you created previously.



10. **File** > **Exit** from **Data Dictionary Manager**.

Create another New Plant Group Type.

11. Create another **New Plant Group Type**.
12. **Delete** the **Plant Group Type** you just created.
13. Select the **Plant Group Type** you just created.
    a. Select **Edit** > **Delete**

    OR

    b. Right click and select **Delete**.

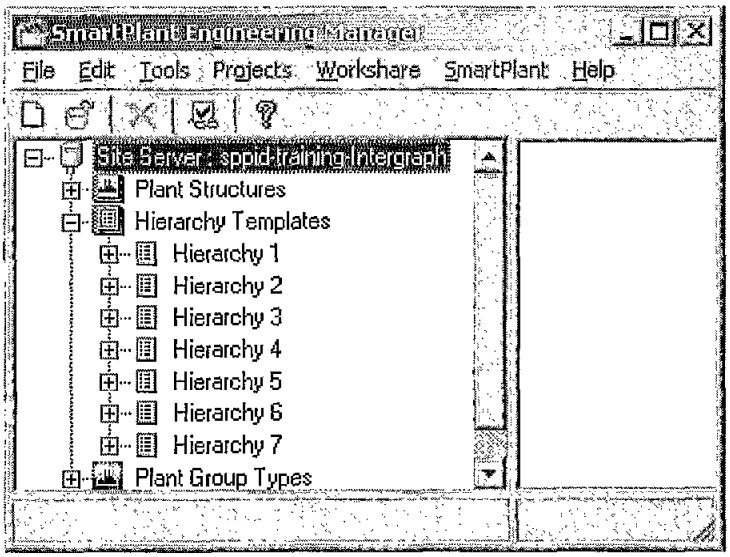
Lab 2 – Hierarchy Templates

Create a new Hierarchy Template and utilize the Plant Group Type created from the previous lab.

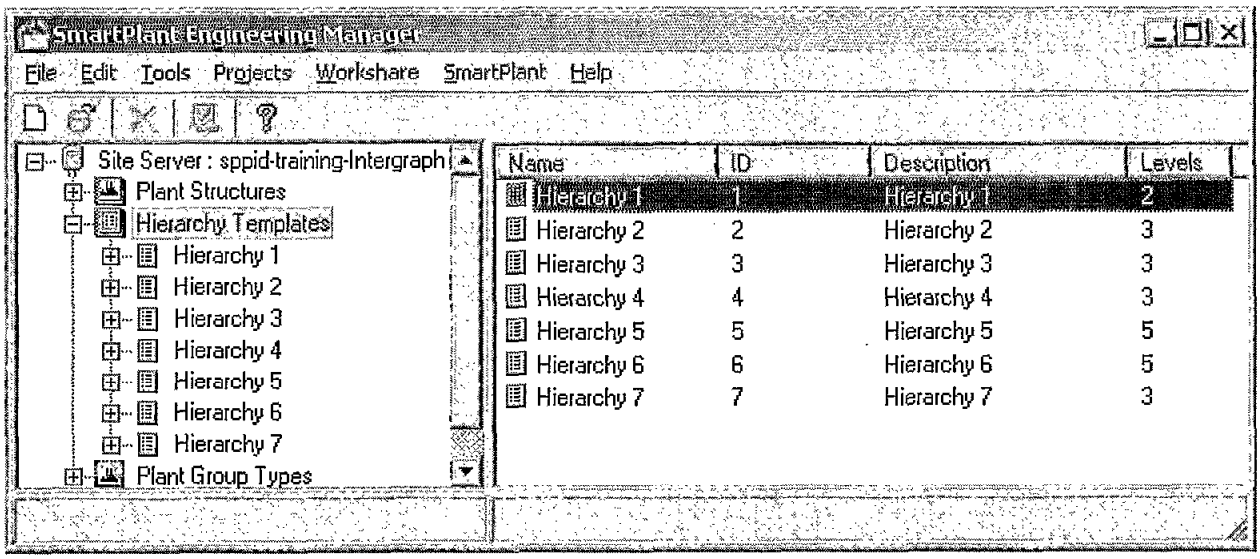
1. Start **SmartPlant Engineering Manager.**

    a. Select **Start > Programs > Intergraph SmartPlant Engineering Manager > SmartPlant Engineering Manager**

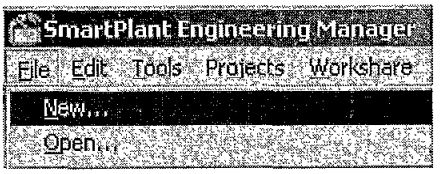
2. Select the + sign to expand the **Hierarchy Templates.**



3. Select the **Hierarchy Templates** node.



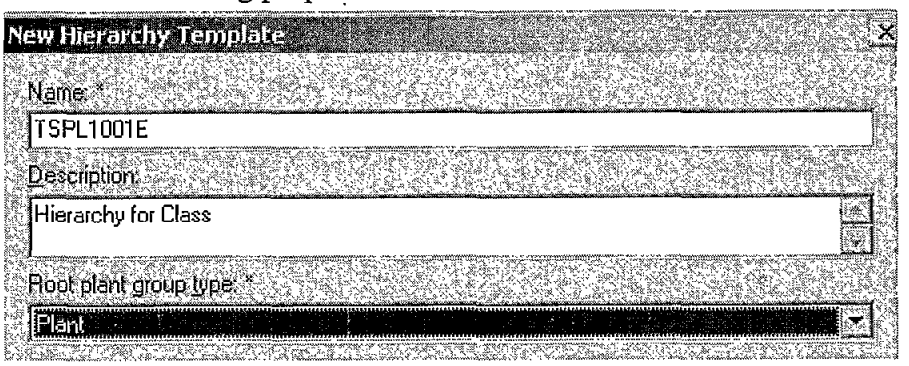
4. Select **File** > **New**.



OR

Right-click on the **Hierarchy Templates** node and select **New Hierarchy Template....**

5. Enter the following properties and select **OK**.



Notes:

- Name is limited to 80 characters. Spaces are permitted but no other special characters.
- The * indicates a property that must have a value, it cannot be left blank.

Add a new Level to the TSPL1001E Hierarchy

6. Expand the **TSPL1001E** hierarchy by selecting the + sign.
7. Select the **Plant** level found under the **TSPL1001E** hierarchy.

8. Select **File** > **New**.

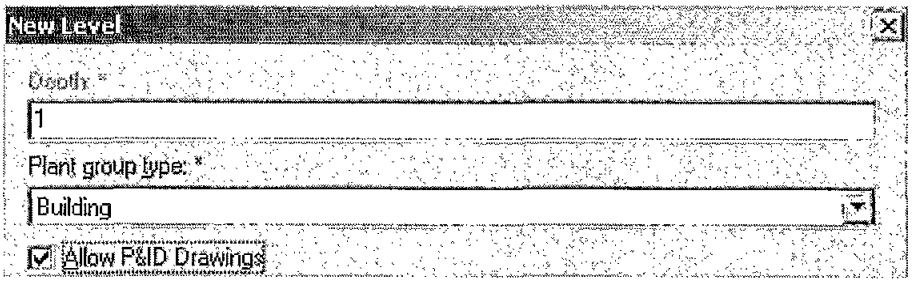
   OR

   Right-click on the **Plant** node and select **New Level.**

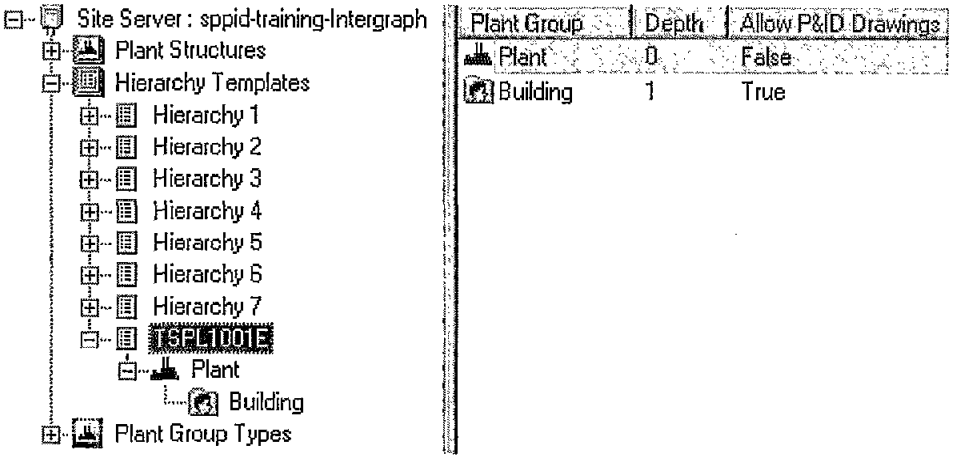
9. Set the **Plant Group Type** = **Building**

a. **Depth** is automatically assigned and is a **read-only** property.

b. Select **Allow P&ID Drawings** to permit P&IDs to be created at this level in the **Hierarchy**. Select **OK**.



10. The new **TSPL1001E** Hierarchy Template should be similar to the below.



Lab 3 – Creating New Plant Structure in Existing Site

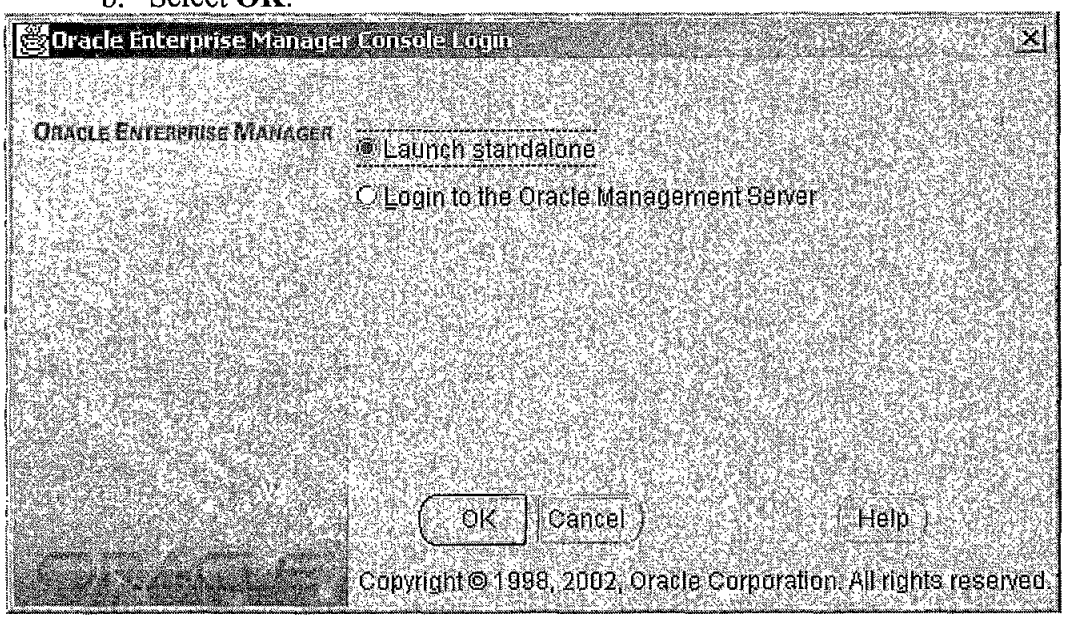
Purpose: To create a new Plant Structure for an Existing Site and utilize a new Hierarchy.

Determine through Oracle Enterprise Manager Console if there is enough User Tablespace.

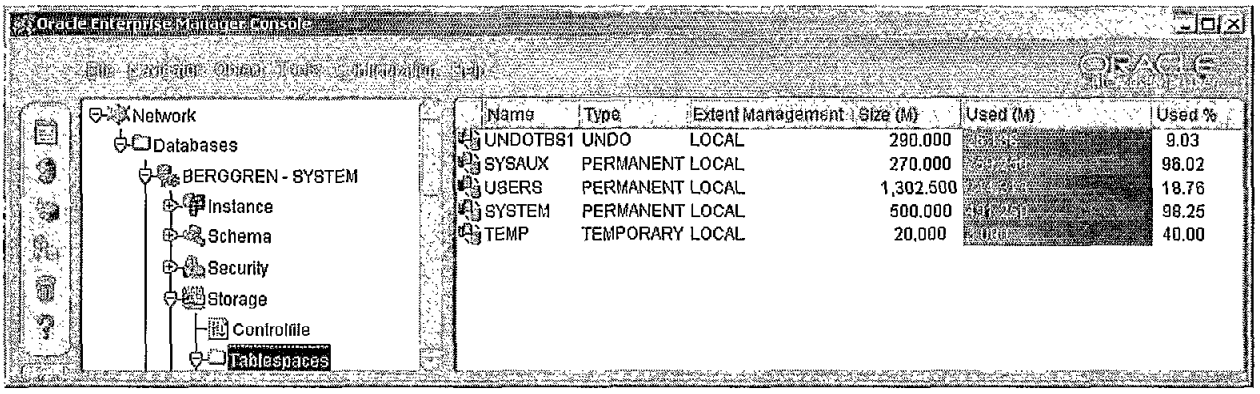
1. Select **Start** > **Programs** > **Oracle – OraClient10G_Home1** > **Enterprise Manager Console**

    a. **Launch Standalone**

    b. Select **OK**.



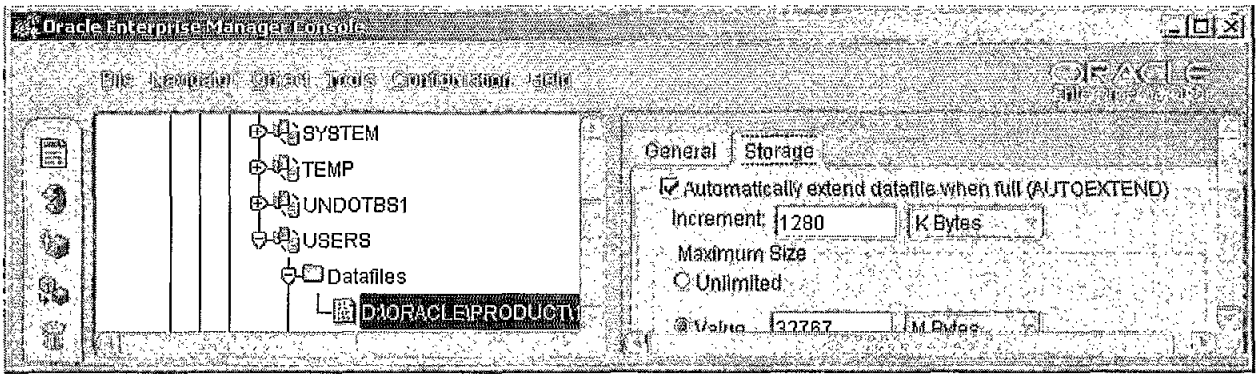
2. Select the + to expand the **SP** from the treeview.
3. Select the + to expand the **Storage** from the treeview.
4. Select **Tablespaces** and note the **USERS** in the **name** column in the list view. We have used 89% of the **Tablespace** available. We are not OK with this amount of space used.



5. Determine if the **User Tablespace** is set to **Automatically Extend.**

   a. From **Tablespaces > Users > DataFiles** select the **.dbf** file.

   b. On the Storage tab is the check box selected for the **Automatically Extend Datafile when Full? YES**



Notes:

- Instead of **Automatically Extending the Datafile when Full** we had the option of adding another **datafile** to the **USERS** tablespace.

6. Exit **Enterprise Manager Console.**

   a. Select **File > Exit**

Preliminary Information

7. It is understood that the Database is installed and configured prior to the following steps.
8. A SmartPlant Engineering Site must already be created.
9. From Windows Explorer

   a. Create a subfolder named **TSPL1001E** under the **Training_Site** folder.

b. Create a subfolder named **Drawings** under the **TSPL100E** folder.

c. **Copy** the delivered **P&ID Reference Data** and **Paste** into the **TSPL1001E** folder

Delivered location = ~\Program Files\SmartPlant\P&ID Reference Data

Paste into = ~\Training_Site\TSPL1001E

11. Which Hierarchy are you going to utilize during the Plant Creation?

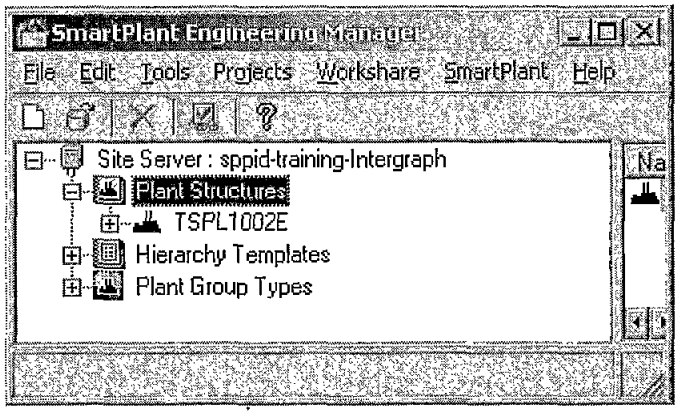
12. Do you have an established Windows Group and added the appropriate users to the Windows Group? You will need to to setup User Access with SmartPlant Engineering Manager after the Plant is created.

Create a new Plant Structure using the custom Hierarchy created in a previous lab.

10. Enter **SmartPlant Engineering Manager** to **Create** a **New Plant Structure**

a. Select **Start** > **Programs** > **Intergraph SmartPlant Engineering Manager** > **SmartPlant Engineering Manager**

11. Select the **Plant Structures** node.



13. Select **File** > **New**

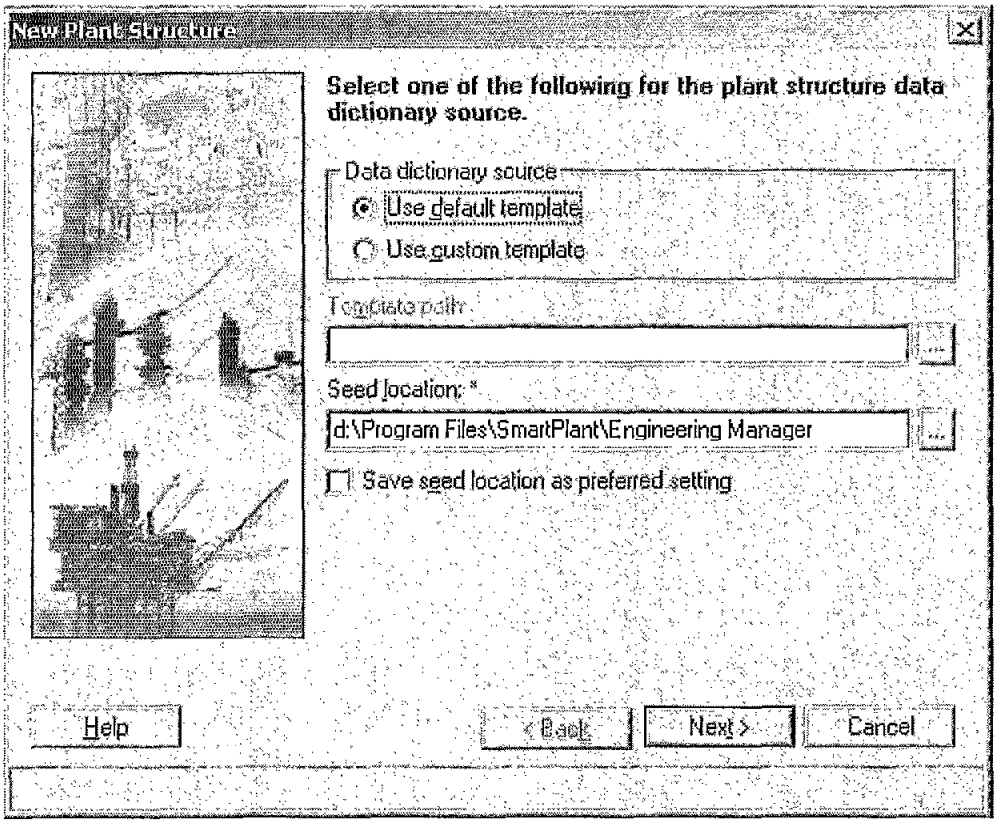
OR

Right mouse click on the **Plant Structure** node and select **New Plant Structure**.

14. Use **Default Template** as the **Data Dictionary Source.** Selecting this option will create the data dictionary using the delivered template.

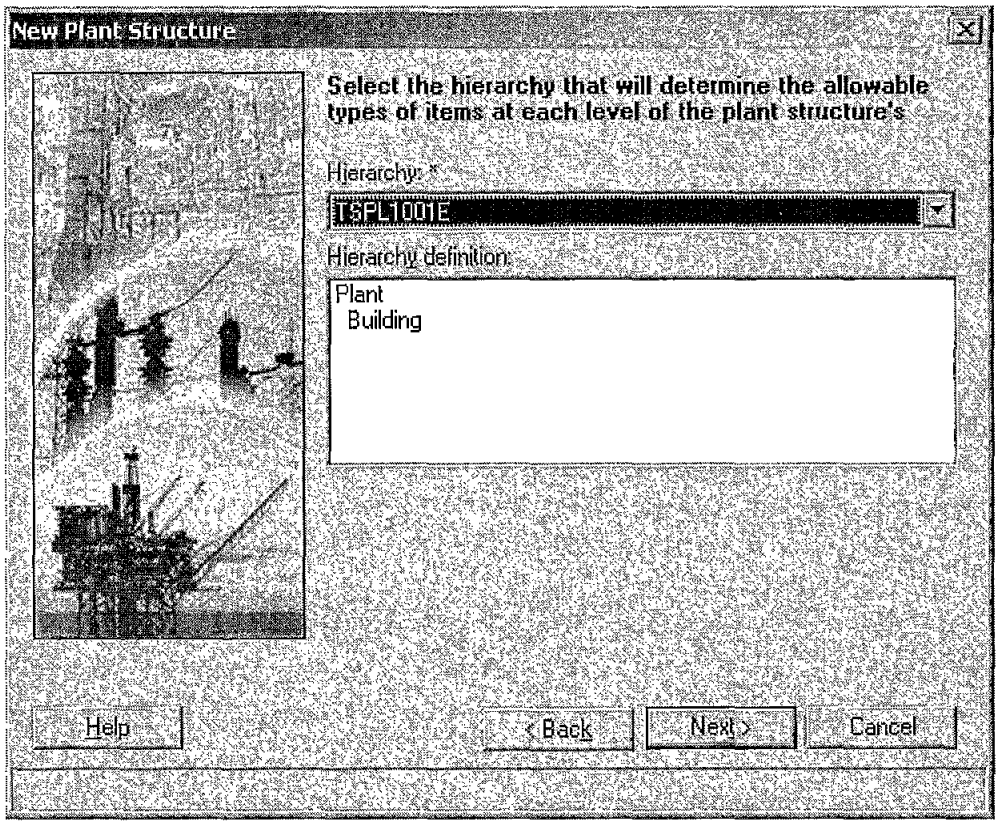
15. For the **Seed Location** keep the default. The **Seed location** specifies the path where the resources, scripts, and templates are located. These files can be installed on a share that is common to all. By default, these files are delivered in folders under the **~:\Program Files\SmartPlant\Engineering Manager** folder and are used by **SmartPlant Engineering Manager** to populate the data dictionaries. This field is limited to 255 characters.

    a. Select **Next**.



16. Select the **TSPL1001E** hierarchy created from the previous lab. **Hierarchies** determine the item types allowed at each level in the plant structure.

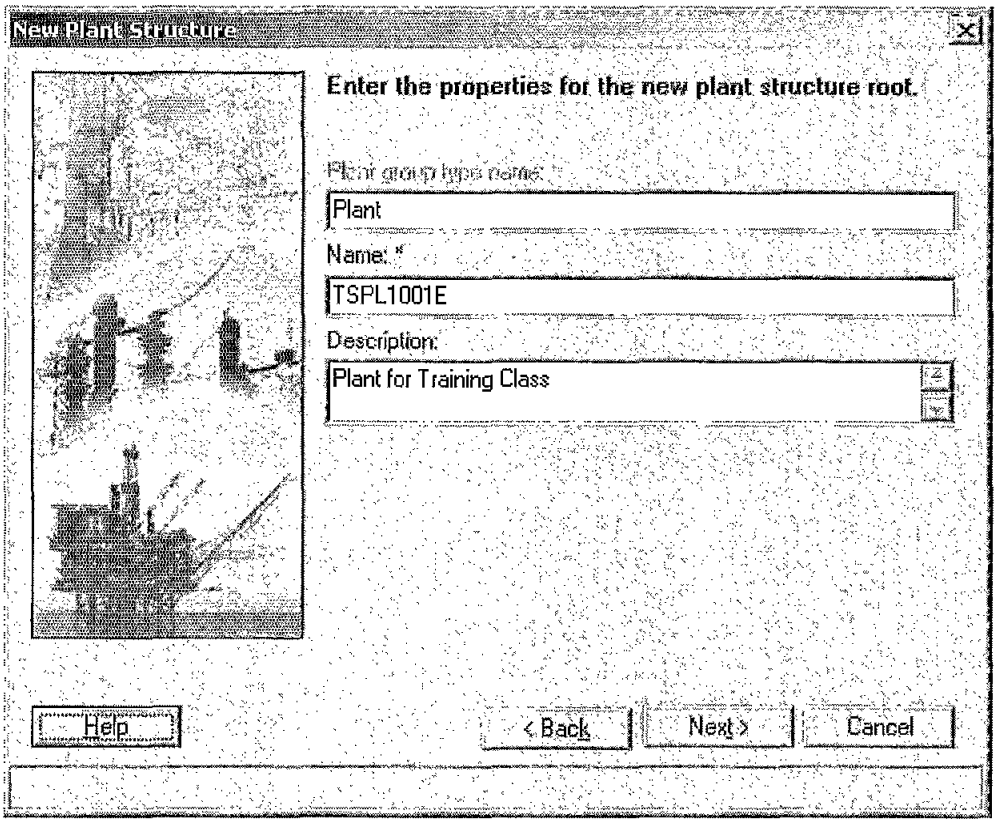
a. Select **Next**



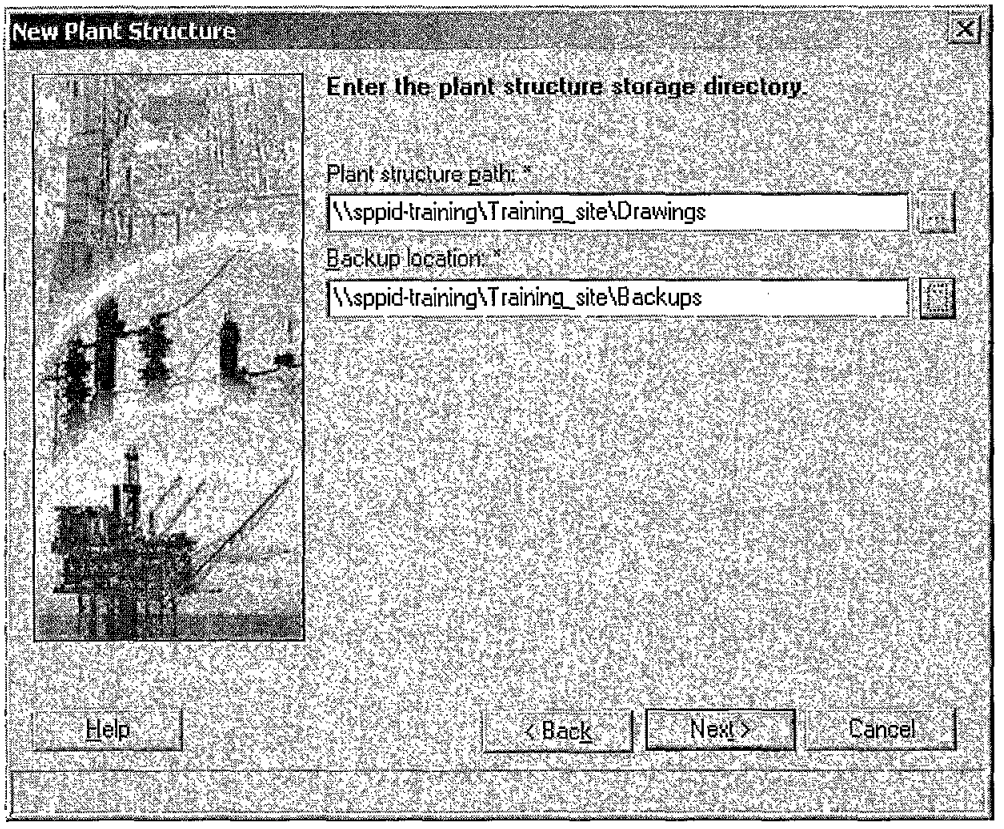
17. Enter a **Name** for the plant, which is displayed by the icon under the **Plant Structures** node in the **Tree** view. This name is limited to 80 characters, cannot start with a numeric digit, and cannot contain any of the following characters: < , > ? \ / ' ; { } [ ] ~ ` ! % * ( ) | " :

18. Enter a **Description,** the description is limited to 240 characters.

    a. Select **Next**



19. Enter the plant structure storage directory and backup location.



- **Plant Structure Path** = *\\MachineName\Training_Site\TSPL1001E\Drawings*

  Plant structure path specifies the path to the storage location for the plant data and the drawing files. You must create the plant structure share before running this wizard, using the form *\\siteserver\sitename\plantname*. The wizard will create the *plantname* folder if it does not already exist.

- **Backup Location** = *\\MachineName\Training_Site*

  Backup location specifies the path to the shared storage folder for backing up the plant files.

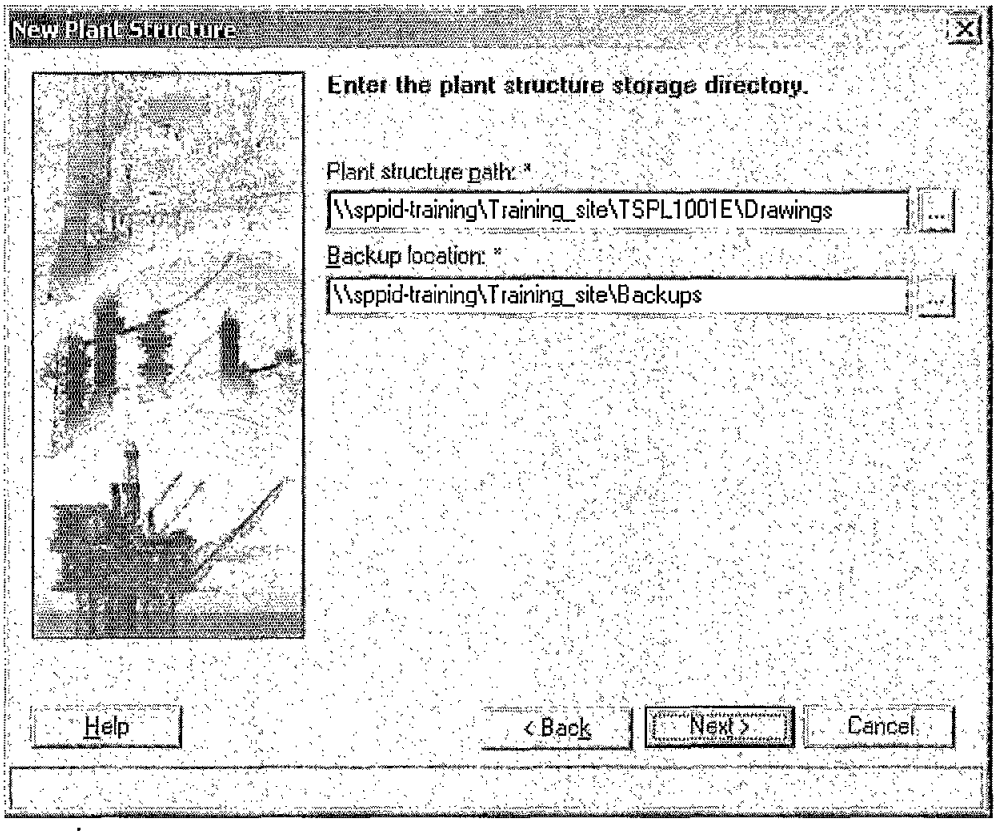
  Notes:

  - Select a backup location outside the **Plant structure path** to avoid recursive backups being stored in a single backup file. For example, if the **Plant structure path** is *\\siteserver\sitename\plantname,* do not set the backup location for *plantname* to *\\siteserver\sitename\plantname\backups*.

  - Verify the backup location has available space, the Restore process generates a temporary folder in this backup location while the plant data is being restored. This folder is removed when the process finishes.

- Location paths cannot contain any of the following characters: < , > ? / ' ; { } [ ] ~ ` ! % * ( ) : |

a. Select **Next**



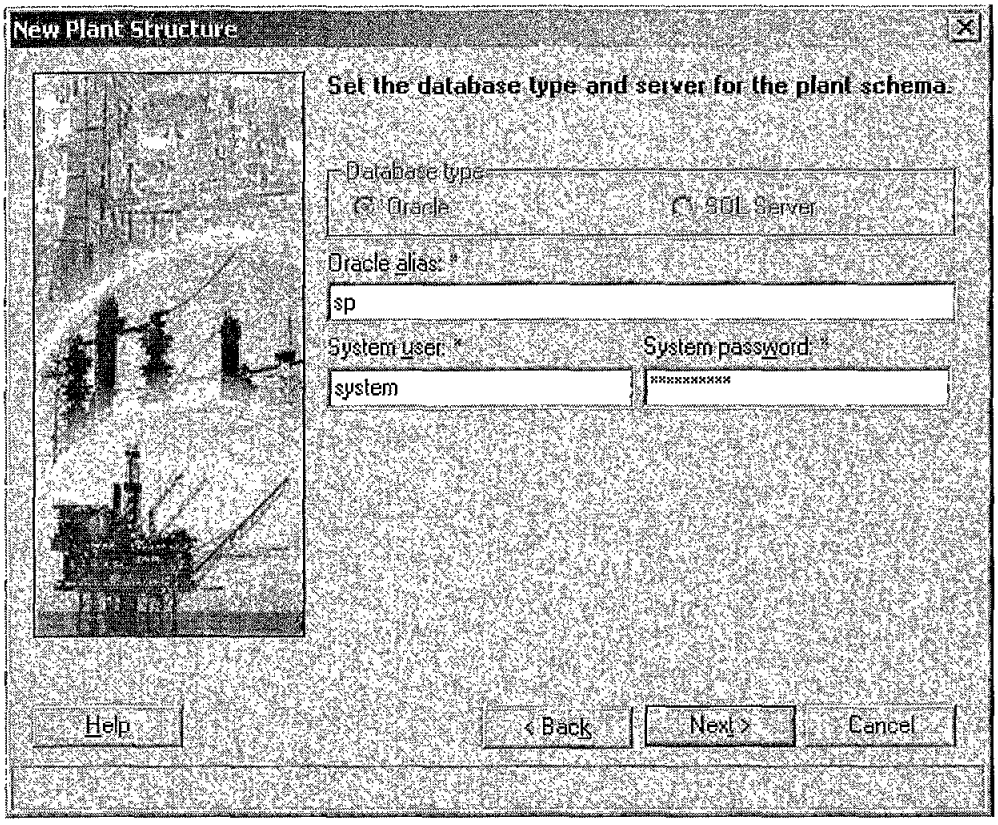
20. Set the database type and server for the plant schema.

a. **Oracle Alias** = *sp*

b. **System user** = *system*

c. **System password** = *sysmanager*

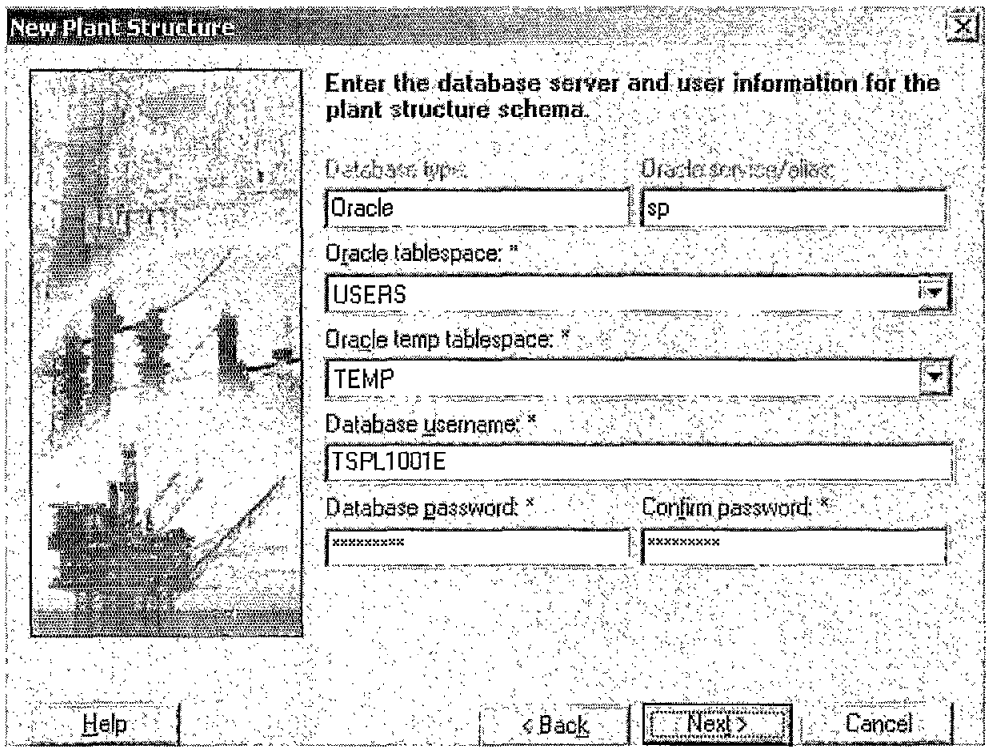
d. Select **Next**.



21. Enter the database server and user information for plant structure schema.

a. **Oracle Tablespace** = *Users*

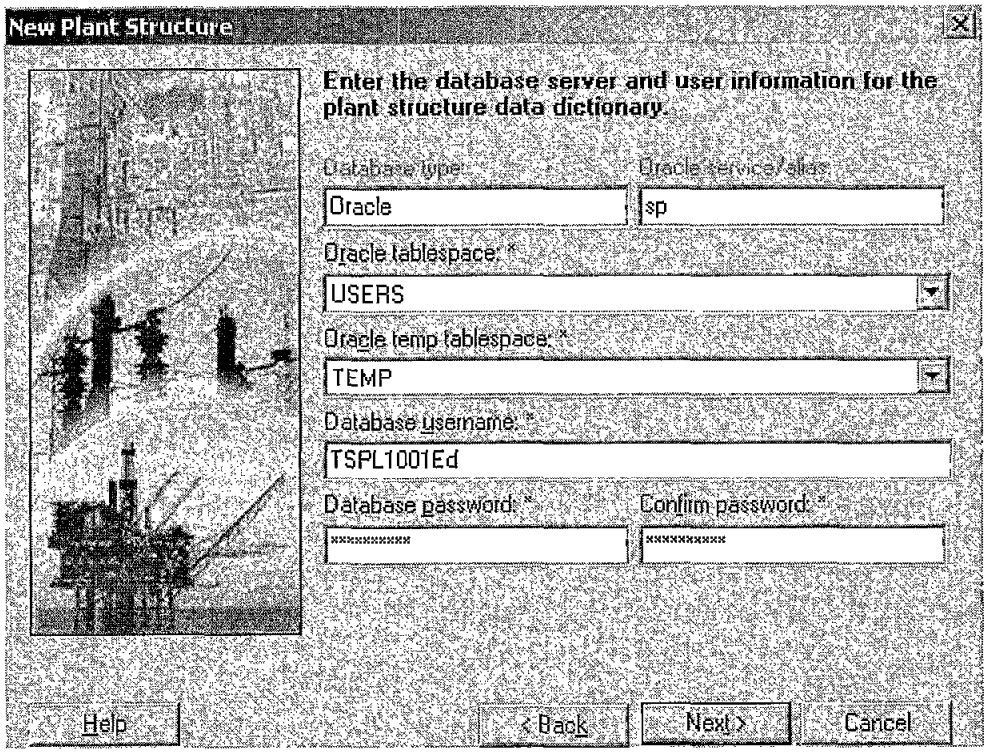
b. **Oracle Temp Tablespace** = *Temp*



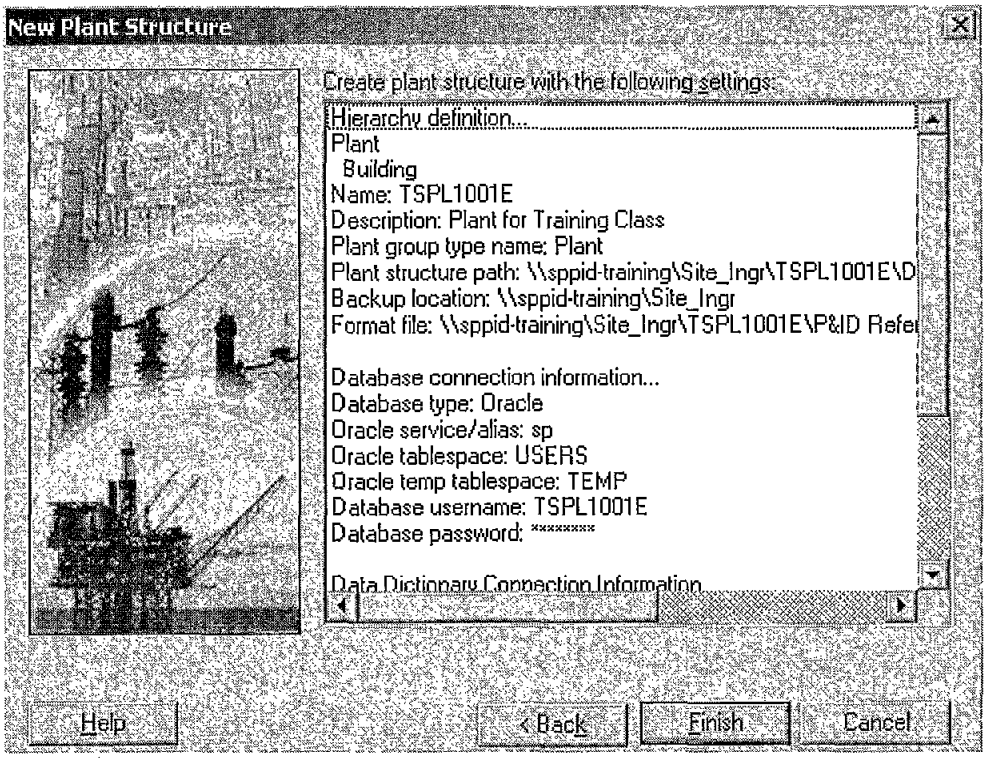
c. Select **Next**

22. Enter the database server and user information for plant structure data dictionary.

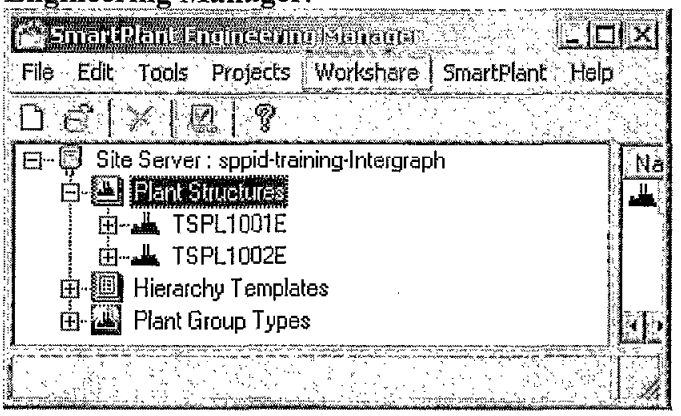
    a. Accept the defaults and select **Next**



23. Review the following settings and select **Finish**.

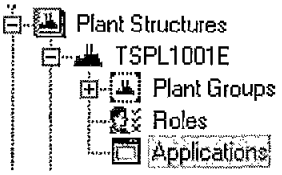


24. When complete the new **Plant Structure** will be displayed in **SmartPlant Engineering Manager**.



Associate the SmartPlant P&ID Application to the Plant Structure.

25. Select the **Applications** node below the **TSPL1001E Plant Structure**.

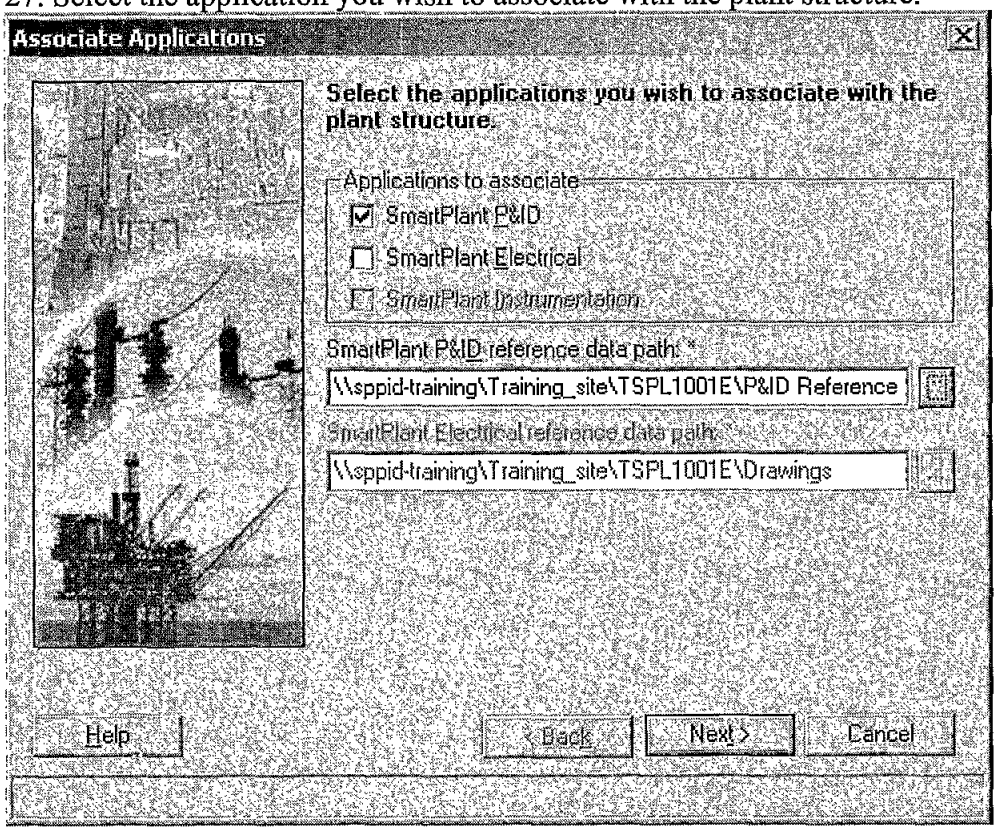


26. Select **Tools** > **Associate Applications**

    OR

    Right mouse click on the **Applications** node and select **Associate Applications**.

27. Select the application you wish to associate with the plant structure.



a. **Applications to associate** = *SmartPlant P&ID*

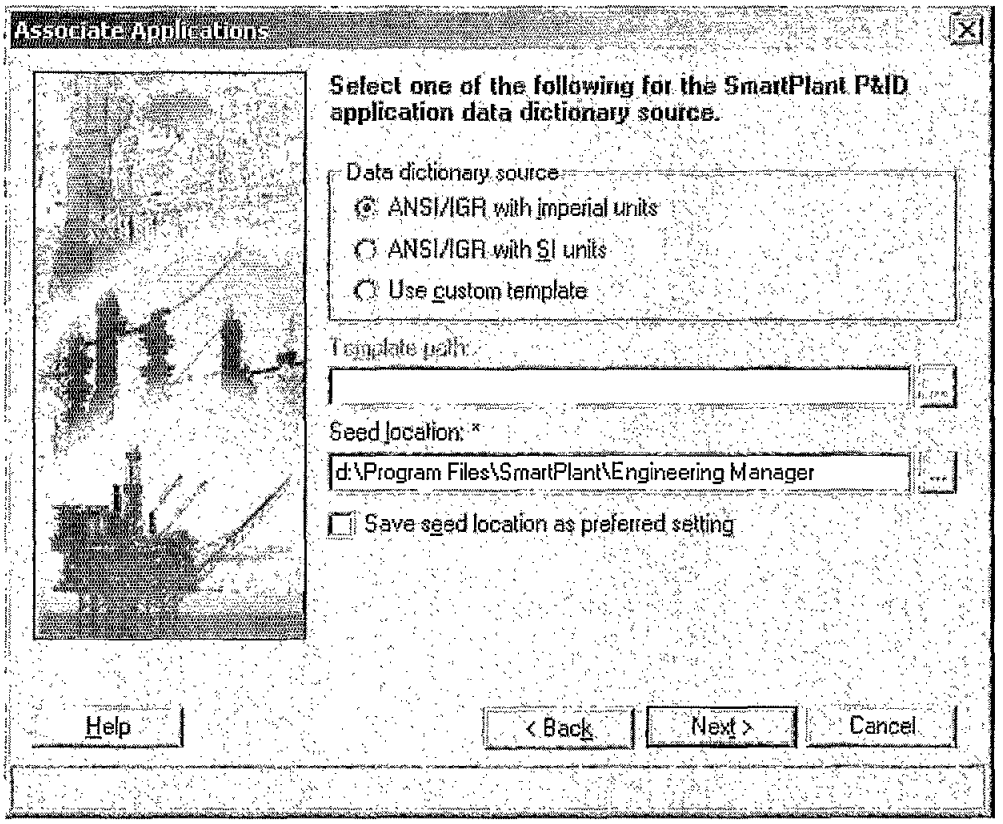
b. **SmartPlant P&ID reference data path** = *\\MachineName\Training_Site\TSPL1001E\P&ID Reference data*

   To set the **SmartPlant P&ID reference data path** type or browse to the reference data path (in UNC format) for the application options. This field is enabled only if **SmartPlant P&ID** is selected in the **Applications to associate** options above. This field is limited to 255 characters.

c. Select **Next**

28. Select one of the following for the **SmartPlant P&ID** application data dictionary source.

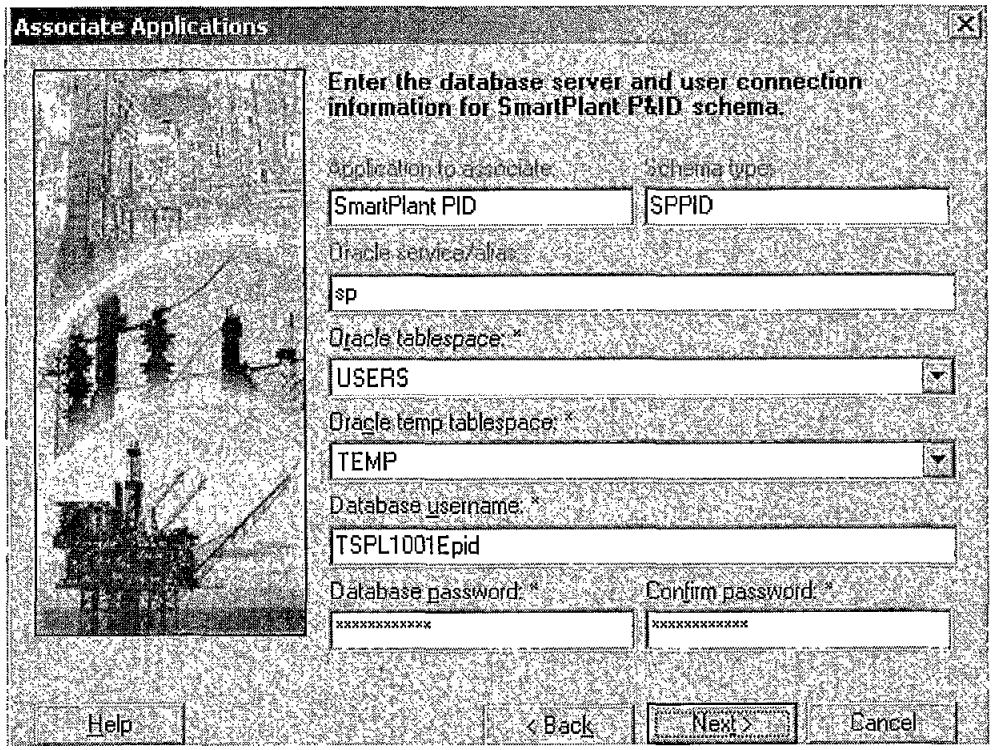
    a. **Data dictionary source** = *ANSI/IGR with imperial units*



    b. Select **Next**.

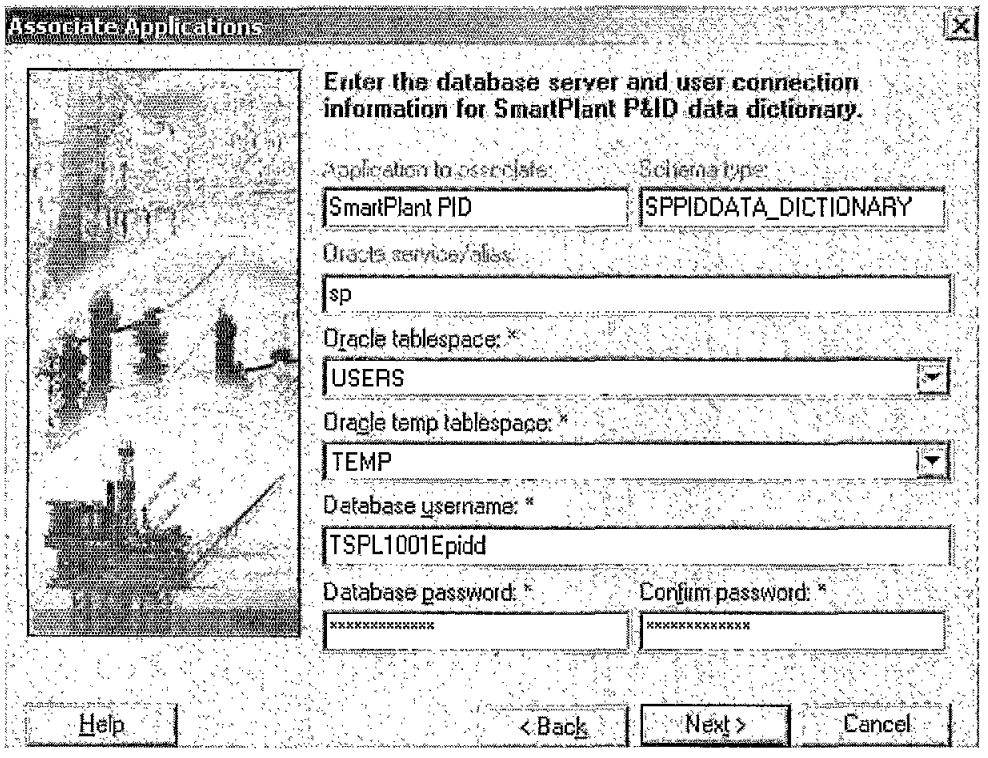
29. Enter the database server and user information for SmartPlant PID Schema.

a. Accept the defaults and select **Next**

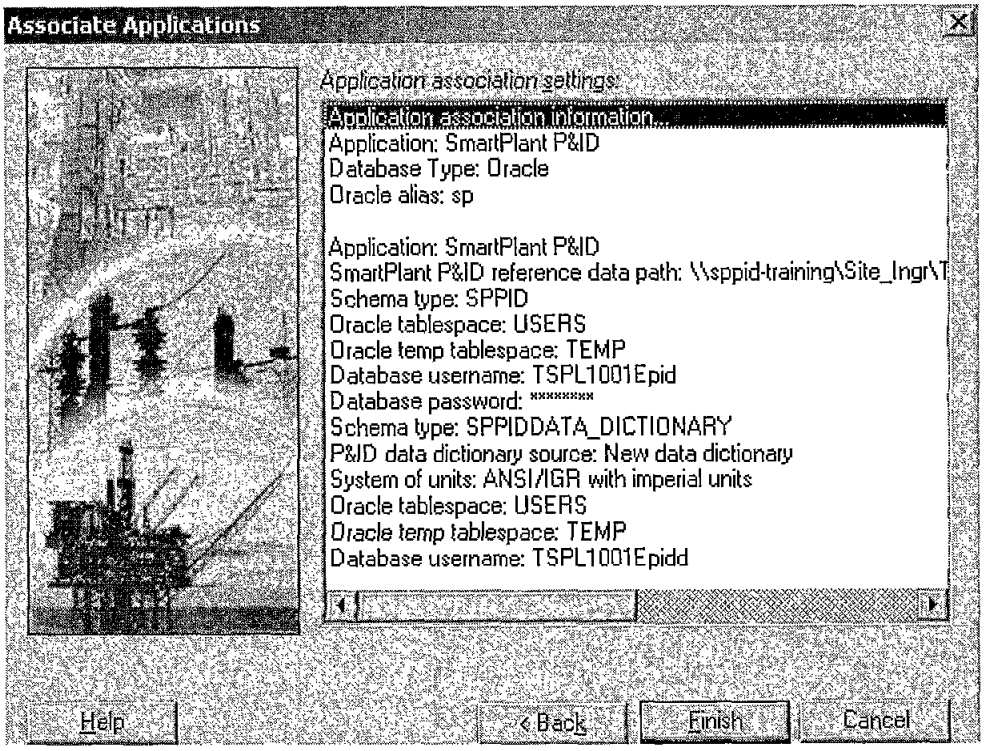


30. Enter the database server and user connection information for **SmartPlant PID** data dictionary.

    a. Accept the defaults and select **Next**



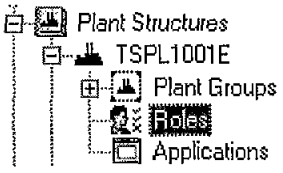
31. Review the following settings and select **Finish**.



32. When the process has completed, the **SmartPlant P&ID** application will be displayed in **SmartPlant Engineering Manager**.

Assign Roles to the new Plant Structure and Application.

33. Select **Roles** node below **Plant Groups** for the new **Plant Structure** of **TSPL1001E**.



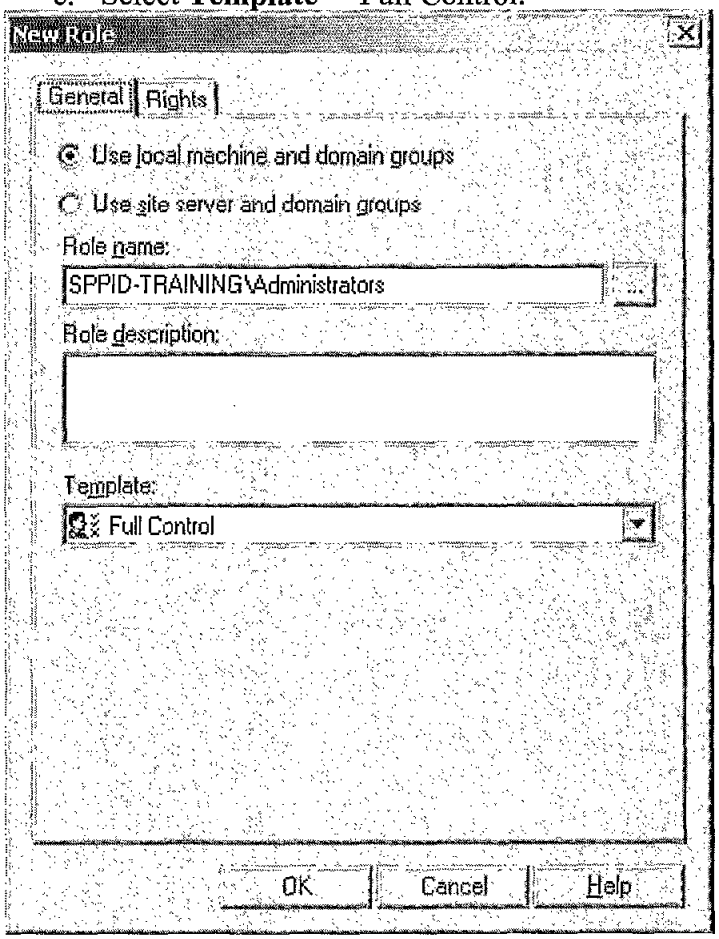
34. Right mouse click and select **New Role**.

35. On the **General** tab:

a. Select the **Use local machine and domain groups**
    1. **Use local machine and domain groups** - Use this option when you want to choose an existing user group or domain that is accessible from your machine.
    2. **Use site server and domain groups** - Use this option when you want to choose a user group or domain that is accessible from the site server machine.

b. Select **Role Name** = <*machine name*>\Adminstrators

c. Select **Template** = Full Control.



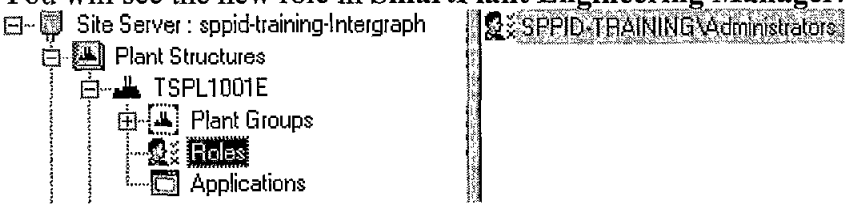
36. On the **Rights** tab:

    a. Set Application to **SmartPlant Engineering Manager**
    b. Select **Expand All**
    c. Verify that **Full Control** is selected for **Plant Structure Access** and **Formats.**

    d. Set Application to **SmartPlant P&ID**
    e. Select **Expand All**
    f. Verify that **Full Control** is selected for the various Categories.

37. Select **OK.**

38. You will see the new role in **SmartPlant Engineering Manager**.



Updating Roles after Roles have been established.

The **Tools** > **Refresh Users** allows you to update the site administrator group and the plant structure role users. Use this command when you add or delete users in a Windows® or Novell® user group that has been assigned to a role for user access.

39. For an **individual role**
    a. Select the individual **Role**
    b. Select **Tools** > **Refresh Users**

       OR

       Right mouse click and select **Refresh Users**.

40. For **all Roles** in a **Plant Structure**
    a. Select the **Roles** node
    b. Select **Tools** > **Refresh Users**

       OR

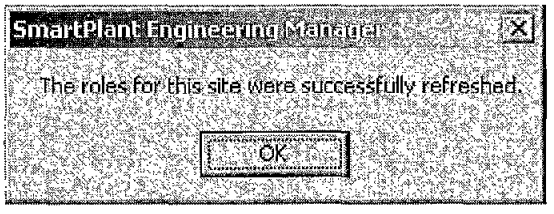
       Right mouse click and select **Refresh Users**.

41. For **all Roles** in a Site.
    a. Select the **Site** node
    b. Select **Tools** > **Refresh Users**

       OR

       Right mouse click and select **Refresh Users**.

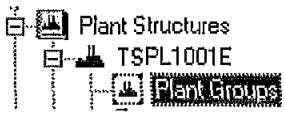
42. When the software has completed refreshing the roles, you will see the following message box:



    a. Select **OK**.

Create PlantGroups for the new Plant Structure.

43. Select the **Plant Groups** node for the new **Plant Structure** of **TSPL1001E**.



44. Select **File** > **New**

    OR

    Right mouse click and select **New Building...**

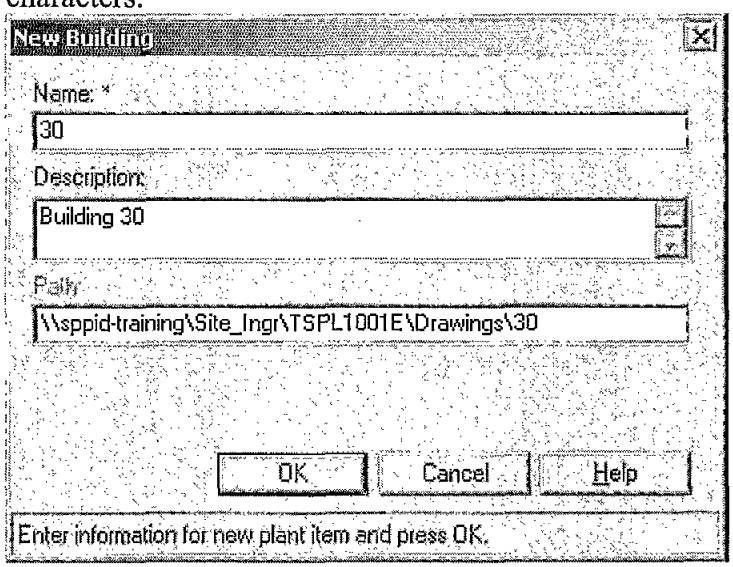
45. Enter the following values for the properties of the new building:

    a. **Name** = 30

    Type a name for the plant group as you want it to appear in the **Tree** view. This field is limited to 240 characters and cannot contain any of the following characters: < , > ? \ / ' ; { } [ ] ~ ` ! % * ( ) | " :. A folder with this name cannot already exist in the plant-structure folder.

    b. **Description** = Building 30

    Type a description. The length of the description is limited to 240 characters.



    c. **Path** - Displays the location where files in this plant group are stored. The software automatically appends the value in the **Name** box to this path and creates a folder using this name in your plant storage location. This field is limited to 255 characters.

    Notes:

    - The **Path** field cannot contain any spaces if you plan to use the **Piping Data Transfer to PDS 3D** process.

- In a Workshare collaboration, new plant groups cannot be created by standalone satellite sites or by the satellite sites in a project.

d. Select **OK**.

46. When you have finished, you will see the plant group in the tree view of SmartPlant Engineering Manager.

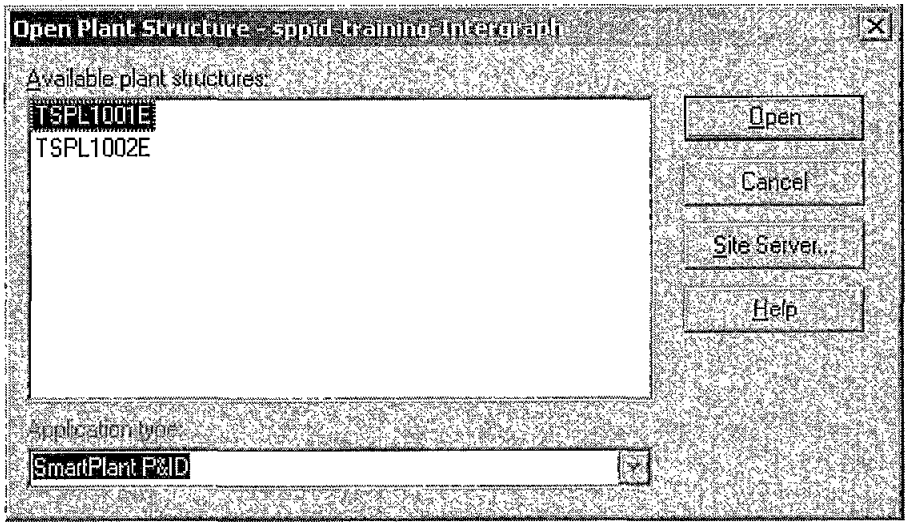
47. **File** > **Exit** from **SmartPlant Engineering Manager**.

Create Drawings

48. Start **Drawing Manager**

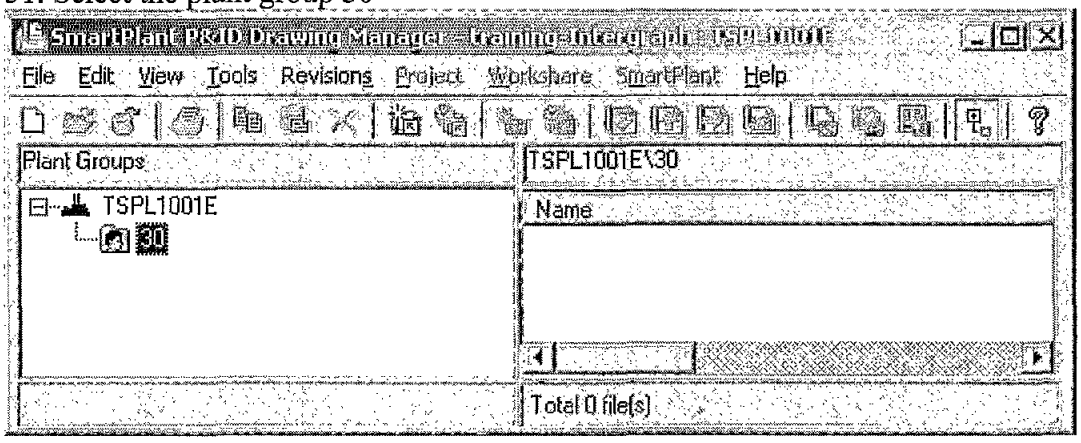
    a. Select **Start** > **Programs** > **Intergraph SmartPlant P&ID** > **Drawing Manager**

49. Select the **TSPL1001E** plant structure on the **Open Plant Structure** dialog box.



50. Select **Open**

51. Select the plant group **30**



52. Select **File** > **New Drawing**

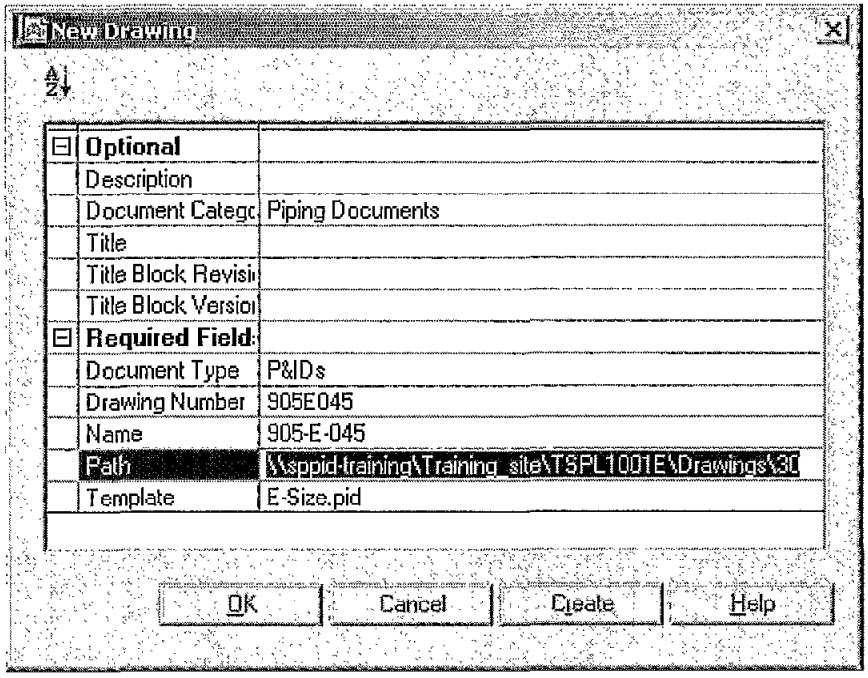
    OR

    Right click on the plant group **30** and select **New Drawing**.

53. Enter the following values for the properties of the new drawing, **Tab** to the next field or select **Enter**.

    a. **Drawing Number** = 905E045[1]

    b. **Name** = 905-E-045[2]



[1] Drawing Number must be unique per Plant.

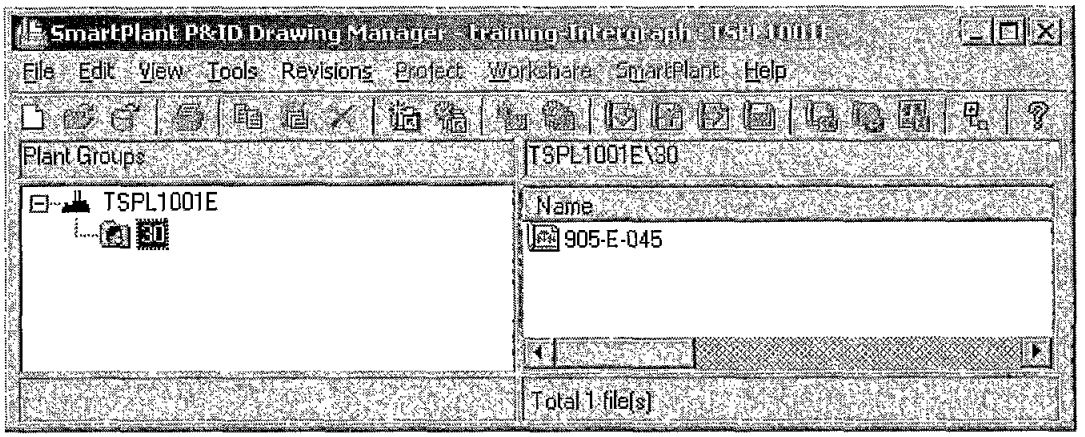
[2] Drawing Name must be unique per Plant and is the name of the drawing file on your file system.

54. Select **OK**, which creates the new drawing, adds it to the selected plant node, and closes the **New Drawing** dialog box.

    OR

    Select **Create**, Creates a new drawing and add it to the selected plant node, and the **New Drawing** dialog box will stay open.

55. The drawing will display in the list view of Drawing Manager.

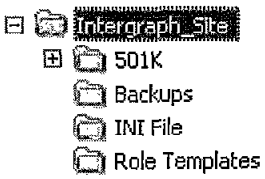


56. **File** > **Exit** from **Drawing Manager**.

Lab 4 – Creating a new Site Server and Plant Structure

Preliminary Information

1. It is understood that the Database is installed and configured prior to the following steps.
2. From **Windows Explorer**:
    a. **Create** a new **folder** named **Intergraph_Site** on the driver with the most space.
    b. **Share** the **Intergraph_Site** folder and assign permissions of Everyone full control.
    c. Create the following **subfolders** in the **Intergraph_Site** folder.
        i. **501K**
        ii. **Backups**
        iii. **Role Templates**
        iv. **INI File**
    d. **Create** one (1) **subfolder** in the **501K** folder.
        i. **Subfolder** = *Drawings*
    e. **Copy** the delivered **P&ID Reference Data** and **Paste** into the **501K** subfolder.
        i. Delivered location = ~*Program Files\SmartPlant\P&ID Reference Data*
        ii. Paste into = ~*Intergraph_Site\501K*
3. When complete you should have a folder structure similar to the below.

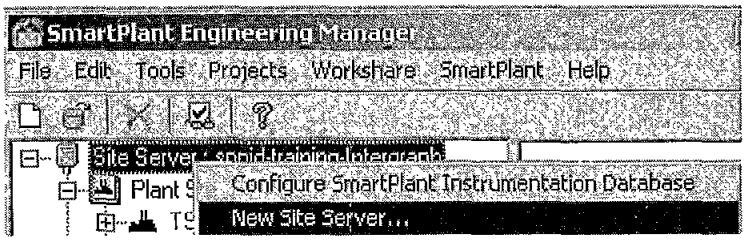


Create a Site Server

4. Start SmartPlant Engineering Manager.

    a. Select **Start > Programs > Intergraph SmartPlant Engineering Manager > SmartPlant Engineering Manager**.

5. Right-click on the **Site Server** root and select **New Site Server...**



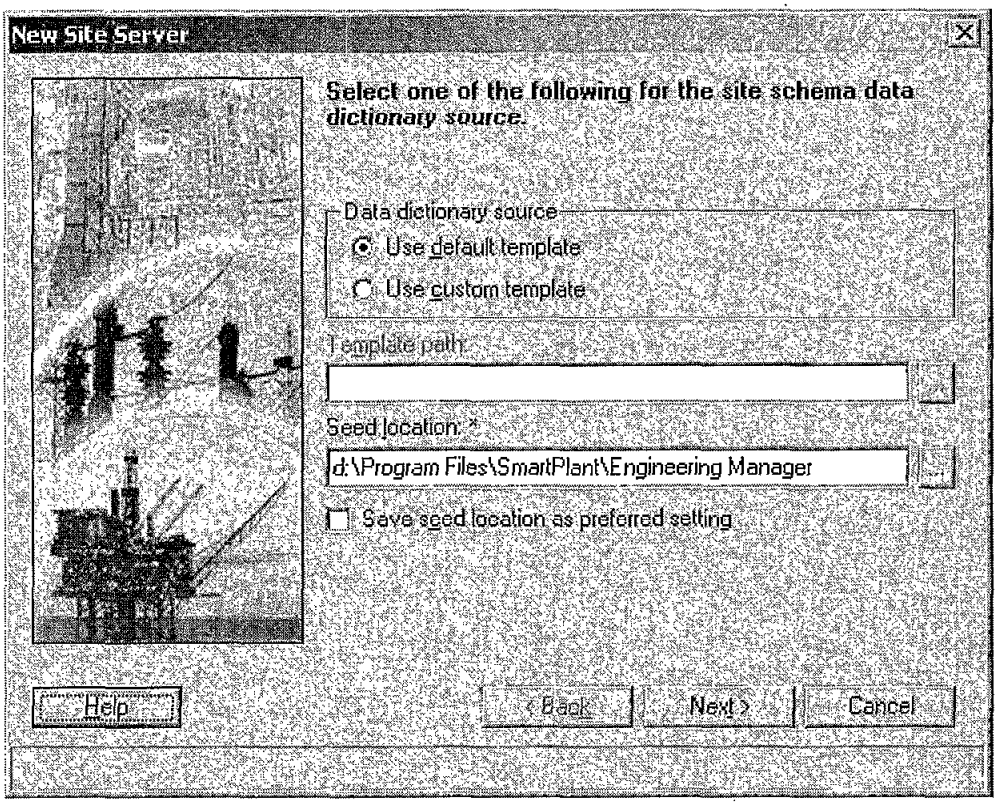
OR

Select **File > New**

6. The **New Site Server** wizard steps you through creating a site schema and site data dictionary to hold the database connection information for your site.

7. Select **Use default template** as the Data Dictionary Source for the site schema data dictionary source.

    a. Select **Next**



8. Enter the **name** and **path** information for the new site.

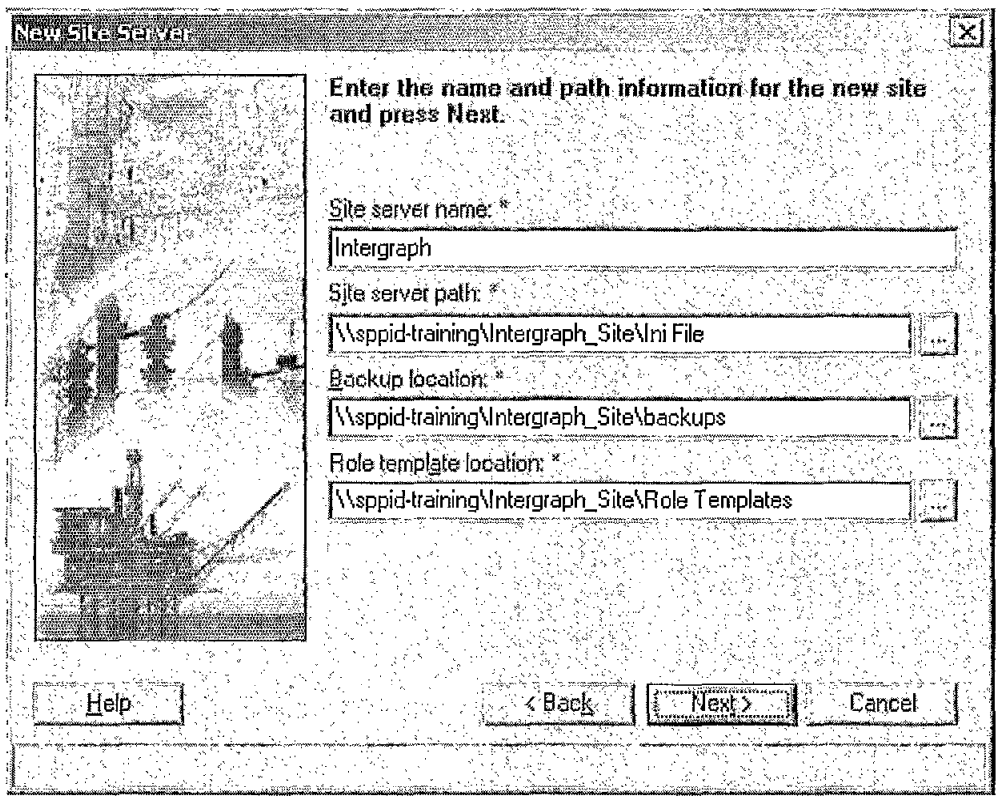
   a. **Site Server Name** = *Intergraph*

   b. **Site Server Path** = *\\Machine Name\Intergraph_Site\INI File*

   c. **Backup Location** = *\\Machine Name\Intergraph_Site\Backups*

   d. **Role Template Location** = *\\Machine Name\Intergraph_Site\Role Templates*

   e. Select **Next**.



9. Set the database type and server for the site schema

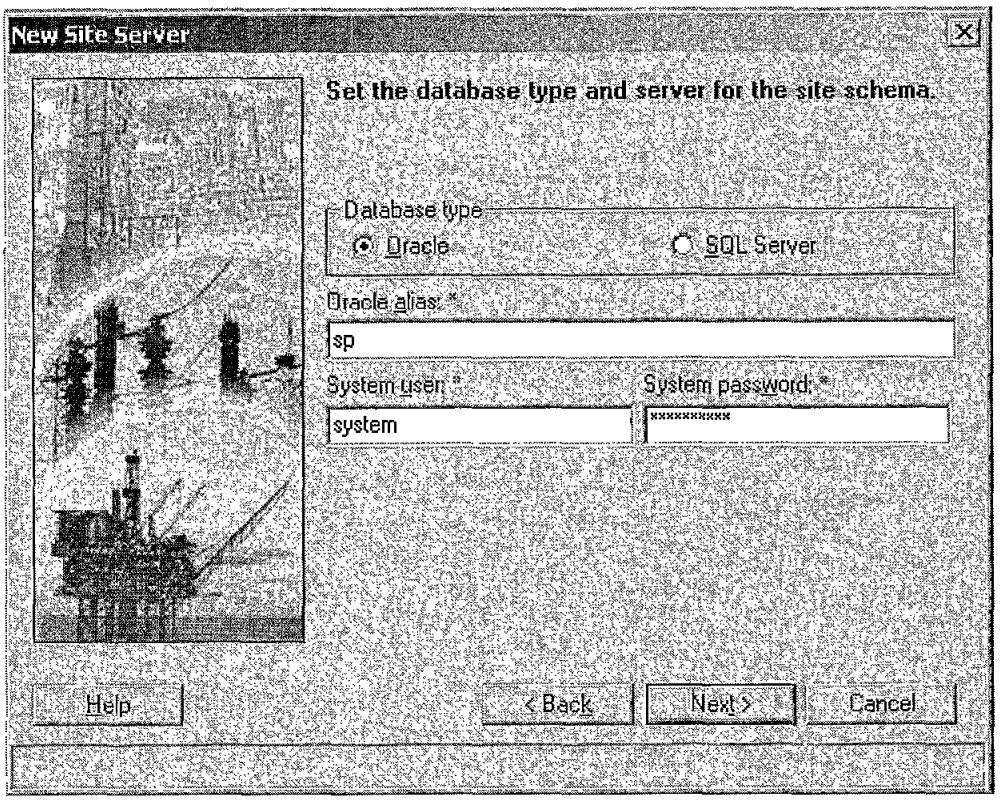
   a. **Database Type** = *Oracle*

   b. **Oracle Alias** = *SP*

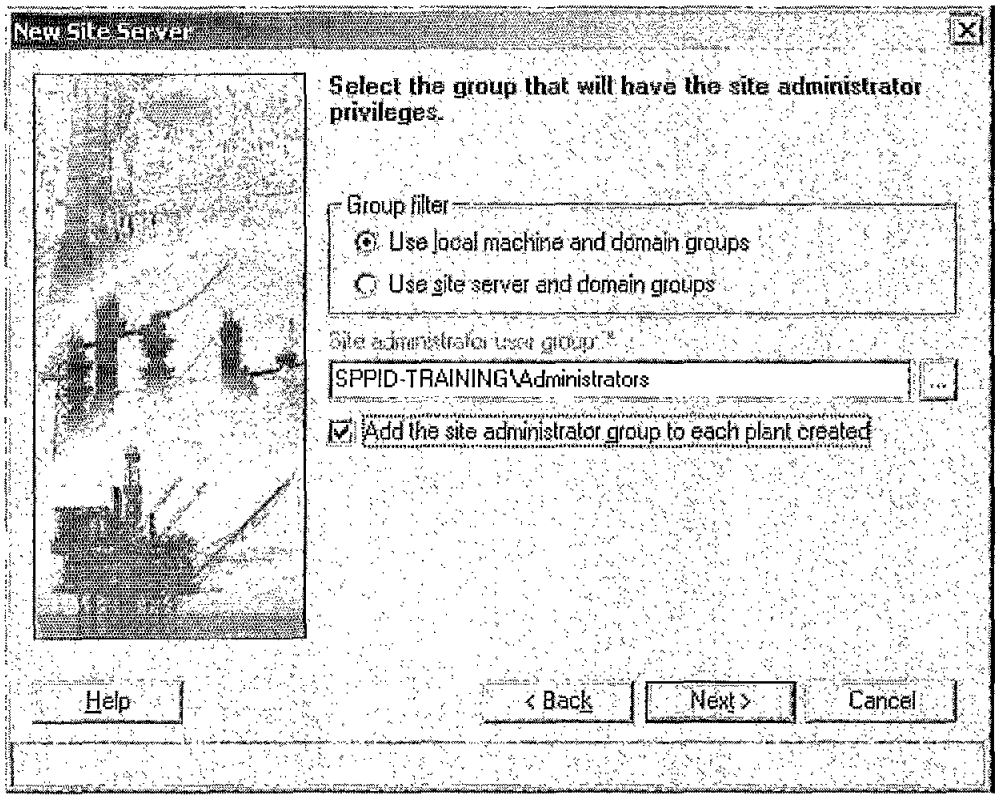
   c. **System User** = *system*

   d. **System Password** = *sysmanager*

   e. Select **Next**



10. Select the group that will have the site administrator privileges.



a. **Group Filter** = *Use local machine and domain groups*

Use local machine and domain groups - Use this filter option when you want to choose an existing user group or domain that is accessible from your machine.

Use site server and domain groups - Use this filter option when you want to choose a user group or domain that is accessible from the site server machine.

b. **Site administrator group** = <machine name>*Administrators*

Site administrator user group - Click the **Browse** button to display the **Select Groups** dialog box, which allows you to select the Windows or Novell user group you want to assign to this new role. The name of the SmartPlant role will be the same as the name of the selected user group.

c. Select **Add the site administrator group to each plant created**

Add the site administrator group to each plant created - Check this option if you want the site administrator group specified above to be assigned as a role with full control in each plant created in the site. Doing this saves you the step of creating a new role to grant these users access to the new plant.

d. Select **Next.**

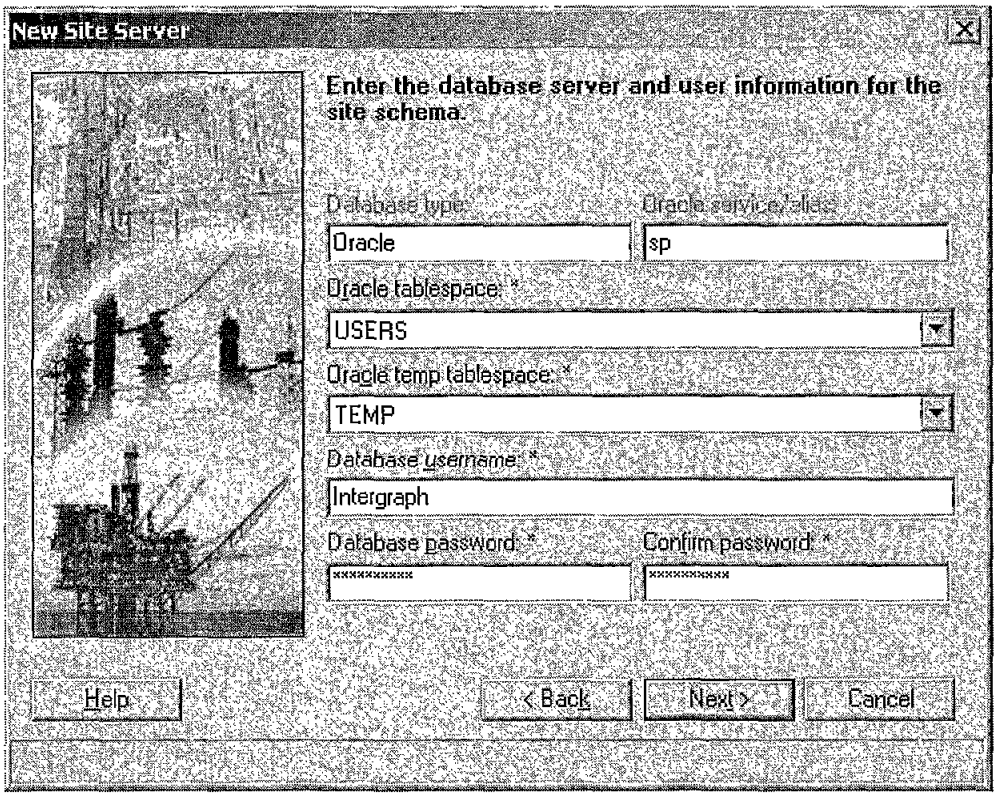
11. Enter the database server and user information for the site schema.

    a. **Oracle Tablespace** = *Users*

    b. **Oracle Temp Tablespace** = *Temp*

    c. Accept the defaults for the **Database Username** and **Password.**

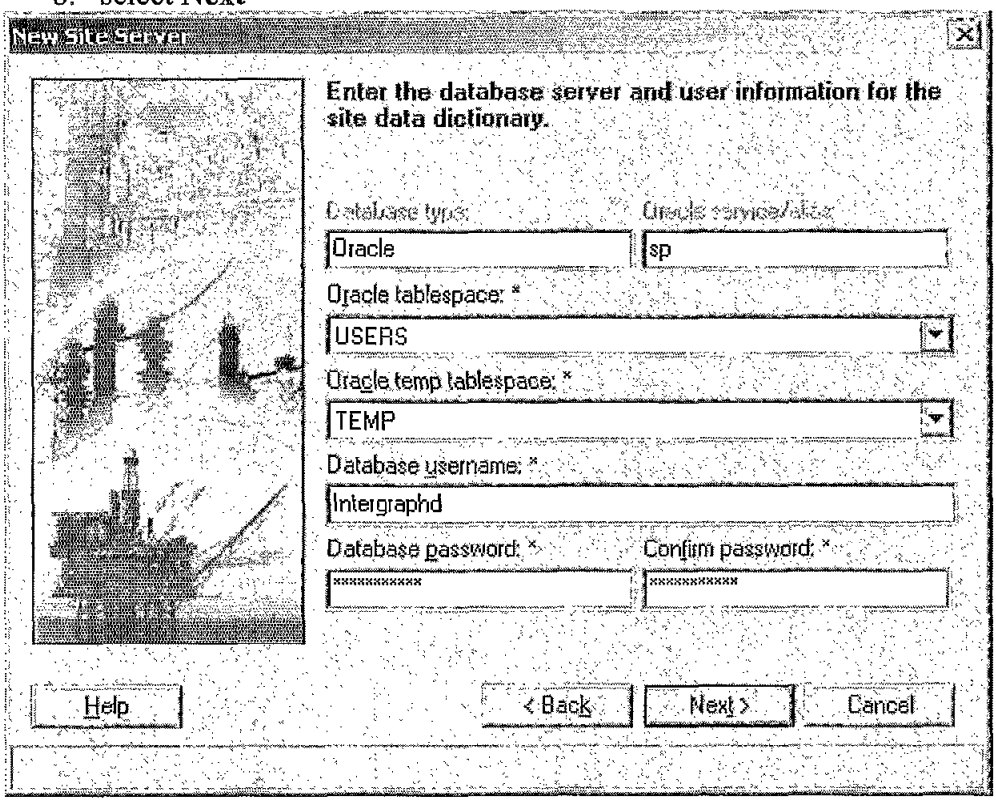
    d. Select **Next**



12. Enter the database server and user connection information for site data dictionary.

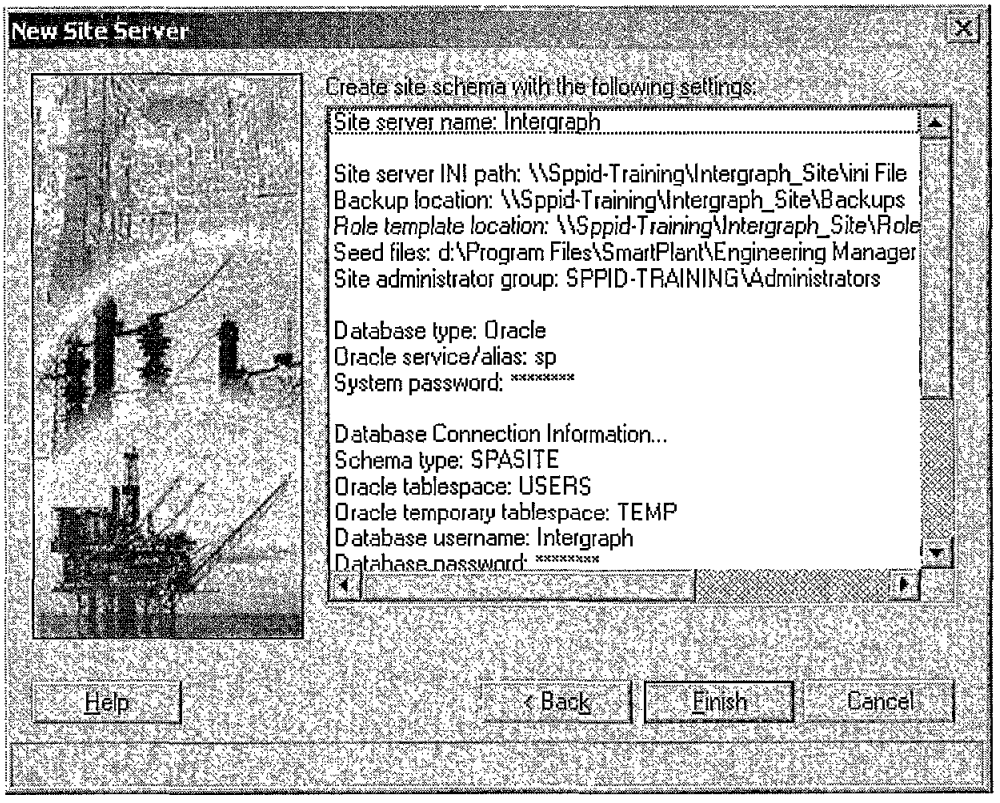
    a. Accept the defaults

    b. select **Next**

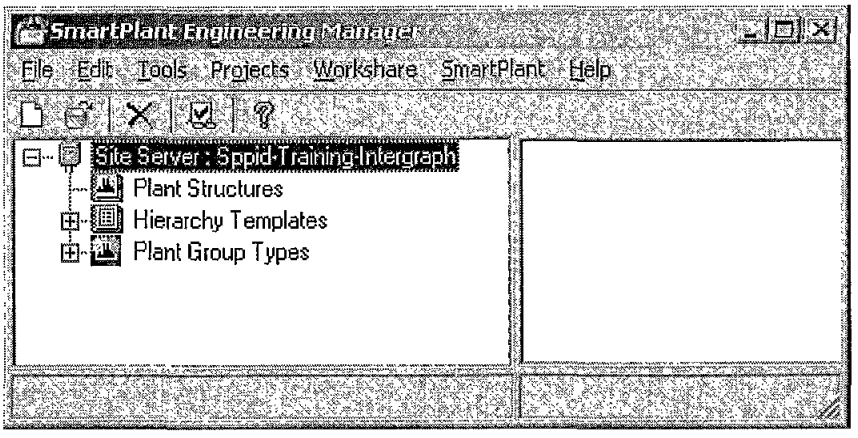


13. Review the following settings for the site schema creation.

    a. Select **Finish.**

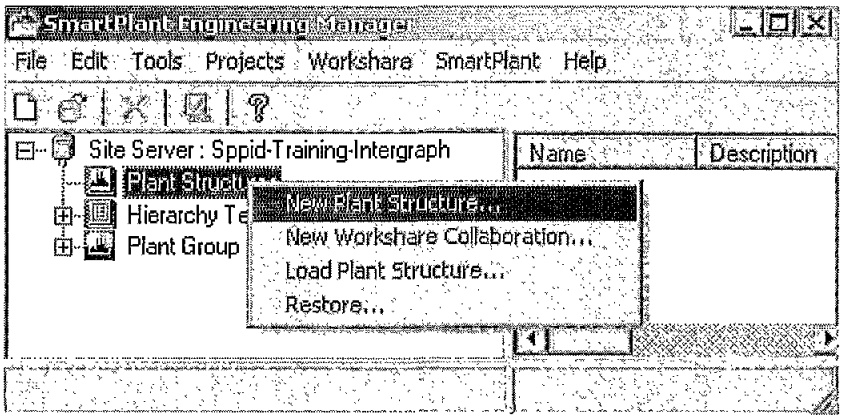


14. When the **Site** creation process finishes, you will have a window similar to the below.

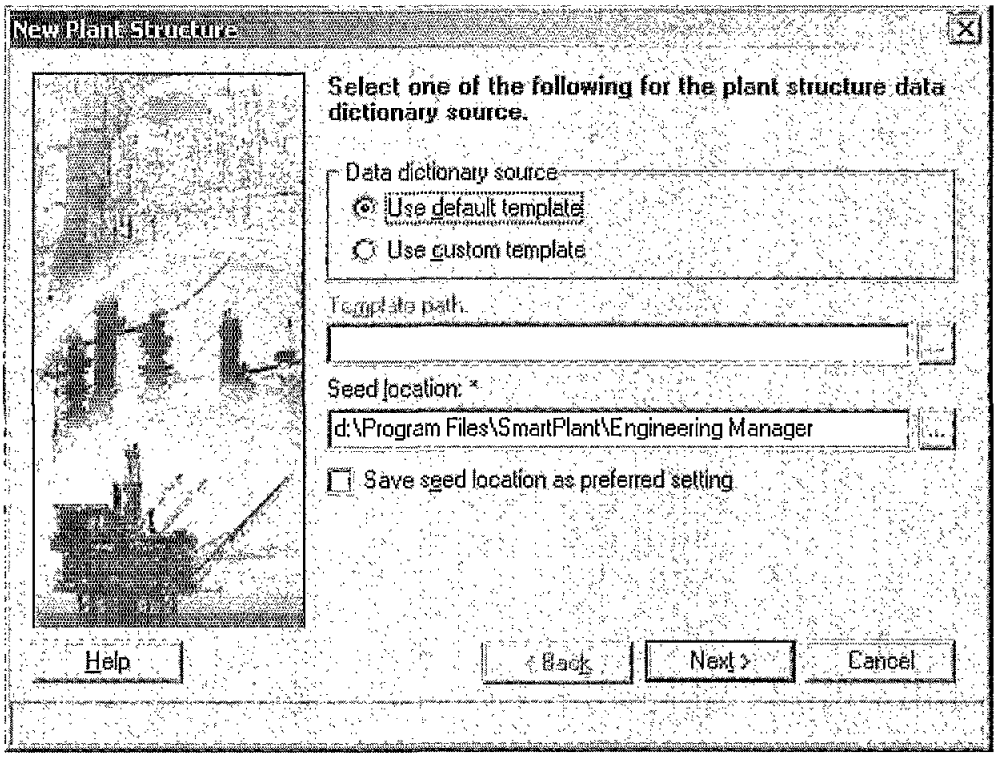


Create a new Plant Structure using Hierarchy 7

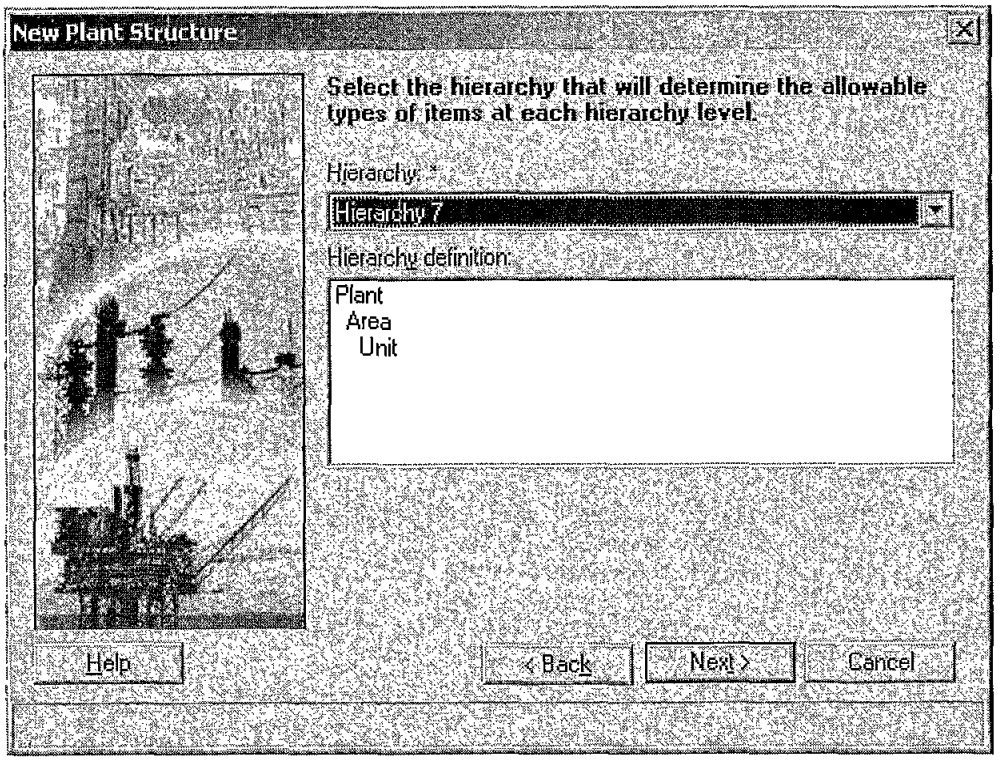
15. Select the **Plant Structure** node, right mouse click and select **New Plant Structure.**



16. For the **Data Dictionary Source** select **Use Default Template**
    a. Select **Next.**



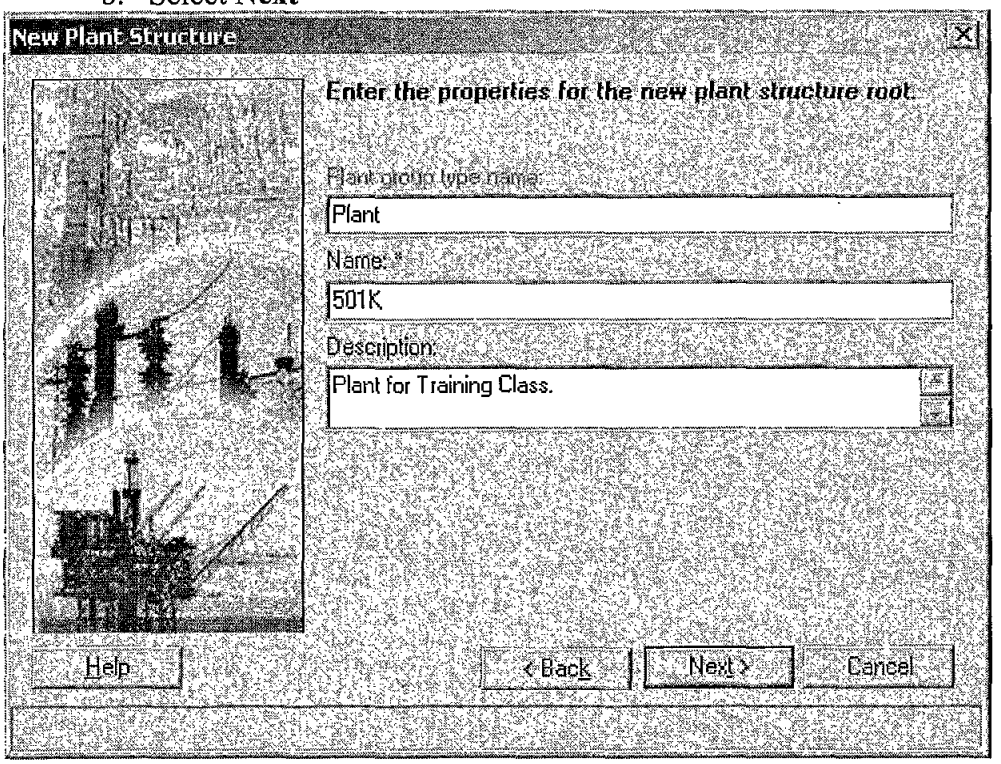
17. Select **Hierarchy 7** as the **Hierarchy** and select **Next.**



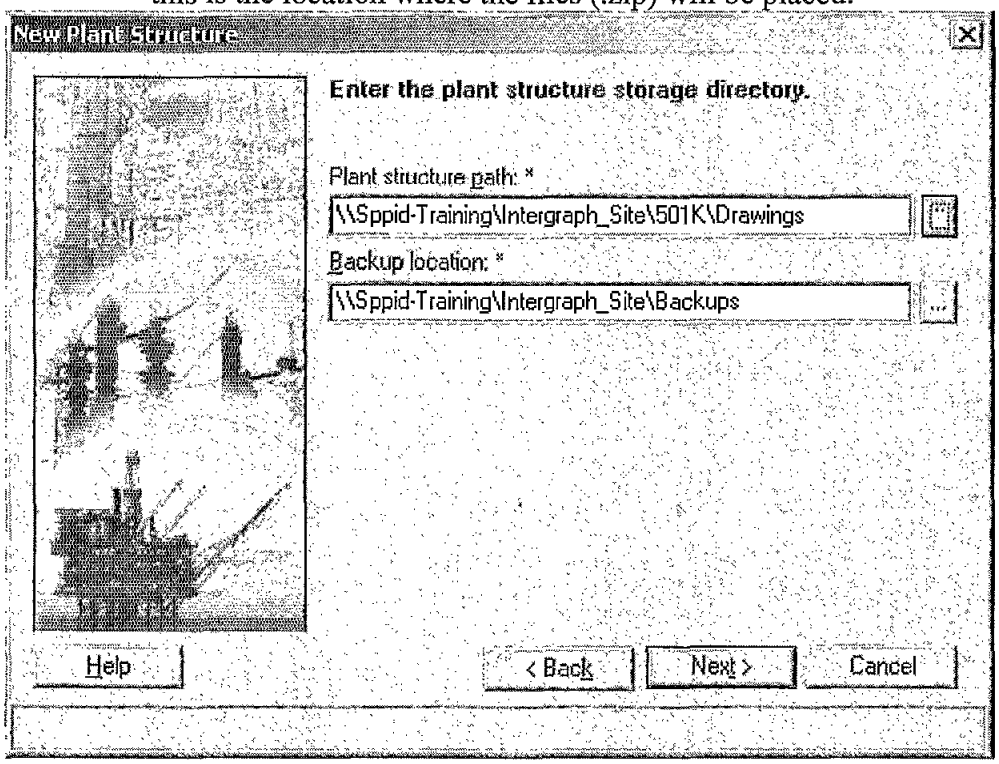
18. Enter the **Name** and **Description** for the Plant.

    a. **Name = 501K**

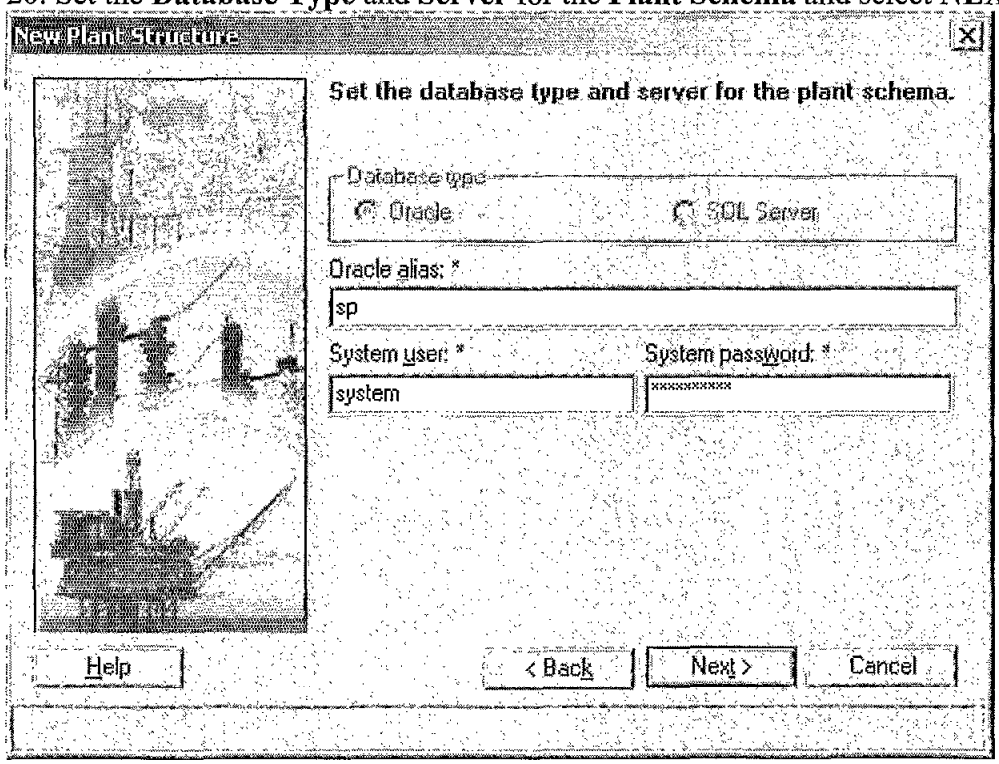
    b. Select **Next**



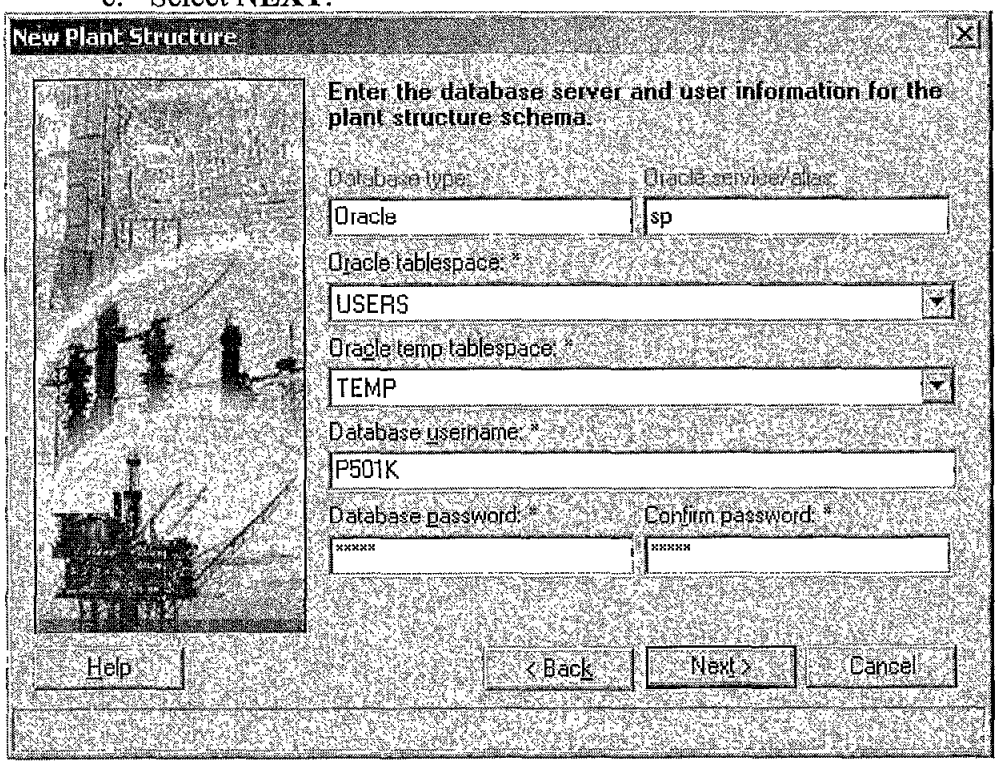
19. Enter the **Plant Structure Path**
    a. \\<**Machine Name**>>**Intergraph_Site\501K\Drawings**
    b. Notice the path to the **Backup Location**, when you **Backup** the **Plant** this is the location where the files (.zip) will be placed.

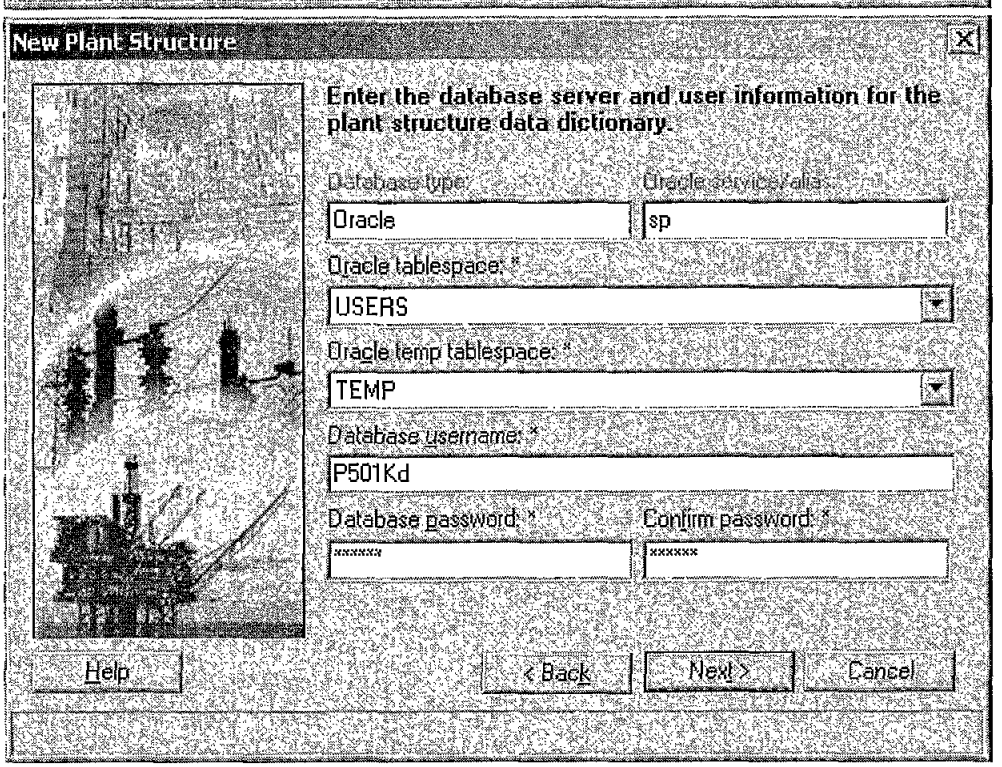


20. Set the **Database Type** and **Server** for the **Plant Schema** and select **NEXT**.

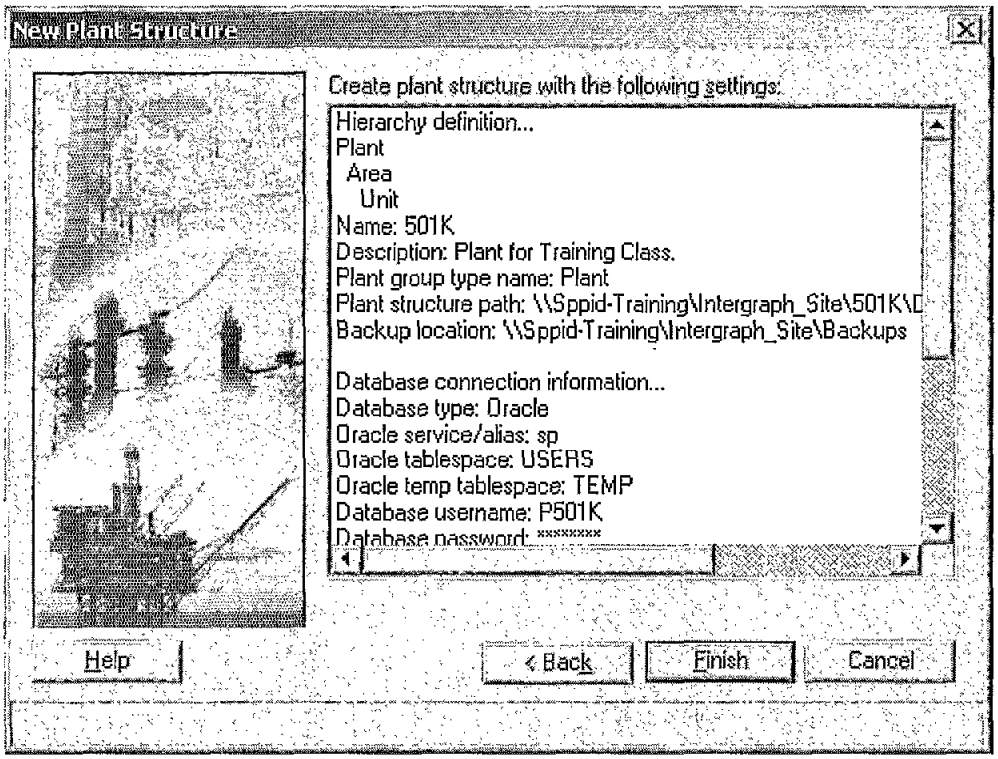


21. Enter the **Database Server** and **User** information for the **Plant Structure** and **Plant Structure Data Dictionary**
    a. **Oracle TableSpace = Users**
    b. Notice the **Database Username** is the **Plant Name** with a **Prefix** of **P** added, a database username cannot begin with a number.
    c. Select **NEXT**.

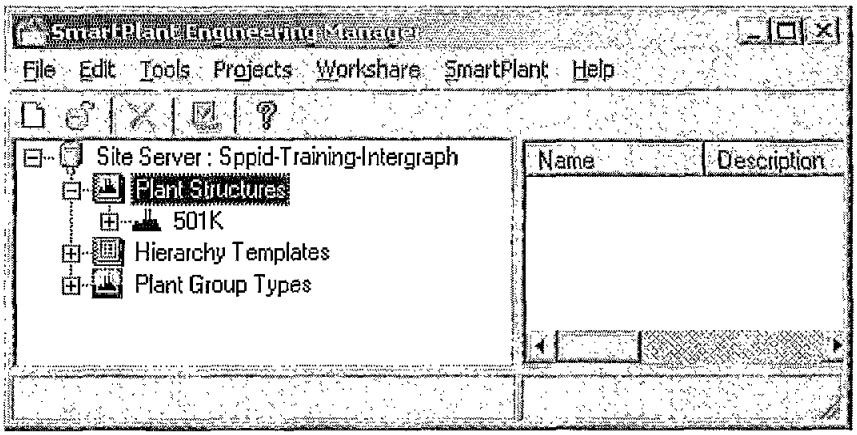




22. Select **Finish,** to create the **Plant Structure**, once you reviewed the below settings.

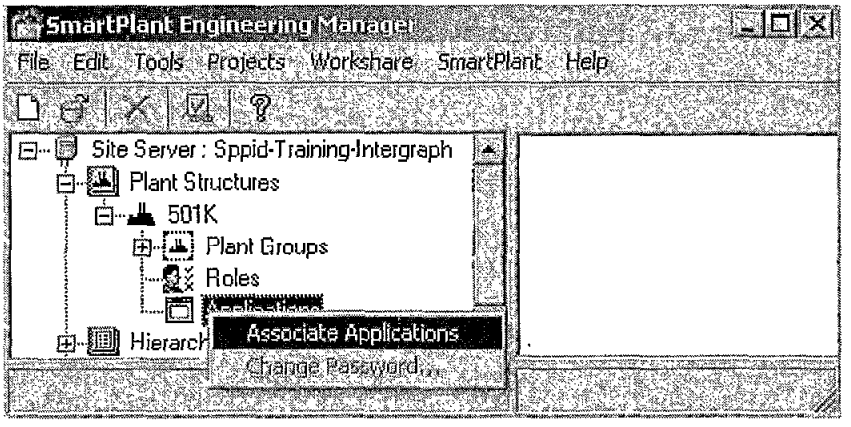


23. Once completed the **501K** Plant should be listed under the **Plant Structures.**



Associate SmartPlant P&ID Application

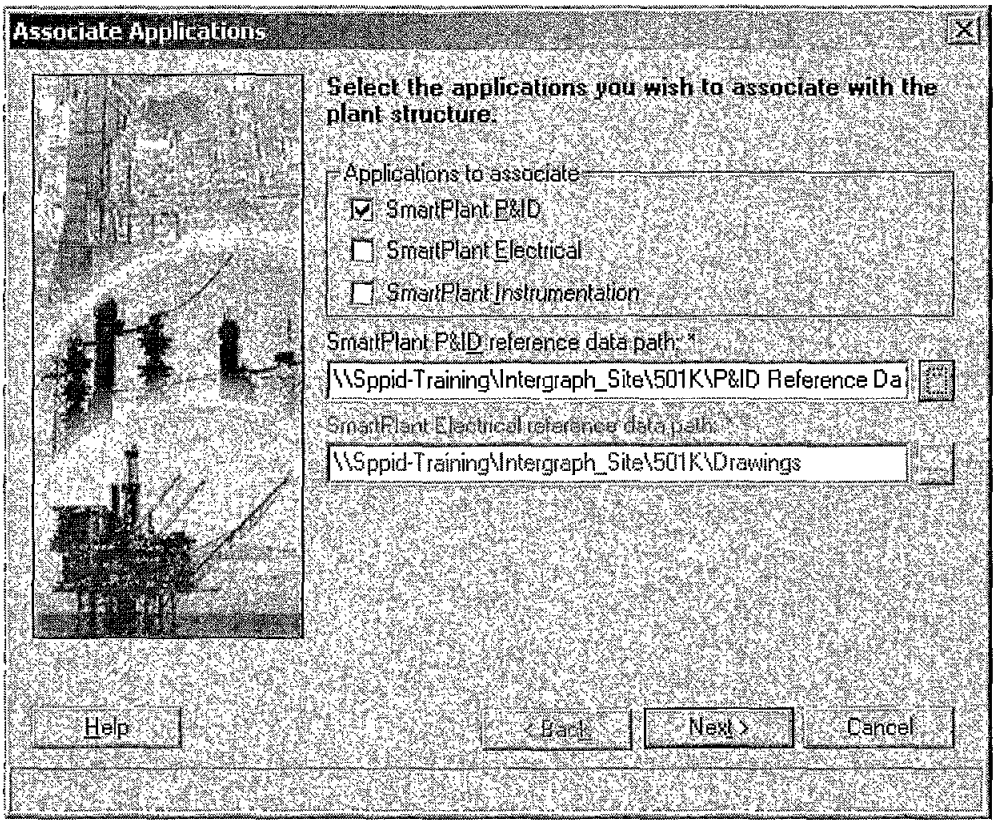
24. Select the **Applications** node, found under the 501K Plant, right mouse click and select **Associate Applications**.



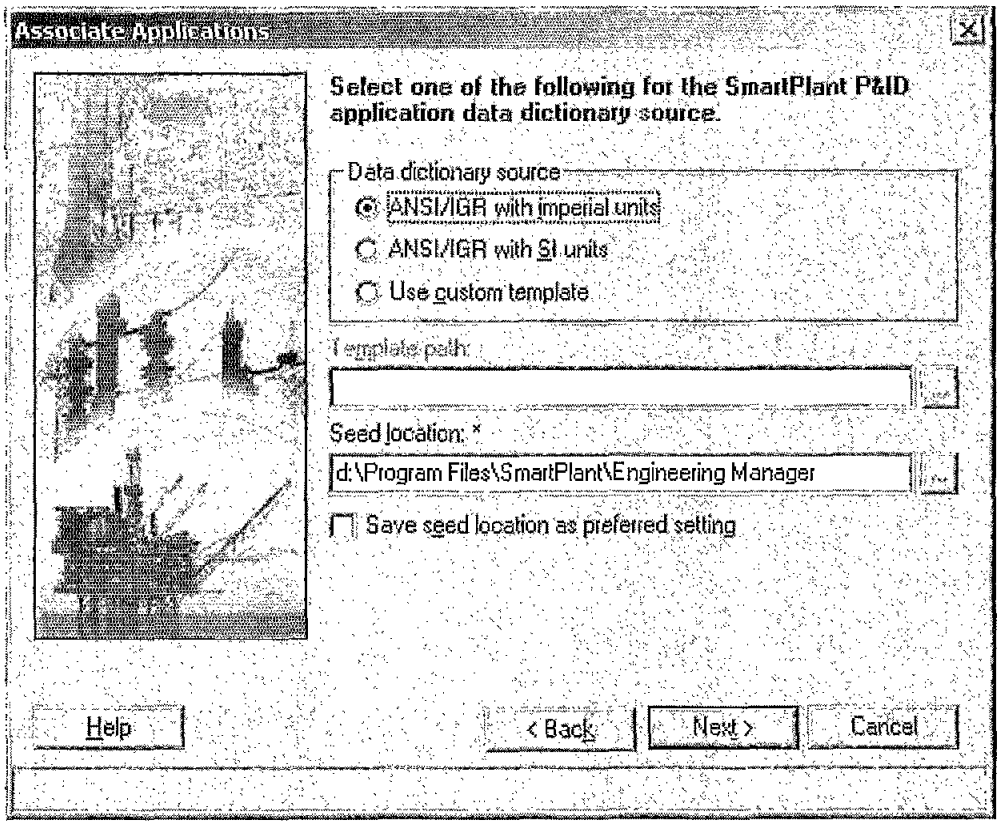
25. Select the **SmartPlant P&ID** as the **Application to Associate**

    a. Set the **SmartPlant P&ID Reference Data Path = \\Sppid-Training\Intergraph_Site\501K\P&ID Reference Data**

    b. Select **Next.**

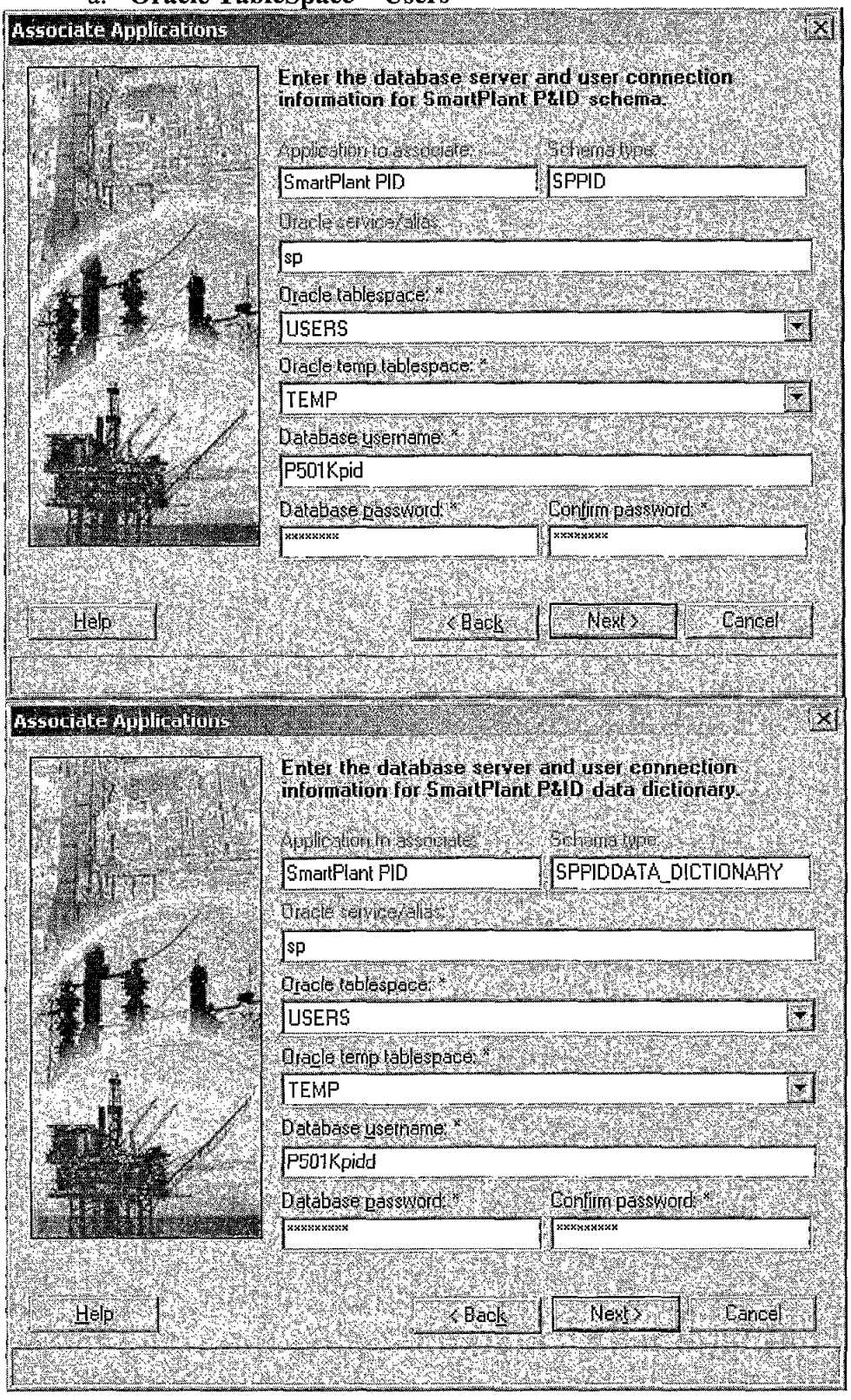


26. Select **ANSI/IGR with Imperial Units** as the **Data Dictionary Source**
    a. Select **Next**.

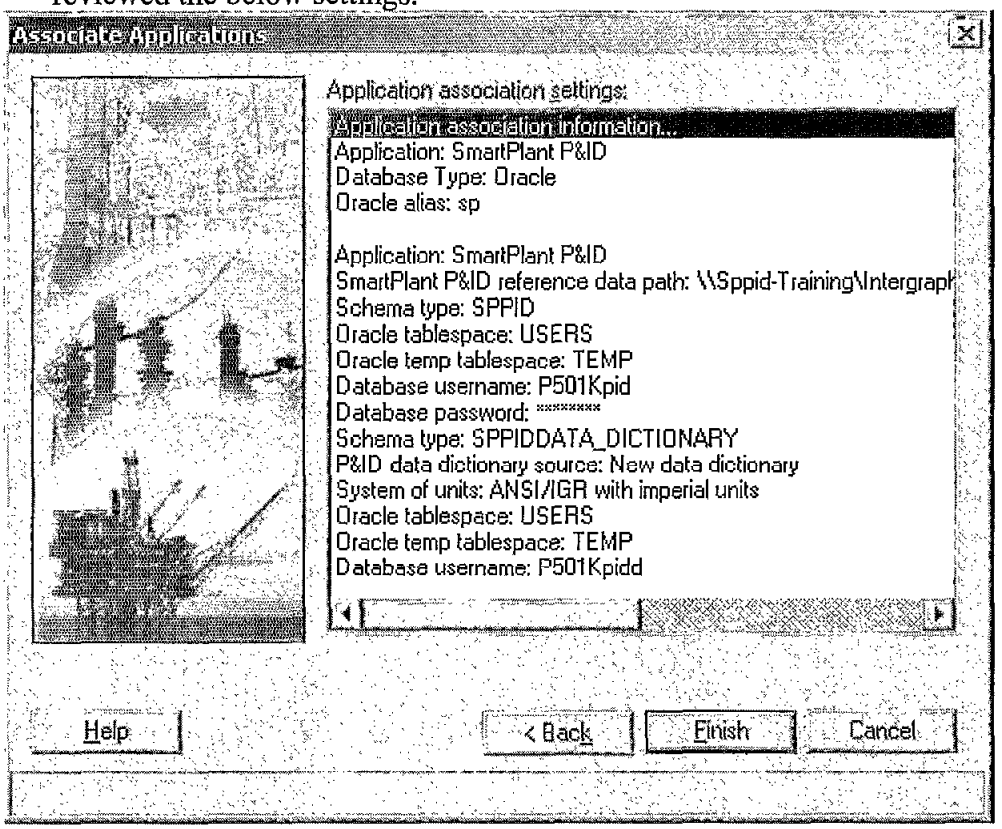


27. Enter the **Database Server** and user connection information for the **SmartPlant P&ID Schema** and **SmartPlant P&ID Data Dictionary**.

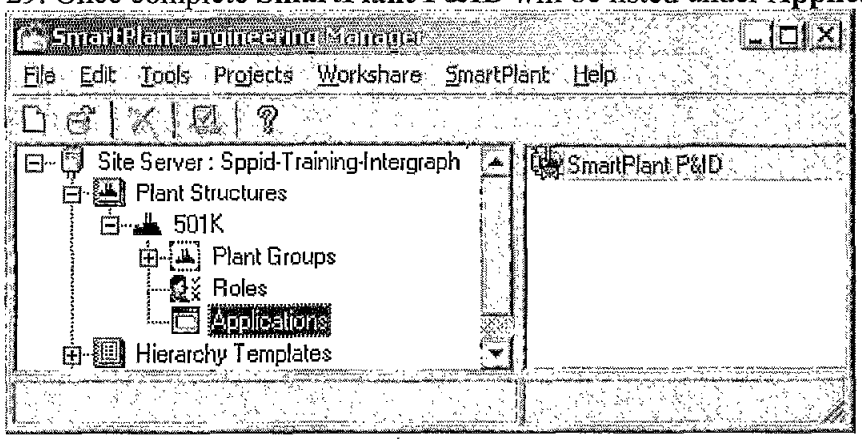
a. **Oracle TableSpace = Users**



28. Select **Finish,** to Associate the SmartPlant P&ID Application, once you reviewed the below settings.

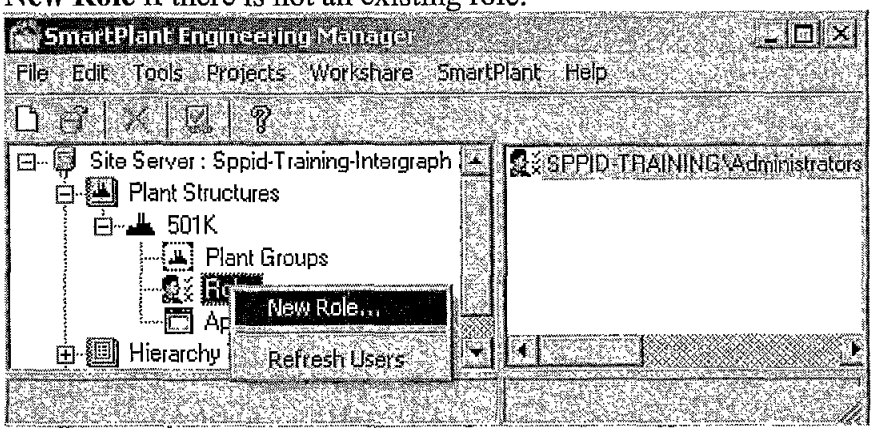


29. Once complete **SmartPlant P&ID** will be listed under **Applications.**



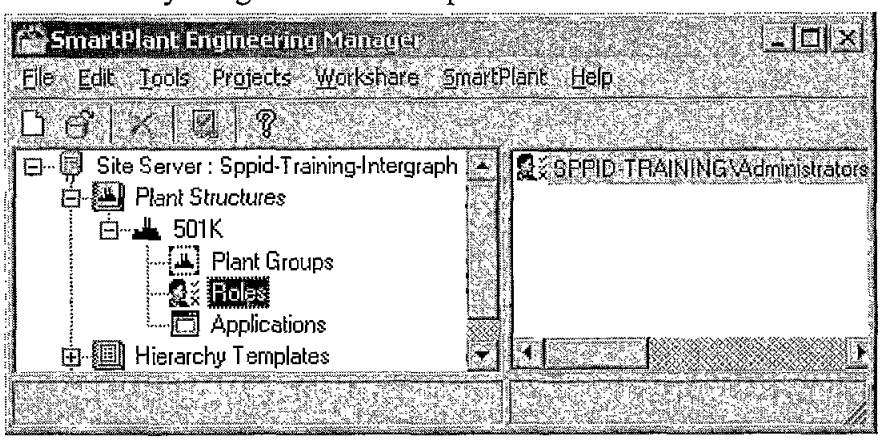
Assign Roles to the new Plant Structure and Application.

30. From the **Roles** node found under the **501K** Plant, right mouse click and add a **New Role** if there is not an existing role.



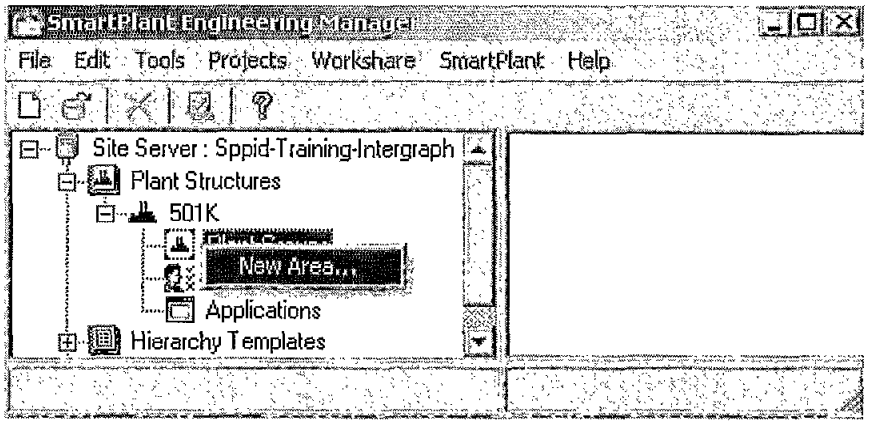
Notes:

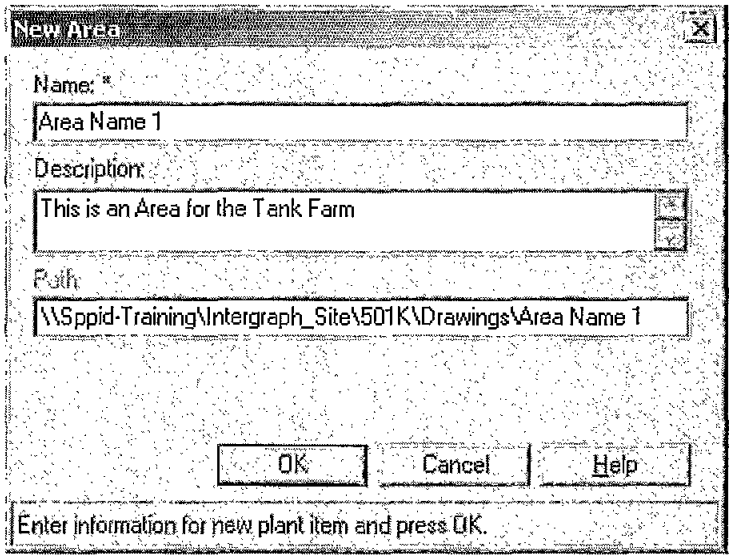
- If you checked the option to **Add the site administrator group to each plant created** during the **Site** creation you will have a role automatically assigned to the new plant.



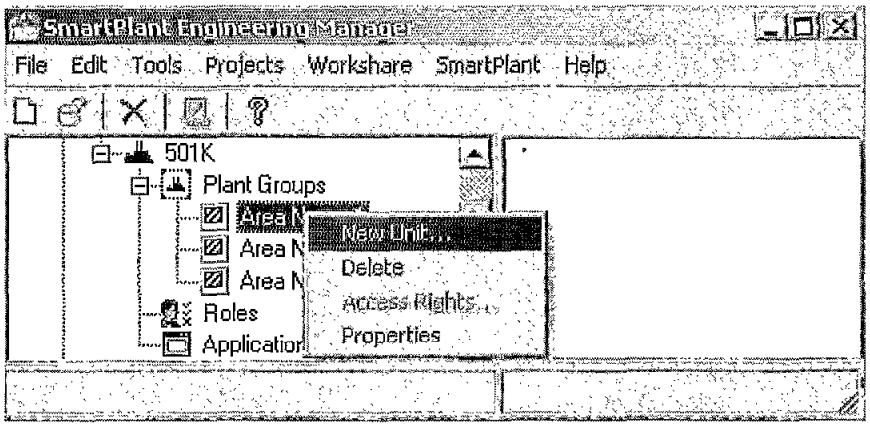
Create PlantGroups for the new Plant Structure.

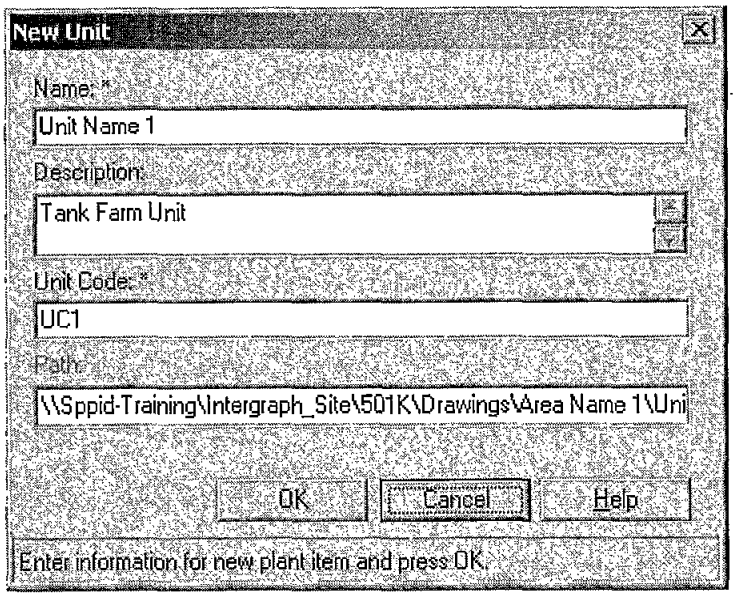
31. Create several **Plant Groups (Areas)** by selecting the **Plant Groups** node found under the **501K** Plant, right mouse click and select **New Area.**





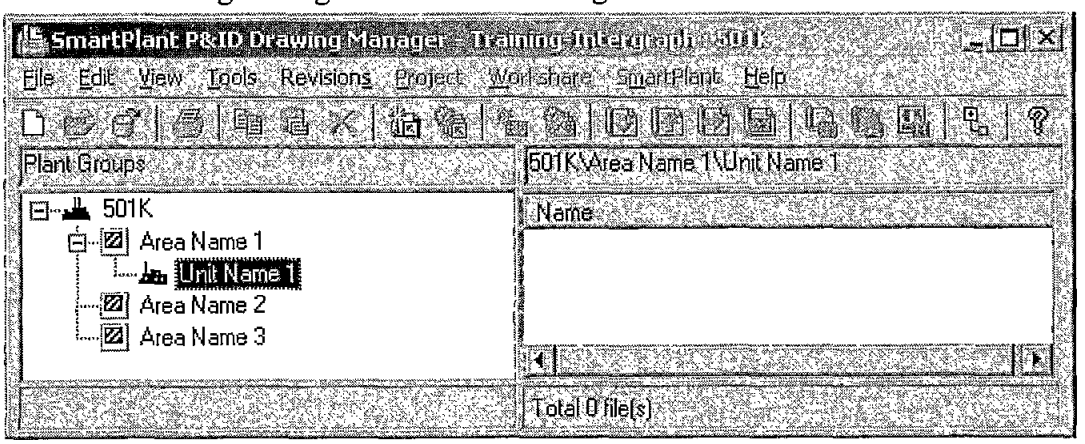
32. Create several **Plant Groups (Units)** by selecting the name of the **Area** found under the **Plant Groups** node, right mouse click and select **New Unit.**





Create Drawings

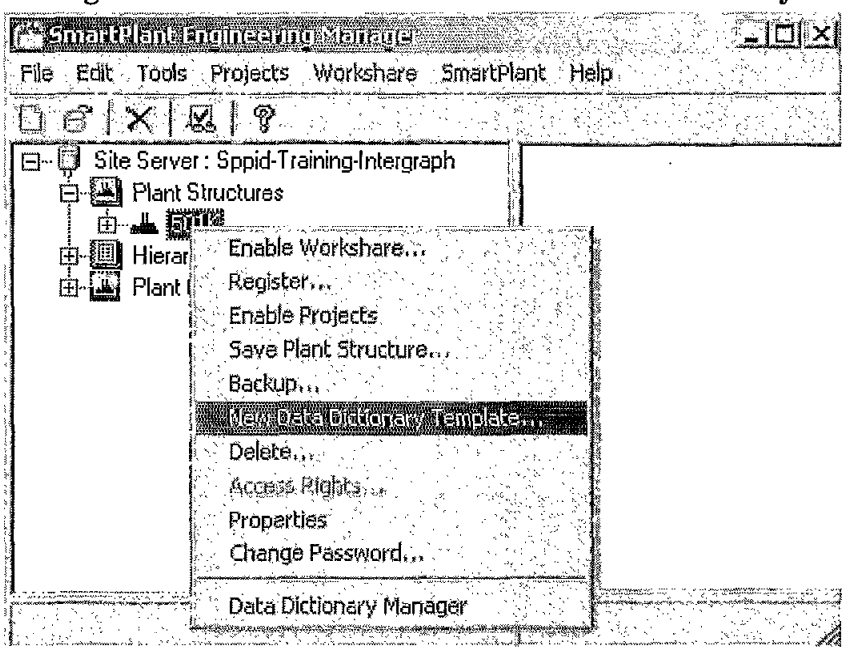
33. Start Drawing Manager and create drawings for the various Units.



Lab 5 – Using a Data Dictionary Template to Create a New Plant

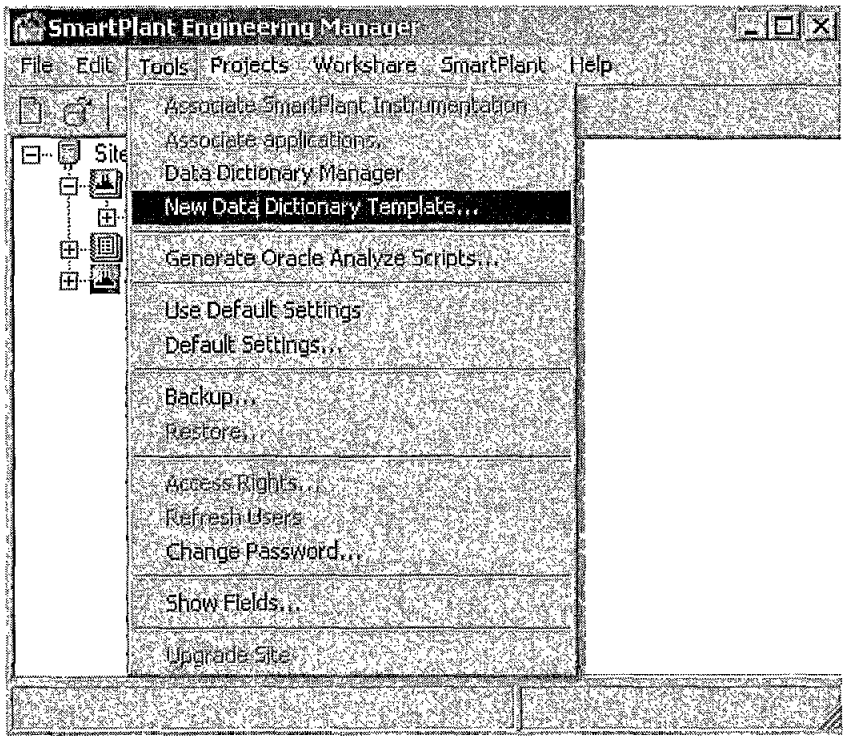
Creating the Plant Data Dictionary Template

1. Start **SmartPlant Engineering Manager**.
2. Create a **Data Dictionary Template** from the existing **Plant Data Dictionary**.
   a. Right click on the **Plant** and select **New Data Dictionary Template...**



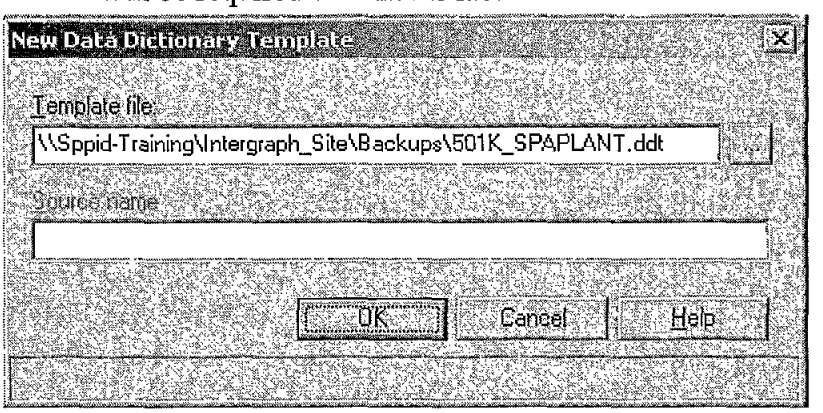
OR

Select **Tools > New Data Dictionary Template...**



3. Select **OK** on the **New Data Dictionary Template** dialog to accept the default template name.

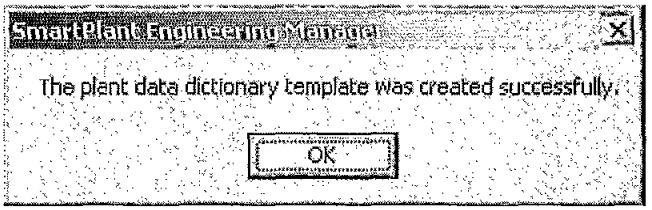
    a. Notice the path location where the file will be saved, this information will be required later in the lab.



- **Template file** - Allows you to specify the path and file name for the new template.

- **Source name** - Available only when creating an application template, this field displays the internal name of the source data dictionary template used to create the existing application data dictionary. You can type a new name to be used in place of Imperial or Metric in the **Plant Settings** table in the plant schema.

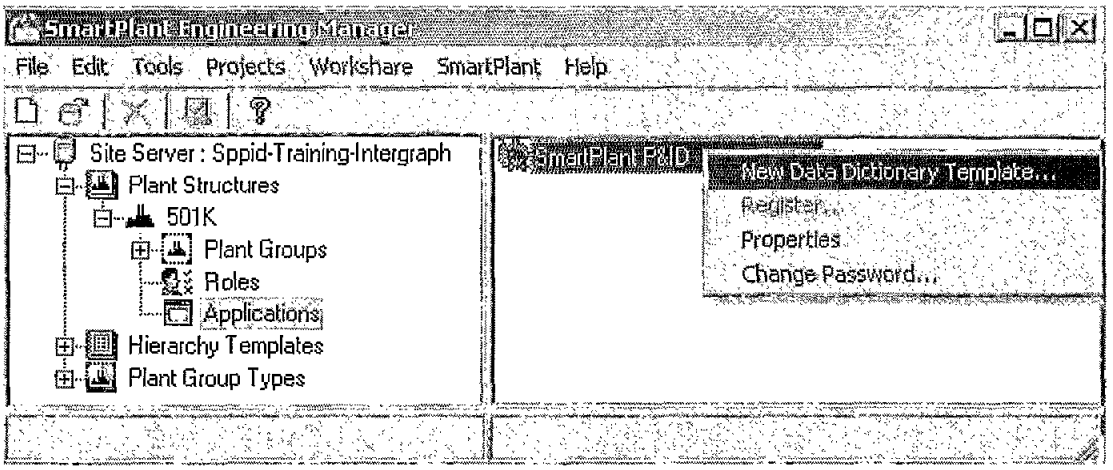
4. You will see the following dialog when the template has been created:



Creating the P&ID Application Data Dictionary Template

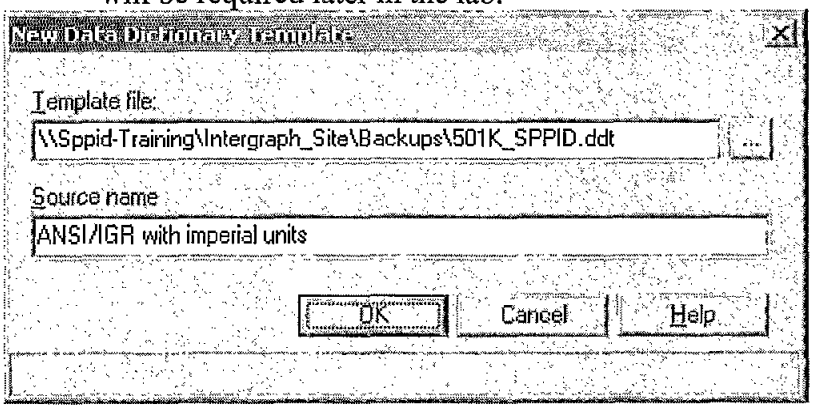
5. Create a **data dictionary template** from the existing **P&ID data dictionary** of the **Plant**

   a. Right click on the **P&ID Application** of the Plant and select **New Data Dictionary Template...**



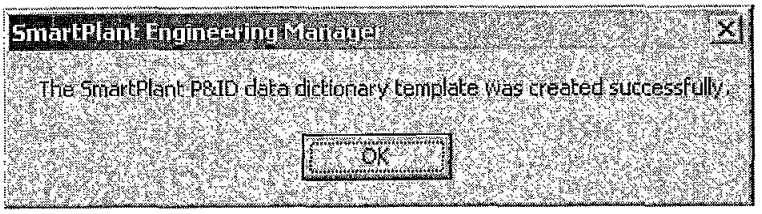
6. Select **OK** on the **New Data Dictionary Template** dialog to accept the default template name.

   a. Notice the path location where the file will be saved, this information will be required later in the lab.



- **Template file** - Allows you to specify the path and file name for the new template.
- **Source name** - Available only when creating an application template, this field displays the internal name of the source data dictionary template used to create the existing application data dictionary. You can type a new name to be used in place of Imperial or Metric in the **Plant Settings** table in the plant schema.

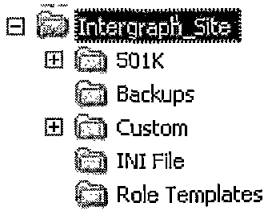
7. You will see the following dialog when the template has been created:



Create a new Plant with the custom Data Dictionary Template.

Preliminary Information

8. From Windows Explorer:
   a. Create a **subfolder** for your **Plant** below the folder for your **Site.**
      i. Subfolder name = **Custom**



      ii. To determine where the **folder** for your **site** is
         1. Select the **Site**
         2. Right mouse click
         3. Select **Properties**
         4. On the **General** tab
            a. Note the **Site Server ini Location**

iii. Create a subfolder below the **Custom** folder for the P&Ids.

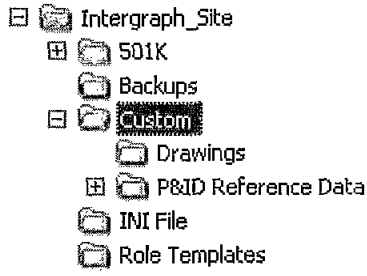
1. subfolder name = Drawings

9. **Copy** the **P&ID Reference Data** from the **old Plant** to the **new Plant**

   a. **Old Plant (501K)** is the **Plant** we are using the **custom data dictionary templates** from.

   b. **New Plant (Custom)** is the **Plant** you will **create** for which you created a **subfolder** in the previous step.

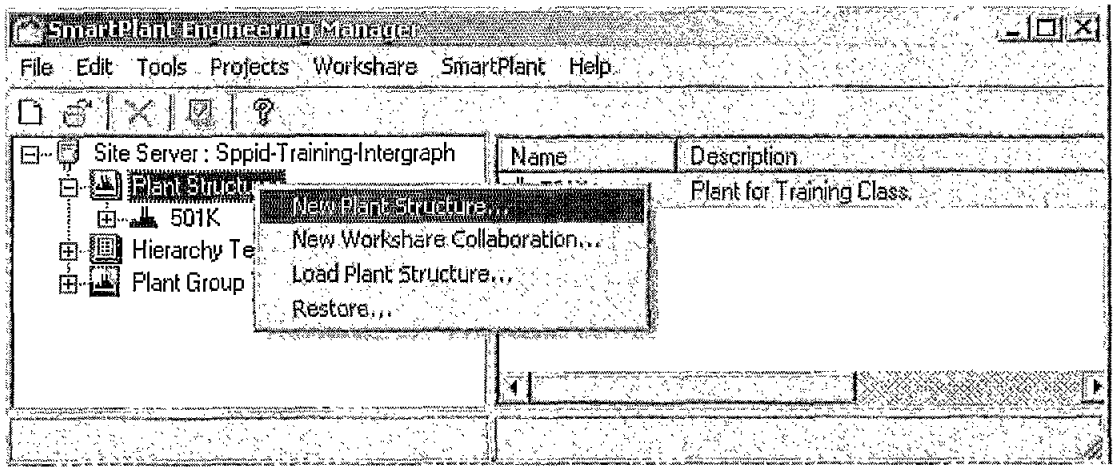
10. When complete beneath the Custom folder a similar folder structure should exist.



Create a Plant Structure

11. From **SmartPlant Engineering Manager**.

12. Right-click on the **Plant Structures** node and select **New Plant Structure...**



13. **New Plant Structure Wizard** allows you to specify the source for the plant data dictionary. Data dictionary templates are not database-specific. In other words, a given data dictionary template can be used in both Oracle and SQL Server environments.

   a. **Data Dictionary Source** = *Use custom template*

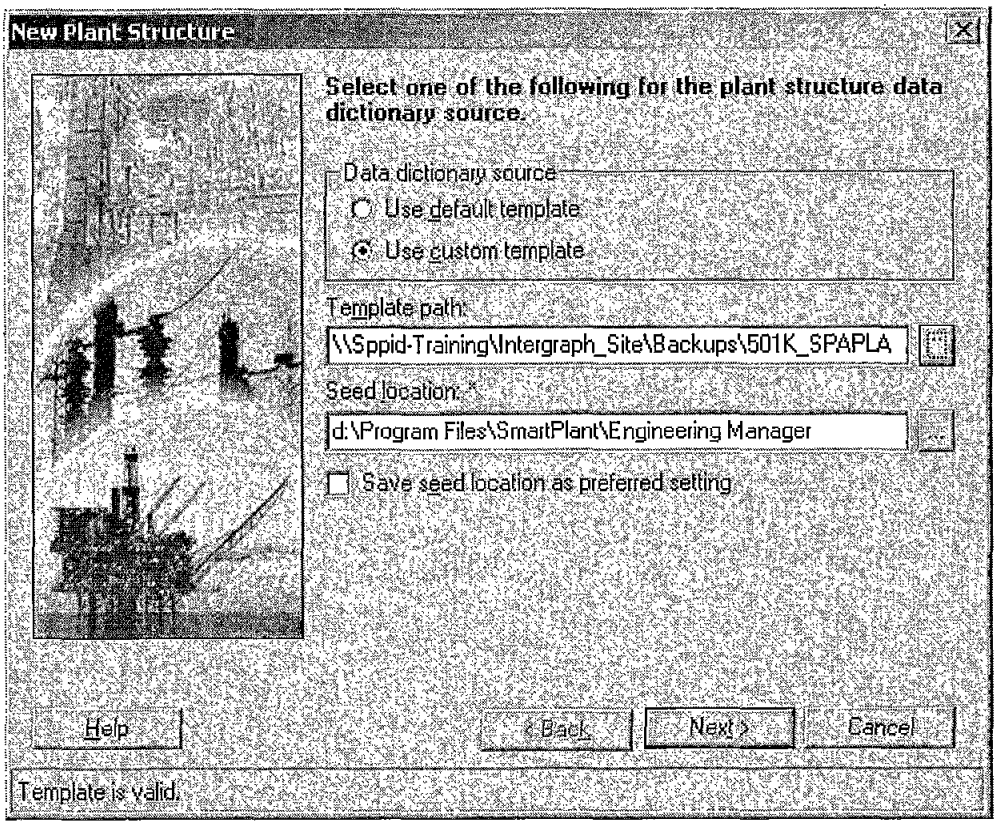
i. Selecting this option to create the data dictionary using a custom template will "copy" the existing plant structure.

b. **Template path** = *\\Machine Name\Intergraph_Site\Backups\501K_SPAPLANT.ddt*

c. Notice the **prompt** in the **lower left** corner of the **New Plant Structure form.**

i. **Template is Valid**[3]**.**

d. Select **Next**



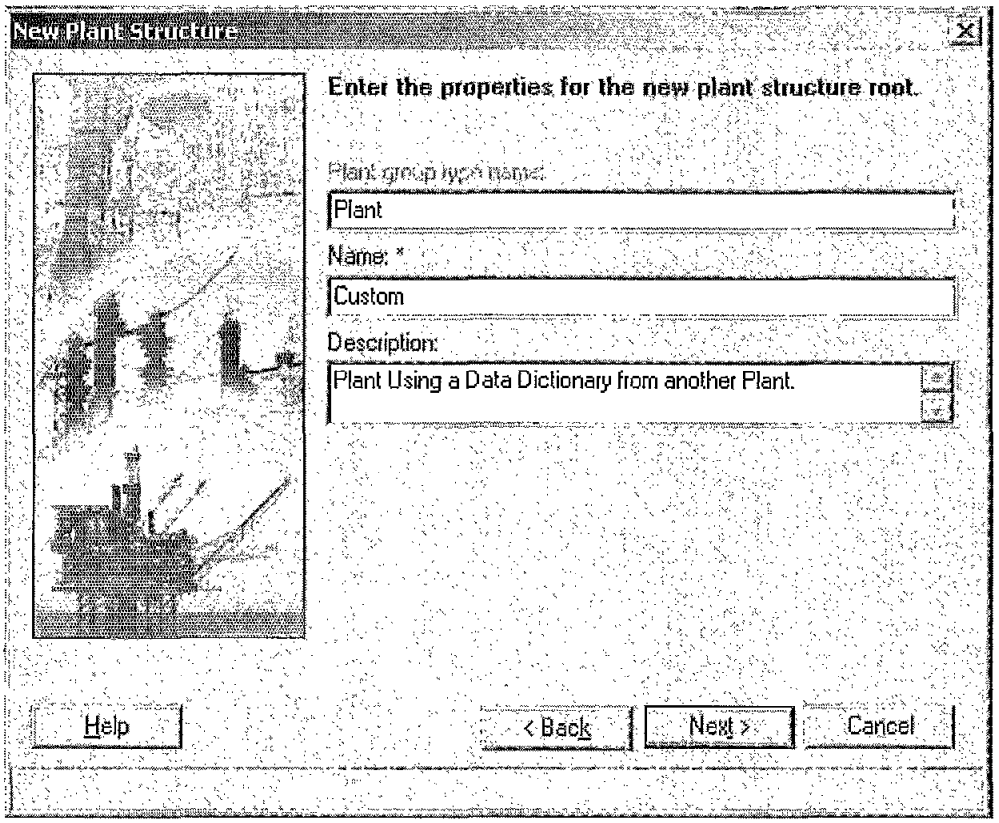
[3] Data dictionary templates are not upgradeable. However, you can use the Data Dictionary Template Comparison Utility to compare your existing template with the default template delivered with the latest version of SmartPlant Engineering Manager. For more information, see SmartPlant Data Dictionary Template Comparison Utility.

14. Enter the properties for the new plant structure root.

    a. **Name** = *Custom*

    b. **Description** = key in some information

    c. Select **Next**

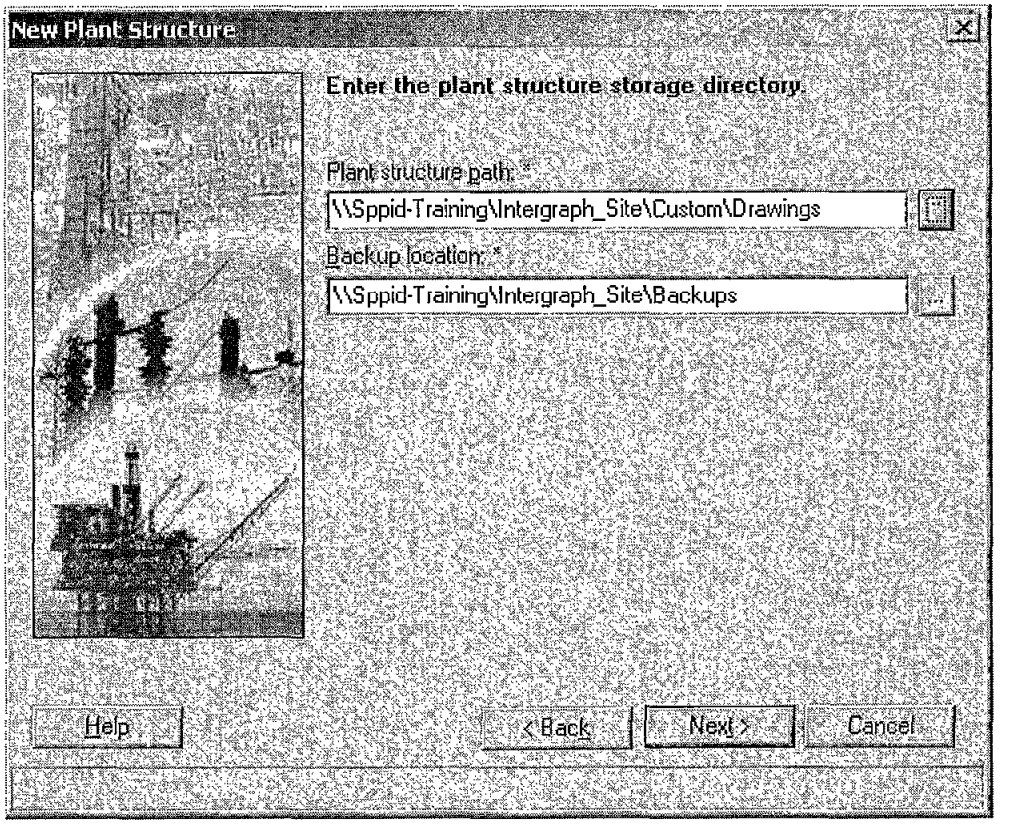


15. Enter the plant strucure storage directory and the location to the format file.

    a. **Plant structure path** = *Machine Name\Intergraph_Site\Custom\Drawings*

    b. **Backup location** = *MachineName\ Intergraph_Site\Backups*

    c. Select **Next**



16. Continue completing the **Plant Structure** creation.

    a. Set the database type and server for the plant schema.

    b. Enter the database server and user information for the plant structure schema.

        i. **Oracle Tablespace = Users**

    c. Enter the database server and user information for the plant structure data dictionary.

        i. **Oracle Tablespace = Users**

    d. Review the Create plant structure with the following settings.

    e. Select **Finish.**

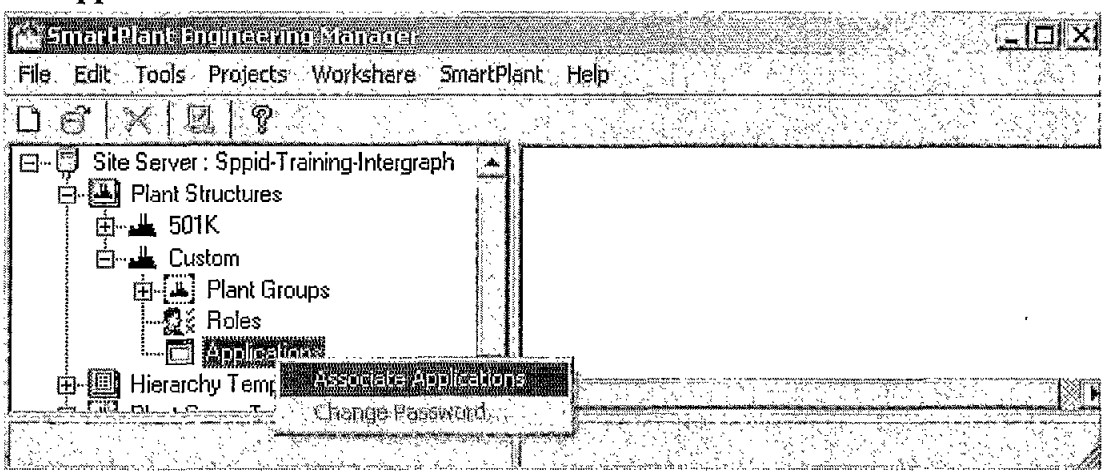
Associate SmartPlant P&ID Application

17. Select the **Applications** node below the **Custom Plant Structure.**

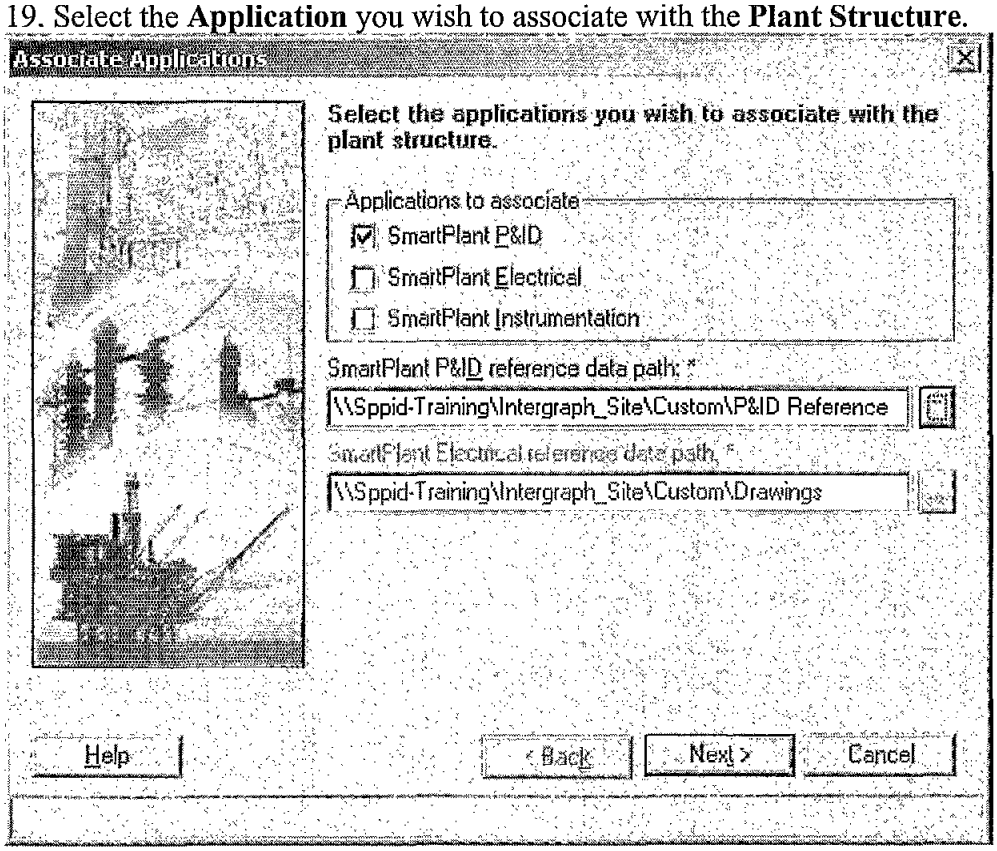
18. Select **Tools** > **Associate Applications**

    OR

    Right mouse click on the **Applications** node and select **Associate Applications.**



19. Select the **Application** you wish to associate with the **Plant Structure.**



a. **Applications to associate** = *SmartPlant P&ID*

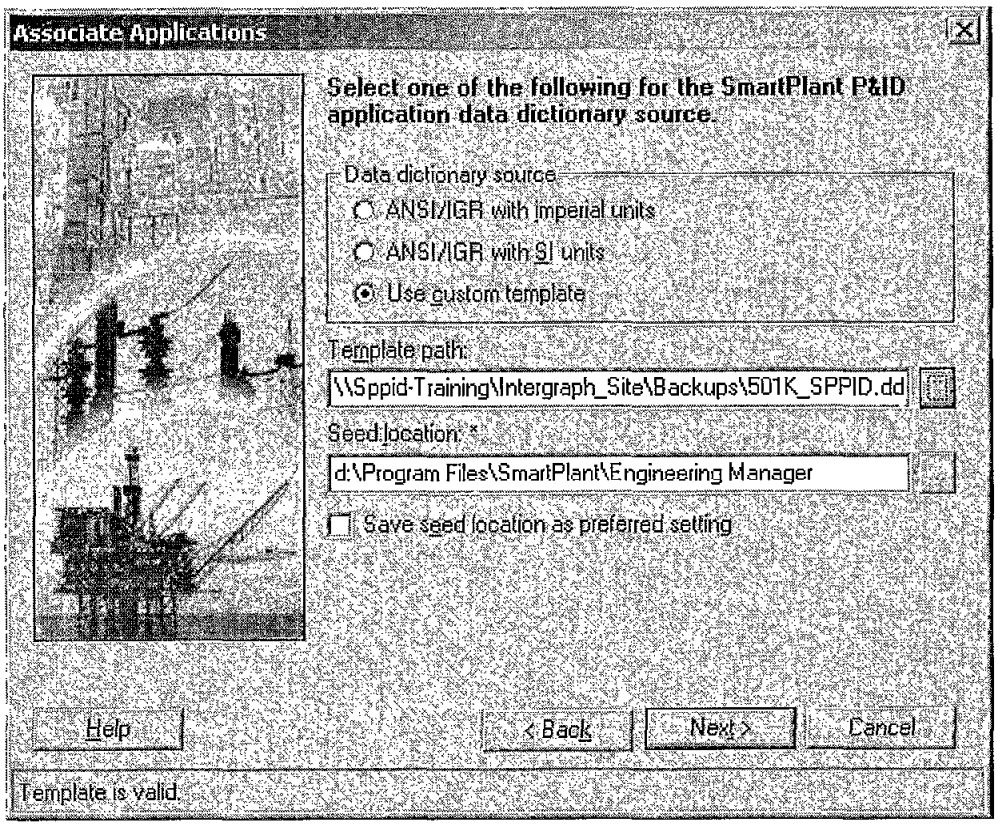
b. **SmartPlant P&ID reference data path** = *\\MachineName\Intergraph_Site\Custom\P&ID Reference data*

c. Select **Next**

20. **Associate Applications Wizard - Data Dictionary Source** allows you to specify the source for the application data dictionary. Data dictionary templates are not database-specific. In other words, a given data dictionary template can be used in both Oracle and SQL Server environments.

e. **Data Dictionary Source** = *Use custom template*

i. Selecting this option to create the data dictionary using a custom template will "copy" the existing plant structure.



f. **Template path** = *\\Machine Name\Intergraph_Site\Backups\501K_SPPID.ddt*

g. Notice the **prompt** in the **lower left** corner of the **New Plant Structure form.**

i. **Template is Valid**[4]**.**

h. Select **Next**

[4] Data dictionary templates are not upgradeable. However, you can use the Data Dictionary Template Comparison Utility to compare your existing template with the default template delivered with the latest version of SmartPlant Engineering Manager. For more information, see SmartPlant Data Dictionary Template Comparison Utility.

21. Continue completing to **Associate Application**.

    a. Enter the database server and user connection information for SmartPlant P&ID schema.

        i. **Oracle Tablespace = Users**

    b. Enter the database server and user connection information for the SmartPlant P&ID data dictionary.

        i. **Oracle Tablespace = Users**

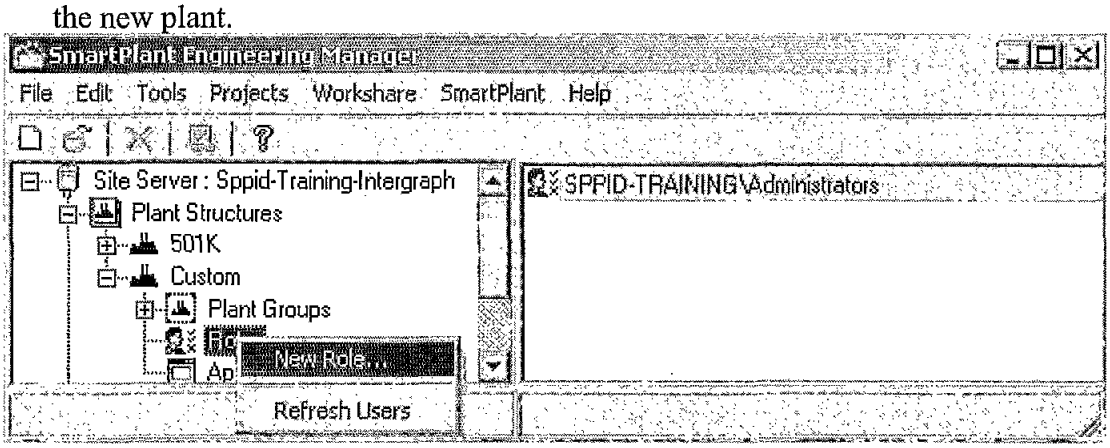
    c. Review Application association settings.

    d. Select **Finish**.

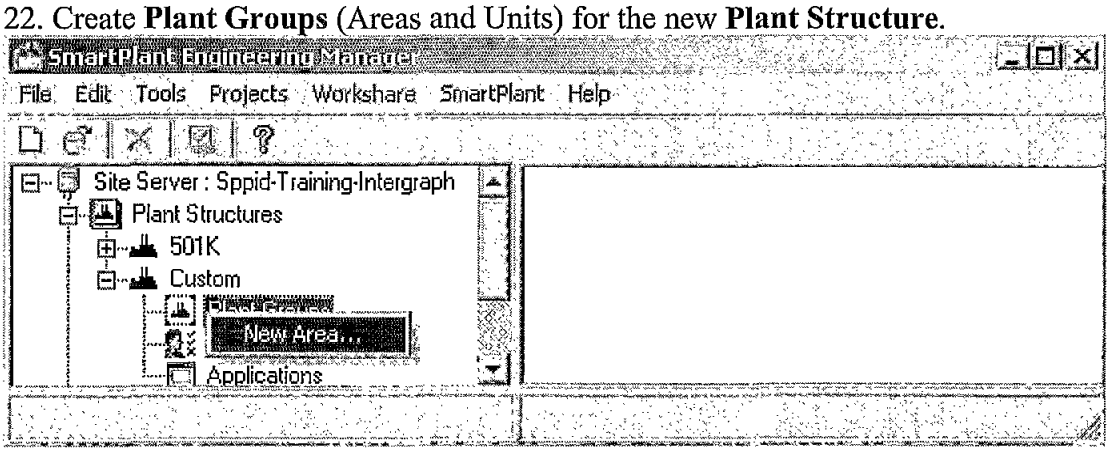
Assign Roles to the new Plant Structure and Application.

Notes:

- If you checked the option to **Add the site administrator group to each plant created** during the Site creation you will have a role automatically assigned to the new plant.

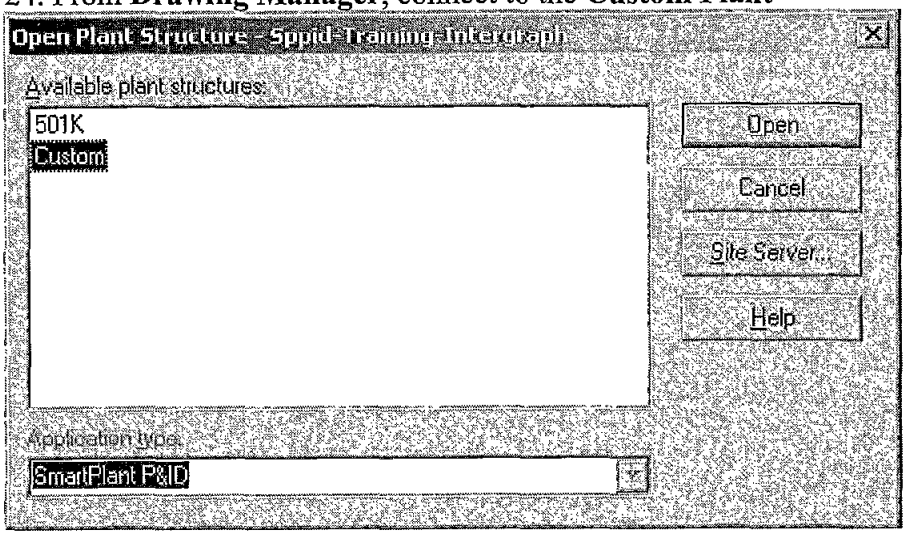


22. Create **Plant Groups** (Areas and Units) for the new **Plant Structure**.

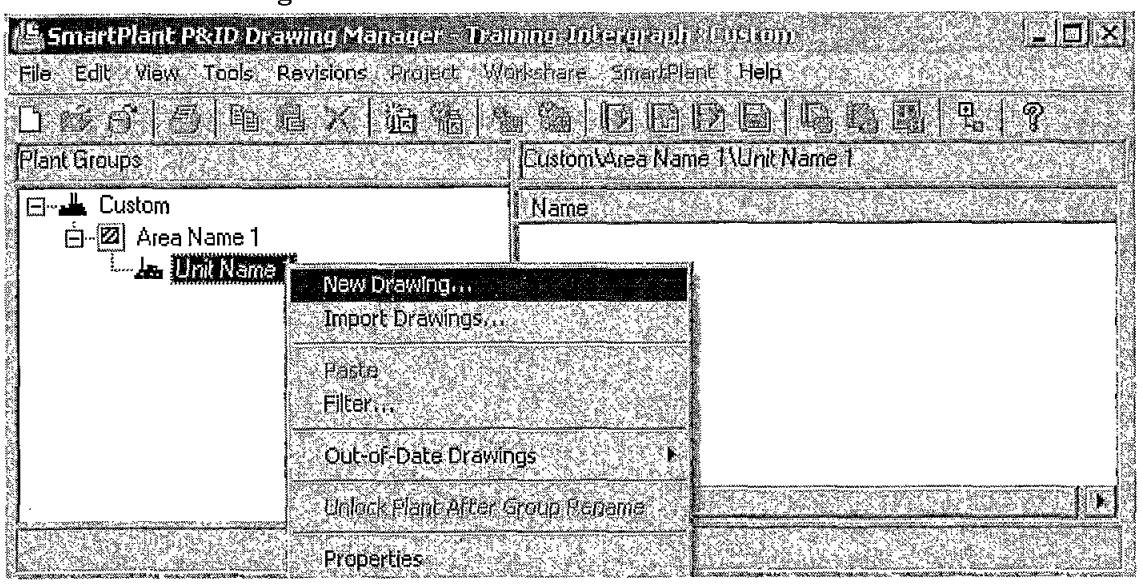


23. **Exit** from **SmartPlant Engineering Manager**.

24. From **Drawing Manager**, connect to the **Custom Plant**



25. **Create** a **Drawing** for the **Unit**.



26. **Exit** from **Drawing Manager**.

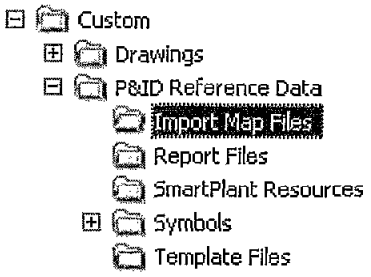
Lab 6 – Import of Drawings

Prior to starting the Import Process.

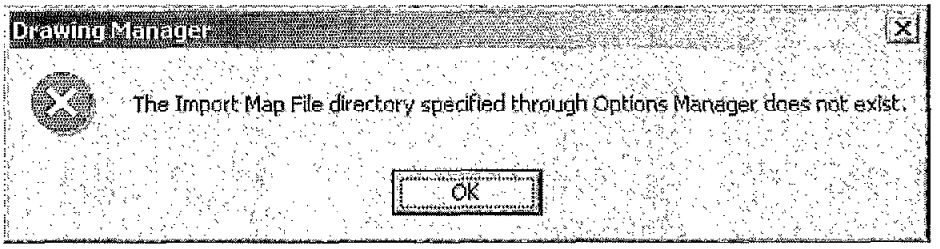
1. For the **Custom** plant verify through **Options Manager** > **Settings** the **Import Map Path** is set.

Reference Data	Setting
Import Map Path	\\Sppid-Training\Intergraph_Site\Custom\P&ID Reference Data\Import Map Files

2. From **Windows Explorer**, verify the **folder** is created as defined by the **Import Map Path.**

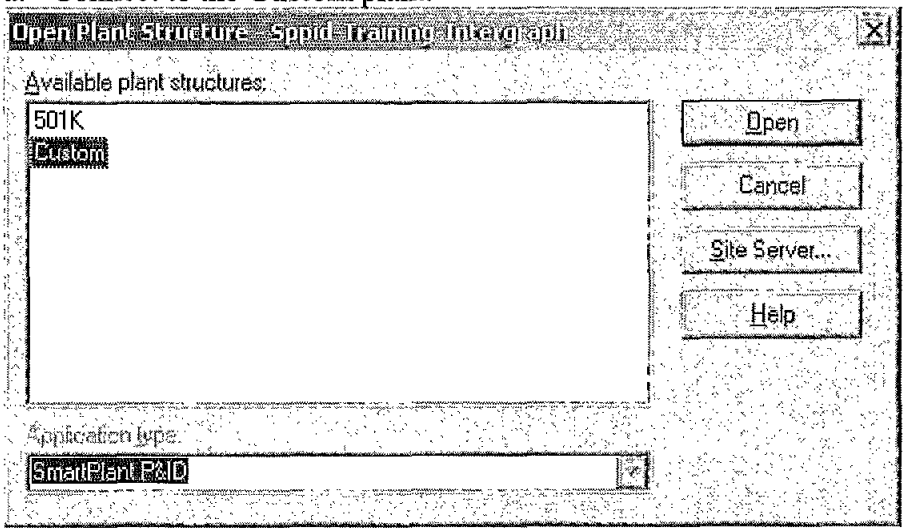


3. If the above criteria is not defined the below message will occur during the import process.

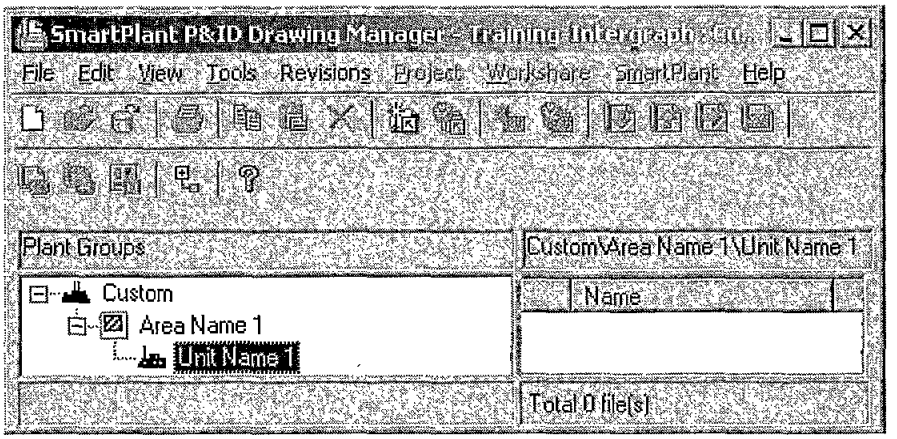


From Drawing Manager

a. Connect to the **Custom** plant.



4. Select the **Plant Group** (Unit) for which you will **import** a drawing into.

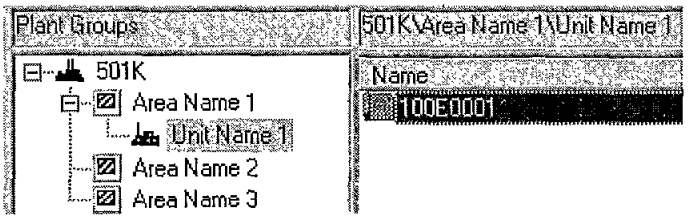


The Import Drawing Process

5. Select **File** > **Import Drawings**
   a. The **Import Drawing Wizard** will become active.
   b. Select **Next**
6. Select the **Source Plant**, which you will be importing the drawing from.

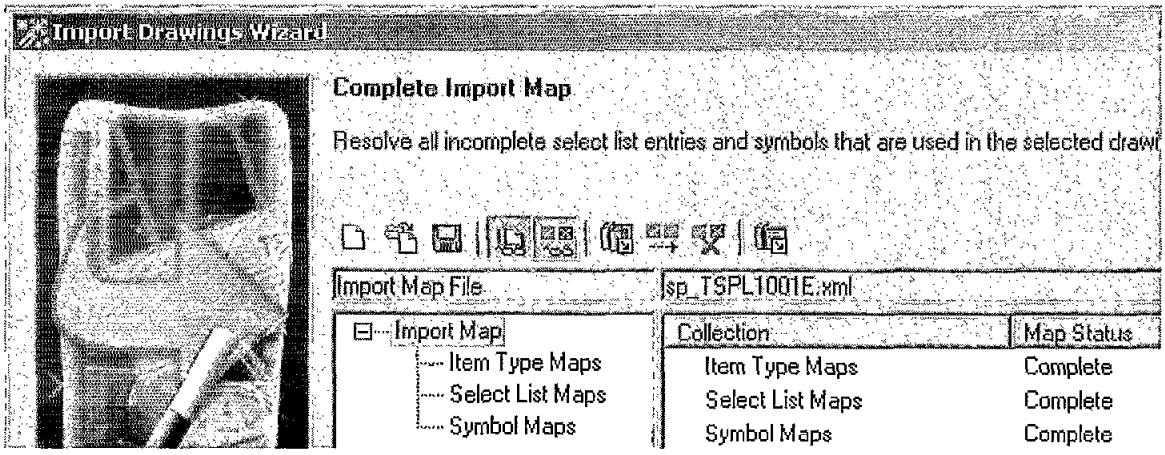
   We will be importing a drawing from a plant (**501K**), which resides in the same Site Server (**Intergraph**).
   a. Select the **Plant**.

   OR
   b. Select a different **Site Server** if the **Plant** resides within a different **Site**
7. Select **Next**
8. Select the **Drawing(s)** which will be imported.



9. Select **Next**

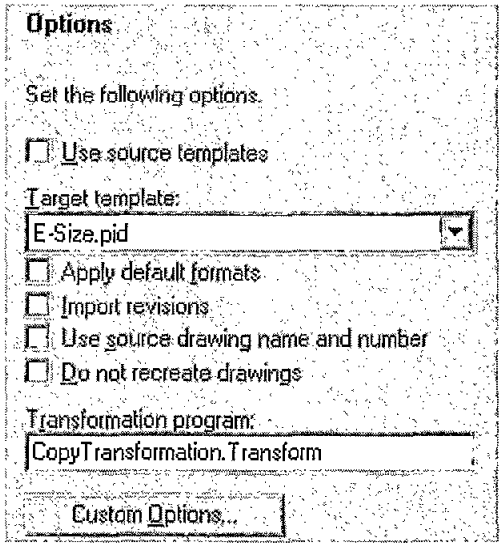
a. The Map Status column in the list view contains a value of Complete or Incomplete. A value of Complete indicates this item and all of the items below it have been mapped. A value of Incomplete indicates this value is not mapped or some value below it has not been mapped. You must expand the Tree view to find the item that needs to be mapped. When you select the top-most node in the Tree view and the Map Status displays Complete for all three of its children, then you know that the import map is complete.



10. Select **Next**

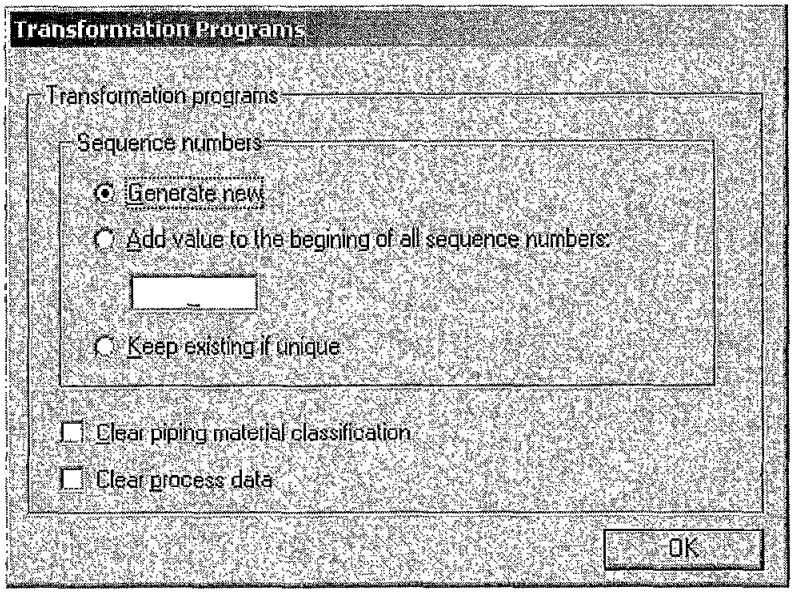
11. **Set Options**

a. Select the Options to utilize during the import of the drawing(s).



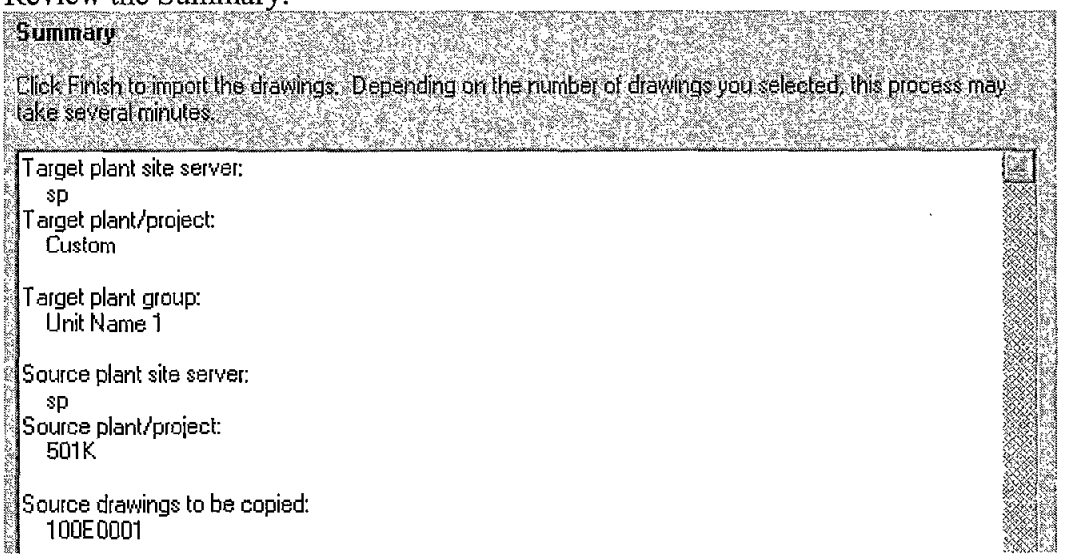
b. Select **Custom Options.**

1. Review the options
2. Select **OK**



12. Select **Next**

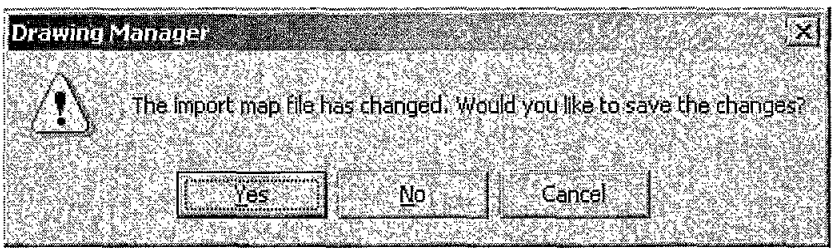
13. Review the Summary.



14. Select **Finish.**

15. The first time the Import process is ran you will be prompted with the below message. Subsequent Import process may also prompt you with the below message if changes to the Import Map file would be required.

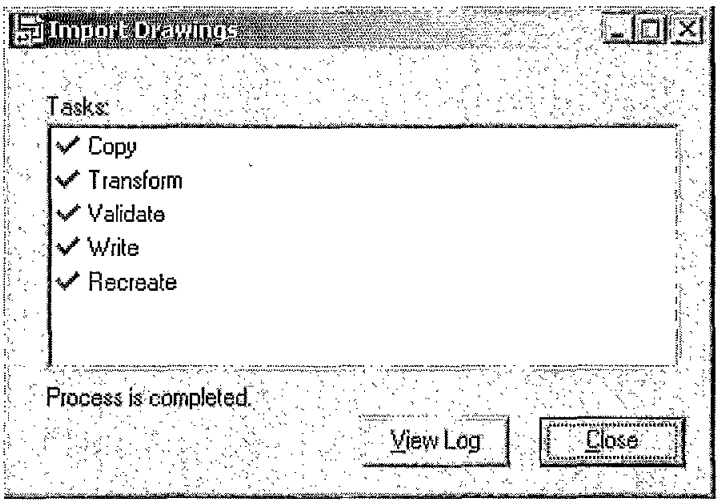
    a. Select **Yes**



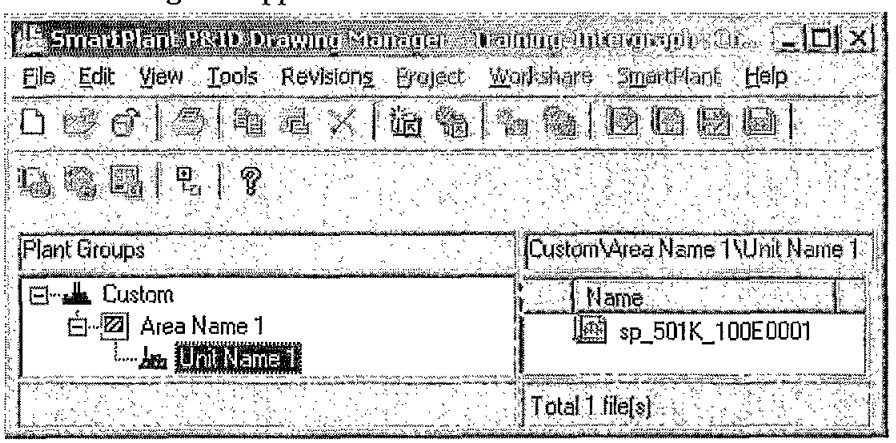
16. The import process will begin and the below 5 stages will complete, based on the options selected.

    a. **View** the **Log** file

    b. Select **Close.**



17. The **Drawing** will appear in the **list view.**



    a. To **rename** the **drawing**

        1. Select the **Drawing**
        2. Select **Edit** > **Properties**

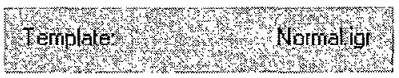
           OR

           Right mouse click and select **Properties**

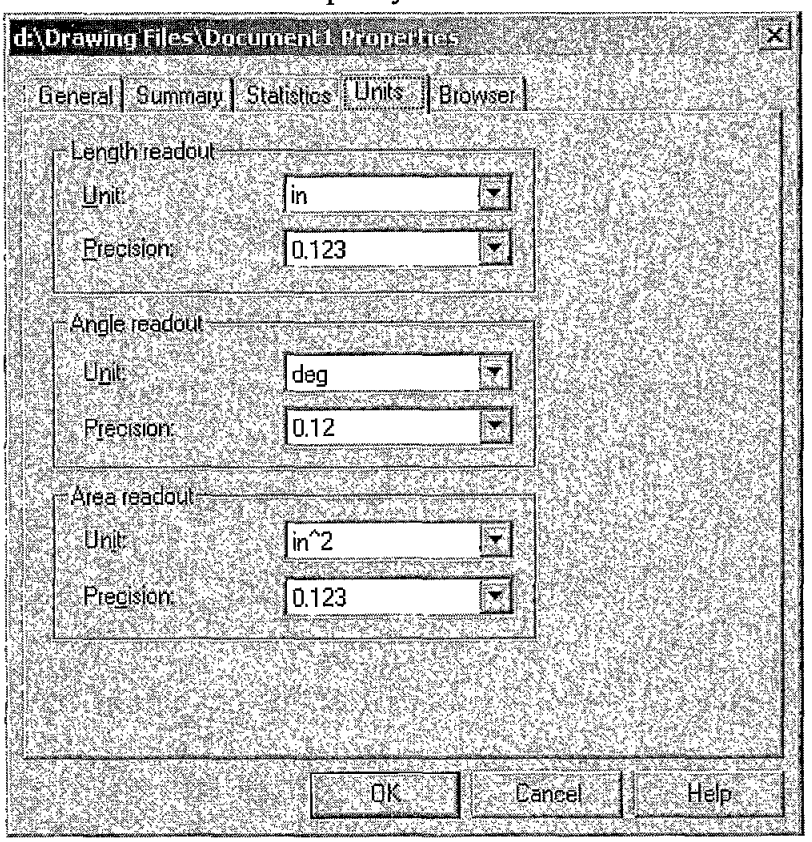
Lab 7 – Creating Border Files and Template Files

Create a Border File

1. Enter **SmartSketch**
   a. Select **Start** > **Programs** > **Intergraph SmartSketch** > **SmartSketch**
2. Verify the **normal.igr** file was used.
   a. Select **File** > **Properties** and select the **Summary** tab.

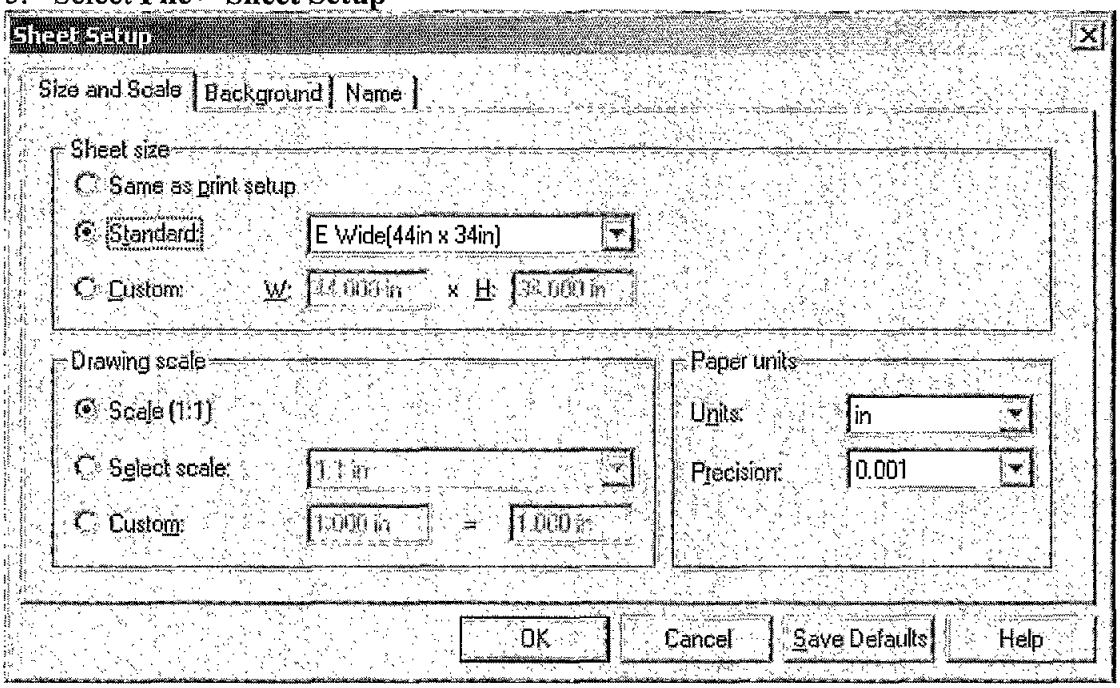


3. Select the **Units** tab specify the **Units** and **Precision**.



   a. **Length readout**: Select a unit of **in** with precision of **0.123**
   b. **Angle readout**: Select **deg** with precision of **0.12**
   c. **Area Readout**: Select **in^2** with precision of **0.123**
4. Select **OK**.

5. Select **File > Sheet Setup**

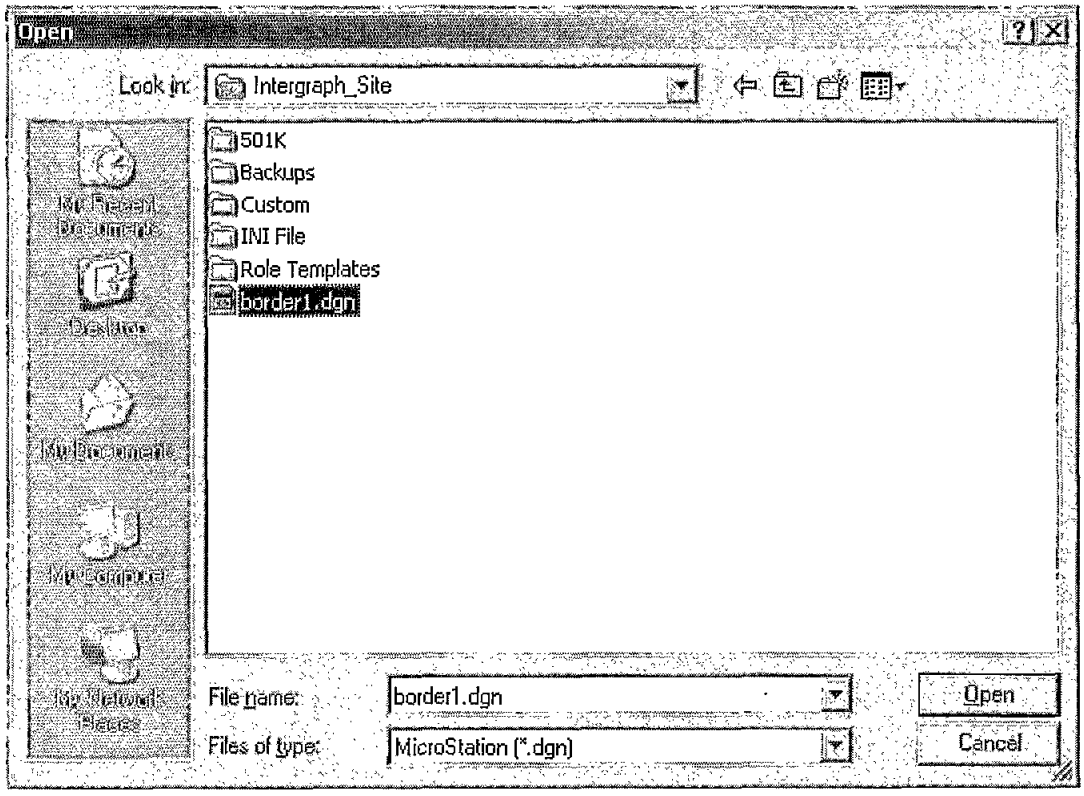


a. Select the **Size and Scale** tab.

i. **Sheet Size** = E Wide(44in X 34in)

b. Select **OK**.

6. Open a MicroStation border file called **border1.dgn**.



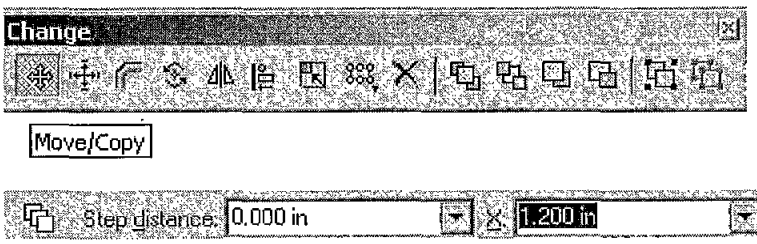
a. This file will be provided by the instructor.

b. Select **File > Open**

7. Select **Window > Tile Horizontally** to display both files on the screen.
8. Select **Edit > Select All** to select all of the graphics in the Microstation file.
9. Select **Edit > Copy** to copy the graphics from the MicroStation file.
10. Ensure the SmartSketch file is active before pasting the graphics.
11. Select **Edit > Paste** to paste the graphics into your new SmartSketch file.

    a. If necessary, utilize the **Move** command on the **Change** toolbar to move the graphics.

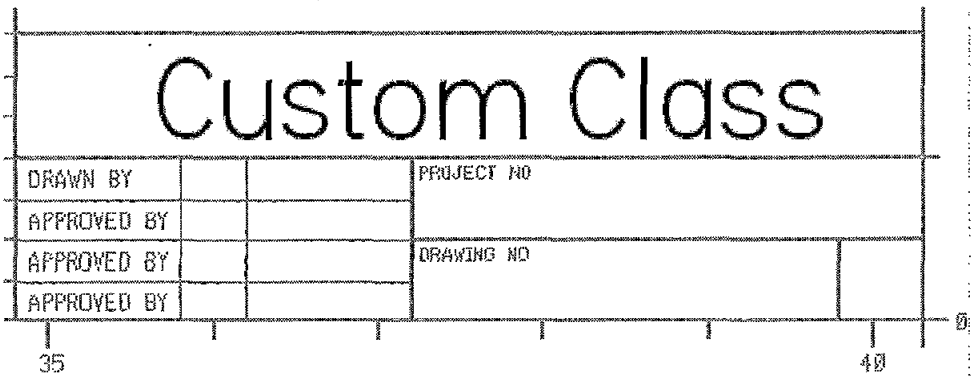
12. Close the **Microstation** file.
13. Utilize the **Move/Copy** command on the **Change** toolbar to move the border file inside the Sheet size.



14. **Delete** the **INTERGRAPH** logo from the graphics.

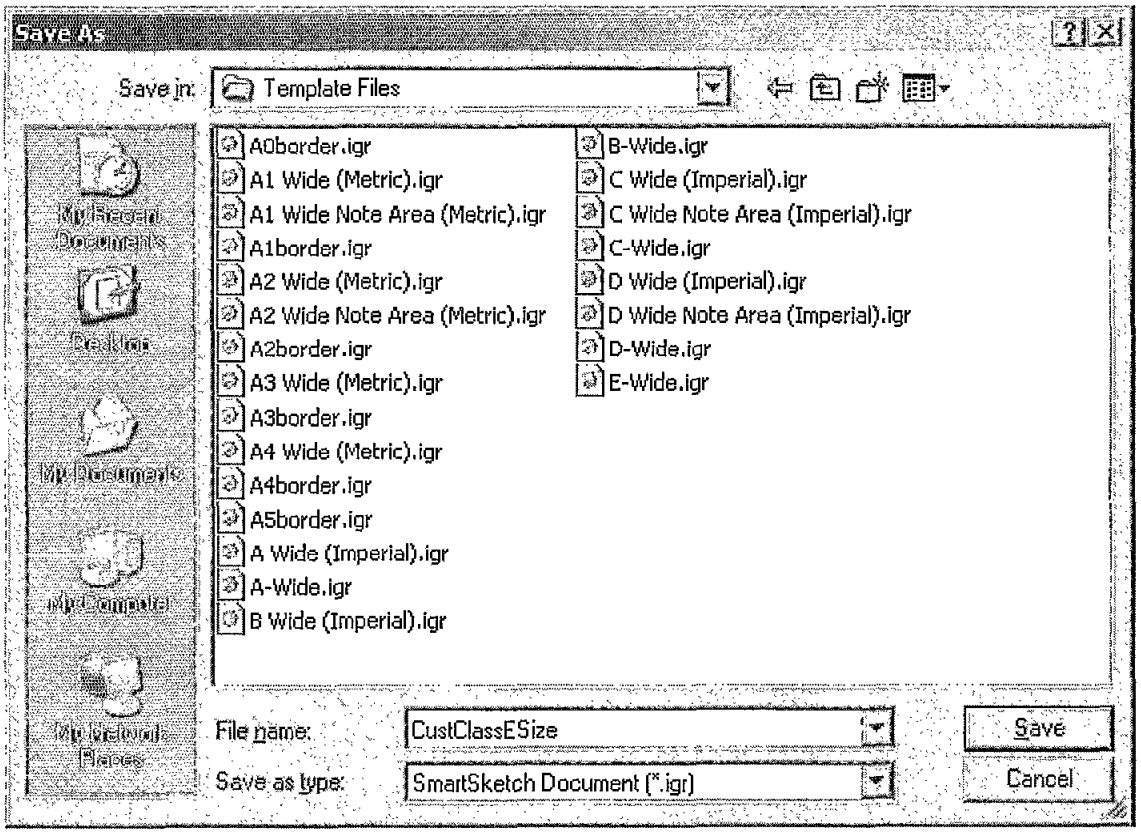
    a. Use a **Select Set**

15. Utilize the **Text** command and replace the logo with the text of **CUSTOM CLASS**. You may use Intergraph ANSI font of size .50 in (or another font and size of your choice).



16. Select **File > Save.**

17. In the **Save As** dialog box, navigate to the folder of the reference data of the plant you are currently working in.
    a. You will save your new border in this folder. **\\Machine Name\Intergraph_Site\Custom\P&ID Reference Data\Template Files**
    b. Type **CustClassEsize** for the name for the border in the **File Name** field.

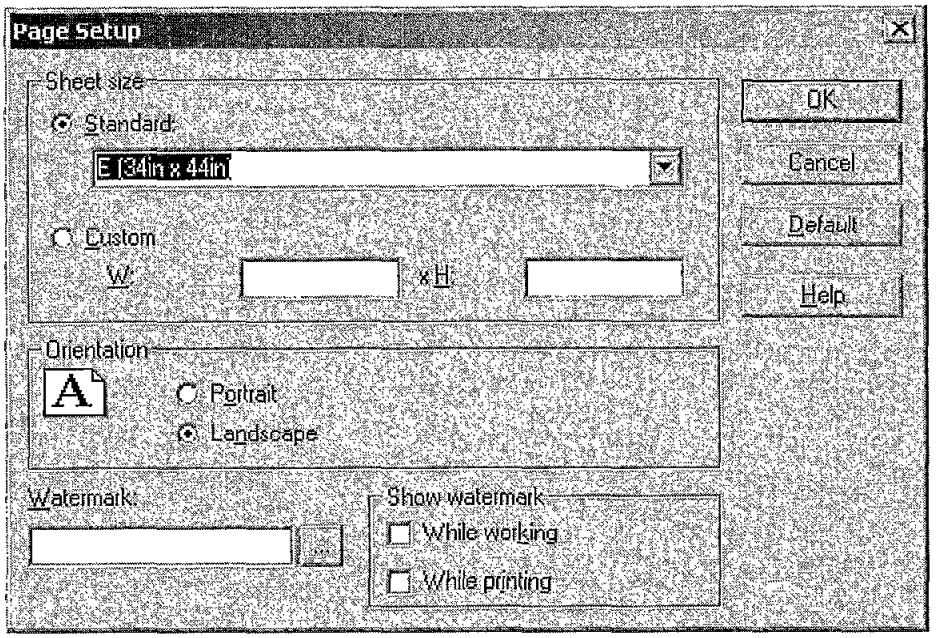


    c. Select **Save**.

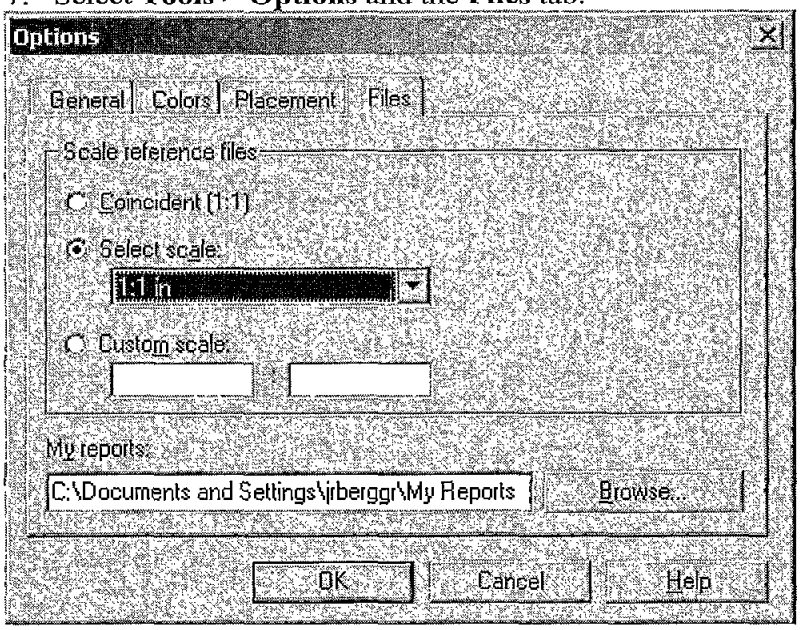
18. Select **File** > **Exit** to exit the **SmartSketch** application.

Create a Template File

1. Select **Start** > **Programs** > **Intergraph SmartPlant P&ID**> **SmartPlant P&ID**.
2. Select **File** > **New Template**.
3. Select **File** > **Page Setup**.
4. Select **E [34in x 44in]** for the sheet size in the **Sheet size** frame.
    a. Select **OK**.



5. Select **File > Properties**
    a. Select the **Units** tab.
    b. Specify the following **Units** and **Precision**.
        1. **Length readout:** Select a unit of **in** with precision of **0.123**
        2. **Angle readout:** Select **deg** with precision of **0.12**
        3. **Area Readout:** Select **in^2** with precision of **0.123.**
6. Select **OK**.
7. Select **Tools > Options** and the **Files** tab.



    a. Select **1:1 in** for the **Select scale** in the **Scale reference files** frame.

8. Select **OK**.

9. Select **Edit** > **Insert** > **Object**.

    a. Uncheck the **Link** checkbox so that your border file will be embedded within the template.

    b. Select **Browse**

        1. select the **CustomClassEsize.igr** file created in the previous section of this exercise.

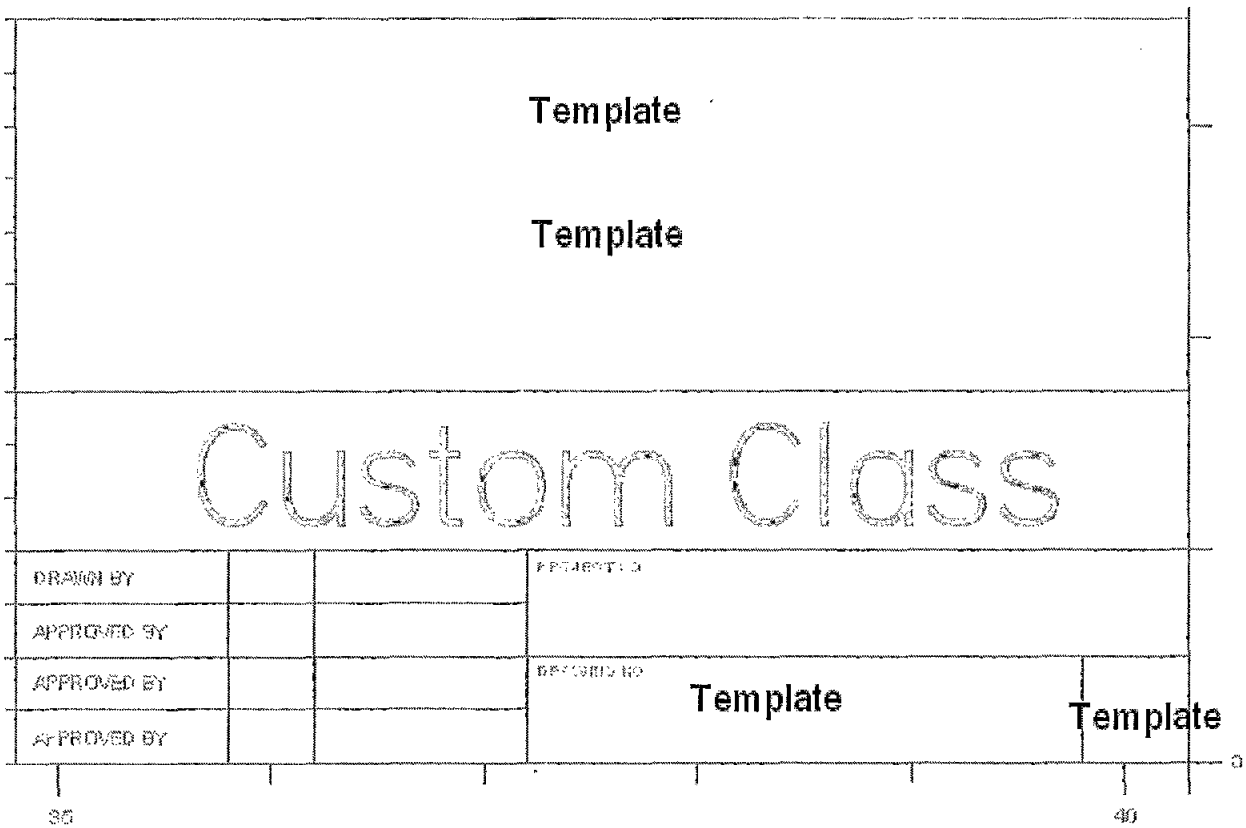
        2. Select **Open** on the **Browse** dialog.

10. Select **OK**.

11. Postion the Border (SmartFrame box) so that it is properly centered on the sheet.

12. Place the **Title Block Label** into the **Template**

    a. **Symbols** > **Design** > **Title Block Label – E Size**



13. Set additional settings, whenever a drawing is created utilizing this template those drawings will have identical settings.

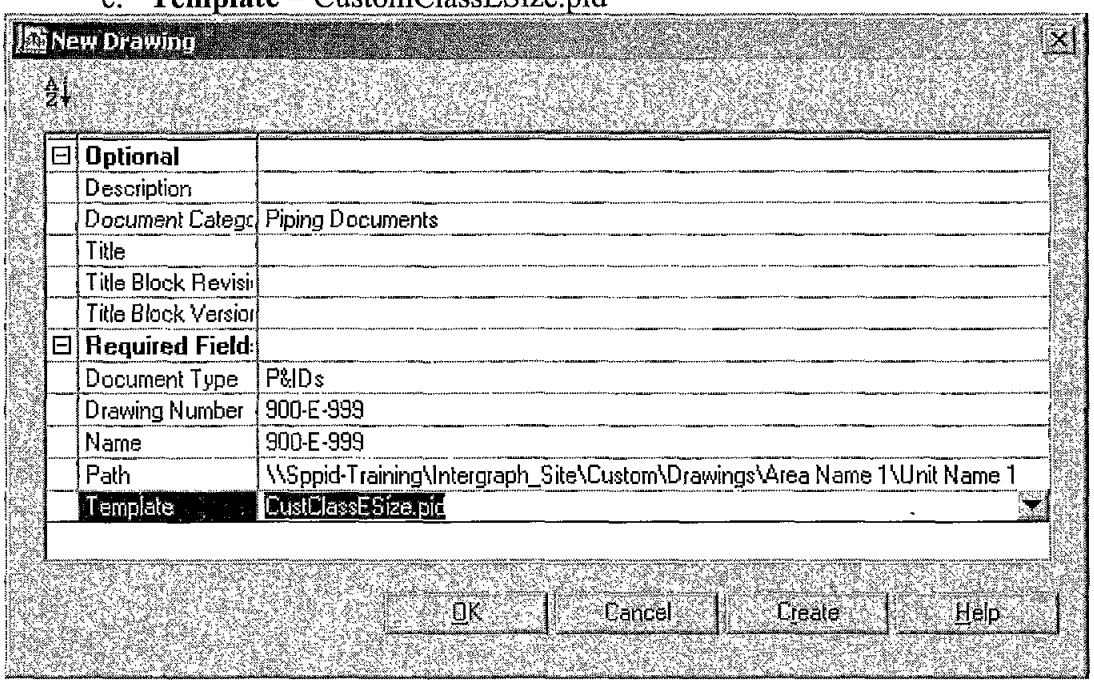
    a. For Example:

1. Select **View** > **Properties** and the **Display** tab, check **Prevent Selection of Inserted Objects.**
2. Select **View** > **Properties** and the **Grid** tab, check the **Show Grip, Snap Grid** and set the density = .05 in

14. Select **File** > **Save.**
    a. Type the name **CustomClassEsize** for the template in the **File Name** field. (Save the template border in the default templates location defined in **Options Manager**, that is, **\\Machine Name\Intergraph_Site\Custom\P&ID Reference Data\Template Files**
    b. Select **Save.**
15. Select **File** > **Exit.**

Create a Drawing Using the New Template

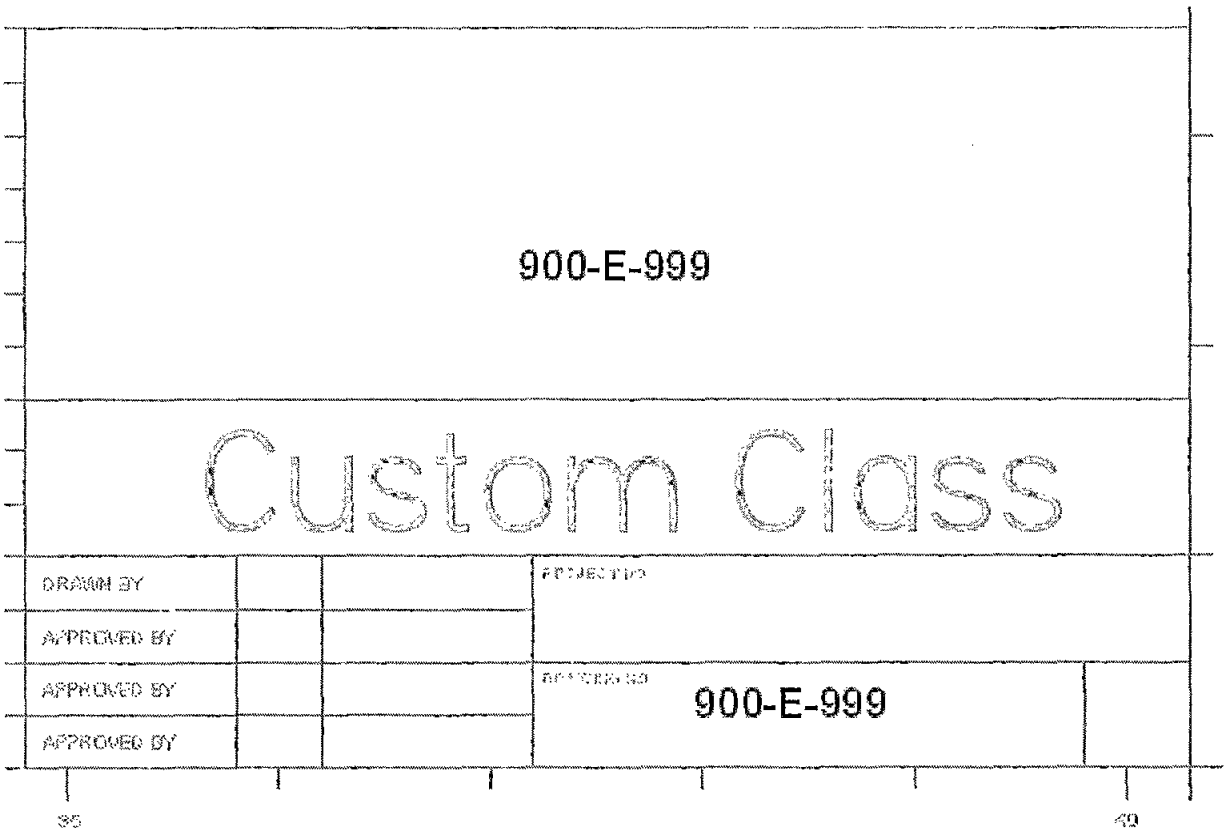
16. Select **Start** > **Programs** > **Intergraph SmartPlant P&ID** > **Drawing Manager** to open the Drawing Manager application.
17. Create a new drawing with the following properties:
    a. **Drawing Number** = 900-E-999
    b. **Drawing Name** = 900-E-999
    c. **Template** = CustomClassESize.pid



18. Open the drawing and verify that you see the border[5] you created in this exercise.

Notes:

- Green text in any label remaining from the copied Microstation file indicates that the label font is not on the machine. To resolve, you will need to change the fonts of the remaining labels or load the font onto the machine.



19. **File** > **Exit** the drawing.

20. **File** > **Exit** from Drawing Manager

[5] You can specify a new sheet size for an existing drawing through the **File** > **Page Setup** command, for example, a B-size drawing to a C-size. Choose the template size from the list. The size choices are more limited for an existing drawing than for a new template. Delete the existing Border file and insert/embed the appropriate border file through the **Edit** > **Insert** > **Object** command

Lab 8 - Migrating a SmartSketch Drawing into SmartPlant P&ID

1. Enter Drawing Manager
   a. Select **Start > Programs > Intergraph SmartPlant P&ID > Drawing Manager**
2. Create a drawing.
   a. Select **File > New > Drawing**.
3. Define the following properties, and select **OK**.

   Name: SStoSPdwg

   Description: Drawing to translate SS to SP

   Drawing Number: SStoSPdwg

   Title: Migration Drawing

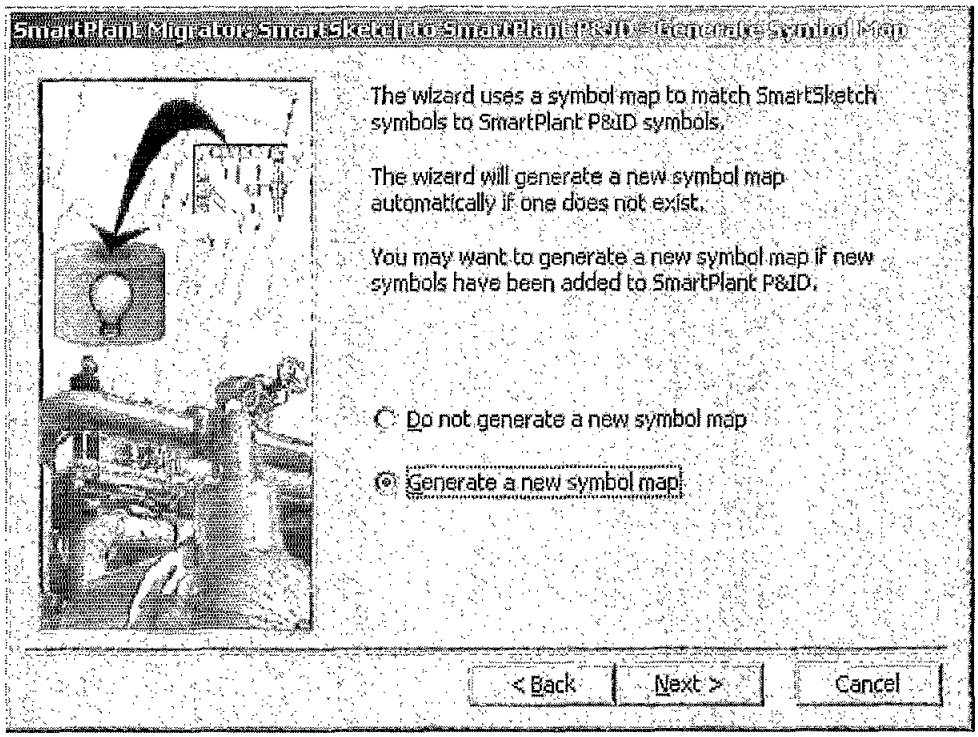
   Template: E-Size.pid
4. Open the drawing
   a. Double click the new **SStoSPdwg**
5. Start the Migration
   a. Select **File > Import > SmartSketch**.
6. Select **Next**.
7. On the **Generate Symbol Map** dialog box, there are two choices:
   a. **Do not generate a new symbol map**

      and

   b. **Generate a new symbol map**.

   Select **Generate a new symbol map**

   Remember the first time the Migrator is run, the **SymbolMap.csv** file will be created. After the first migration, if no new symbols have been created in SmartPlant P&ID, then **Do not generate a new symbol map** can be selected. Conversely, if new symbols have been created, a new symbol map should be generated to account for those new symbols.
8. Select **Next**.



9. Browse to the file called **Migrator.igr**
    a. Select the file.
    b. Select **Open**
    c. Select **Next**
10. Click **Finish** to start the Migration process. The software will create a temporary SmartSketch file called **GetSmart.igr** with the graphics to migrate.
11. Open the **GetSmart.log** file in the **~\temp** folder. Notice the files that are read:
    a. PID Symbol Map
    b. PID Connector Map
    c. PID Rotation Map

    Review the file for the symbols placed and their x,y location. Also review for any errors. Errors during migration are written to this file.
12. Open and review the **SymbolMap.csv** file in the **~\Program Files\SmartPlant\P&ID Workstation\Program** directory in Microsoft Excel. There are two columns in this file:
    a. AABBCC code
    b. The path to the symbol.

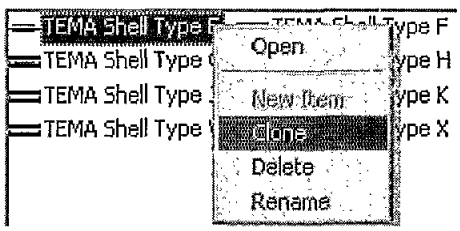
    This is the file that will be generated the first time the migrator is run and should be re-generated when new symbols are created in SmartPlant.

13. Open and review the **ConnectorMap.csv** file in the **~\Program Files\SmartPlant\P&ID Workstation\Program** directory in Microsoft Excel. This file makes the connection between SmartSketch line styles and SmartPlant piping symbols. If new line styles are added in SmartSketch, this file can be edited to migrate the new line styles.
14. Open and review the **RotationMap.csv** file in the **~\Program Files\SmartPlant\P&ID Workstation\Program** directory in Microsoft Excel. This map is used for autoaligning symbols. The map is primarily for Nozzles.
15. In SmartPlant, draw a fence around the entire graphics in the drawing. Select the **Move/Copy** button from the Main toolbar, and move the entire graphic set up in the drawing.

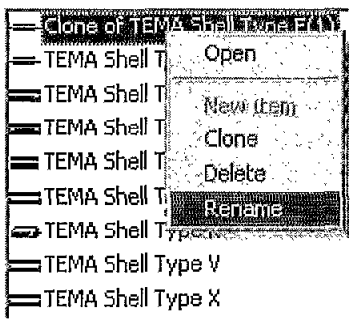
Lab 9 – Cloning a Symbol (TEMA)

Purpose: Cloning a symbol and modifying the graphics

1. Open the **Catalog Manager**
   a. Select **Start > Programs > Intergraph SmartPlant Engineering Manager > Catalog Manager**
2. Select the **Vertical Drums** category in the **Catalog Explorer**
   a. **Symbols > Equipment > Heat Transfer Equipment > TEMA Shell and Tube > Shells**
3. **Clone** the **TEMA Shell Type E** symbol.
   a. Select the **TEMA Shell Type E** symbol
   b. Right mouse click on the symbol
   c. Select **Clone**

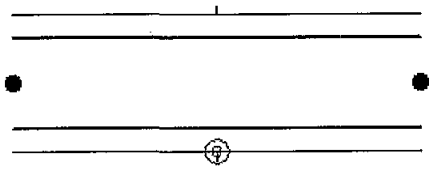


4. Select the cloned symbol.
   a. Right mouse click on the symbol
   b. Select **Rename**

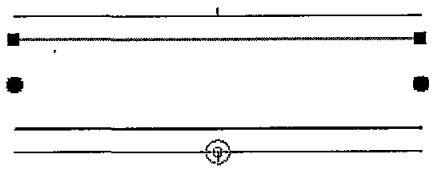


   c. Rename the symbol.

5. Double click on the symbol to open it.

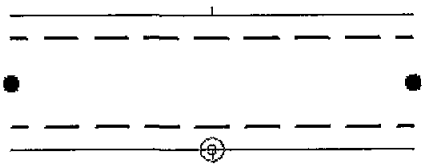


6. Change the Line Style for the two inside lines to dashed.
   a. Select the line to change

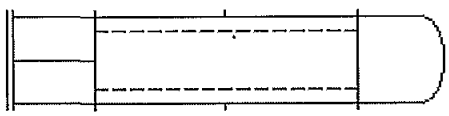


   b. Set the Line Style = Dashed

7. When complete the symbol should be similar to the below.



8. **File** > **Exit** from **Catalog Manager**.
9. Open a Drawing and place the symbol
   a. Place a Front End on the Shell
   b. Place a Rear End on the Shell

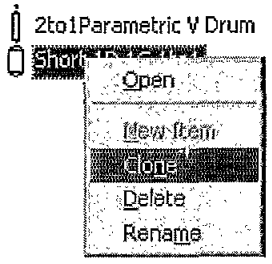


10. **File** > **Exit** from the **Drawing**.

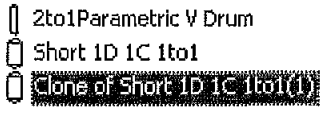
Lab 10 – Cloning a Symbol (Vessel)

Purpose: Clone a symbol. Changing the graphics and properties.

11. Open the **Catalog Manager**
    a. Select **Start > Programs > Intergraph SmartPlant Engineering Manager > Catalog Manager**
12. Select the **Vertical Drums** category in the **Catalog Explorer**
    a. **Symbols > Equipment > Vessels > Vertical Drums.**
13. **Clone** the **Short 1D1C 1to1** symbol.
    a. Select the **Short 1D1C 1to1** symbol
    b. Right mouse click on the symbol
    c. Select **Clone**



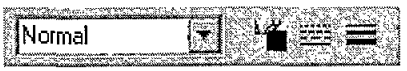
14. Select the cloned symbol.



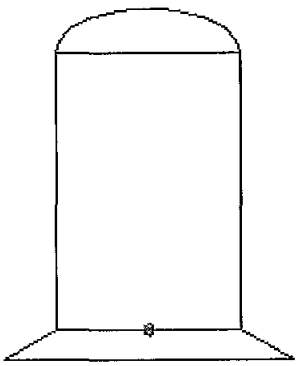
15. Right mouse click on the symbol
16. Select **Rename**
    a. Rename the symbol.
17. Double click on the symbol to open it.
18. Set grid spacing to **0.10** in.
    a. Select **Tools > Options**
        i. Select the **View** tab
    b. Change your grid spacing to **0.10** in.
19. **Delete** the bottom arc.
20. On the **Graphics** tab, draw a skirt on the vessel.

a. Select the **Line** command from the **Draw** toolbar.

b. Set the Line Style = Normal



c. Draw the skirt on the vessel



21. In the **Properties Window**, change:

    a. **AABBCC Code**: (Look in Help to determine the proper AABBCC code for this item.)

        i. An Example: all of the Vertical Drums are assigned an AABBCC code of 1B2G##, since this is the first symbol we add to Vertical Drums the AABBCC code you would assign would be VB2G01

    b. **Construction By**: **By Contractor**

    These values will now be predefined for this symbol. Note the predefined properties obtained by cloning the symbol.

22. View the graphics on the **Icon** tab.

    a. Use the drawing tools to draw the icon you want to associate with the item.

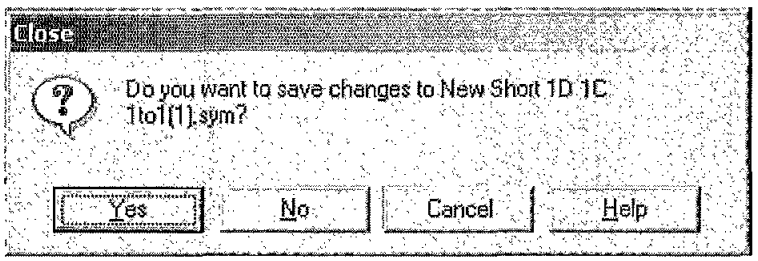
Notes:

- Any changes made to the symbol on the **Graphics** tab, instead of the **Icon** tab, are automatically added to the icon unless you click on the **Icon** tab. Once you click the **Icon** tab, only the graphics in the symbol placed up to that time are added. From then on, you can either manually add graphics in on the **Icon** tab or you can delete all the icon graphics, thereby causing all the graphics on the **Graphics** tab to be copied to the icon layer when the file is exited and saved.

23. **Save** the symbol

    a. Select **File > close**

b. Select **Yes** to save changes.



24. **File** > **Exit** from **Catalog Manager**

25. Open a **Drawing** in **SmartPlant P&ID**

    a. From **Drawing Manager** or **SmartPlant P&ID**

    b. Place the new **Vessel**

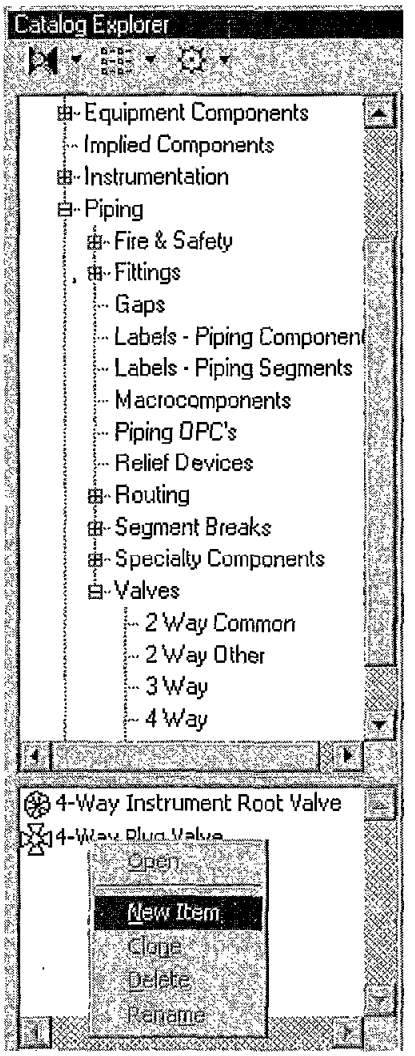
        i. Notice the properties you predefined for this item.

    c. Place **Nozzles** and **Trays** on the new **Vessel**

Lab 11 – Creating a new Symbol (Piping Component)

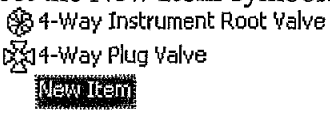
Purpose: Learn to create a new symbol with piping connect points.

1. Enter **Catalog Manager**
   a. Select **Start > Programs > Intergraph SmartPlant Engineering Manager > Catalog Manager**
2. Create a new 4 Way Piping Valve.
   a. Select the **4 Way** folder in the Catalog Explorer
      1. **Symbols > Piping > Valves > 4 Way**
   b. Right mouse click in the List View
   c. Select **New Item**

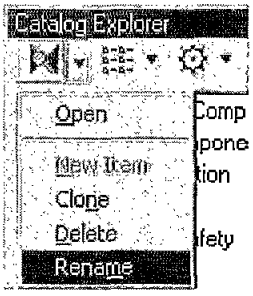


3. Rename the **New Item** symbol.

a. Select the **New Item** symbol.

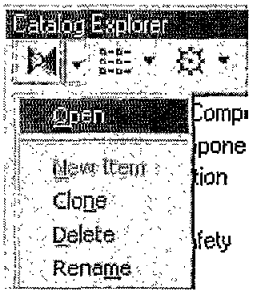


b. Select **File > Rename** from the **Catalog Explorer** menu.

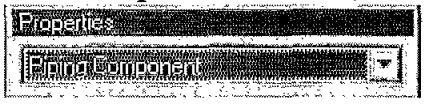


c. Rename the symbol.

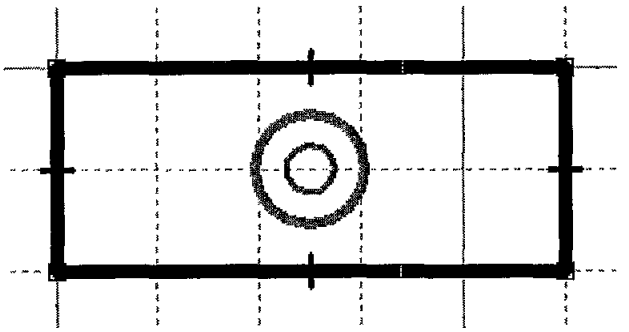
4. Select **File > Open** from the **Catalog Explorer** menu.



5. In the **Properties Window**, change the item type to **Piping Component**.



6. Define the following required properties in the **Property Window**.
   a. **AABBCC Code:** WQ1C01
   b. **Piping Comp Class**: In-line Comp
   c. **Piping Comp Subclass**: Valve
   d. **Piping Comp Type**: 4-way valve
7. Draw the following graphics on the **Graphics** tab.
   a. Change your grid spacing to **0.10** in.
      1. Select **Tools > Options, View** tab



8. Add the 4 (Left, Right, Top, Bottom) connect points on the item.

   a. Select **Place Points** on the **Catalog Tools** toolbar.

   b. Select point type you will be placing from the **Connect Point** toolbar.

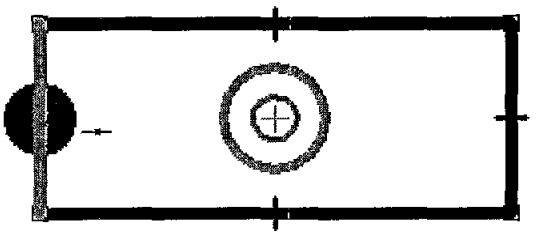
      i. Piping Point

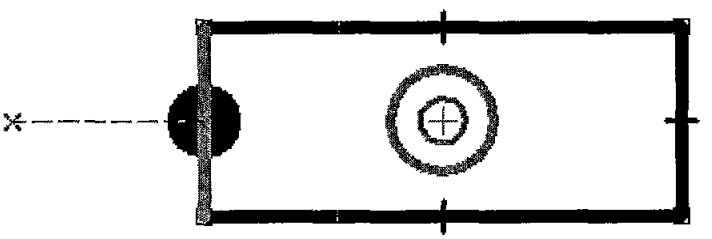
   c. Select the symbol at the location where the connect point will be created.

Notes:

- The piping and instrument connect points must be collinear with the origin of the symbol in order for the item, when placed in a drawing, to trim the pipe or instrument line properly.



   d. The software displays a dynamic dashed line representing the connection of the new connect point. Orient the dashed line to represent the appropriate connection angle for the new connect point.



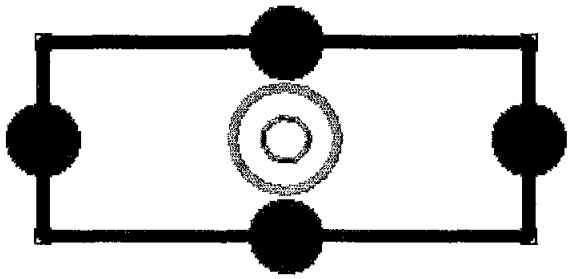
Notes:

- You can also type the exact angle value in the **Connect angle** field to define the connection angle.

   e. After the connection angle is correct, click again to place the connect point.

   f. Turn **Grid Snap Off**.

g. Repeat the steps for the remaining three (Right, Top, Bottom) connect points, you may need to turn **Grid Snap Off**

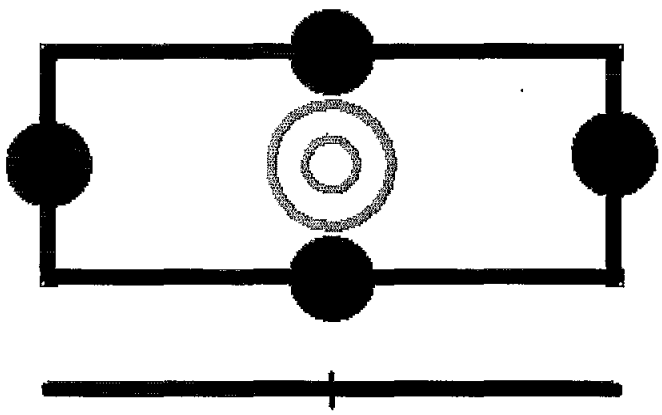


9. Select the **Heat Trace** tab to define the location of the Heat Tracing Graphics when applied in SPPID.

   a. Use the **Ctrl** key to view both the **Graphics** and **Heat Trace** tab.

      1. Ensure the **Heat Trace** tab is active **(Bold)**

   b. Define the item to be heat traced by drawing the location for the heat tracing graphics.



10. Select the **Icon** tab.

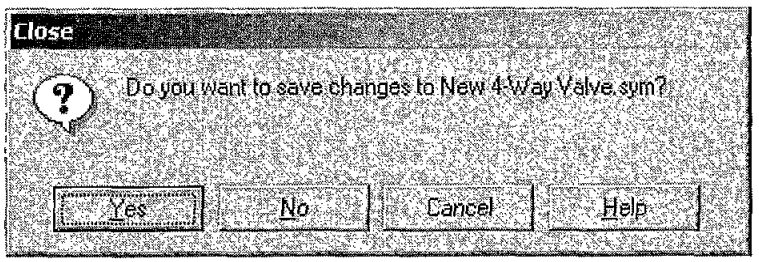
    a. If necessary, change the graphics.

       1. Delete any connect points.

11. Select the **Graphics** tab.

12. Select **File** > **Close**

    a. Select **Yes** to save changes.

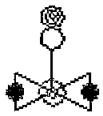


13. Open a **Drawing**.
14. Place the **Valve** on a horizontal **Pipe Line**.
15. Place the **Valve** on a vertical **Pipe Line**.
16. Define the **Heat Trace Medium** on the **Pipe Line** to check the heat trace graphics location on the valve.

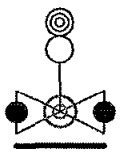
Lab 12 – Jacketing

Creating a Jacket for a Piping Component

1. Start **Catalog Manager**
2. **Open** the **Blank Gate Valve**
   a. **Symbols > Piping > Valves > 2 Way Other**

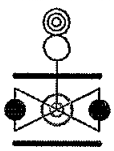


3. Turn **Maintain Relationship** off through **Tools > Maintain Relationships**
   a. The command is a toggle.
4. Utilize the **Line/Arc Continuous** command to draw the **Jacket** on the bottom of the Valve
   a. The distance between the center of the valve and the Jacket = .12"



5. Utilize the **Mirror** command on the **Change** toolbar

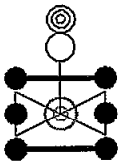
to **Copy** and **Mirror** the **Jacket** to the top of the **Valve.**



6. Ensure the Graphics tab is active and the default (bold)

7. Utilize the **Place Point** command to add **Auxiliary Connect Points**

to the **Valve** to enable placement of **Jacketed Nozzles** on the **Valve.**



8. **Save** the symbol and **Exit Catalog Manager**.

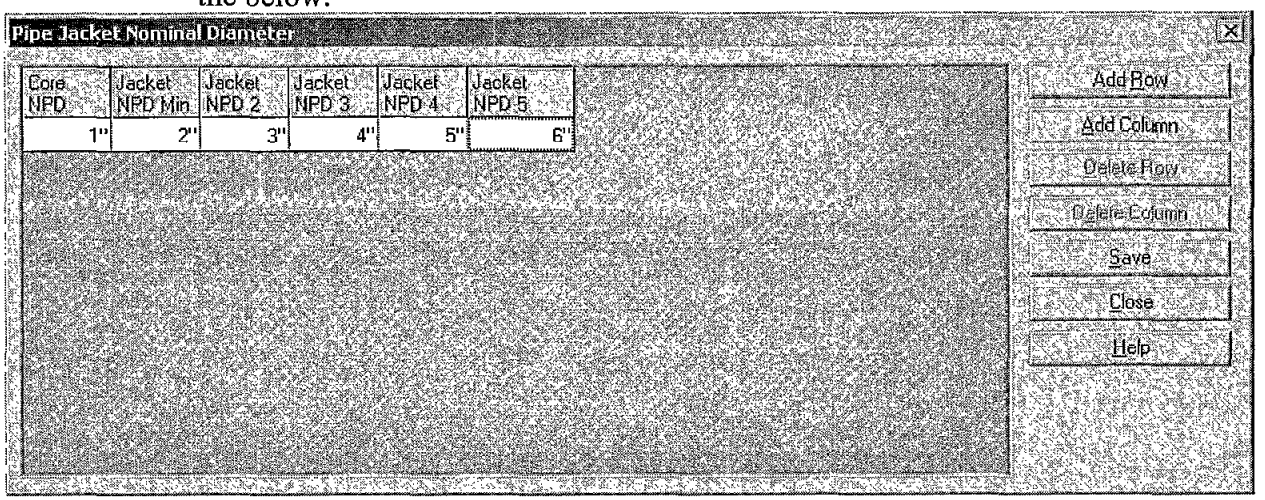
Enabling Jacketing

9. Test the modifications to the symbol.

10. Start **Options Manager**

    a. From the **Settings**, Set **Heat Tracing Media – Jacketed Pipe = SJJ**

    b. From **Tools > Pipe Jacket Nominal Diamter…** setup the table similar to the below.



    c. **Save** and **Exit** from **Options Manager**.

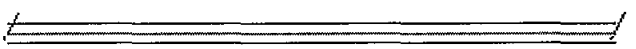
11. Open a **Drawing**.

    a. **Route Pipe**

        i. Set a value of **1"** for **Nominal Diameter**

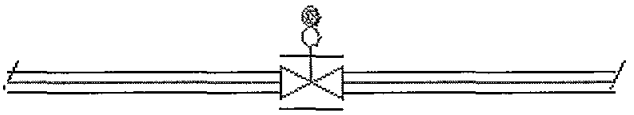
        ii. Set a value of **SSJ** for **Heat Tracing Medium**

        iii. Your Pipe should be similar to the below.



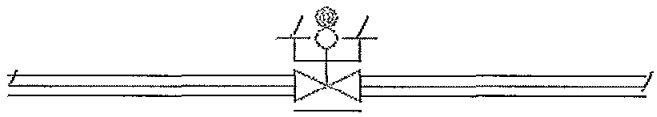
    b. Place the **Blank Gate Valve** on the **Pipe.**

        i. Your Valve should be similar to the below, showing the Jacket on the valve.



c. Place the **Jacket Nozzle** on the **Valve**.

i. Select **Symbols** > **Piping** > **Fittings** > **Flanges and Unions** > **Jacket Nozzle (Valve)**

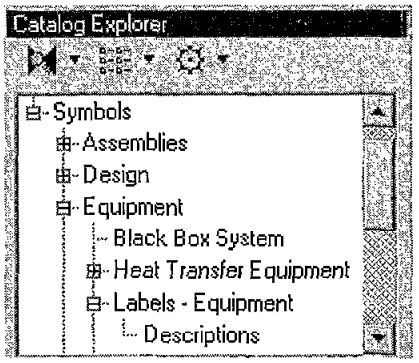


d. **Exit** the **Drawing**.

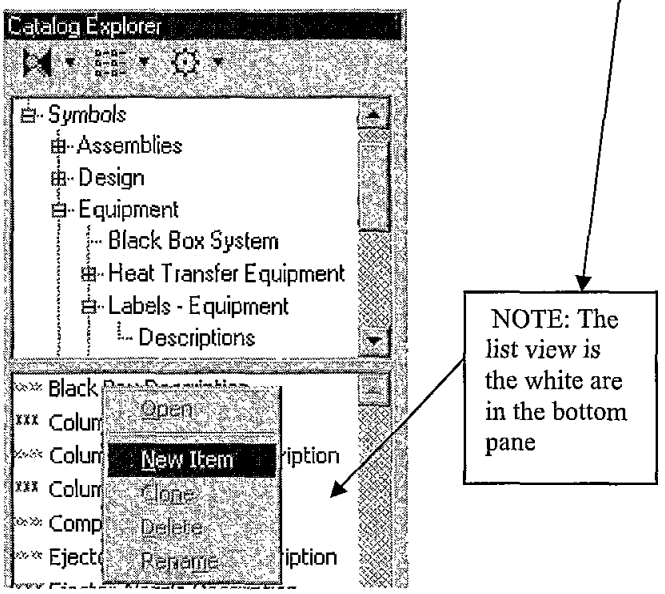
Lab 13 – Creating Viewable Labels

Purpose: To create a new description label for equipment using the SmartText Editor within Catalog Manager.

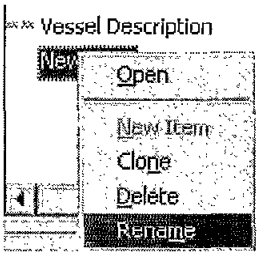
1. Start **Catalog Manager**.
2. Expand the **Equipment > Labels – Equipment > Descriptions** folder.



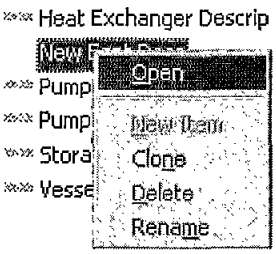
3. Create a new description label for **Equipment**.
   a. Right mouse click in the list view, see note below.
   b. Select **New Item**



4. Rename the **New Item** symbol.
   1. Select the **New Item** symbol.
   2. Right mouse click
   3. Select **Rename**

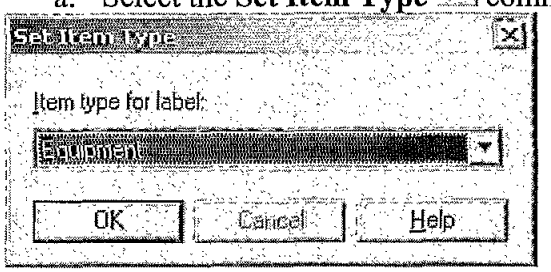


5. Open the symbol
   a. Select the symbol.
   b. Right mouse click
   c. Select **Open**

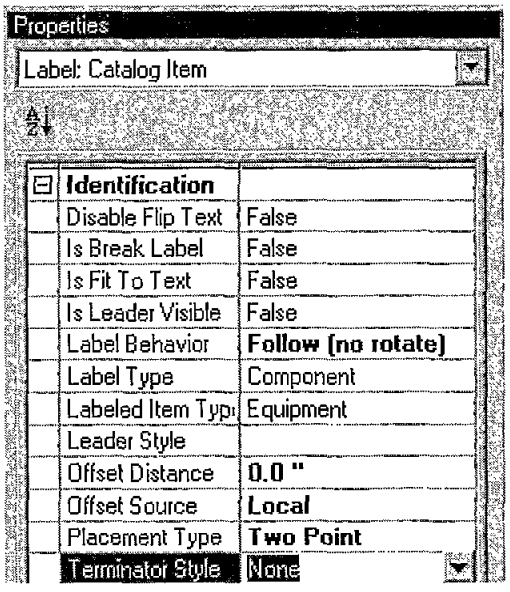


6. In the **Properties Window**, change the item type to **Label: Catalog Item.**

7. Define the type of item the label will be utilized for.
   a. Select the **Set Item Type** command on the **Catalog Tools** toolbar.



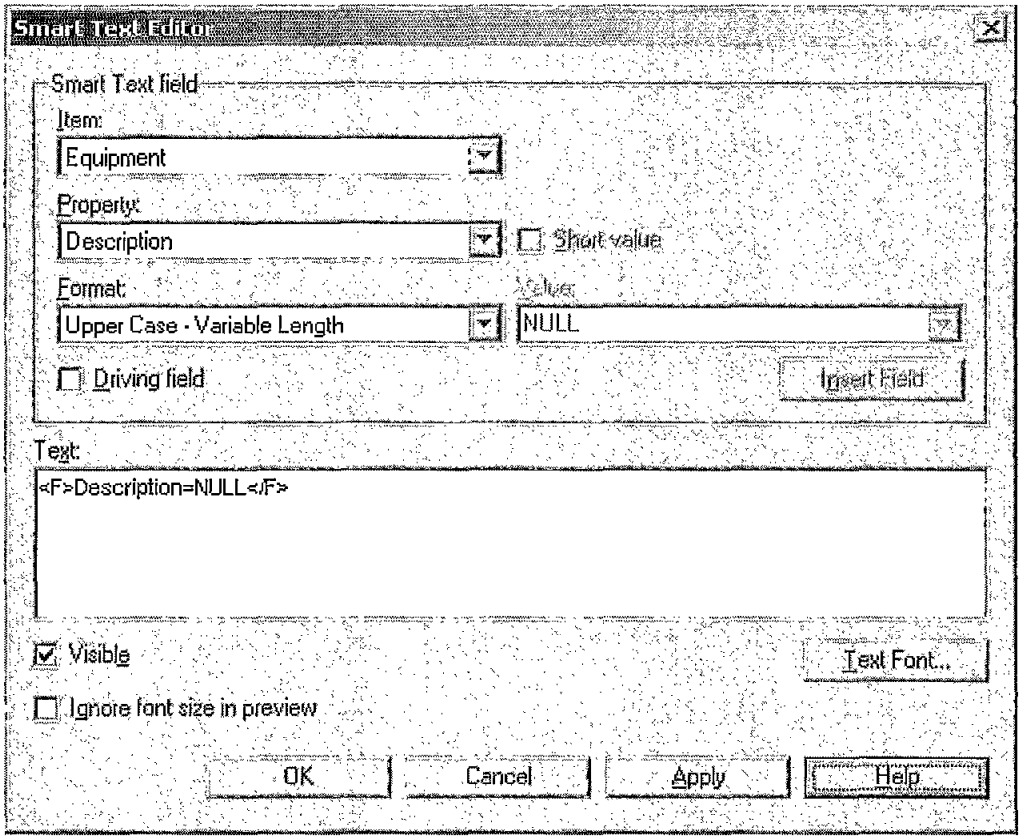
8. Define the following additional properties as shown in the figure below:
   a. **Label Behavior** = Follow (no rotate)
   b. **Offset Distance** = 0.0"
   c. **Offset Source** = Local
   d. **Placement Type** = Two Point
   e. **Terminator Style** = None



9. Leave the **Graphics** tab blank, with the exception of the origin ; there will be no graphics to our label.
10. Select the **Label** tab, which will be utilized to define the properties in the label.
11. Hold the **Ctrl** key to display the **Graphics** and **Label** tab, ensure the **Label** tab is active.

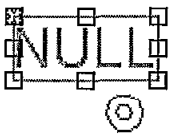
12. Select the **SmartText Editor** command from the **Catalog** Tools toolbar.

13. Define the following values:
    a. **Smart Text** field
        1. **Item** = Equipment
        2. **Property** = Description
        3. **Format** = Upper Case – Variable Length
    b. Select **Insert Field** to enter the **Description** property in the **Text** field.
    c. Change the **Text Font** if necessary
        1. Select the **Text** in the **Text field**
        2. Select the **Text Font** button in the **Text** field.
        3. Select **OK**.
    d. When complete the **Smart Text Editor** form should be similar to the below image.

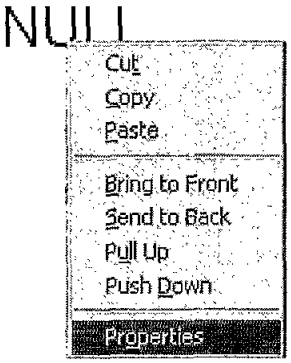


14. Change the **Properties** of the **Text Box** to center the label on the **origin**.

    a. Select the **Text Box**



    b. Right mouse click and select **Properties**.



    c. Change the **Justification** and **Text Alignment**.

        1. **Justification**

            1. **Horizontal** = Shape Center
            2. **Vertical** = Shape Center

2. **Text Alignment**
    1. **Horizontal** = Center
    2. **Vertical** = Center
    3. Select **OK**

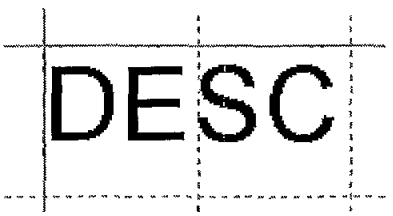
15. Turn off the **Grid**, if necessary and **Move** the **Text Box** to the origin.

    NOTE: You could utilize a **Pin Point**[6] to move the **Text Box**, see footnote at the bottom of page.

16. Save the symbol.
    a. Select **File** > **Save**

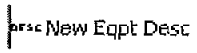
17. Select the **Icon** tab.

    a. Change the text from NULL to DESC
        1. Double click on the NULL text
        2. Highlight the text.
        3. Key in **DESC**



18. **Close** the Symbol
    a. Select **File** > **Close**
    b. Select **Yes** to save the changes.

19. Your symbol should appear in the **Catalog Explorer** similar to the below.



20. Enter a drawing, an item of equipment, and label it with the new label.
21. Define a value for the description property in the **Properties** window.

[6] **PinPoint** is a tool that helps you draw and modify elements relative to known positions in a drawing. You can place a target point, and the software dynamically displays the horizontal and vertical distance between the pointer and the target point.

Lab 14 – Creating a Revision Label.

1. From **Catalog Manager**, **Create** a Revision Label symbol.

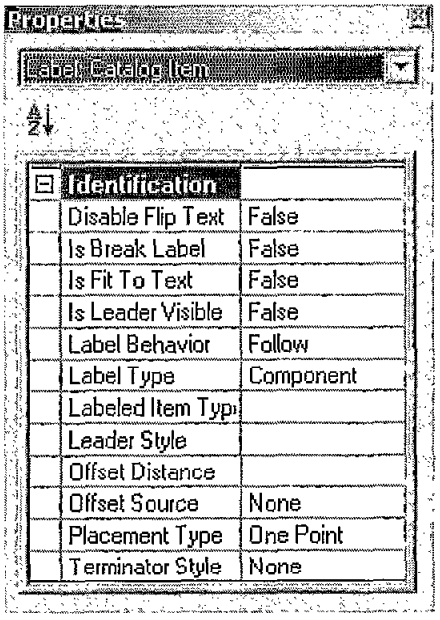
   a. Start **Catalog Manager**

   b. From the **Catalog Explorer**, select **Symbols** > **Design**

   c. Create a **New Item** under **Symbols** > **Design**

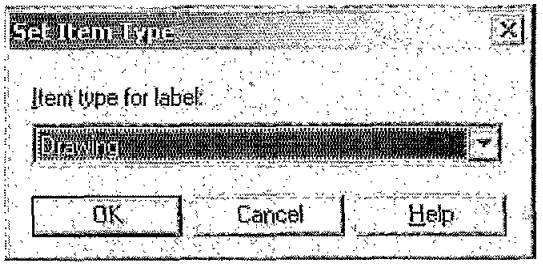
   d. Rename the **New Item** to **Title Block Revision Label**

2. From the **Properties Windows** set the Item = **Label: Catalog Item.**



3. Utilize the **Set Item Type** command from the **Catalog Tools**

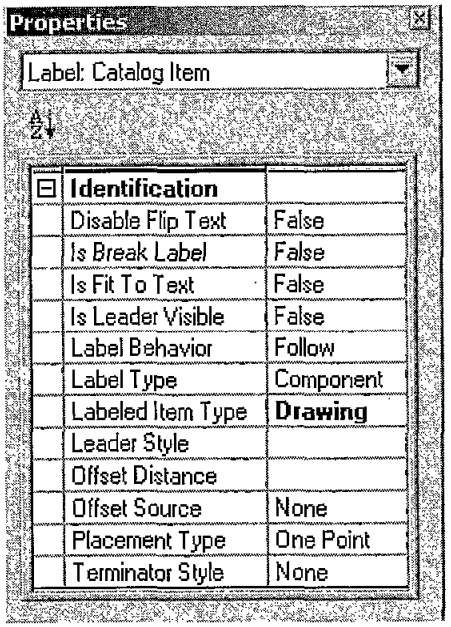
toolbar to set the type of symbol you are creating a label for.



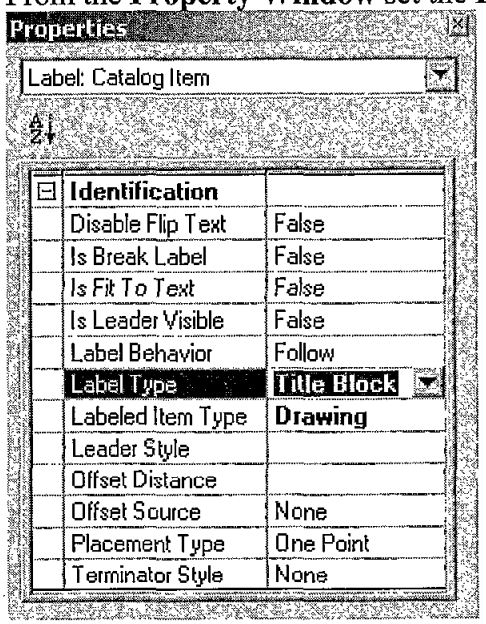
   a. Item Type for Label = **Drawing**

   b. Select **OK.**

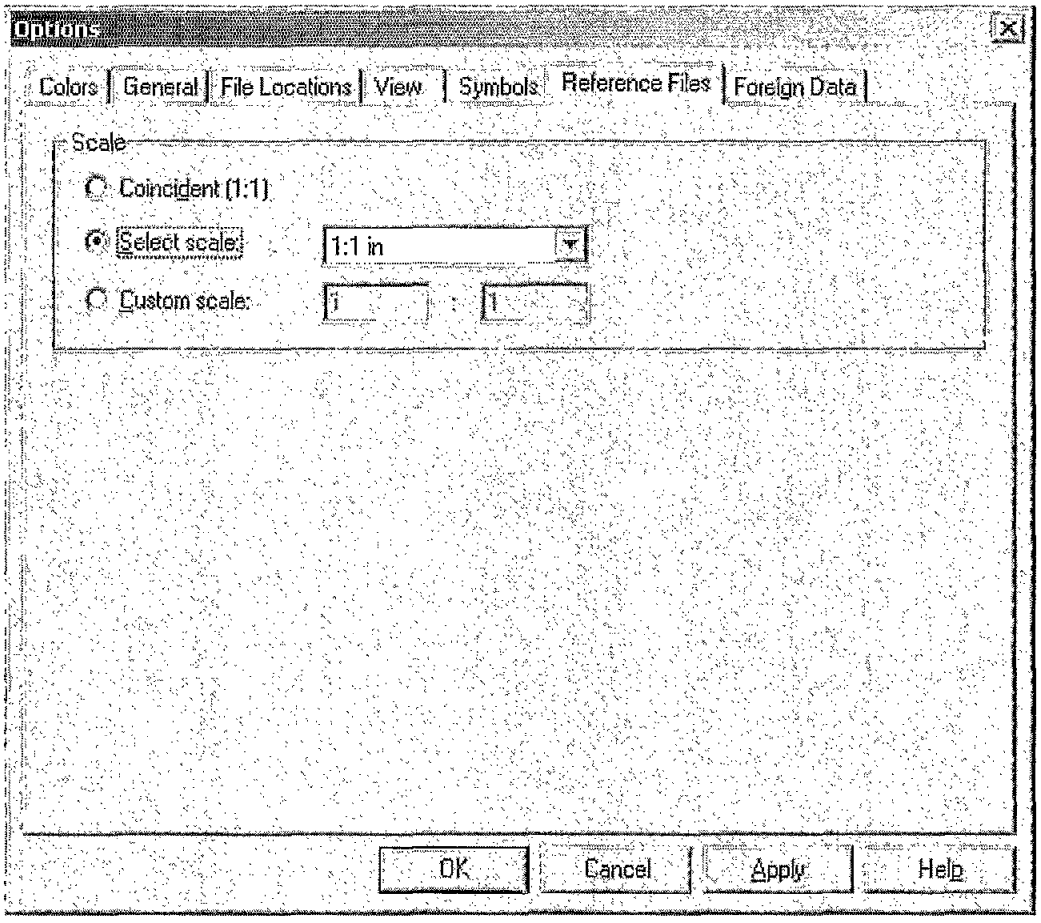
   c. Notice the **Labeled Item Type** property in the **Property Window** is defined.



4. From the **Property Window** set the **Label Type = Title Block.**

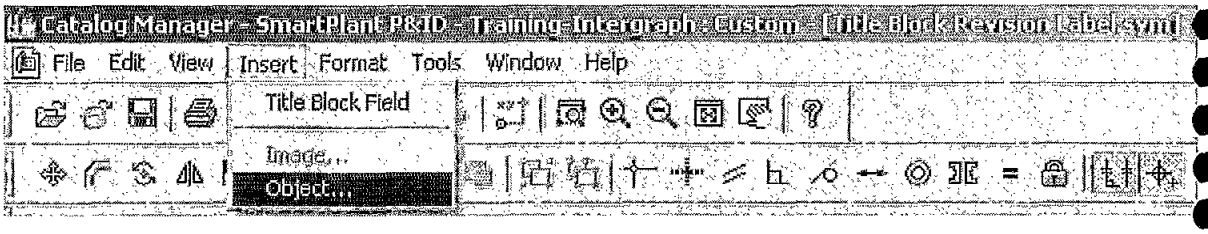


5. Save the Symbol
    a. File > Save
6. Set the **Scale** for **Reference Files**
    a. **Tools > Options > Reference Files**
        i. **Select Scale = 1:1 in**
        ii. **Select OK**



7. Insert the appropriate **Border** file for which you are creating a **Revision** label.

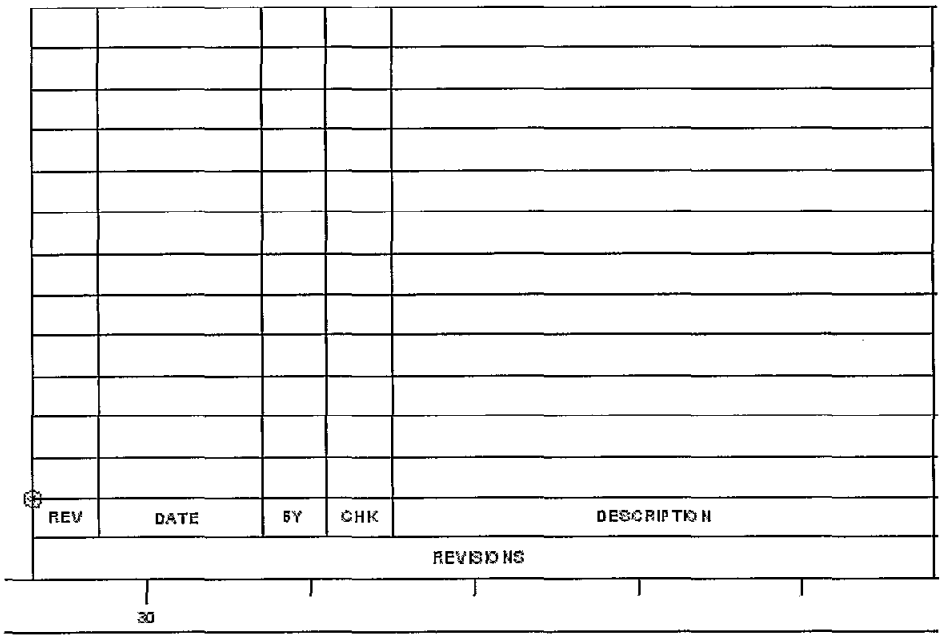
   a. **Insert** > **Object** command



   b. Browse to the P&ID Reference Data > Templates folder

      i. Select the **E-Wide.igr**

8. Move the **E-Wide.igr** file to the correct position, similar to the below. It is important to think about where you will be moving the .igr file to with respect to the origin symbol.



9. Utilize the **Insert > Title Block Field**[7] command to define a **Title Block Revision** label.

    a. Place a **Text Box** on the symbol sheet which displays the **Major Revision Number.**

        i. Label Set = SPPID Revision

        ii. Field = Revision\SP_MajorRevisionNumber

        iii. Function = First

        iv. Function Operator = +

        v. Function Argument = 0

        vi. Toggle on **Display Label Names**

        vii. Select the **MORE** button and define any Font characteristics.

        viii. The below image is an example for including the "***First***"[8] **Major Revision Number** property value in the **Title Block** label.

[7] The Title Block Field command, on the Insert menu, opens the **Place Label Ribbon**, which allows you to insert dynamic title block labels into your document. These labels use XML code and provide a means of retrieving updatable data such as revision numbers.

[8] Reference **Catalog Manager > Help > Title Block Symbols.**

Function	Operator	Range of values	Description

ix. Place the **Text**[9] **Box** on the **Symbol**. Note the origin of the Text box is Left Top.

x. Stretch the Text Box to fit within the Rev Field

Re				
REV	DATE	BY	CHK	DESCRIPTION
REVISIONS				

b. Place a **Text Box** on the symbol sheet which displays the **Revision Date.**

i. Label Set = SPPID Revision

ii. Field = Revision\SP_RevisionDate

iii. Function = First

iv. Function Operator = +

v. Function Argument = 0

vi. The below image is an example for including the **Revision Date** of the First Revision..

vii. Place the **Text**[10] **Box** on the **Symbol**. Note the origin of the Text Box is **Left Top.**

viii. Stretch the **Text Box** to fit within the **Rev Field**

Re	Revision[1+			
REV	DATE	BY	CHK	DESCRIPTION
REVISIONS				

Index	=	1 or higher	The index value represents the actual position of the revision in the list. The first revision created always has the lowest index (1), therefore as you add more revisions, the same index number displays the properties of progressively newer revisions.
First	+	0 or higher	The function specifies the position of the revision relative to the first (oldest) revision, for example, 'First + 2' means two revisions later than the first revision, that is, the third revision in the current order. If you delete a revision, the indexes of all later revisions to which the property applies change accordingly.
Last	-	0 or higher	The function specifies the position of the revision relative to the last (newest) revision, for example, 'Last - 1' means the revision immediately before the last revision. If you add a revision, the indexes of all the other revisions to which the property applies change accordingly; if you delete a revision, the indexes of all earlier revisions change.

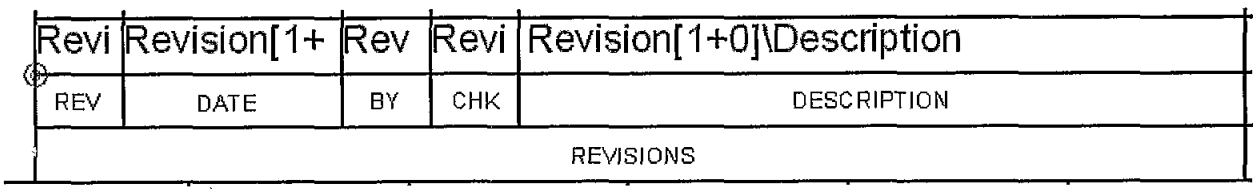
[9] To view or edit the XML text behind the label, select the label and click **Smart Text Editor**. On the **Smart Text Editor** dialog box, the XML text appears in the **Text** box. If you edit the text, be careful not to change any of the XML code strings.

[10] To view or edit the XML text behind the label, select the label and click **Smart Text Editor**. On the **Smart Text Editor** dialog box, the XML text appears in the **Text** box. If you edit the text, be careful not to change any of the XML code strings.

c. Continue building the Revision Title Block to include the Created By, Checked By and Description Text Boxes.

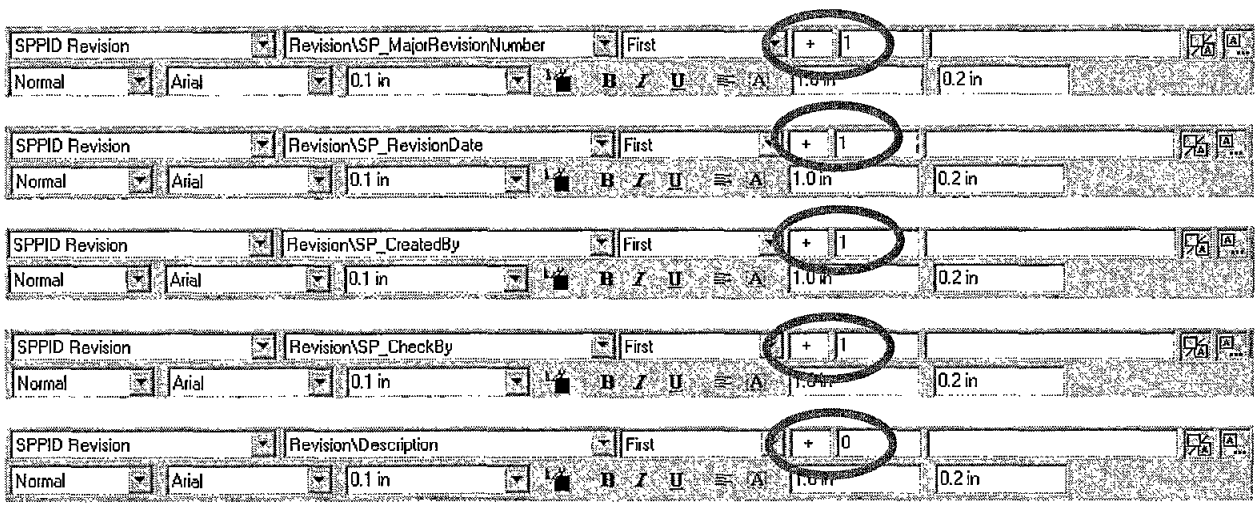
i. The below images indicates how to build the Text Boxes with the Insert > Title Block Field command.

10. Once the above steps have been completed your symbol will be similar to the below.



11. Add additional **Text Boxes** for the **Properties** of another **Revision** and place the **Text Boxes** above the previous **Text Boxes**.

a. The below images shows the Text Boxes built with the Title Block Field command, notice the Function Argument was incremented by 1.



12. Once completed the **Title Block Label** symbol should be similar to the below.

Revi	Revision[1+	Rev	Revi	Revision[1+1]\Description
Revi	Revision[1+	Rev	Revi	Revision[1+0]\Description
REV	DATE	BY	CHK	DESCRIPTION
REVISIONS				

13. To set the **Text Justification,** select the :**Text Box**, right mouse click and select **Properties.**

    a. **Edit** the **Text Alignment** fields

14. Select the **Icon** tab and draw how the **Icon** is to appear in the **Catalog Explorer** of **SPPID** and **Catalog Manager.**

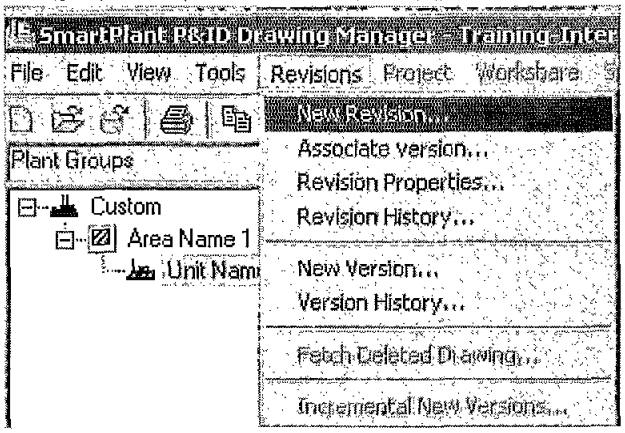
15. Before saving the **Symbol, Delete** the inserted **Border File.**

16. **File** > **Exit** from **Catalog Manager.**

    a. **Save** the symbol

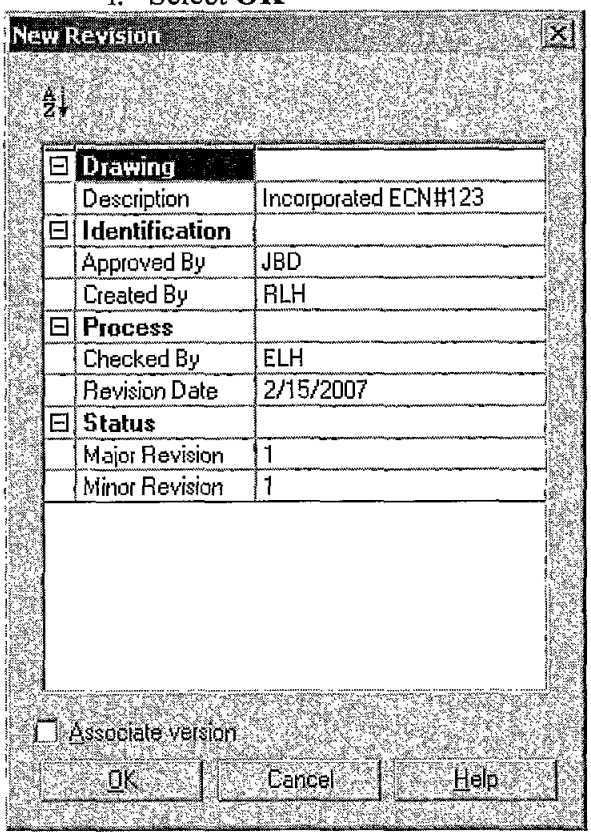
17. From **Drawing Manager** create several **Revisions** for a **Drawing.**

    a. Select **Revisions** > **New Revision** command



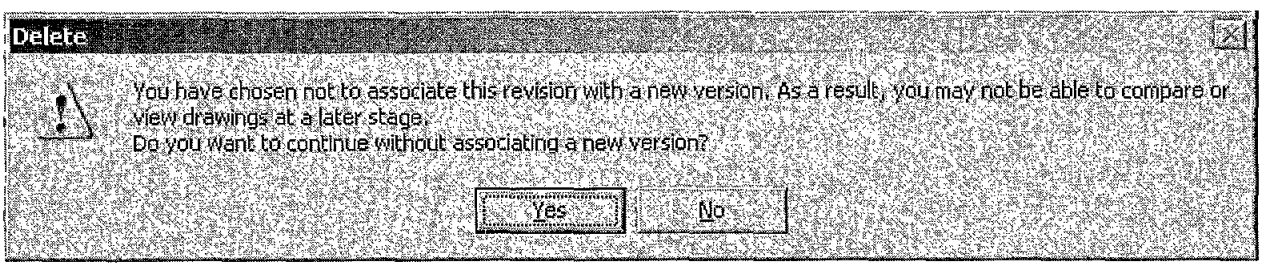
b. Fill out the information for a revision similar to the below

i. Select **OK**



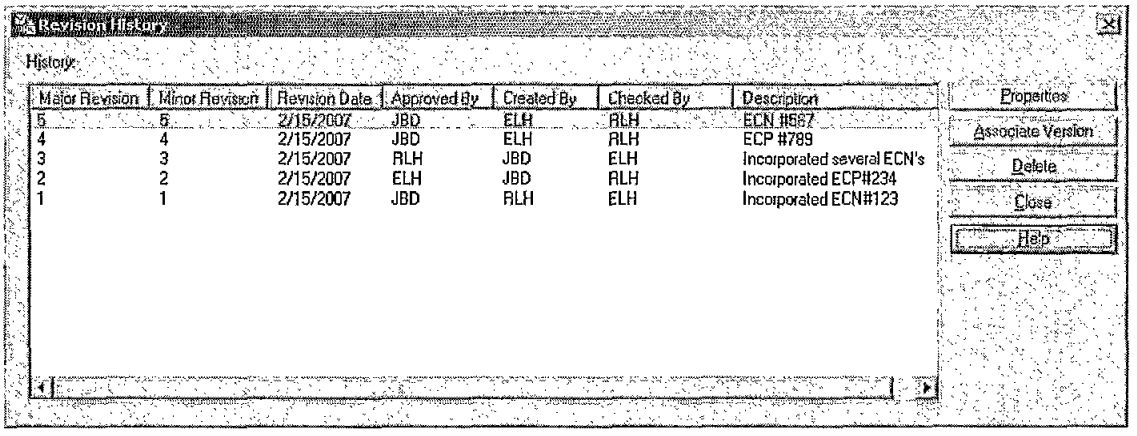
c. Notice you receive a dialog box similar to the below.

i. Select **Yes** for this Lab.



d. Create 4 additional **Revisions** for this **Drawing.**

18. Utilize the **Revisions** > **Revision History** command to review and/or edit the **Revisions.**



19. **Open** the **Drawing** and place the **Title Block Revision** label.

2	2/15/2007	JBD	RLH	Incorporated ECP#234
1	2/15/2007	RLH	ELH	Incorporated ECN#123
REV	DATE	BY	CHK	DESCRIPTION
REVISIONS				

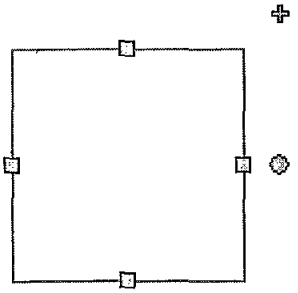
20. **File** > **Exit** from the **Drawing**.
21. Place **the Title Block Revision** label in the **Template** (E-Size.pid).
    a. From **Windows Explorer** path to the **Template** Files folder for your plant.
    b. Select **the E-Size.pid** and double click on the file to open.
    c. Place the **Title Block Revision** Label in the **Template** file, you should have a similar image as shown below.

Tem	Template	Te	Tem	Template
Tem	Template	Te	Tem	Template
REV	DATE	BY	CHK	DESCRIPTION
REVISIONS				

22. **Create** a new **Drawing** utilizing the above **Template**
23. **Create** a **Revision**(S) for this **Drawing**
24. **Open** the **Drawing**.
25. Does the **Revision** info display? **YES**
26. **File** > **Exit** the **Drawing**.

Lab 15 – Creating a Parametric Black Box

Purpose: To create a new parametric Black Box based on the below image.

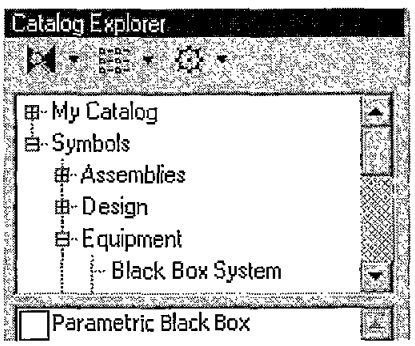


The procedure to create a parametric involves several steps and will be broken down into several distinct parts:

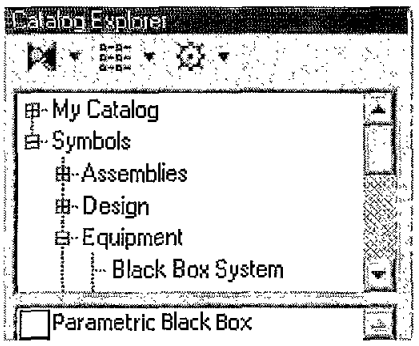
1. Create the symbol in the Catalog Explorer	2. Set drawing options
3. Draw the new symbol	4. Add dimensions to the symbol
5. Add variables and equations to the symbol	6. Save the symbol

Create the Symbol in the Catalog

1. Enter **Catalog Manager**
   a. Select **Start** > **Programs** > **Intergraph SmartPlant P&ID** > **Catalog Manager**
2. Expand the **Equipment** > **Black Box System** folder.

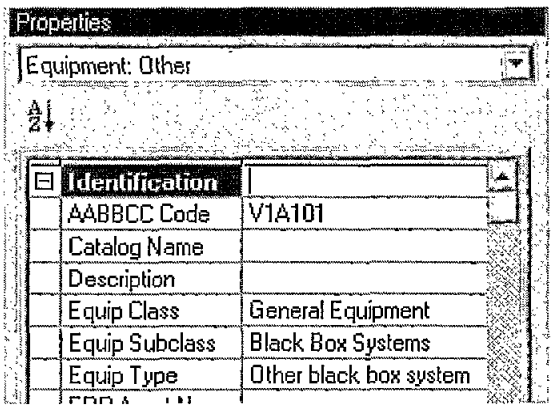


3. Create a new **Black Box** symbol for **Equipment**.
   a. Right mouse click in the list view
   b. Select **New Item**



4. **Rename** the symbol.
    a. Right click on the symbol
    b. Select **Rename**
5. **Open** the symbol
    a. Right click on the symbol
    b. Select **Open**
6. Set the **Item Type** in the **Properties Window** to **Equipment: Other**

7. Define the following additional properties as shown in the figure below:
    a. **AABBCC Code** = Search Catalog Manager Help for AABBCC to determine the first character of the AABBCC code for all user defined P&ID symbols.
    b. **Equip Subclass** = Black Box System
    c. **Equip Type** = Other Black Box System



8. **Save** the symbol.

    a. Select **File** > **Save**

Set Drawing Options

Information to remember: Before you can begin drawing the new parametric symbol, you must set up the **Catalog Manager** interface. Because the software maintains the options that you set until you turn them off, setting up the interface is not required for every parametric symbol that you create.

9. Enable **Maintain Relationships**

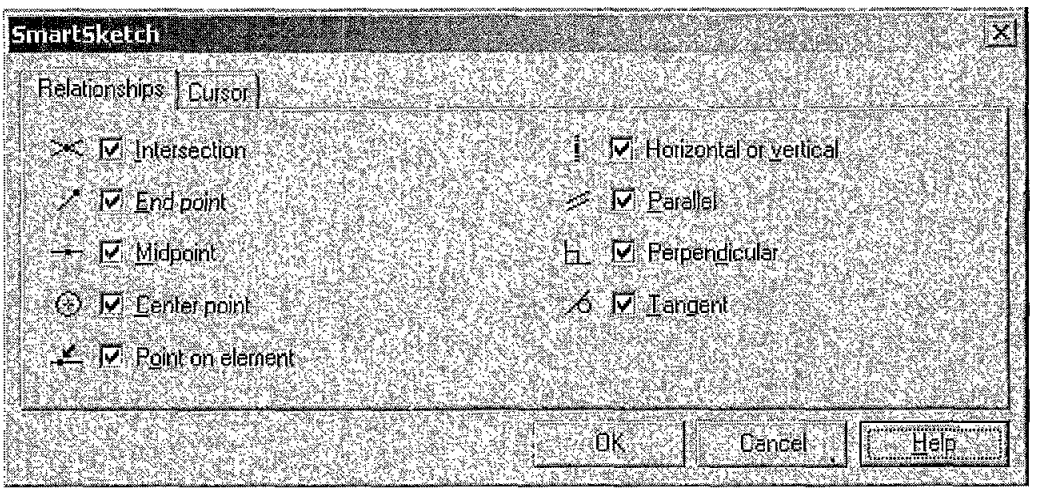
    a. Select **Tools** > **Maintain Relationships**

        i. If no check mark appears beside the **Maintain Relationships** command, click the command to turn maintaining of relationships on.

10. Set the relationships you want to recognize, and clear the relationships you do not want to recognize as you drawing

    a. Select **Tools** > **SmartSketch...**

    b. Check all of the Relationships



11. Add the **Point** command to the toolbar.

    a. Select **Tools** > **Customize**

        i. Under **Categories**, select **Draw**.

ii. Drag the **Point** button to the right side of the toolbar region.

12. Add the **Lock** button to the toolbar.

    a. Select **Tools** > **Customize.**

13. Under **Categories,** select **Relations.**

    a. Drag the **Lock** button to the right side of the toolbar region, and then click **Close** to close the **Customize** dialog box.)

    b. Select **Close**

14. Display the **Label** toolbar; the label toolbar has our dimensions on it.

    a. Select **View** > **Toolbars**

    b. Select **OK**

15. Display the **Layer Groups** dialog box, we will utilize the dialog box to create two layers.

    a. Select **Tools** > **Layer Groups**

16. Define two **layers**[11] to help in designing the symbol.

    a. Under **Layers,**

        i. Key in **Construction**

        ii. Select the **Tab** key.

        iii. Key in **Dimension**

        iv. Select the **Tab** key.

        v. Select **OK**

17. Display the **Layers** toolbar.

    a. Select **Tools** > **Layers**

[11] These new layers allow you to work in the background to specify aspects of the parametric symbol. When the new symbol is complete, you will turn off these layers so the driving dimensions and construction objects of the symbol do not appear in the graphic or icon of the symbol.

18. **Save** the symbol

    a. Select **File** > **Save**

Draw the New Symbol

19. Set the **Layer** to the **Default** layer.

    a. Select **Default** in the Layer field of the **Layers** toolbar.

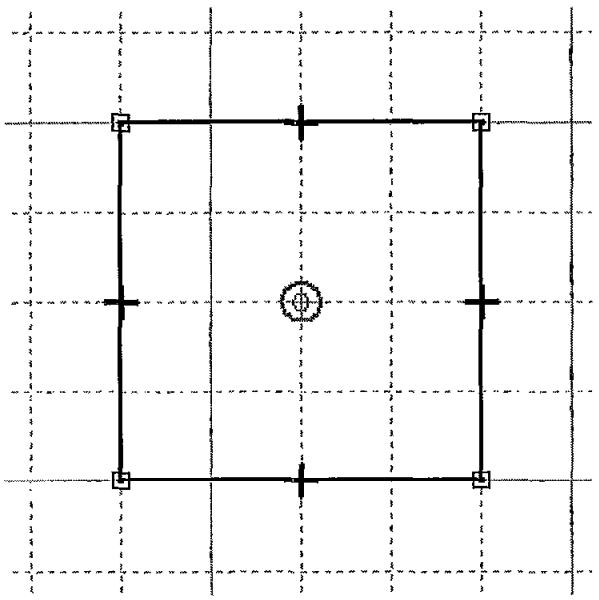
20. Ensure the **Graphics** tab is active.

21. Begin to draw the symbol

    a. Select **Line/Arc Continuous** on the **Draw** toolbar.

    b. Use the origin of the new symbol as the center of the box and draw four connected lines to form a square around the origin.

    c. The software will place horizontal and vertical relationship handles on each new line.



22. Set the Layer to the **Construction** layer.

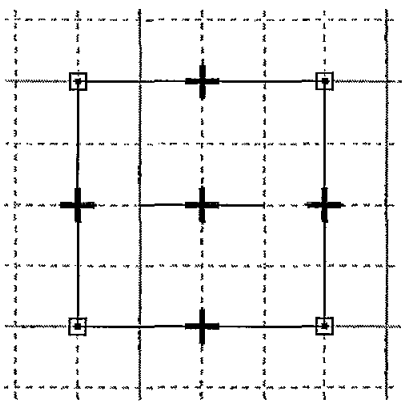
    a. Select **Construction** in the Layer field of the **Layers** toolbar.

23. Move the origin symbol away from the symbol graphics.

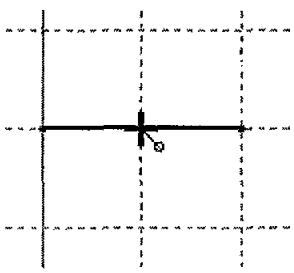
Notes: Consider the following when creating a parametric symbol.

- Do not create dimension off of origin symbol . The reason is, we delete the origin symbol during file save, and any dimensions created with respect to the origin symbol will be deleted as well.
- Delete or move the origin symbol temporarily, when you save the symbol the origin will embed itself.

24. Draw a **Line** on the **Construction** layer through the center of the symbol.



25. Select the **Lock** command on the toolbar.
    a. Select the **MidPoint** of the **Line** in the center of the symbol to lock it.
    b. Select the **Esc** key to switch to the **Select** tool.



Notes:

- Locking the point that you added to the center of the symbol assures that the point will not move when the box is resized in SmartPlant P&ID. This **Line** is necessary for adding dimensions to the box later.

26. **Save** the Symbol
    a. Select **File > Save**

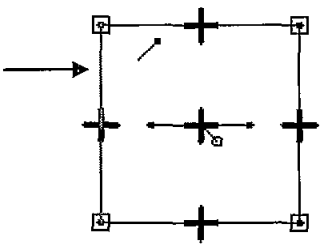
Add Dimensions to the Symbol

27. Set the Layer to the **Dimension** layer.

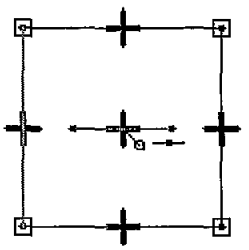
    a. Select **Dimension** in the **Layer** field of the **Layers** toolbar.

28. Select **Distance Between** on the **Label** toolbar.

    b. Select the left vertical line of the symbol at the **end point** to identify the origin element.

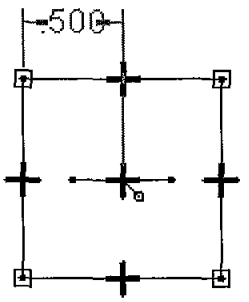


    c. Select the construction line at the **mid point**, which you previously added to the symbol to define a location to measure to.



    d. Move the pointer past the top of the symbol, and click to place the first dimension.

        i. Notice that as you move the pointer, the dimension dynamically follows your movement.



29. Add a **second** dimension.

    e. Select **Distance Between** on the **Dimension** toolbar.

    f. Select the construction line at the **mid point**.

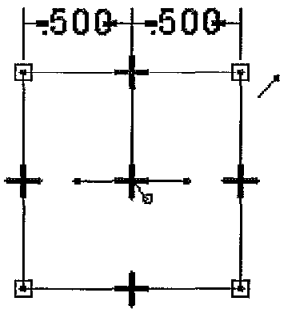
    g. Select the right vertical line of the symbol at the **end point**.

h. Move the pointer past the top of the symbol, and click to place the second dimension.

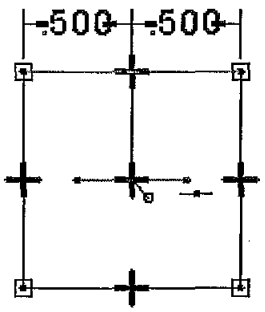
30. Add a **third** dimension.

i. Select **Distance Between** on the **Dimension** toolbar.

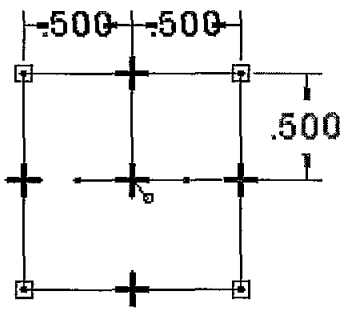
j. Select the top horizontal line at the **end point** .



k. Select the construction line at the **mid point** .



l. Move the pointer past the right of the symbol, and click to place the third dimension.



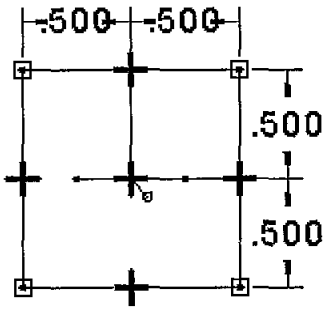
31. Add a **fourth** dimension.

m. Select **Distance Between** on the **Dimension** toolbar.

n. Select the construction line at the **mid point** .

o. Select the bottom horiztonal line of the symbol at the **end point** .

p. Move the pointer past the right of the symbol, and click to place the fourth dimension.



32. **Save** the Symbol
    a. Select **File** > **Save**

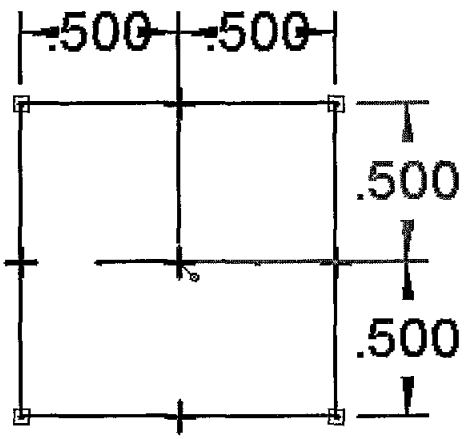
Add Variables and Equations to the Symbol

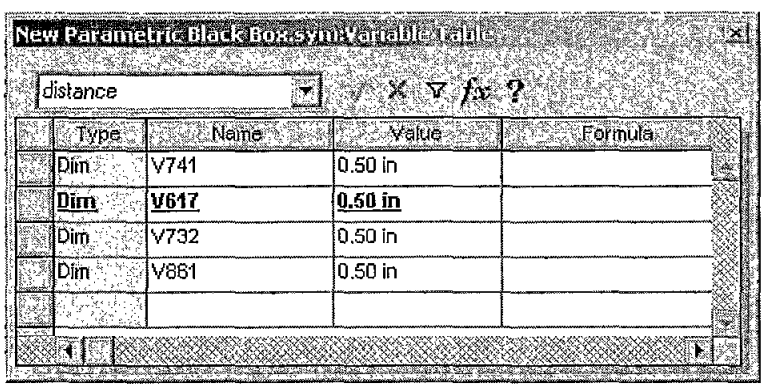
33. Fit the view.

Notes:

- If all the dimensions are not displayed then when the Variable Table dialog box is displayed you may not see all the dimensions in the Variable Table.

34. Select **Tools** > **Variables** to display the Variable Tables dialog box. The dimensions that were added to the symbol will display in a tabular format.
    a. Moving your cursor over a **Dim**[12] in the variable table will highlight the dimension on the symbol.





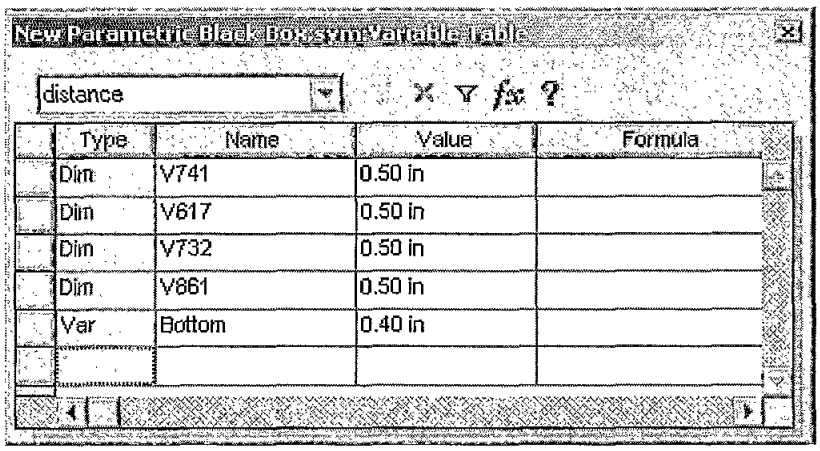
35. Define 4 variables to tie to the dimension variables. In the last row of the **Variable Table** dialog box, Key in

[12] DIM refers to a dimensional relationship

a. **Name** = Bottom

b. **Value** = 0.40 in

c. Tab through the Formula field



d. **Name** = Top

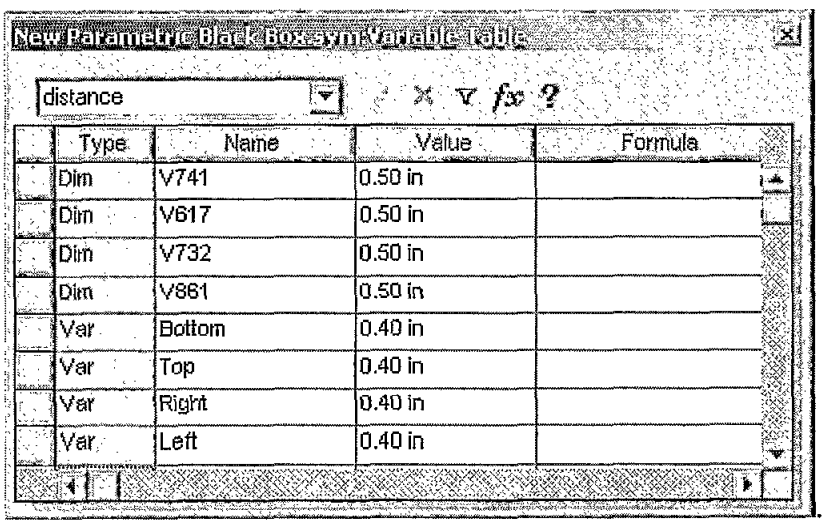
e. **Value** = 0.40 in

f. **Name** = Right

g. **Value** = 0.40 in

h. **Name** = Left

i. **Value** = 0.40 in



36. Create a relation between the **Dim** and **Var**, in the **Formula**[13] column for the first dimension, key in

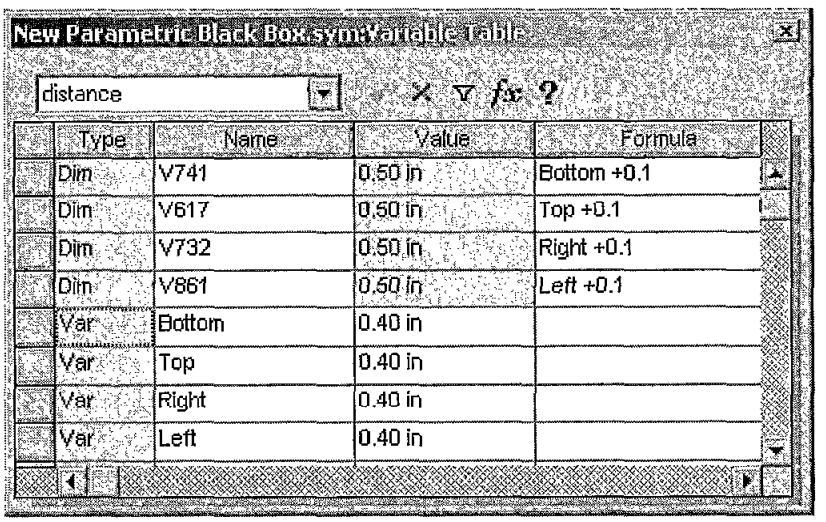
    a. **Formula** = Bottom + 0.1

        1. This defines equations for each dimension that you want users to be able to change in the P&ID. Adding a value of 0.1 to the variable for each dimension guarantees that the sides of the box cannot be resized to a value of 0.

    b. **Formula** = Top + 0.1

    c. **Formula** = Right + 0.1

    d. **Formula** = Left + 0.1



37. Test the equations for the parametric symbol.

    a. Change the **Value** for the **Bottom** variable to **.60**.

    b. Change the **Value** for the **Top** variable to **.60**.

    c. Change the **Value** for the **Right** variable to **.30**.

    d. Change the **Value** for the **Left** variable to **.30**.

38. Select **Undo** on the Main toolbar four times to return the dimensions to their original values.

39. **Save** the Symbol

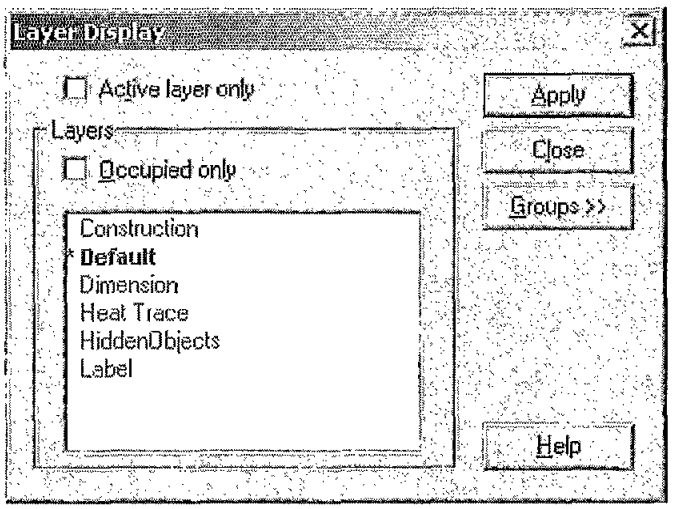
40. **Close** the **Variable Table** dialog box.

---

[13] **Formula** - Displays the function or relation that defines the value of the variable. Enter a mathematical expression in a cell in this column to calculate the value for a corresponding dimension.

41. **Move** the origin to the center of the symbol.
42. **Save** the symbol.
    a. Select **File** > **Save**
43. Set the active layer to **Default**.
    a. In the **Layer** list of the **Layer** ribbon bar, select **Default**.

44. Turn off the **Construction** and **Dimension** layers.
    a. Select **Layer Status**.
    b. Select **Dimension** and **Construction** to hide the layers.
    c. Select **Apply**
    d. Select **Close**



Notes:

- If you do not turn off the display of the **Dimension** and **Construction** layers that you created, the dimensions you drew previously will appear as part of the parametric symbol graphic and icon in SmartPlant P&ID.

45. Select the **Icon** tab.

    a. If necessary, delete or create any items on the **Icon** tab.
46. Select the **Graphics** tab to return to the symbol graphics.

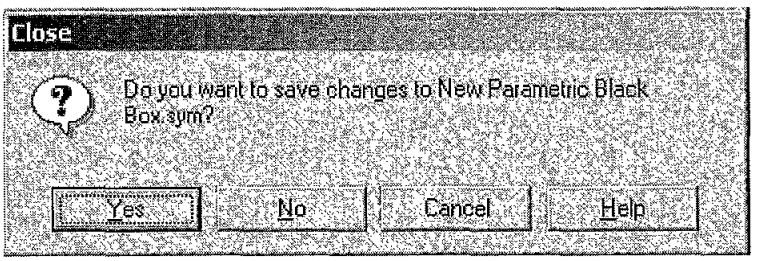
47. **Save** the Symbol

a. Select **Save** on the **Main** toolbar

48. **Close** the symbol

    a. Select **File** > **Close**

    b. Select **Yes** to save changes.



49. **Exit** from **Catalog Manager**.

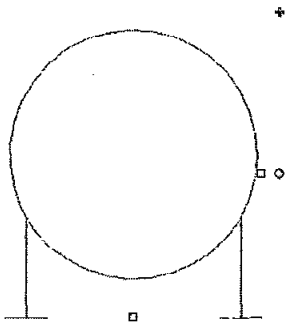
    a. Select **File** > **Exit**

50. **Open** a drawing and place the new parametric Black Box symbol.

    a. Stretch the symbol by the handles.

Lab 16 – Creating a Parametric Pump

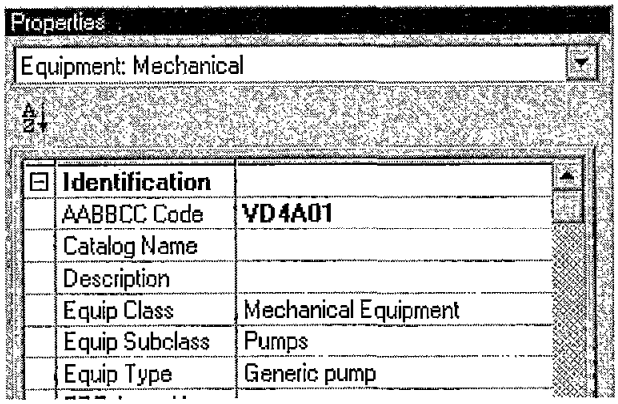
Purpose: To create a new parametric Pump based on the below image.



Create the Symbol in the Catalog

1. Enter **Catalog Manager**
   a. Select **Start** > **Programs** > **Intergraph SmartPlant P&ID** > **Catalog Manager**
2. Expand the **Equipment** > **Mechanical** > **Pumps** folder.
3. Create a new **Pump** symbol for **Equipment**.
4. **Rename** the symbol.
5. Open the symbol.
6. Set the **Item Type** in the **Properties Window** to **Equipment: Mechanical**

7. Define the following additional properties as shown in the figure below:
   a. **AABBCC Code** = Search Catalog Manager Help for AABBCC to determine the first character of the AABBCC code for all user defined P&ID symbols.
   b. **Equip Subclass** = Pumps
   c. **Equip Type** = Generic Pump



8. Save the Symbol.
    a. Select **File > Save**

Set Drawing Options

Information to remember: Before you can begin drawing the new parametric symbol, you must set up the **Catalog Manager** interface. Because the software maintains the options that you set until you turn them off, setting up the interface is not required for every parametric symbol that you create.

9. Enable **Maintain Relationships**

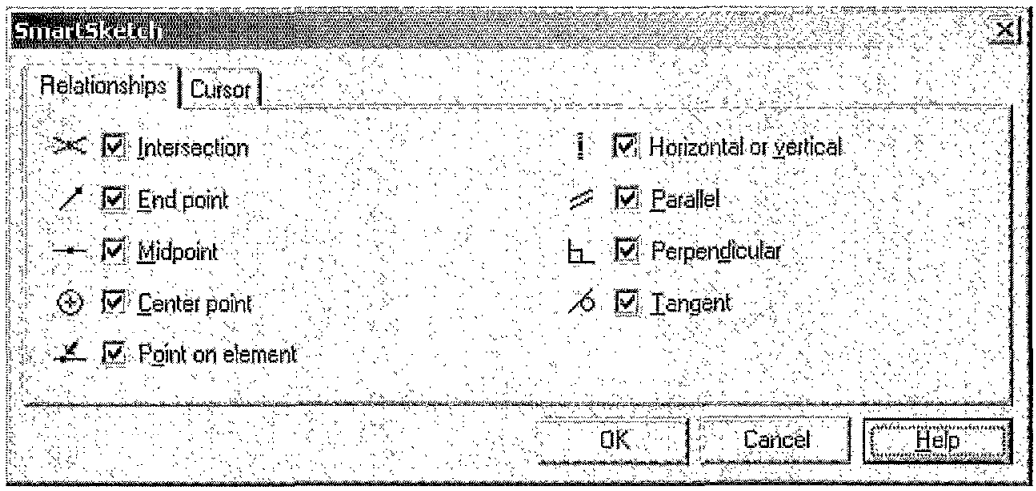
    b. Select **Tools > Maintain Relationships**

        i. If no check mark appears beside the **Maintain Relationships** command, click the command to turn maintaining of relationships on.

10. Set the relationships you want to recognize, and clear the relationships you do not want to recognize as you drawing

    c. Select **Tools > SmartSketch...**

    d. Check all of the Relationships



11. Add the **Point** command to the toolbar.

    e. Select **Tools** > **Customize**

        i. Under **Categories**, select **Draw**.

        ii. Drag the **Point** button to the right side of the toolbar region.

12. Add the **Lock** button to the toolbar.

    f. Select **Tools** > **Customize**.

13. Display the **Label** toolbar; the label toolbar has our dimensions on it.

    g. Select **View** > **Toolbars**

    h. Select **OK**

14. Display the **Layer Groups** dialog box, we will utilize the dialog box to create two layers.

    i. Select **Tools** > **Layer Groups**

15. Define two **layers**[14] to help in designing the symbol.

    j. Under **Layers**,

[14] These new layers allow you to work in the background to specify aspects of the parametric symbol. When the new symbol is complete, you will turn off these layers so the driving dimensions and construction objects of the symbol do not appear in the graphic or icon of the symbol.

i. Key in **Construction**

ii. Select the **Tab** key.

iii. Key in **Dimension**

iv. Select the **Tab** key.

v. Select **OK**

16. Display the **Layers** toolbar.

    k. Select **Tools** > **Layers**

17. **Save** the symbol

    l. Select **File** > **Save**

18. Move the origin ◎ symbol away from the symbol graphics you will be drawing.

Notes: Few things to consider while creating a parametric symbol.

- Do not create dimension off of origin symbol ◎. The reason is, we delete the origin symbol during file save, and any dimensions created with respect to the origin symbol will be deleted as well.
- Delete or move the origin symbol temporarily, when you save the symbol the origin will embed itself.

Draw the New Symbol

19. Set the **Layer** to the **Default** layer.

    m. Select **Default** in the Layer field of the **Layers** toolbar.

20. Ensure the **Graphics** tab is active.

21. Begin to draw the symbol

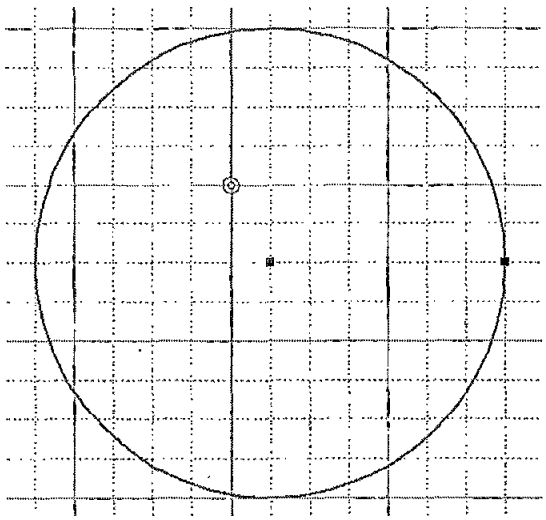
    a. On the **Graphics** tab, define the graphics for the new symbol.

i. Turn **Grid Snap On**

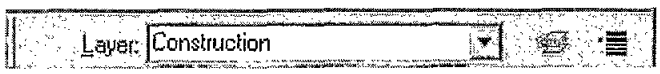
ii. Draw a **circle** with **1.5 Radius** 

Notes:

- The origin of the circle is the location of the original origin.

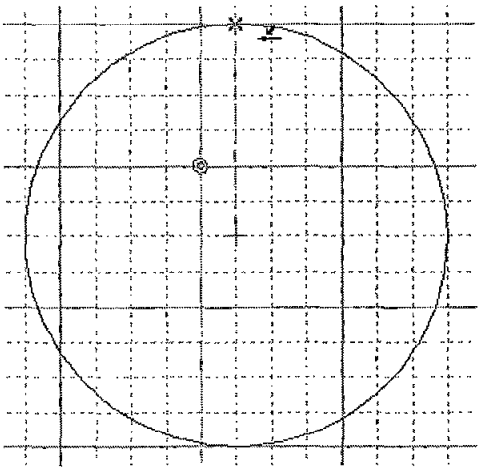


22. From **Tools** > **Layers**, set the layer to **Construction**.

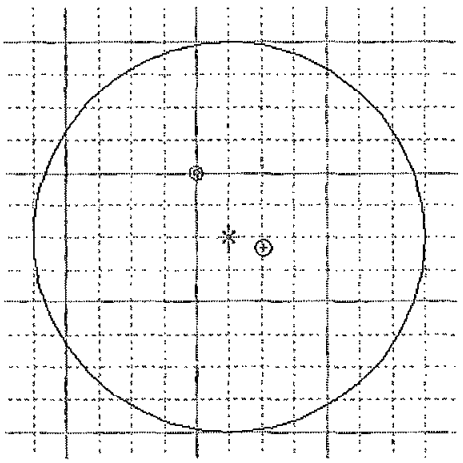


23. Draw the two construction lines from the center of the circle.

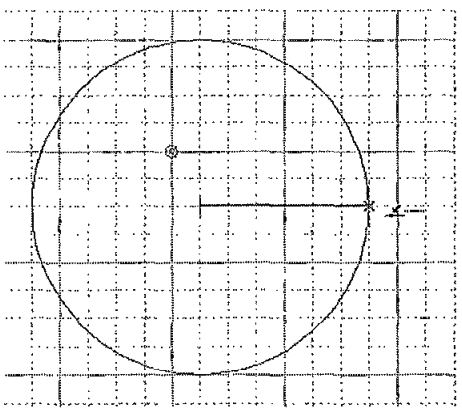
24. Select the **Line** command from the toolbar and drag the cursor over the circle to find the origin of the circle.

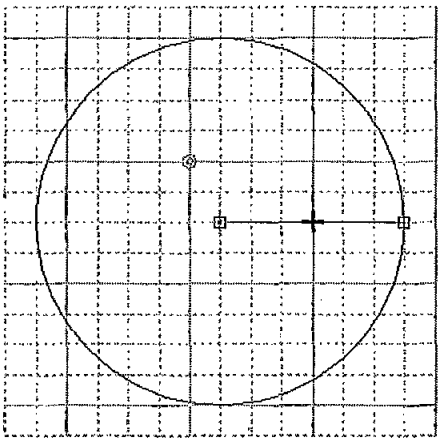


a. Then route the line from the center of the circle.

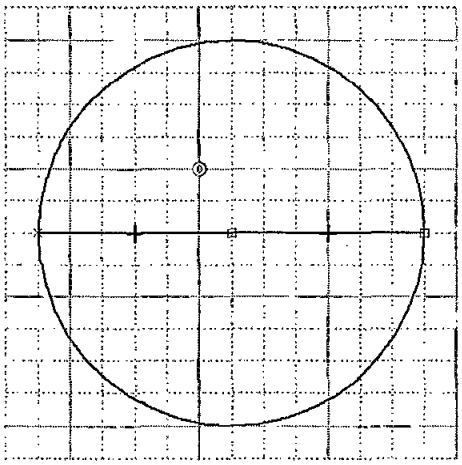


b. To the right of the circle.

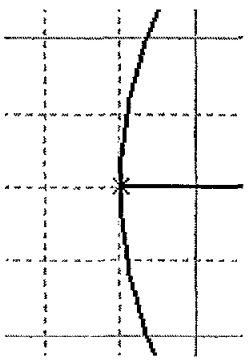




c. Repeat the previous steps for placing the construction line on the left. Your symbol should be similar to the below.

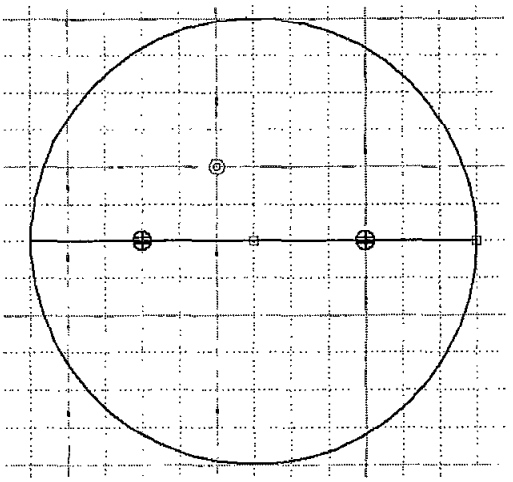


25. **Delete** the **Intersection** relationship on the left side of the circle.

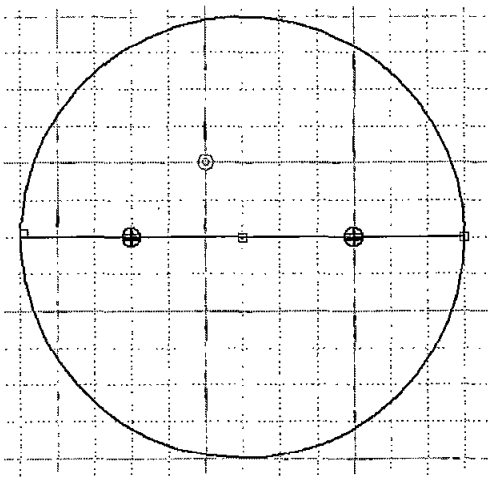


26. Place the **Equals** and **Collinear** relationships on the two lines.

a. Placing **co-linear** and **equal** relationships on the lines 90° to the circle element will drive the diameter.

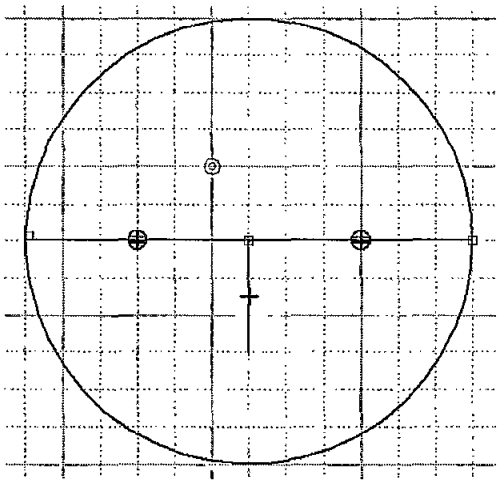


27. Add the **Perpendicular** relationship to the construction line on the left.



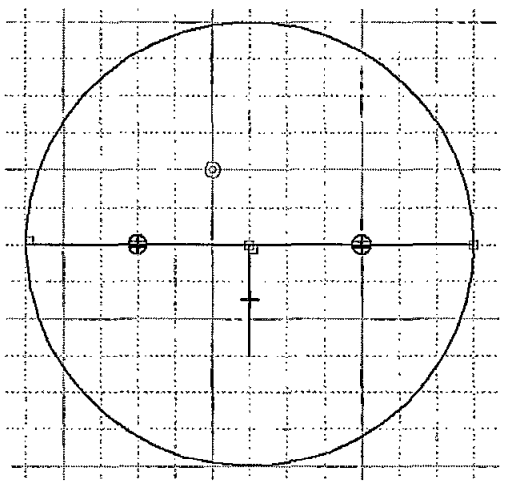
28. Draw the vertical construction line from the center of the circle .75" at 270 degrees.

    a. Pause the cursor over the horizontal construction line until the **End Point** relationship displays, then select the horizontal construction line and route your vertical construction line .75" at 270 degrees.



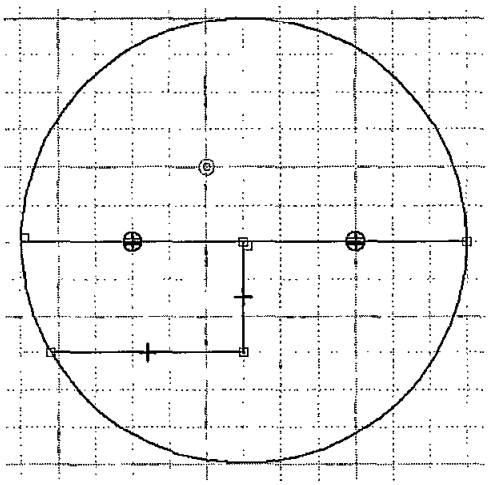
29. Add the **Perpendicular** relationship to the vertical construction line.

    a. Select the vertical construction line and then the right horizontal construction line.



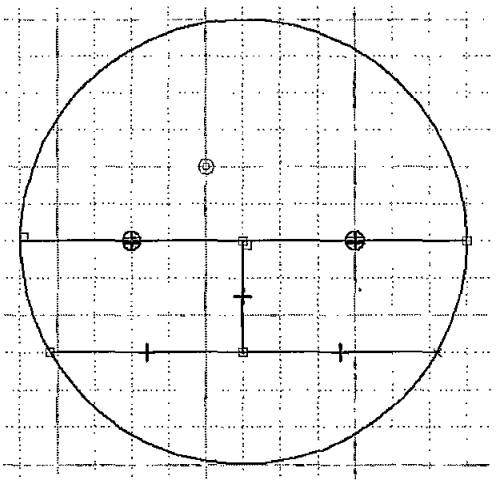
30. Draw the lower construction line from the bottom of the vertical construction line to the left of the circle.

    a. Pause the cursor over the vertical construction line until you get the **End Point** relationship, then select vertical construction line and route your horizontal construction line to the left of the circle.

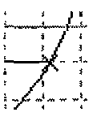


31. Draw the lower construction line from the bottom of the vertical construction line to the right of the circle.

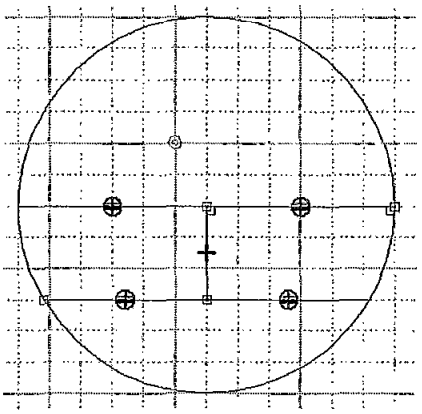
    a. Pause the cursor over the vertical construction line until you get the **End Point** relationship, then select the vertical construction line and route the horizontal construction line to the right of the circle.



32. Delete the **Intersection** relationship on the right side of the circle.



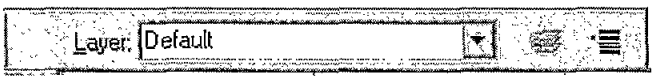
33. Place the **Equals** and **Collinear** relationships on the two lines.



34. Verify all lines inside the circle are on the construction layer

    a. Select a **line**, right mouse click and select **properties**.

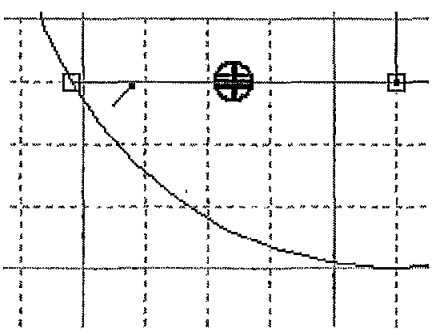
35. Toggle the layer to Default and draw the left leg of the pump.



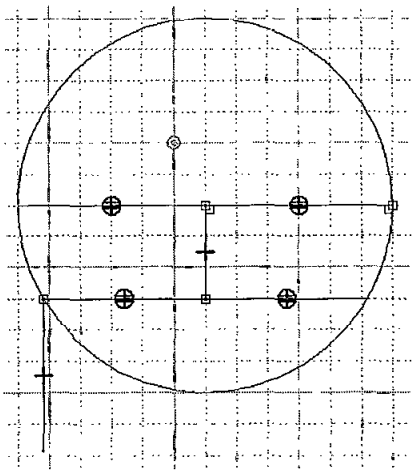
Symmetrical lines forced equal to 270 degrees to construction lines.

a. Highlight the lower left horizontal construction line by dragging the cursor over the line.

b. Pause the cursor over the line until the **End Point** relationship is displayed.

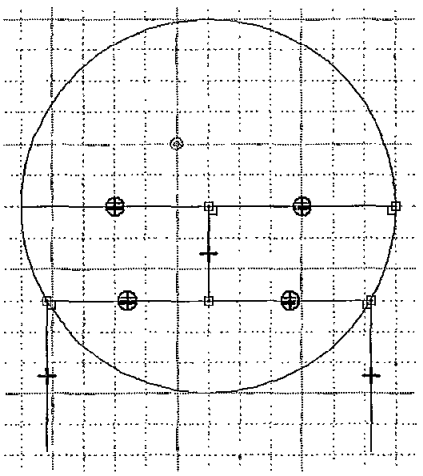


c. Select the lower left horizontal construction line and route a line 1.22" at 270 degrees.



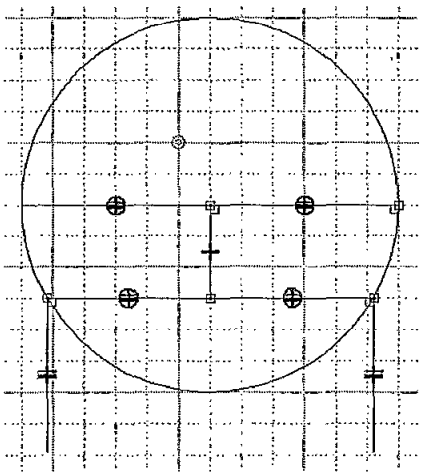
36. Repeat the previous steps for placing the right leg of the pump.

a. Apply the **Perpendicular** relationships to the legs of the pump and horizontal construction line.



Connecting the lines to the circle element forces the lines to follow the element shape.

b. Apply the **Equal** relationships to the legs of the pump.

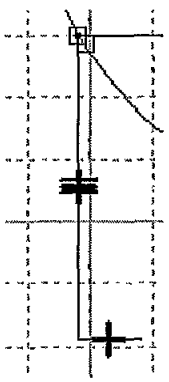


37. Draw the feet on the legs on the pump. They will be symmetrical lines forced to be equal at 90° to the legs.

    a. Highlight the left vertical leg of the pump by dragging the cursor over the line.

    b. Pause the cursor over the line until you the **End Point** relationship is displayed.

    c. Select the vertical leg and route a line .25" at 0 degrees.

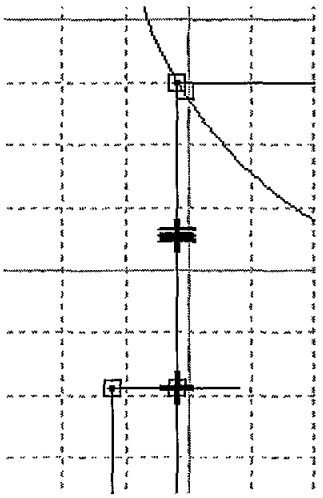


    d. Draw a line from the bottom of the vertical leg 1/2" at 270 degrees

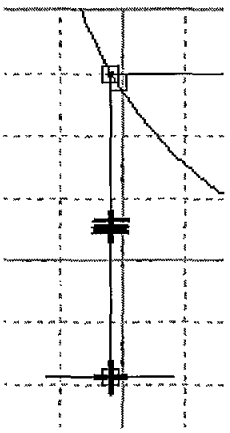
    e. Copy and paste the line drawn in step d, you will have two lines overlaid on top of each other.

    f. Move one of the lines one grid snap to the left or .25" to the left

    g. Using the Extend to Next command to extend the foot of vertical leg to the left .25".



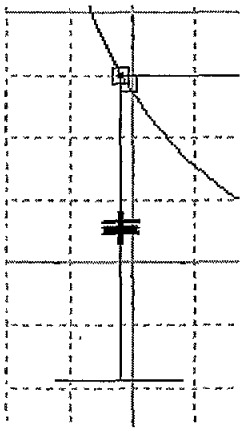
38. Delete the two vertical lines that will not be part of the pump, the leg and foot of the pump should be similar to the below.



39. Delete the Connection  and Horizontal/Vertical  relationships that are applied to the foot of the vertical leg.

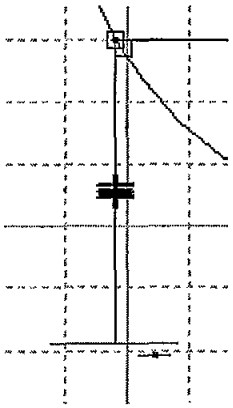
    a. The relationships are between the foot and the lines previously deleted

        i. We will redefine these relationships in the next step.

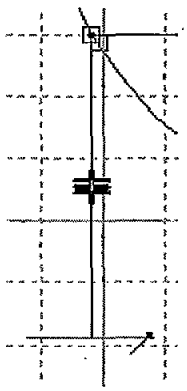


40. Apply the Connection relationship between the foot and the leg of the pump.

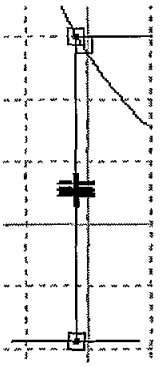
    a. Be sure when you highlight the foot that you receive the Midpoint relationship.



    b. Be sure when you highlight the leg that you receive the **End point** relationship.

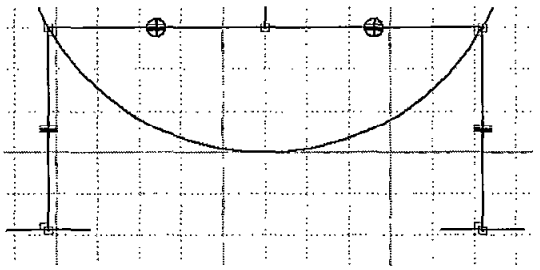


41. The connection at the leg and foot of the pump should be similar to the below.

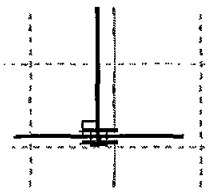


42. Apply **Perpendicular** relationships between the foot and the leg of the pump.

43. Repeat the steps to draw the foot on the right leg.



44. Apply **Equal** relationship to the feet.



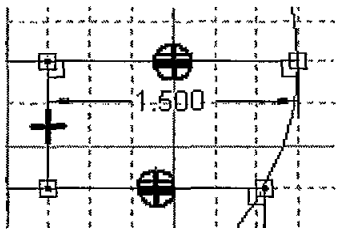
Add Dimensions to the Symbol

45. Dimension the pump so handle parameters will be created which will then be used to drag the symbol. This is the main driving dimension for the handle parameter – Right.

46. Set the layer to the **Dimension** layer.

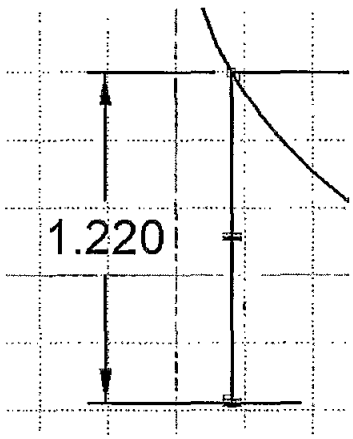
47. First Dimension Between the vertical construction line and the horizontal construction line.

    a. Before selecting the vertical or horizontal construction line remember to pause until you receive the **End point** relationships before selecting the line.



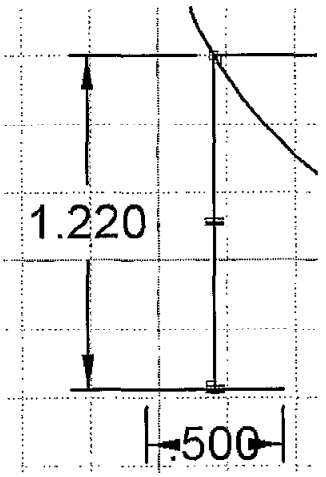
48. Next **Dimension Between** the lower horizontal construction line and the bottom of the leg of the pump. This is the main driving dimension for the handle parameter – Bottom.

    a. Before selecting the horizontal construction line or leg remember to pause until you receive the **End point** relationships before selecting the line.



49. Next **Dimension Between** the foot of the pump. A fixed dimension needs to be defined to prevent random alteration.

    a. Before selecting the foot remember to pause until you receive the End point relationships before selecting the line.



Add Variables and Equations to the Symbol

To complete the functionality of the symbol the driven dimension needs to be linked to the handle parameters (yellow squares, used to drag the symbol). Currently there are only four such parameters in Smartplant (Top, Bottom, Left, Right). This is achieved using **Tools - > Variables**. The handle parameters are set with default sizes using the Name and Values fields (created new). The driven dimensions will be listed, usually with a name 'V####' although they can be altered to describe the dimension. Then the formula field is used to describe how each dimension reacts to change. Basic mathematical functions are provided to allow complex relationships. Altering the value for the handle parameters can be used as a quick test of the functionality but is not a guarantee of the functionality in SmartPlant.

50. **Fit** the view.

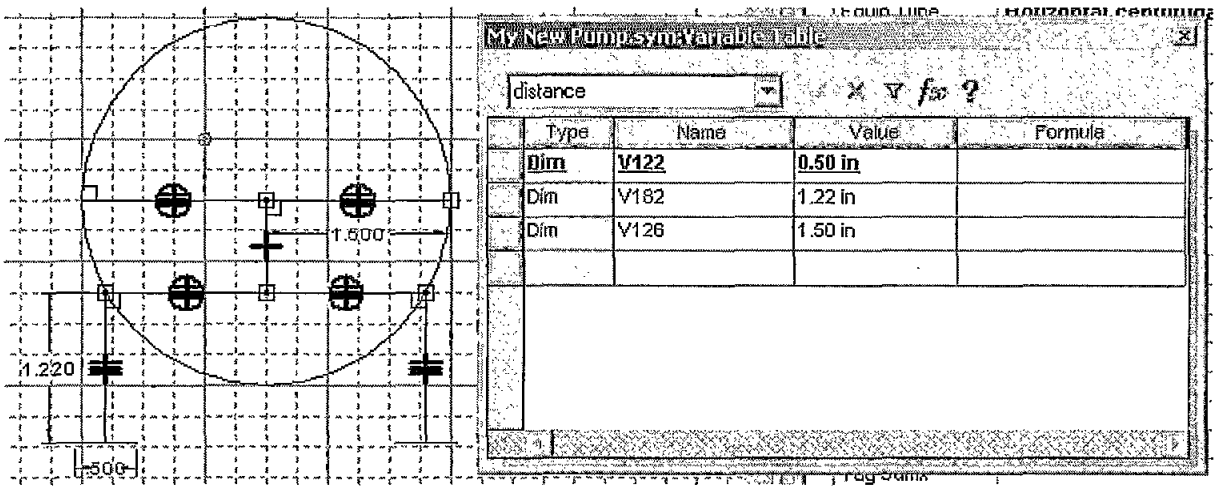
Notes:

- If all the dimensions are not displayed then when the Variable Table dialog box is displayed you may not see all the dimensions in the Variable Table.

51. Select **Tools** > **Variables** to display the Variable Tables dialog box. The dimensions that were added to the symbol will display in a tabular format.

    a. Moving your cursor over a **Dim**[15] in the variable table will highlight the dimension on the symbol.

[15] DIM refers to a dimensional relationship



52. Define 2 variables to tie to the dimension variables. In the last row of the **Variable Table** dialog box, Key in

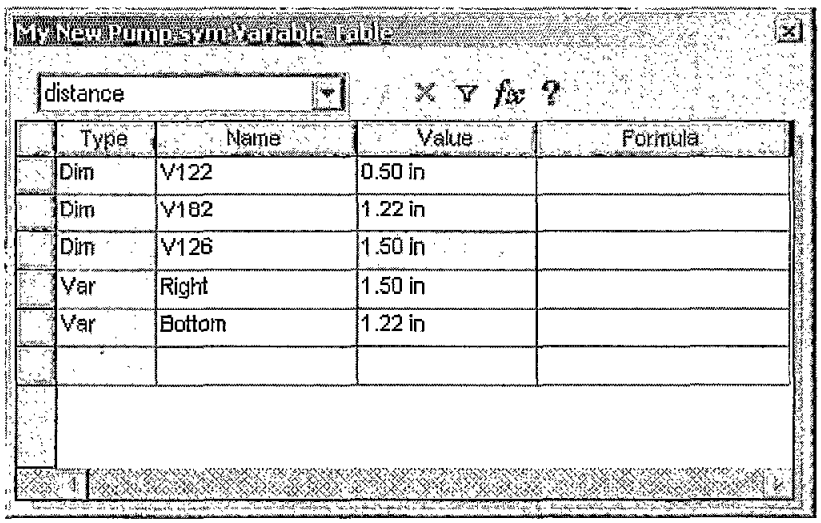
    a. **Name** = Right

    b. **Value** = 1.50 in

    c. Tab through the Formula field

    d. **Name** = Bottom

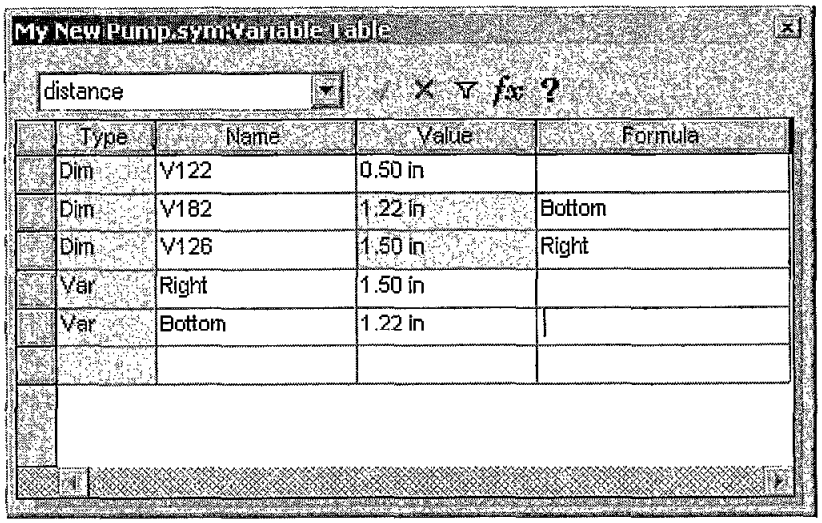
    e. **Value** = 1.22 in



53. Set the **Formula** field for the **Dimensions** in the **Variable Table** to define how each dimension reacts to change

Notes:

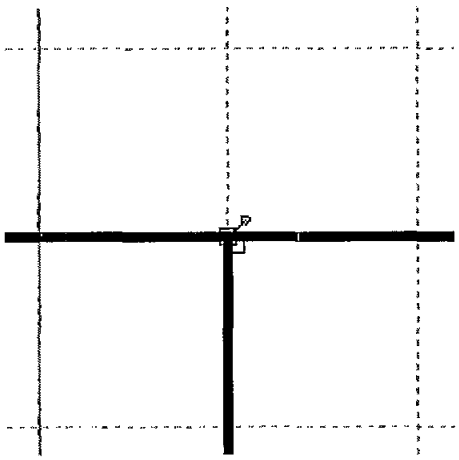
- The final functioning symbol, which allows the diameter of the sphere and the leg height to be altered is usually achieved by trial and error.



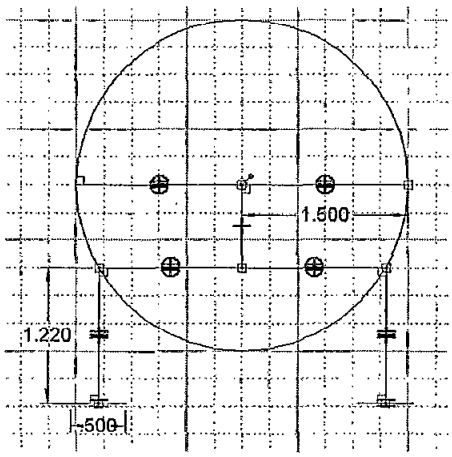
54. Add a **Point** to the center or the circle and **Lock** the point. The Lock relationship fixes all movement about this point.

    a. Set **Layer** = **Construction** before placing **Point**

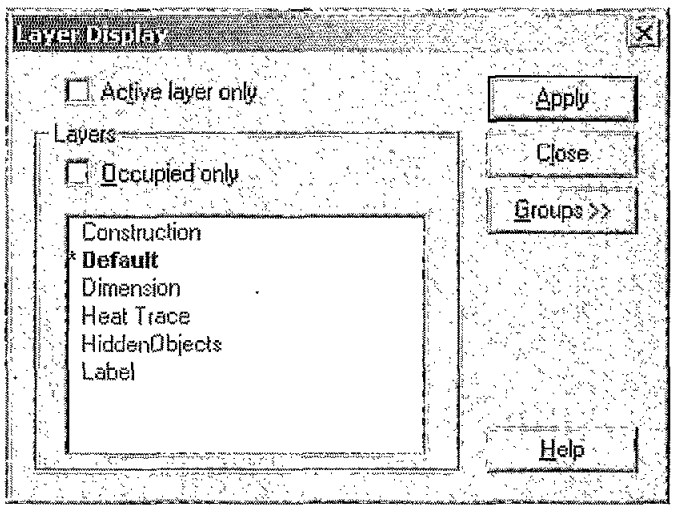
    b. To add the **Point** command to the toolbar by selecting **Tools** > **Customize** > **Toolbar** > **Categories** = **Draw**



55. Move the origin symbol to the center of the circle.



56. Utilize the **Layer Status** command to turn off the display of the **Dimension** and **Construction** layer.

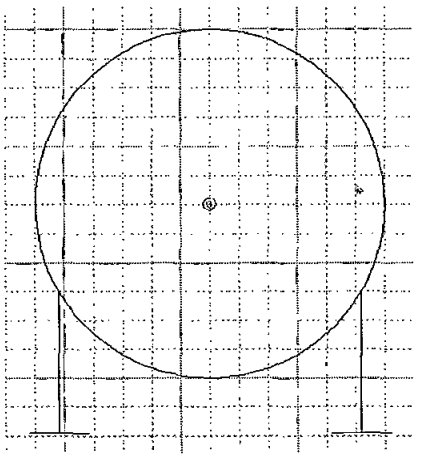


57. Turn off the display or hide the Relationship Handles by:

    a. Select **Tools** > **Relationship Handles** to turn on and turn off the display of relationship handles.

       OR

       You can also click **Relationship Handles** on the **Change** toolbar to toggle relationship handles on and off.

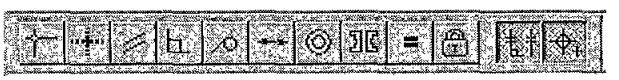


58. **Save** and **Exit** Catalog Manager.

59. **Open** a drawing and place symbol, use the parametric handles ▫ to manipulate the symbol, revisit the symbol in **Catalog Manager** to make adjustments if necessary.

Notes:

- On testing the example and it is found that the circle element moves left or right but does not change size (diameter) as required. It is therefore necessary to further specify the relationships between the elements using construction lines, dimensions and the relationship handles (toolbar shown below).



Save a Drawing in a Different Format (.dwg) within SPPID

1. In Microsoft Excel, open **ExportLayer.xls**. The location of this Microsoft Excel workbook is specified in **Options Manager** > **Settings**.

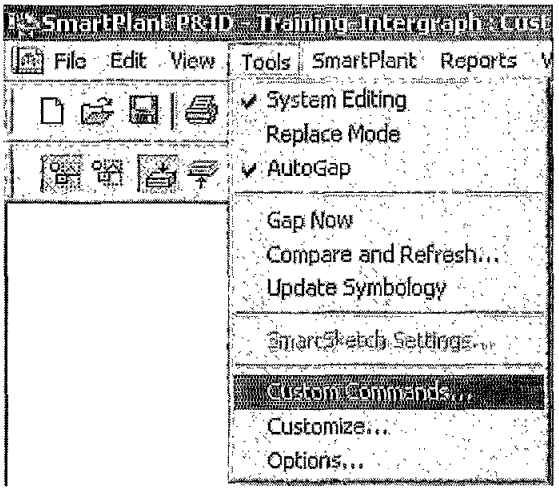
2. Assign **level** or **layer** numbers between **10** and **63** to ensure that graphics appear in the designated levels or layers.

   Notes:

   - You can choose more filters for the **Filter** column of this worksheet from filters in Filter Manager.
   - If you save your drawing to the AutoCAD format, you can name layers with any combination of alphanumeric characters.

3. Save **ExportLayer.xls**.

4. In the design software select **Tools** > **Custom Commands**.



5. When the **Custom Commands** dialog box opens, run the **ExportLayer.dll**

   a. This macro is delivered in **~\Program Files\SmartPlant\P&ID Workstation\Program** folder.

   b. When the macro finishes running, a message appears that tells you if all items were assigned layers successfully or if any items lacked the appropriate layer specification. You can edit the Microsoft Excel workbook again if you need to add filters and layers.

   c. Select **OK**

6. Select **File > Save As**.

   a. On the **Save As** dialog box, select the **drive** and **folder** for the new drawing.

   b. In the **File Name** box, type a new name for the drawing.

   c. In the **Save As Type** box, select the document format that you want to use.

   d. Select **Save**.

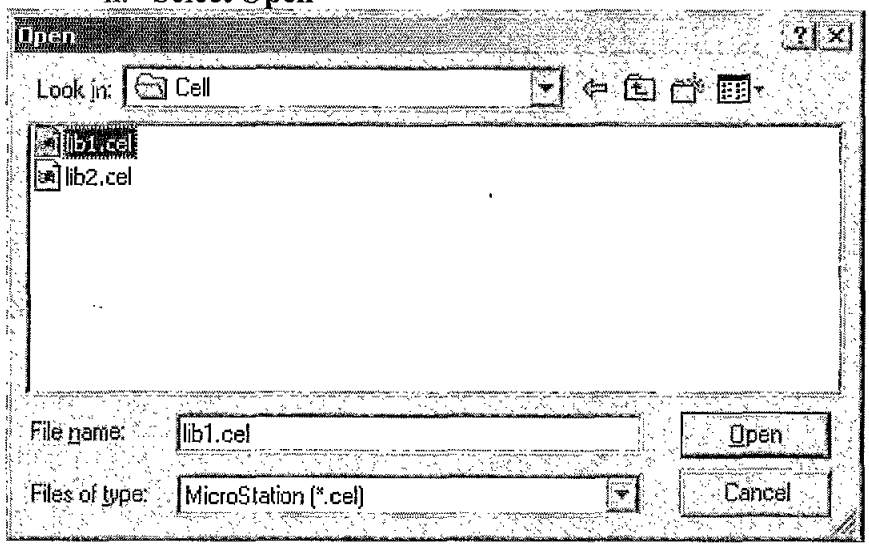
Notes:

- Files in the **~\Program Files\SmartPlant\P&ID Workstation\Program** folder used by the **Save As** command
  - For **AutoCAD**[16]
    - **PidAcad.dwg** - Seed file used for the translation.
    - **PidAcad.ini** - Used to map items during the Translation
  - For **MicroStation**
    - **PidMstn.dgn** - Seed file used for the translation.
    - **PidMstn.ini** - Used to map items during the Translation.

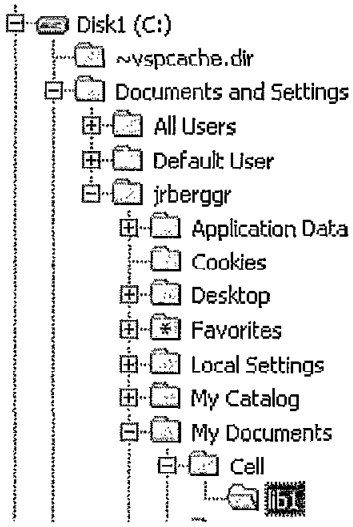
[16] PidCleanup for AutoCAD (AutoCAD only) – Loaded from the web under Freewware tools and Utilities. This is an unsupported program that was written to help cleanup files translated to AutoCAD. For best results this file should be ran for all files translated from SPPID to AutoCAD

Creating symbols in Catalog Manager from a different format (.cel)[17]

1. Start **Catalog Manager**
2. Open a MicroStation Cell Library
   a. Select **File** > **Open**
   b. **Browse** to the **Cell Library**.
      i. Select the Cell Library
      ii. Select **Open**

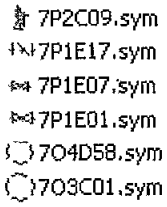


3. A sub-folder will be created in the location of the Cell Library.

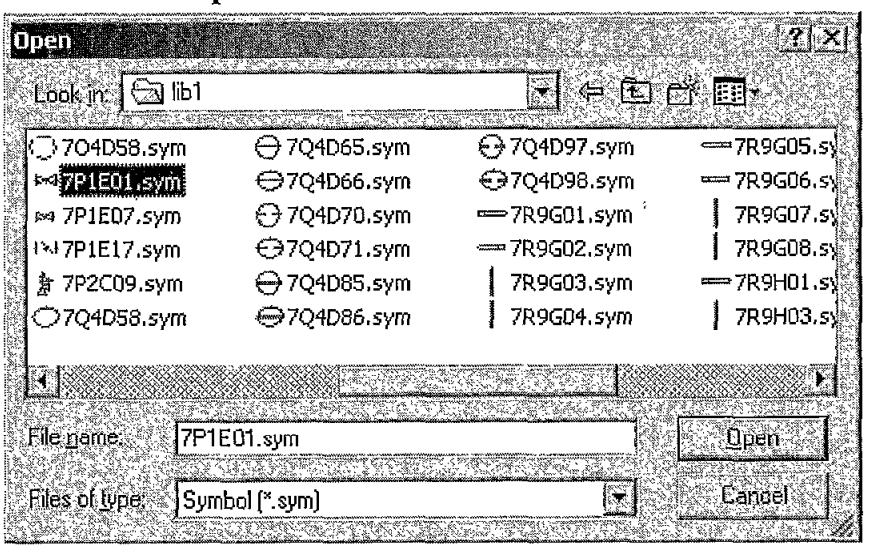


[17] The same steps could be followed for creating an AutoCAD block into a SPPID Symbol.

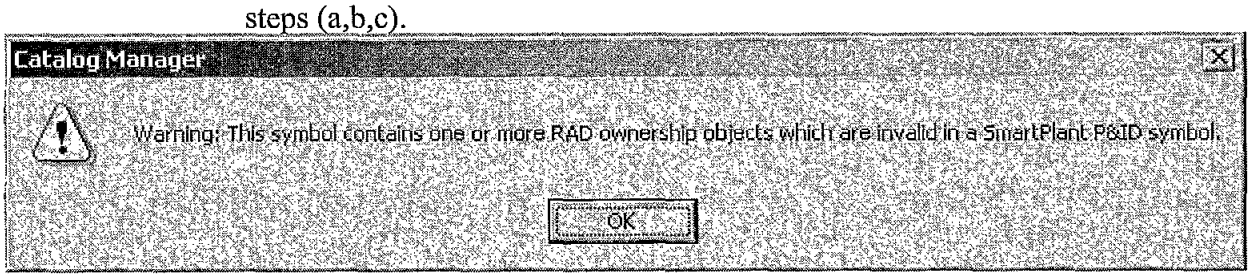
4. Each **Cell** from the **Cell Library** will have a Symbol (.sym) created in this folder.



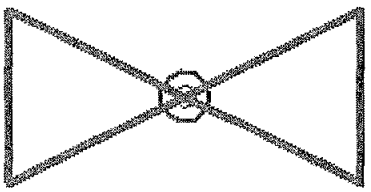
5. Open one of the symbols.
   a. Select **File** > **Open**
   b. Select the Symbol
   c. Select **Open**



6. If you receive the below message upon opening the symbol see the below steps (a,b,c).



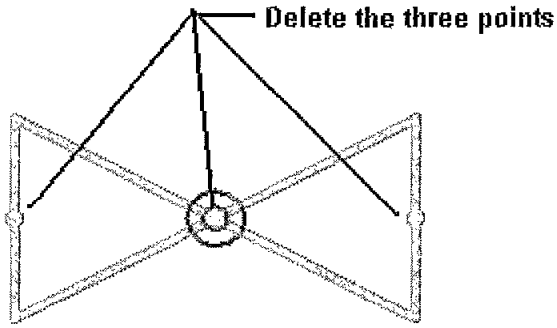
   a. Encompass the symbol with a Select Set



b. Select the **Ungroup**[18] command.

c. Select **Save**

d. **Delete** the three points, this symbol originated from the **PDS 2D** product; which had connect points on the .cel in **PDS 2D**.

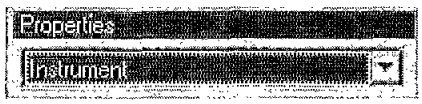


7. Select **Fit**.

8. **Move** the symbol onto the sheet.

9. Set the **Item Type** in the **Property Window**

   a. In this example it's an **Instrument**.



10. Set the **Instr Class** and **Instr Type** in the **Property Window**.

Expansion Qualifie	
Instr Class	**Control valves and regulators**
Instr Type	**Control valve**
Instr Type Modifie	

11. Ensure the lines are on the **Default** layer.

12. Add the **Connect Points** to the **Symbol**

    a. 2 **Piping Points** 

, on the ends of the **Symbol**.

       i. Required since the item in placed on a **Pipe Line**

    b. 1 **Auxiliary Point** 

, at the center of the Symbol.

       i. Required for placing a **Actuator**

13. Define the **Heat Tracing** location on the **Heat Tracing** tab for the **Symbol**.

Graphics, **Heat Trace**, Jacket, Label, HiddenObjects, Icon

[18] The **Ungroup** command will dissolve the association for all elements which are grouped or nested together.

14. View the **Icon** tab and make any changes if required.

15. **Exit Catalog Manager**
    a. **Save** the symbol

16. From **Windows Explorer**, move the symbol to the Plants Reference Data. For this example, see the below.
    a. **From**:
        i. C:\Documents and Settings\<Your Login>\My Documents\Cell\lib1
    b. **To**:
        i. D:\Intergraph_Site\Custom\P&ID Reference Data\Symbols\Instrumentation\In-Line\Valves\2 Way Common

17. **Open** a drawing to test your Symbol.
    a. Place symbol in space.
        i. Heat Trace the symbol
    b. Place the symbol on a pipe line

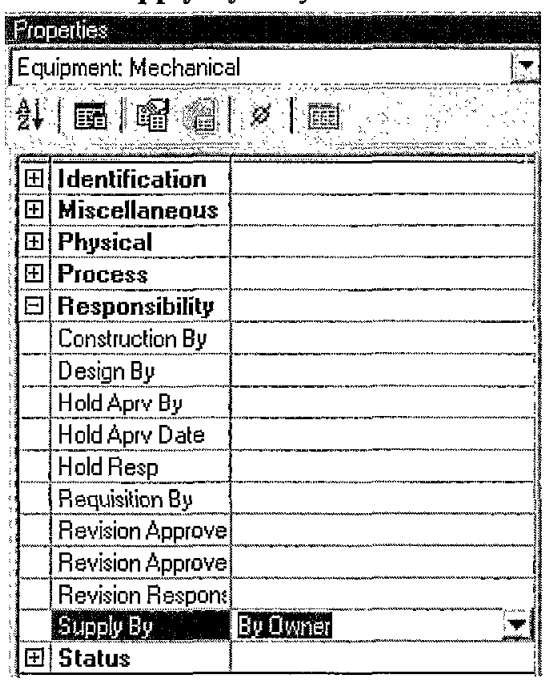
Lab 17 – Creating New Filters for Display Sets

Purpose: To create a new display filter that displays only **Pumps** supplied **By Owner**.

1. Open a drawing in SmartPlant P&ID.
2. Place several Pumps.
   a. Select **Symbols** > **Equipment** > **Mechanical** > **Pumps**

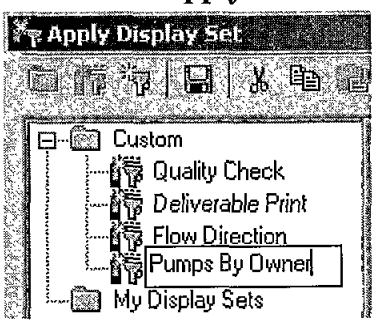
   OR

   b. Place Pump03 assembly twice.
      1. Select **Symbols** > **Assemblies** > **Equipment** > **Pump03**
3. Set the **Supply By** property on a couple of the **Pumps**.
   a. **Supply By** = By Owner

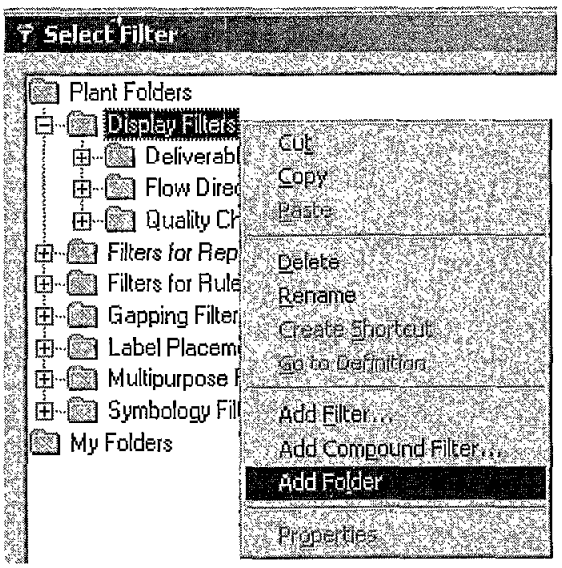


4. Select the **ESC** key on the keyboard to de-select items,
5. Select **View** > **Apply Display Sets**
6. Add a **Display Set** to the **Custom** folder.
   a. Select the **Custom** folder.
   b. Select the **Add Display Set** command.
   c. Enter a name for the **Display Set**.

1. **Pumps By Owner**
2. Select **Apply**



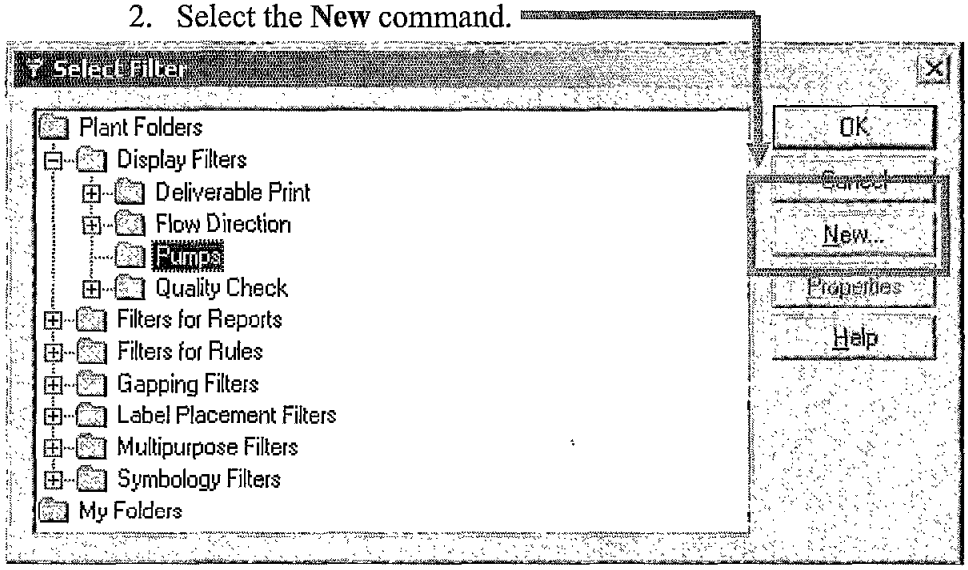
7. **Add** a **Filter** to the **Display Set** to discriminate only on **Pumps**, which are supplied **By Owner**.
   a. Select the **Add Filter** command from the toolbar.
   b. Create a new folder to store the Filter we are about to create.
      1. Select the **Display Filters** from the **Plant Folders** list.
      2. Right mouse click
      3. Select **Add Folder**



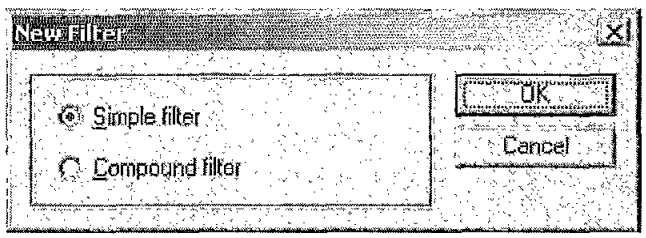
      4. Enter a name for the folder, **Pumps**.

c. **Add** a **Filter** to the **Pumps** folder.

1. Select the **Pumps** folder.
2. Select the **New** command.



3. Select the type (**Simple Filter**) of filter to create
   1. Select **OK**

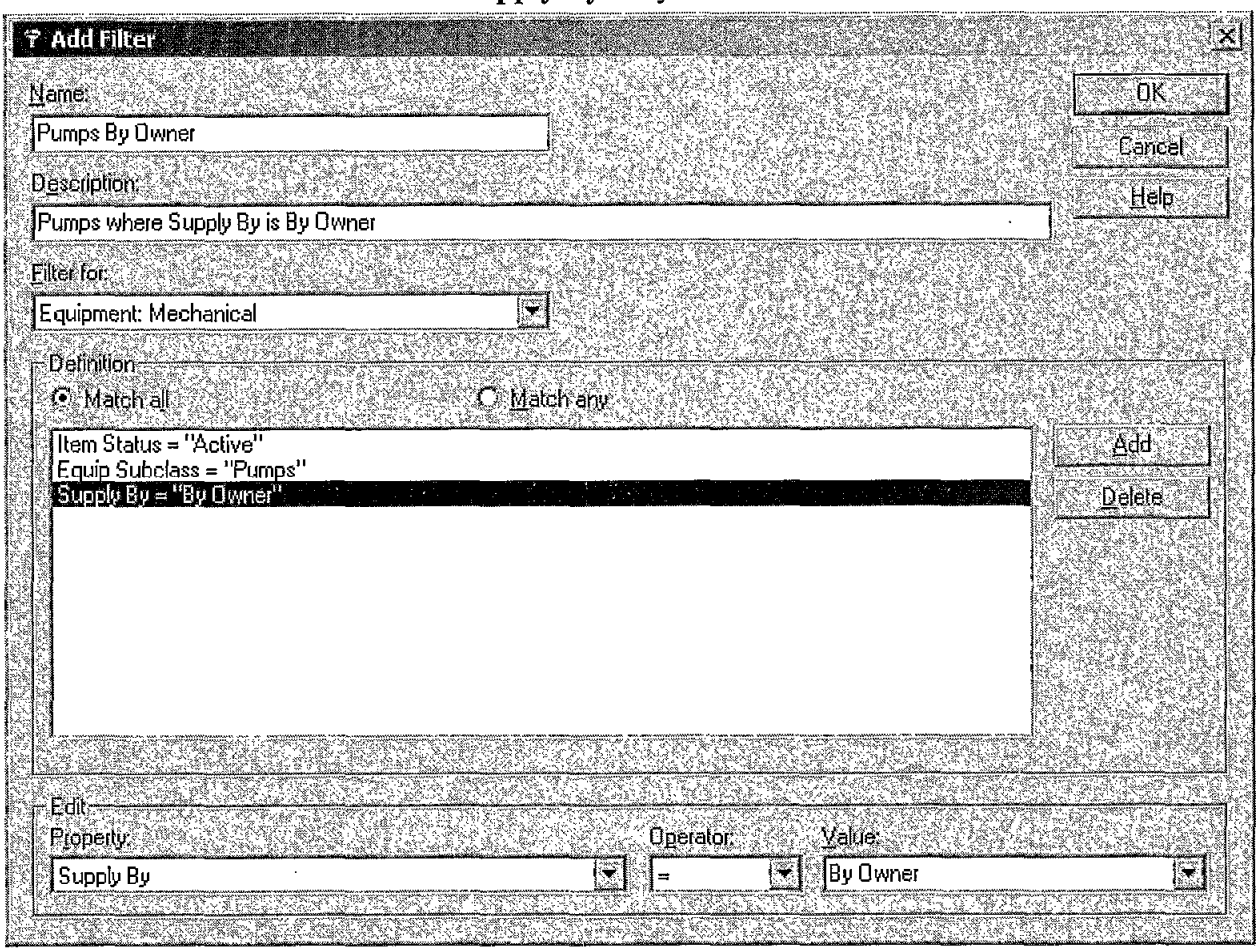


d. Build the Filter by defining the below values:

1. **Name** = Pumps By Owner
2. **Description** = Pumps where Supply By is By Owner
3. **Filter For** = Equipment: Mechanical

Definition

4. **Match All**
5. **Item Status** = Active
6. **Equip Subclass** = Pumps
7. **Supply By** = By Owner



e. Select **OK** on the **Add Filter** form.

f. Select **OK** on the **Select Filter** form.

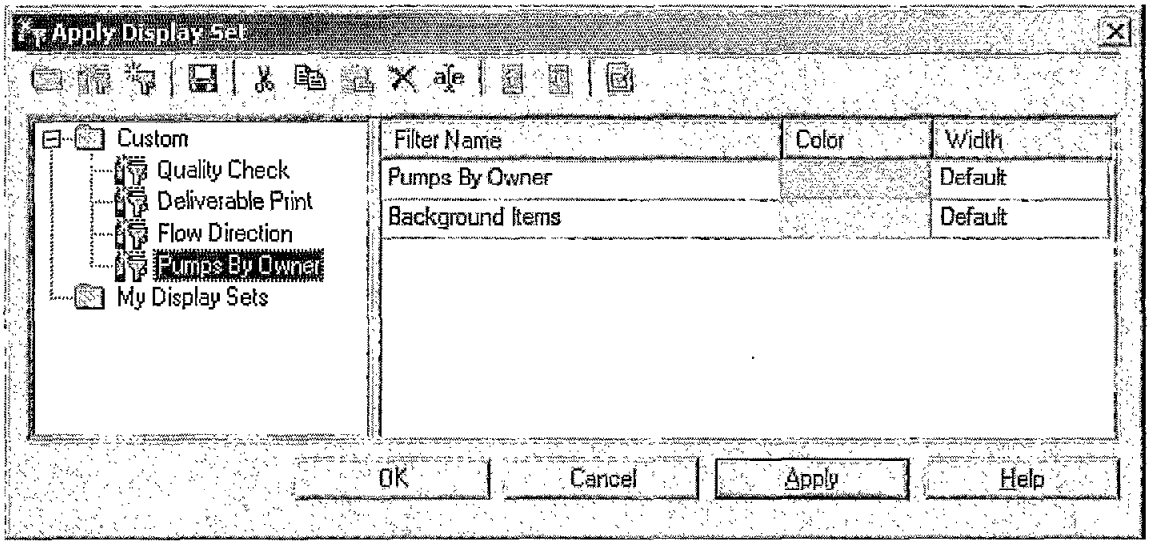
8. On the **Apply Display Set** dialog box, set the color for the **Pumps By Owner Display Set.**

a. **Pumps By Owner = Green**

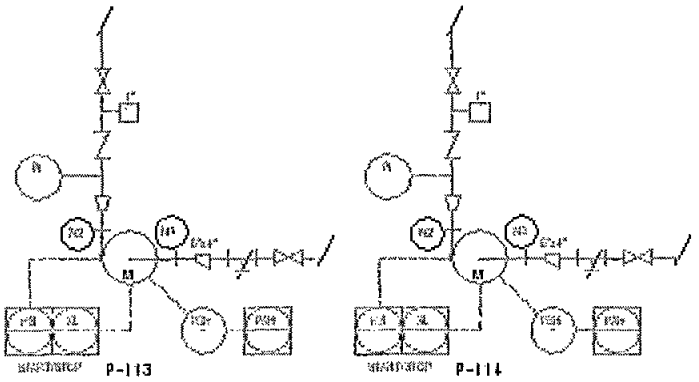
b. **Background Items = Grey**

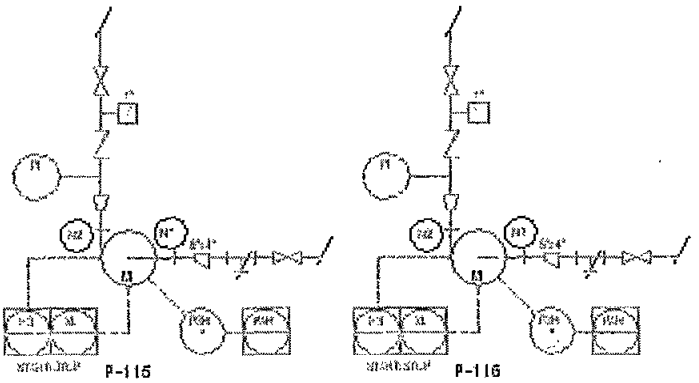
c. Select **Apply**

d. Select **OK**



9. Only **Pumps** with a **Supply BY** of **By Owner** should be displayed in Green and all other items greyed out.





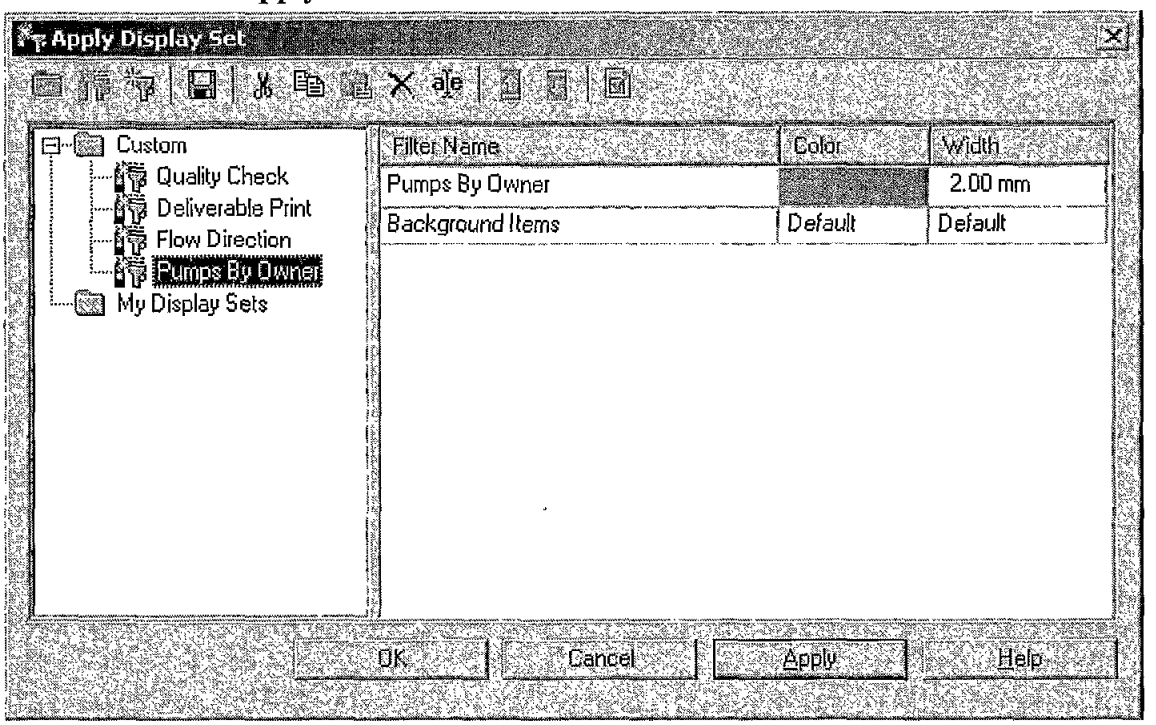
10. Clear the **Display Set**

    a. Select **View > Clear Display Set**

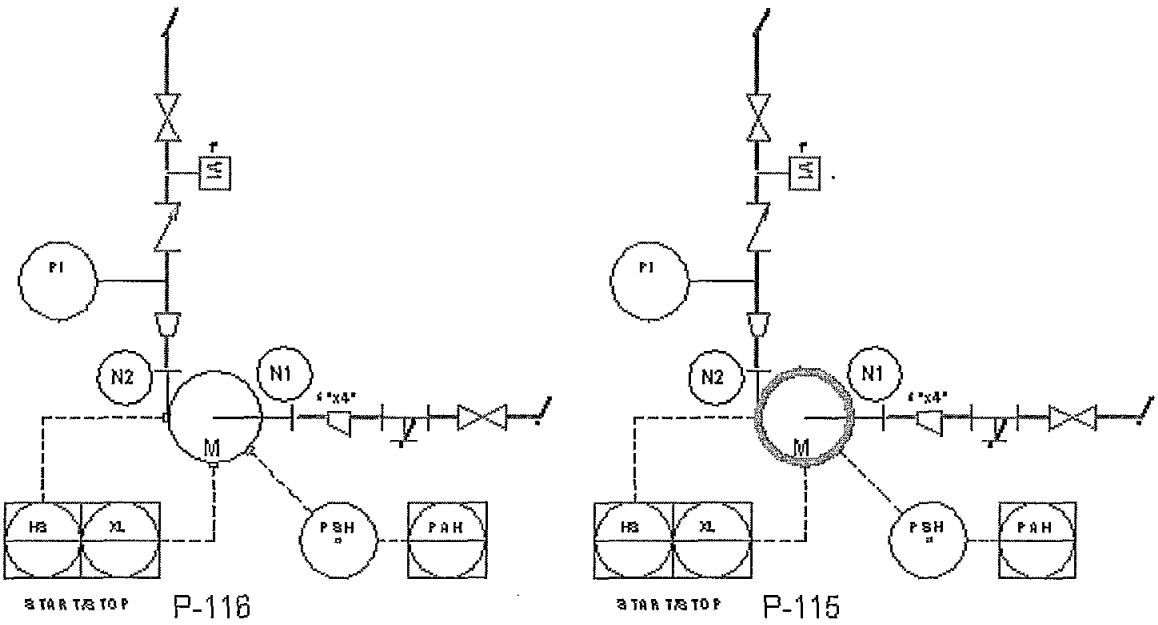
11. **Exit** the **Drawing**.

Lab 18 – Displaying Alternate Symbology with Display Sets

1. Open the same drawing from the previous lab.
2. Select **View** > **Apply Display Set**
3. Select the **Pumps By Owner** display set.
4. For the **Filter Name** of **Pumps By Owner** set the following:
    a. **Color** = Cyan
    b. **Width** = 2.00 mm
5. For the **Filter Name** of **Background Items** set the following:
    a. **Color** = Default
    b. **Width** = Default
6. Select **Apply**.



7. Your drawing should be display similar to the below.



12. **Clear** the **Display Set**

    a. Select **View** > **Clear Display Set**

13. **Exit** the **Drawing**.

    a. Select **File** > **Exit**.

Lab 19 – Reviewing/Editing Options Manager Symbology and Gapping

Purpose: To change **Symbology** and **Gapping** graphics.

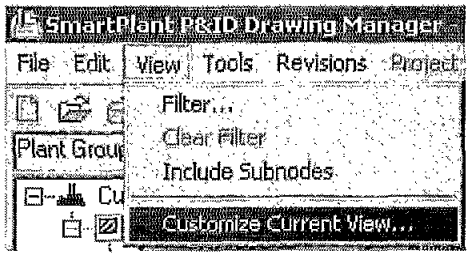
1. Review the **Symbology** and **Gapping** used in **Options Manager**.
2. Exit **Options Manager**.
3. **Create** a new **Drawing**.
4. **Open** the **Drawing**.
5. **Place** several items of **Equipment**
6. Define **Construction Status** of **New, Existing** or **Future** on the **Equipment** Items.
7. Turn **AutoGap ON**.
8. Route several **Primary Piping** lines in the **Horizontal** and **Vertical** direction, be sure to cross over the lines, the **Vertical Primary Piping** line will Gap the **Horizontal Primary Piping** line as defined in **Options Manager > Gapping**.
9. **Exit** the **Drawing**.
10. **Exit** the **Drawing Manager**.
11. Open **Options Manager** and change the following:
    a. For **Symbology**, see the below chart.

Plant Filter	Color	Width	Pattern
Equipment - New		1.00 mm	
Equipment - Future		0.70 mm	
Equipment - Existing		0.70 mm	

    b. Change the default gap symbol for Primary Piping (horizontal and Vertical).
    c. Change the priority of when Horizontal Primary Piping crosses Vertical Primary Piping. See the below chart.

Line Type	Orientation	Gapping Style
Primary Piping	Vertical	
Primary Piping	Horizontal	

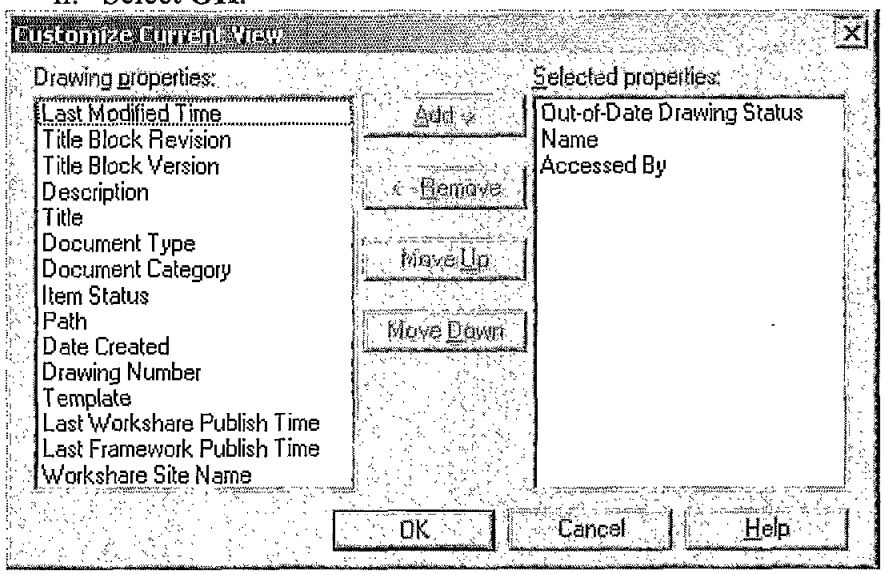
12. **Save** and **Exit Options Manager**.
13. Open **Drawing Manager**
14. **Customize** the **Drawing View** to display the **Out-of-Date Drawing Status** property in the list view.
    a. Select **View > Customize Current View**



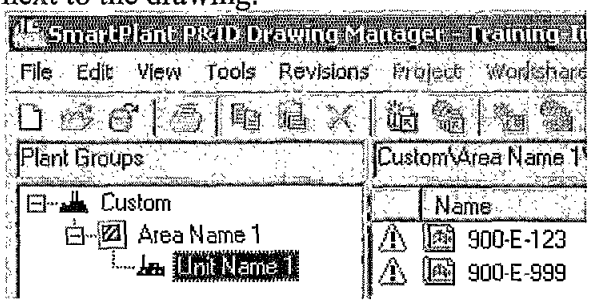
b. Select **View > Customize Current View**

i. Select the **Out-of-Date Drawing Status** from the list of **Drawing Properties** and **Add** to the **Select Properties** field.

ii. Select **OK**.



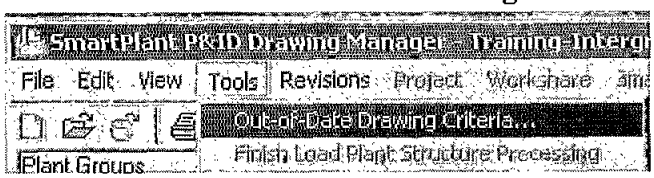
c. If the **Drawing** is **Out-of-Date** a ⚠ will be displayed in the list view next to the drawing.



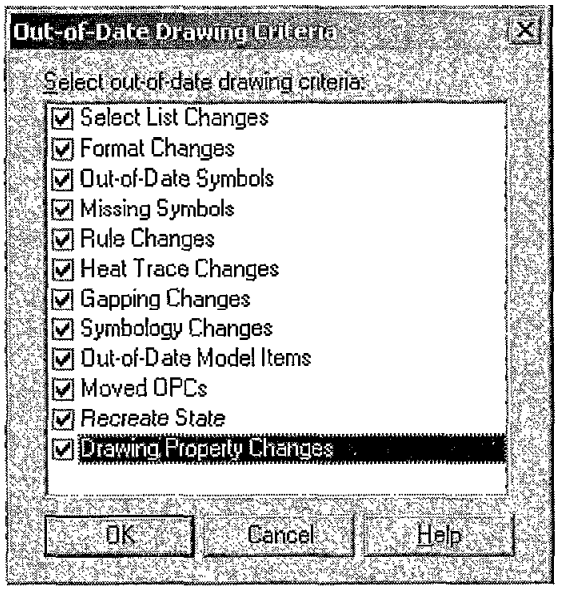
15. Run the **Out-of-Date Drawing Report**

a. Select the criteria to be used to search for values when you use the **File > Out-of-Date Drawings** commands.

i. Select **Tools > Out-of-Date Drawing Criteria...**



ii. Select all the boxes, especially the Gapping Changes and Symbology Changes since we made those changes in the previous steps.



b. Select **File > Out-of-Date Drawings > Report**

i. An **X** should be displayed in the **Gapping** and **Symbology** columns.

Plant Name: Custom

Date/Time: 8/12/2005 2:56:36 PM

Drawings with no X in the criteria column are up-to-date.
Criteria column headers with * indicate criteria that was used to determine the out-of-date draw

Plant Group	Drawing Name	Select List *	Formats *	Out-of-Date Symbols *	Missing Symbols *	Rules *	Heat Trace *	Gapping *	Symbology *	Out-of-Date Model Items *	Moved OPCs
\Unit 38\											
	New							X	X		

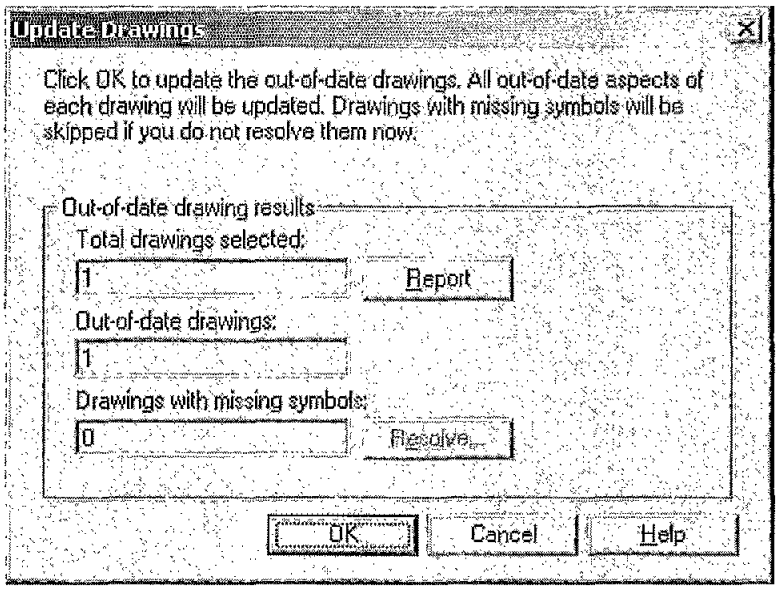
c. **Exit** the **Report** and **Save**.

16. Update the drawing to the current **Gapping** and **Symbology** changes.

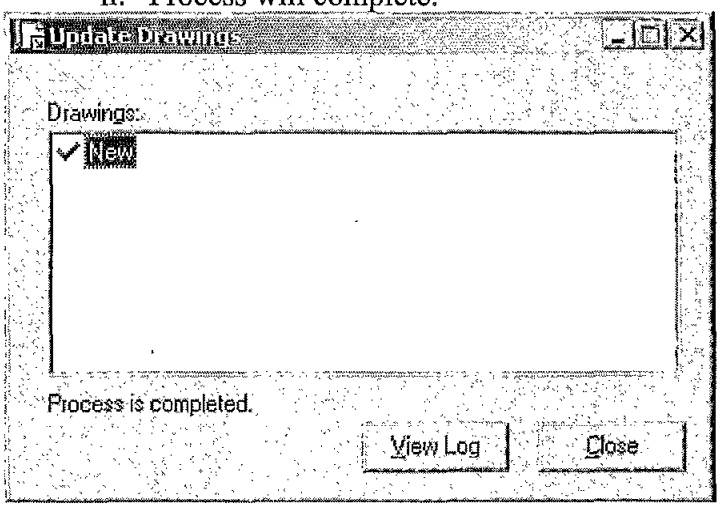
a. Select the **Drawing** in the list view

b. Select **File > Out-of-Date Drawings > Update**

i. Select **OK**.



ii. Process will complete.



1. Select **View Log**

********** UpdateDrawings **********

08/12/2005 15:13:05 - INGRPPO\jrberggr Performed UpdateDrawings.

Out-of-Date Drawing Criteria

Select List Changes = True

Format Changes = True

Out-of-Date Symbols = True

Missing Symbols = True

Rule Changes = True

Heat Trace Changes = True

Gapping Changes = True

Symbology Changes = True

Out-of-Date Model Items = True

Moved OPCs = True

Recreate State = True

Drawing Property Changes = True

Operation : UpdateDrawings

Drawing : New

Status : Completed successfully.

****

2. Select **Close**

17. **Open** the **Drawing**.
    a. Do the items show the changes you made in **Options Manager**?
18. **Exit** the **Drawing**.
19. **Create** a new **Drawing**[19]
20. **Place** several items of **Equipment**
21. Define **Construction Status** of **New**, **Existing** or **Future** on the **Equipment** Items.
22. Turn **AutoGap ON**.
23. Route several **Primary Piping** lines in the **Horizontal** and **Vertical** direction, be sure to cross over the lines, the **Vertical Primary Piping** line will Gap the **Horizontal Primary Piping** line as defined in **Options Manager** > **Gapping**.
24. **Exit Drawing**.
25. **Exit Drawing Manager**

Bonus Lab

26. In **Options Manager**, reset the vales in **Smbology** and **Gapping** to the original values.
27. Run **Update Drawings** on **ALL Drawings**.

[19] This drawing will read the latest changes in Options Manager, update drawings will not be required on this drawing unless changes are made after this drawing was created.

Lab 20 – Creating New Rules

Purpose: Working with **Rule Manager**

1. Edit an existing rule making it illegal to place piping components in space.

   HINTS:

   a. **Rule Manager** > **Plant Rules** > **Free Standing**

   b. Create a new drawing to test your change.

2. Edit an existing rule to display an error in the piping materials class changes at a branch.

   HINTS:

   a. **Rule Manager** > **Plant Rules** > **Relationship** > **Piping**

   b. Create a new drawing to test your change.

   c. Route a horizontal **Pipe Line**

   d. Route a branch off the horizontal **Pipe Line**.

   e. Define a value for **Piping Material Class** on the horizontal **Pipe Line**

      1. Notice the horizontal pipe line and branch will highlight indicating both lines will receive the value you define for Piping Material Class.

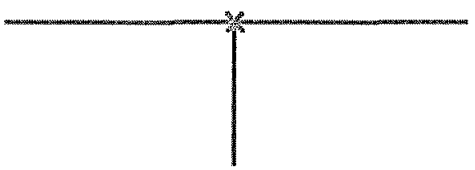
   f. Turn **System Editing OFF**.

   g. Select the branch.

   h. Define a different value for **Piping Material Class** on the branch.

      1. Notice only the branch highlights.

   i. Notice the Inconsistency is display as an **X**.



   j. Turn **System Editing ON**.

3. Edit the pipe to nozzle rule to copy cleaning requirements from the nozzle into the pipe. Display an error if this rule is violated. Remember, rules are invoked at placement time.

   HINTS:

   a. **Rule Manager** > **Plant Rules** > **Relationship** > **Piping**

   b. Create a new drawing to test your change.

   c. Place an **Equipment** item.

d. Place a **Nozzle** on the **Equipment**

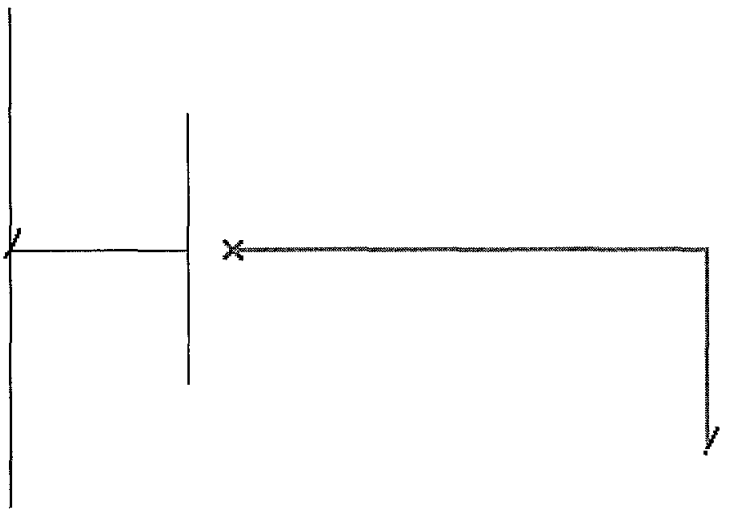
e. Define a value for **Cleaning Requirements** on the **Nozzle.**

f. Route **Pipe** from the **Nozzle**

g. Does **Cleaning Requirements** copy into the **Pipe**? Yes

h. Change the value for **Cleaning Requirements** on the **Pipe.**

i. Do you receive an **Inconsistency Error** between the **Nozzle** and **Pipe**? Yes



4. Reset all the changes made in **Rule Manager.**

5. From **Drawing Manager,** run **Update Drawings** on all drawings.

Lab 21 – Review Existing Rules

Purpose: Understand the delivered rules.

Review a rule from each directory in Rule Manager. Select each tab in the rule and understand what is being defined.

1. **Free Standing > No Freestanding Equip Comp** – How does this rule prohibit placing equipment components in space?

2. **Implied Items > Piping Vent/Drain Detail 2** - Do you understand how the filter works for this item? What symbols are implied by placing these Macrocomponents?

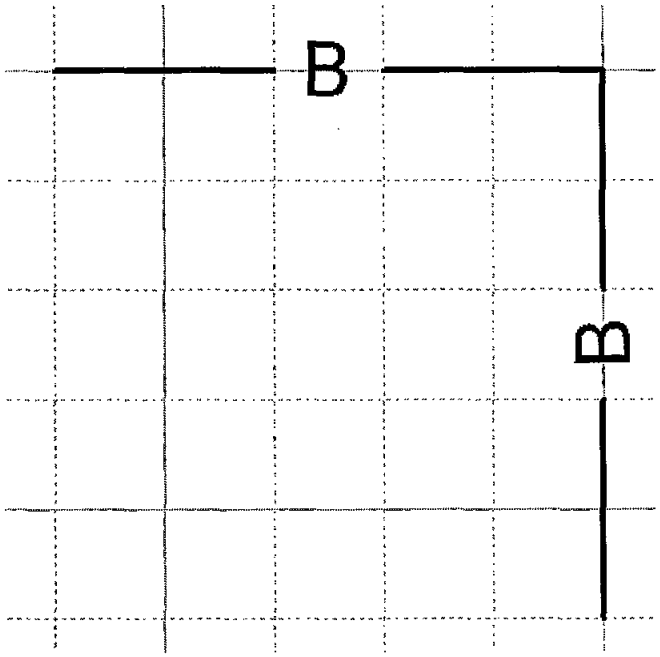
3. **Label Placement > Equipment Label** – What tab in this rule only allows Equipment Labels to be placed on Equipment?

4. **Relationship > Equipment Component > Nozzle to Equipment** - Why do nozzles orient themselves outside the geometry of the equipment?

5. **Relationship > Piping > Piping Comp To Process Pipe Run** – What tab controls the data that is copied from item to item at placement?

Lab 22 – Creating Buried Pipe

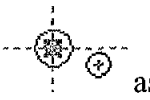
Purpose: Requirement is to create a new line style for buried pipe and to create a new SP P&ID symbol, which the user will route, that utilizes the new line style.



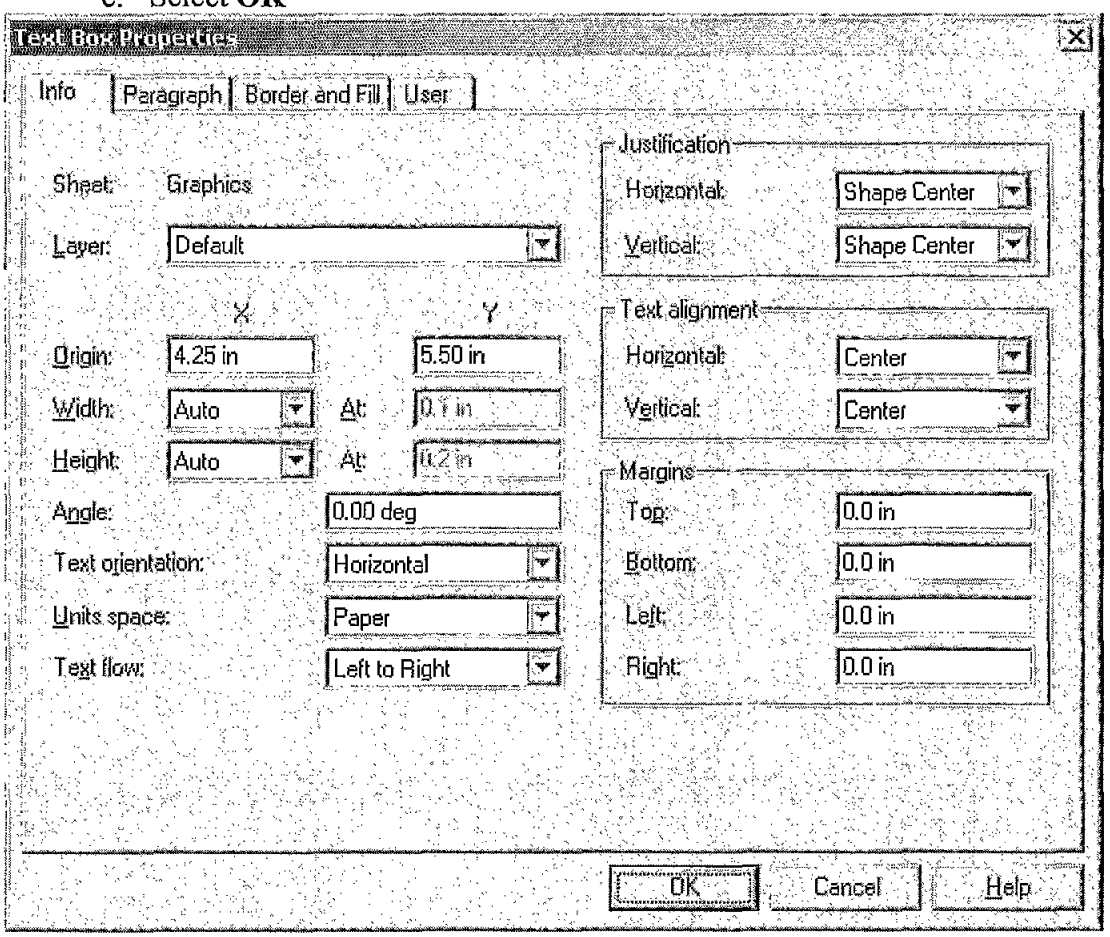
Create a new symbol in Catalog Manager to Create your new line style.

1. Start **Catalog Manager**
2. From the **Catalog Explorer**, create new folder under **Symbols**
   a. Name the folder, **Point Symbols for Linear Styles**
   Notes:
   - This is not the symbol the end user will place; it is only used for the definition of the Point Style in the Line Style Editor.
3. Create a new symbol in the **Point Symbols for Linear Styles** folder.
   a. Rename symbol to **B Linear Style Buried Pipe**
   b. **Open** the **B Linear Style Buried Pipe** symbol
4. Set the tab to Graphics

   Graphics Heat Trace Jacket Label HiddenObjects Icon

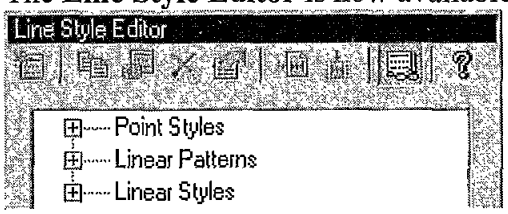
5. Place a Text Box and enter a **B** for the text..
   a. Select the Text Box command from the Draw toolbar.
   b. Select the **Origin** symbol  as the location for the **Text Box**
   c. Enter a **B** for a value 
   d. Select **Esc** to terminate the command.

6. Center the B on the origin symbol.
   a. Select the **B**
   b. right mouse click and select **Properties**
   c. **Justification** = Shape Center
   d. **Text** Alignment = Center
   e. Select **OK**



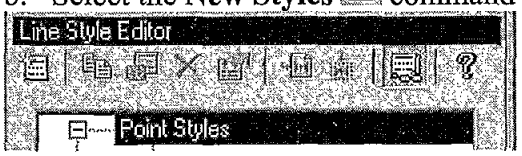
Load the Line Style Editor

7. Select **Tools** > **AddIns**
8. The **Line Style Editor** is now available.

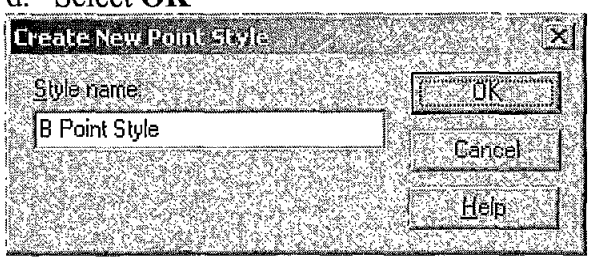


Create a Point Style

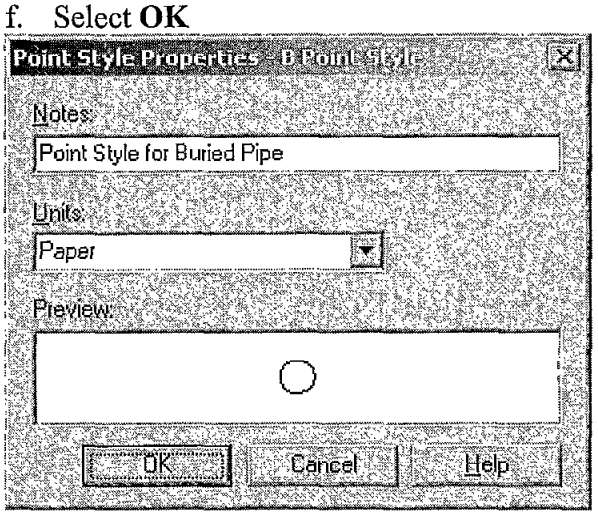
9. Create a new **Point Style**
   a. Select **Point Styles**
   b. Select the **New Styles** command from the toolbar.



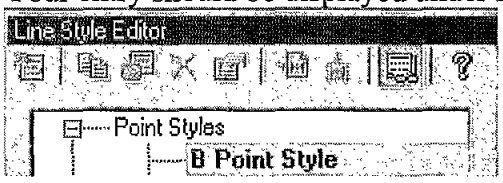
   c. Enter a Style Name = **B Point Style**
   d. Select **OK**



   e. Add a "Note" if applicable.
   f. Select **OK**



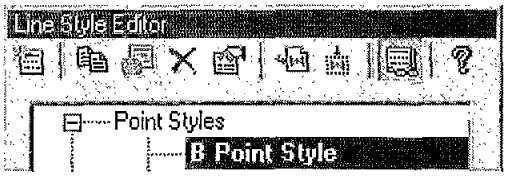
g. Your entry should be displayed under Point Styles.



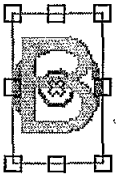
Define Point Style Graphics

10. Define the Point Style Graphics

a. Select the **B Point Style** from the **Line Style Editor**.



b. Select the **B** in the design window.



c. Select the **Define Point Style Graphics** command from the toolbar.

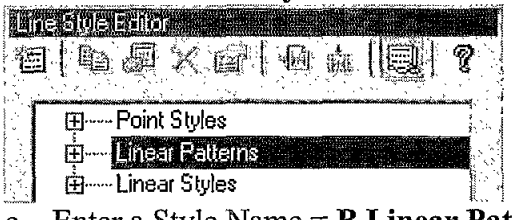
d. Drag the target over the **B** and click.

Create a Linear Pattern

11. Create a new **Linear Pattern**

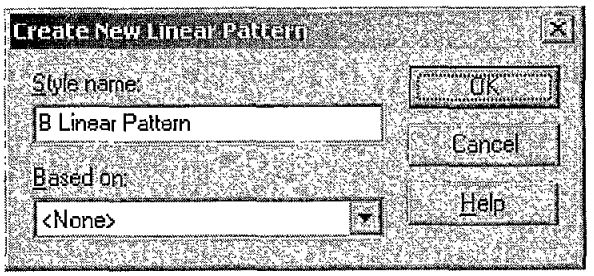
a. Select **Linear Patterns**

b. Select the **New Styles** command from the toolbar.



c. Enter a Style Name = **B Linear Pattern**

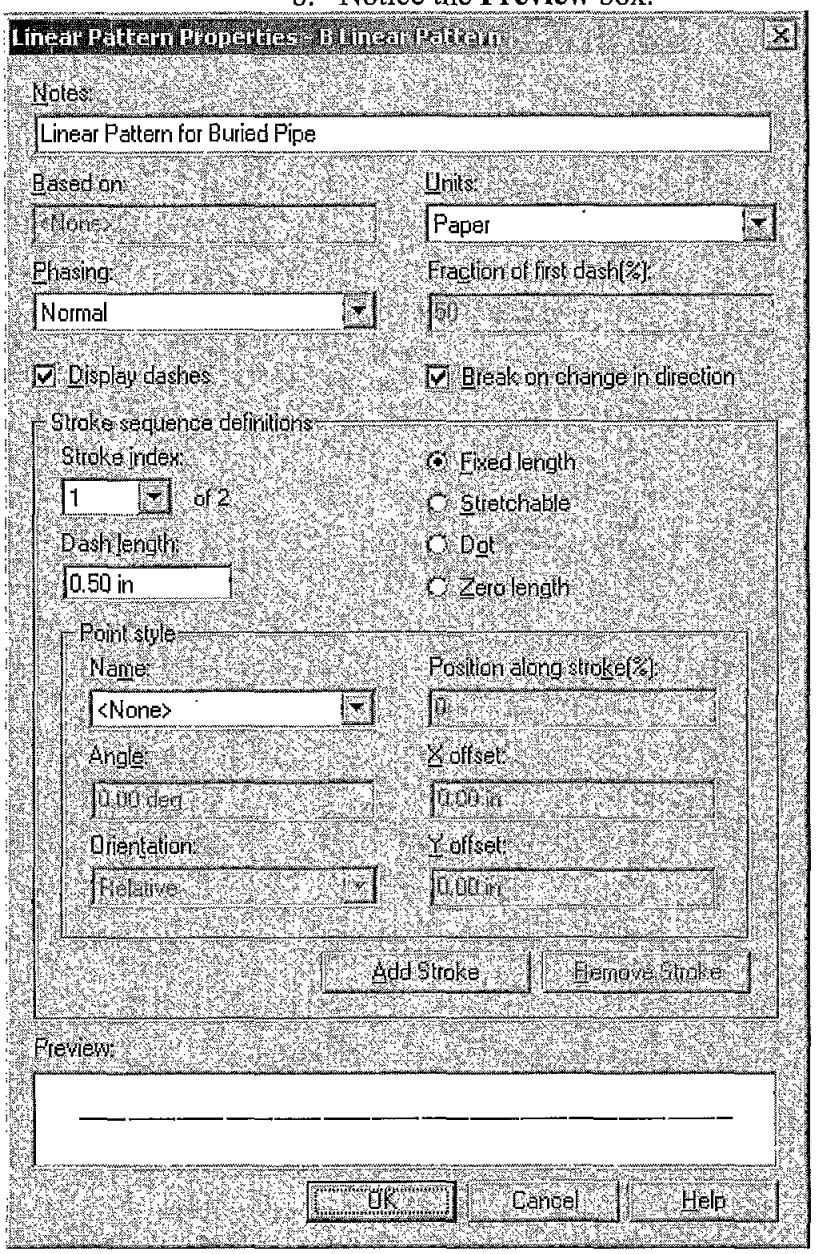
d. Select **OK**



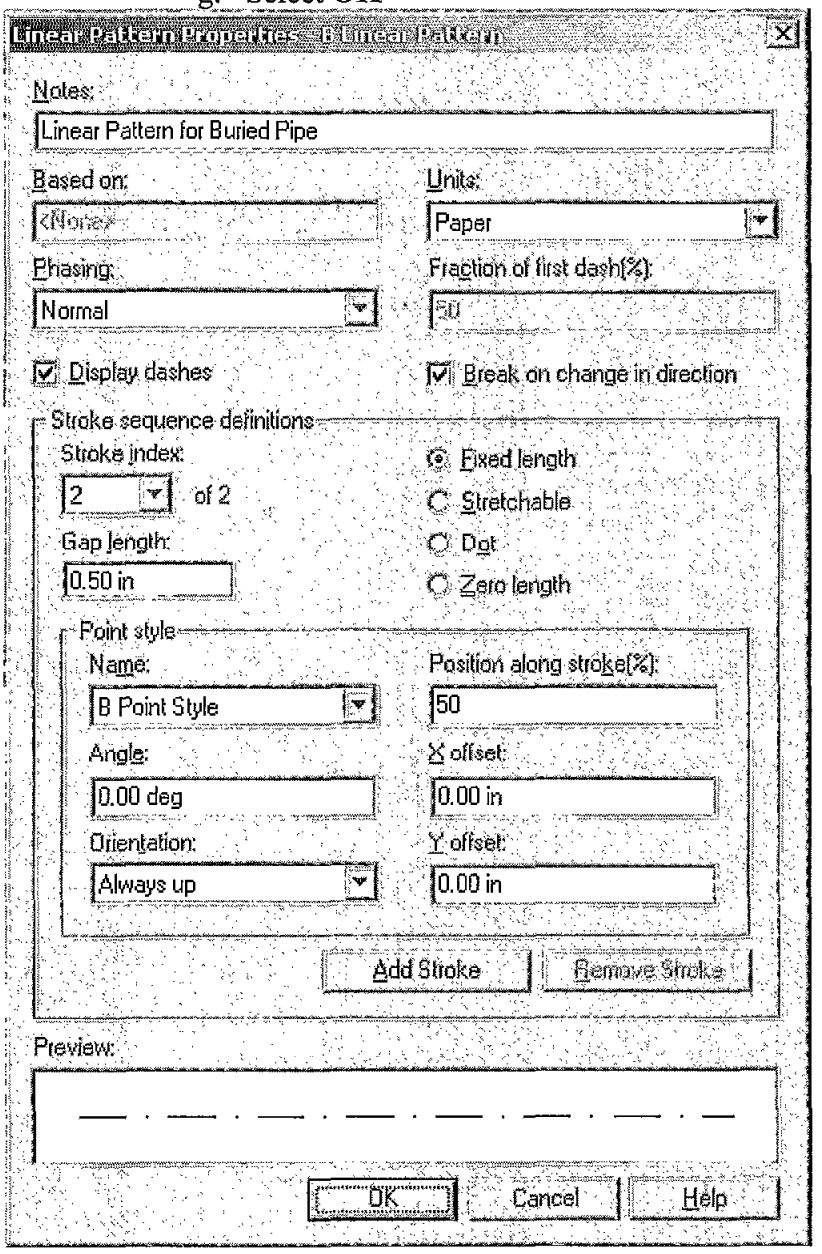
e. Specify descriptive information and attributes of the linear pattern.

- Add a "**Note**" if applicable

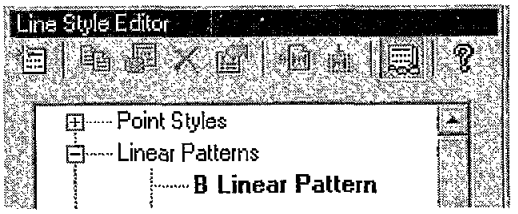
1. For the first **Stroke Index**.
   a. Set the **Dash Length** = 0.50 in
   b. Notice the **Preview** box.



2. For the second **Stroke Index**.
    a. Set the **Stroke Index** = 2
    b. Set the **Gap length** = 0.50 in
    c. Select the **Point Style Name** = B Point Style
    d. **Position Along Stroke** = 50
    e. **Orientation** = Always Up.
    f. Notice the **Preview** box.
    g. Select **OK**

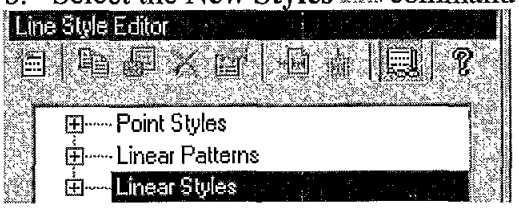


f. The entry for **B Linear Pattern** will be displayed under **Linear Patterns**.

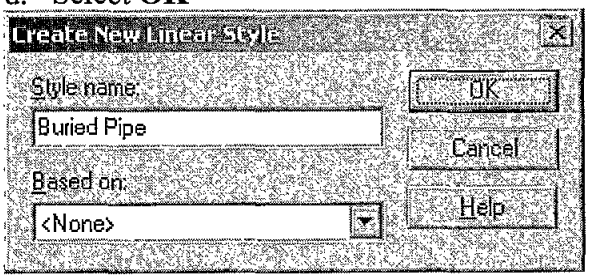


Create a Linear Style

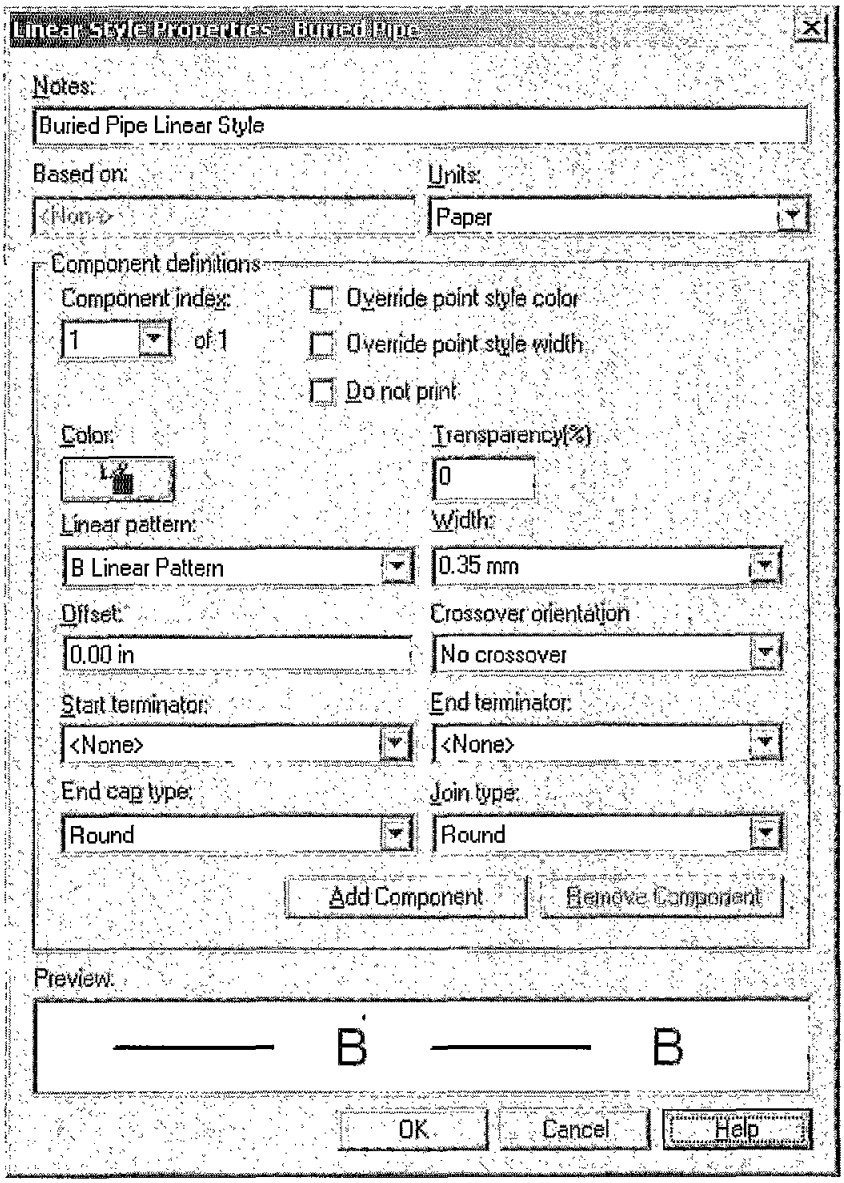
12. Create a new **Linear Style.**
    a. Select **Linear Styles**
    b. Select the **New Styles** command from the toolbar.



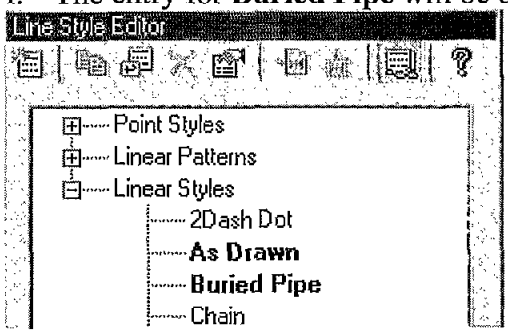
    c. Enter a **Style Name** = Buried Pipe
    d. Select **OK**



    e. Specify descriptive information and attributes of the linear style.
        - Add a "**Note**" if applicable
            1. Set **Linear Pattern** = B Linear Pattern
            2. Notice the **Preview** box.
            3. Select **OK**



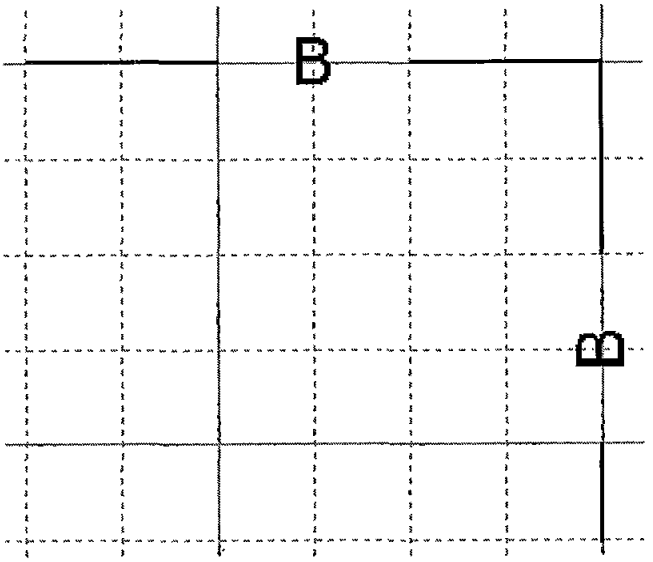
f. The entry for **Buried Pipe** will be displayed under **Linear Styles**.



g. Test the new **Linear Style**.

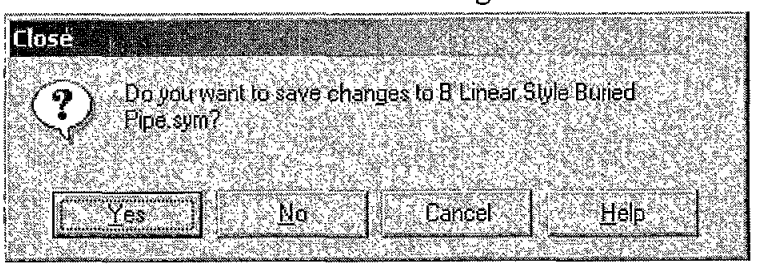
- Select the **Line** command from the Draw toolbar.
- Set the **Style** = Buried Pipe on the Ribbon toolbar

- Route a line in the horizontal and vertical directions



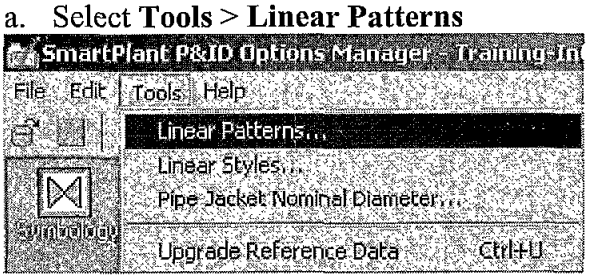
h. **Delete** the **Line** that was routed.
   - **Select** the **Line**
   - Select **Delete** from **the** main toolbar

i. **Exit** from **Catalog Manager**.
   - Select **File** > **Exit**
   - Select **Yes** to save changes.

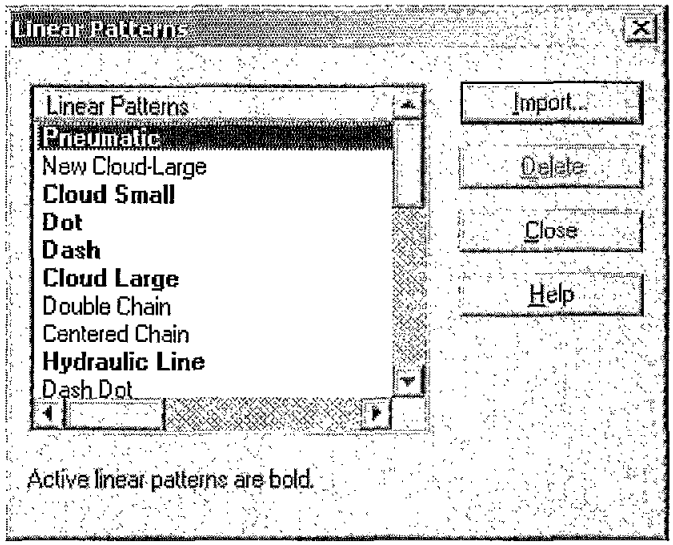


Import the Linear Pattern into Options Manager

13. Select **Start** > **Programs** > **Intergraph SmartPlant P&ID** > **Options Manager**.
    a. Select **Tools** > **Linear Patterns**

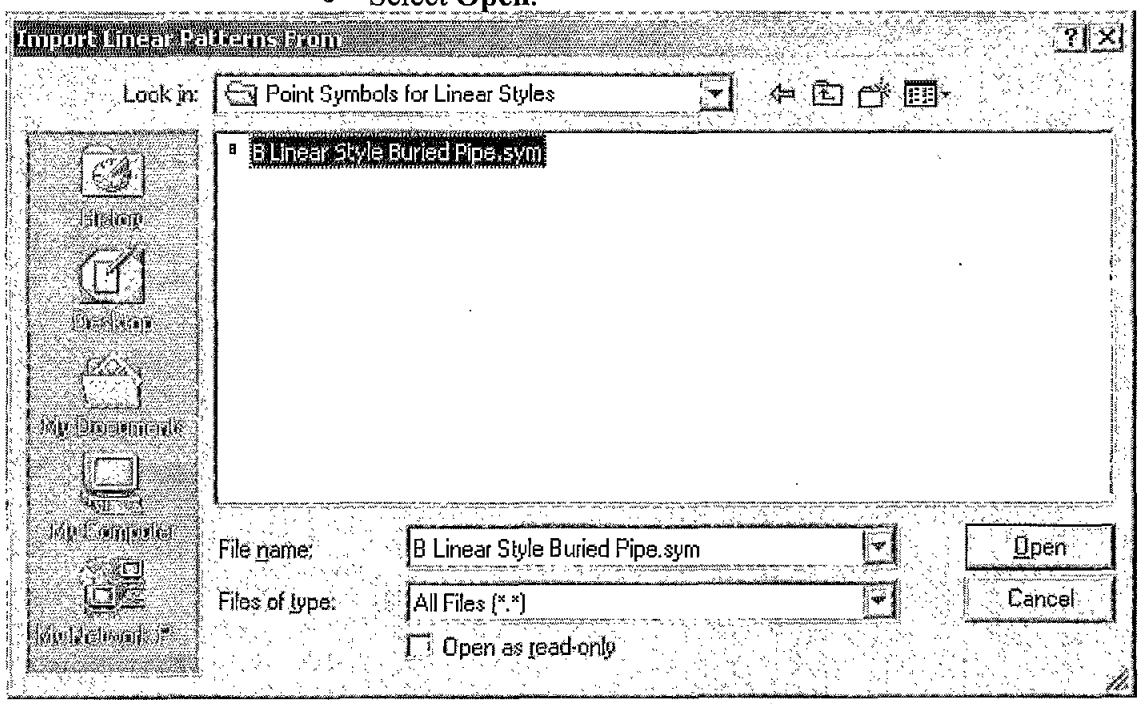


    b. Select **Import** on the **Linear Patterns...** dialog box.



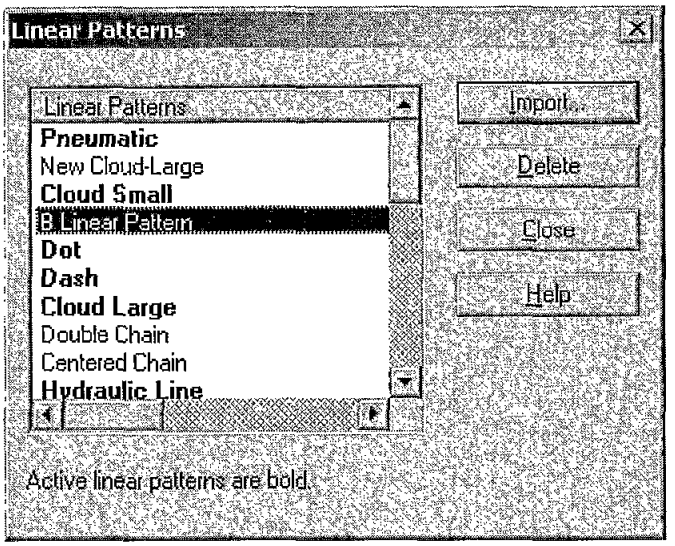
c. Browse to the symbol created through the **Line Style Editor**

- Select the symbol
- Select **Open**.



d. Notice your Linear Pattern was imported.

- Select **Close**



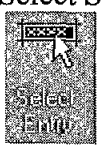
Import the Linear Style into Options Manager

14. Select **Tools** > **Linear Styles**
15. Select **Import** on the **Linear Styles...** dialog box
16. Browse to the symbol created through the **Line Style Editor**
    a. Select the symbol
    b. Select **Open**
17. Notice your Linear Style was imported.
    a. Select **Close**
18. **Exit** from **Options Manager**
    a. Select **File** > **Exit**

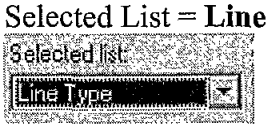
Add Buried Pipe as a new Pipe Run Type in the PID Data Dictionary

We are adding an entry to discriminate on **Buried Pipe** either through **Reports**, the **Design Window** or the **Engineering Data Editor**.

19. Select **Start** > **Programs** > **Intergraph SmartPlant Engineering Manager** > **Data Dictionary Manager**
    a. Select **Select Entry**



    b. Selected List = **Line Type**



    c. Add a New Entry

- **Value** = Buried Pipe
- **Short Value** = BP

d. Select **File** > **Save**

e. Select **File** > **Exit**

Define the Symbology for Buried Pipe in Options Manager

We are adding entries to graphically depict Buried Pipe when placed as New, Existing or Future (Construction Status).

20. Select **Start** > **Programs** > **Intergraph SmartPlant P&ID** > **Options Manager**

    a. Select the **Project Filter** of **Hose – New**

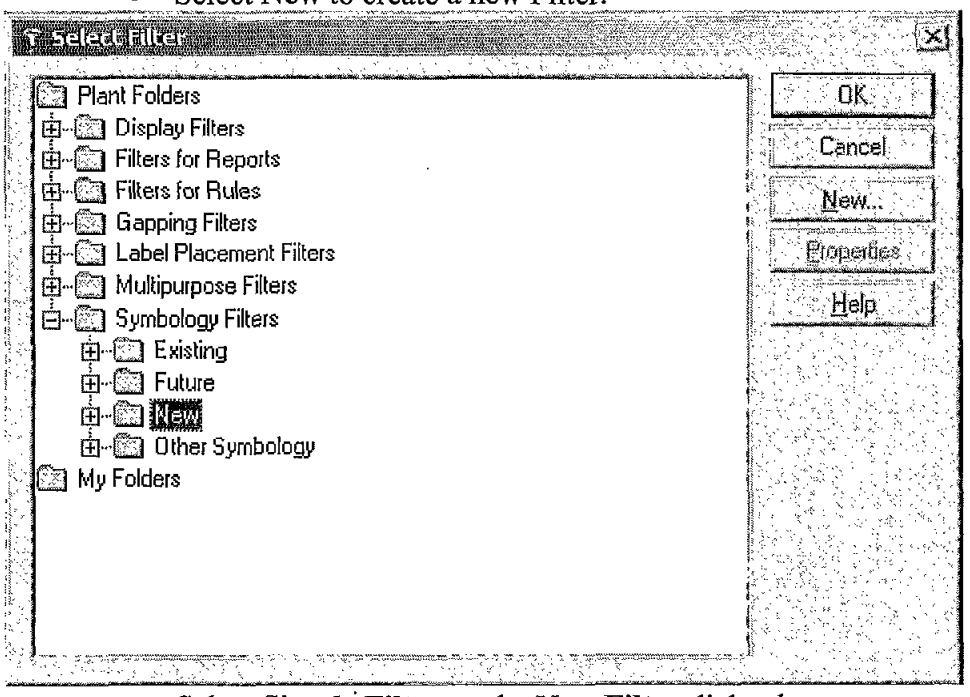
    b. Select **Insert Row** from the toolbar.

    c. Select the blank row, which was inserted from the **Insert Row** command.

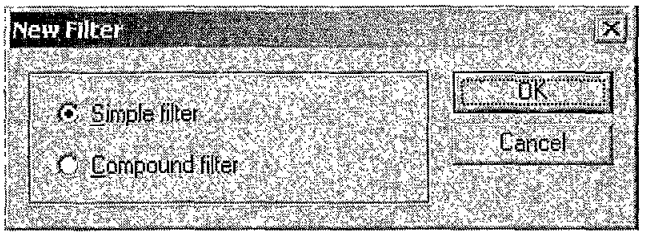
- Select the ellipses in the blank row to add a Filter.

    d. On the **Select Filter** dialog box, from **Plant Folders**, select the **New** folder under **Symbology Filters**.

- Select **New** to create a new Filter.



- Select **Simple Filter** on the **New Filter** dialog box.
- Select **OK**

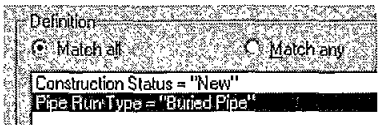


21. On the **Add Filter** dialog box
    a. **Name** the filter
        - **Buried Piping – New**

    b. Assign a **Description**
        - **Filter for New Buried Pipe**

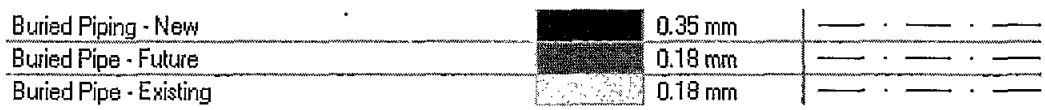
    c. **Filter for**:
        - **Pipe Run**

    d. In the Definition frame.
        - Toggle **Definition = Match All**
        - Define the Construction Status and Pipe Run Type properties to match on.
            1. Select the **Construction Status** property from the **Edit Property** field and set the **Value = New**
            2. Utilize the **Add** button to add a row to the field
            3. Select the **Pipe Run Type** property from the **Edit Property** field and set the **Value = Buried Pipe**



    e. Select **OK**
    f. Select **OK**
    g. Set the **Color, Width** and **Pattern**
        - **Color** = Blue
        - **Width** = .35 mm
        - **Pattern** = B Linear Pattern
    h. Select **File > Save**
22. Repeat the previous steps to add the following two additional Simple Filters.
    a. **Buried Pipe – Future**
        - **Color** = Red
        - **Width** = .18 mm
        - **Pattern** = B Linear Pattern
    b. **Buried Pipe – Existing**

- **Color** = Cyan
- **Width** = .18 mm
- **Pattern** = B Linear Pattern



c. Select **File** > **Save**
d. **Exit** from **Options Manager**
   - Select **File** > **Exit**

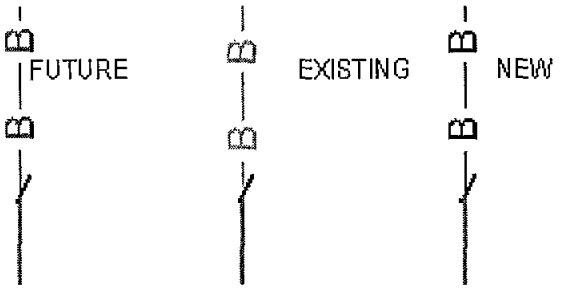
Create a Buried Pipe symbol in Catalog Manager

This is the symbol the end user will utilize in routing Buried Pipe within a P&ID.

23. Select **Start** > **Programs** > **Intergraph SmartPlant Engineering Manager** > **Catalog Manager**
    a. **Clone** the **Primary Piping** symbol
    b. **Rename** symbol to **Buried Piping**
    c. **Open** the **Symbol**
    d. Change **AABBCC Code** = WM1B01
       - Reference Catalog Manager Help for which AABBCC codes to assign.
    e. Change the **PipeRun Type** = Buried Pipe
    f. Edit the **ICON** tab.
    g. **Save** the symbol
    h. **Exit** from **Catalog Manager**

Route Buried Piping in a P&ID

24. From **Drawing Manager** open a drawing and route three different pipe runs with Buried Piping.
    a. Set the property of **Construction Status** to **New**, **Existing** or **Future**, for the pipe runs.
       - Remember by default the **Construction Status** = **New**
         1. **Tools** > **Options** > **Placement**
    b. Label the pipe runs with the **Construction Status** label.
    c. Connect Primary Piping to the ends of the Buried Pipe runs.
       - Do you receive an inconsistency marker where the two pipe run types are connected?
       - Answer: Yes, Why? Hint: Think Rules and Filters
       - Review the inconsistencies.
         1. Connect Point is Unattached



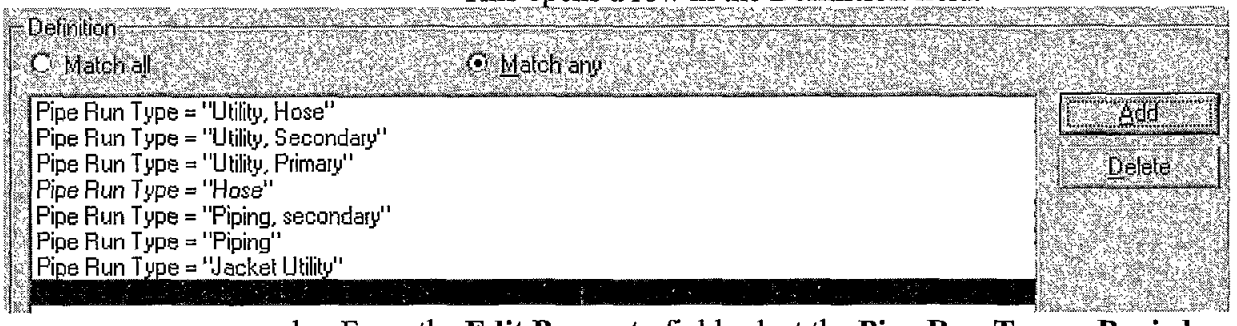
Edit the Process Pipe Run rule in Rule Manager

Permanently address the Inconsistency Marker being placed when the two pipe run types are connected.

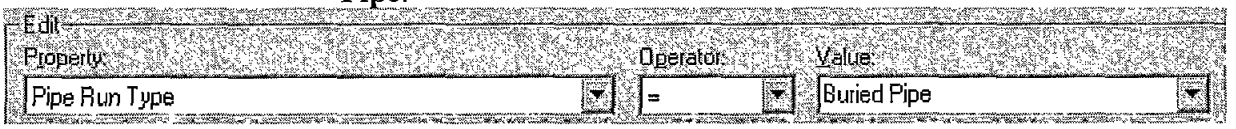
25. Exit the Drawing and Drawing Manager.

26. Enter Rule Manager.

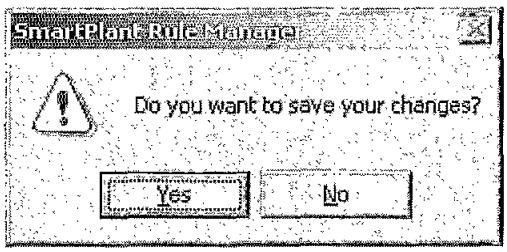
27. Select the **Process Pipe Run** rule.
    a. **Plant Rules > Relationship > Piping > Process Pipe Run to Process Pipe Run**
28. Select **Edit > Properties**
    a. On the **Items** tab note the **Name** of the **Filter** being utilized.
        - **Process Pipe Run**
29. Select **Browse**
30. Select **Properties**
    a. Notice the **Pipe Run Type = Buried Pipe** is not listed in the **Definition** field.
31. Add the **Pipe Run Type = Buried Pipe** to the **Filter**
    a. Select **ADD** on the **Filter Properties** dialog box
        - This opens a row in the **Definition** field.



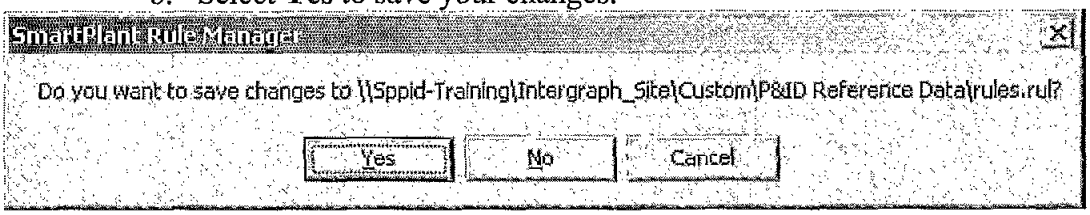
    b. From the **Edit Property** field select the **Pipe Run Type = Buried Pipe.**



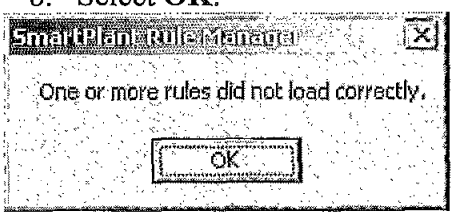
32. Select **OK** on the **Filter Properties** dialog box.
33. Select **OK** on the **Select Item#** dialog box
34. Select **Yes** to save your changes.



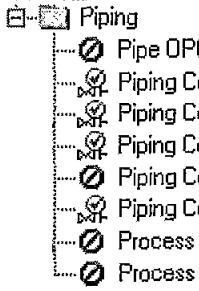
35. Select **OK.**
36. Exit Rule Manager.
    a. Select **File** > **Exit**
    b. Select **Yes** to save your changes.



37. Enter Rule Manager.
    a. You will receive the following message due to other rules utilizing the same filter we previously edited.
    b. Select **OK.**



38. To Refresh the Rules, which utilize the Process Pipe Run filter.
    a. Select **Edit** > **Approve All Rules**, to refresh all the rules.
    OR
    To refresh the individual rule(s) which will be indicated with a ⊘



- Select the **Items** tab for the specific Rule
- Click in the **Name** field, which should be indicating **the Filter has been modified**

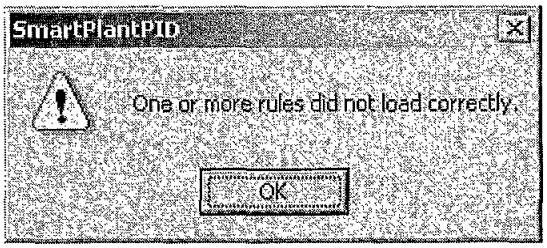
- Select **OK**

    b. Select **File** > **Save**

c. Select **File** > **Exit**

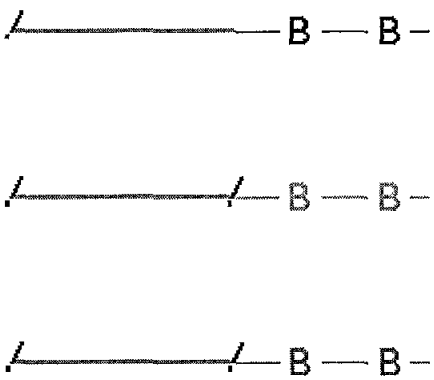
Notes:

- If ALL rules are not addressed which utilized the modified filter, upon entering the drawing the below dialog box will be displayed.



Route Buried Piping in a P&ID

39. From Drawing Manager
    a. Run **Update Drawings** on the drawing in which the three Buried Pipe Runs were placed.
    b. **Open** the drawing
40. Route **Primary Piping** on the opposite end of the **Buried Pipe**



41. **Review** and **Address** the **Inconsistencies**.
    a. **Approve** the **Inconsistency**
    OR
    Copy the value from **Item 1** to **Item 2**
    OR
    Copy the value from **Item 2** to **Item 1**
    OR
    Place a **Segment Break**
        - **Symbols** > **Piping** > **Segment Breaks** > **Construction Status**
42. Correct the Inconsistencies placed on the other end of the Buried Pipe.
    a. Disconnect the **Primary Piping** from the **Buried Pipe** and Reconnect.
    b. Review and Address any **Inconsistencies**.

Lab 23 – Creating and Using a New Format

Purpose: Create a stream number label for pipe runs that has leading zeros.

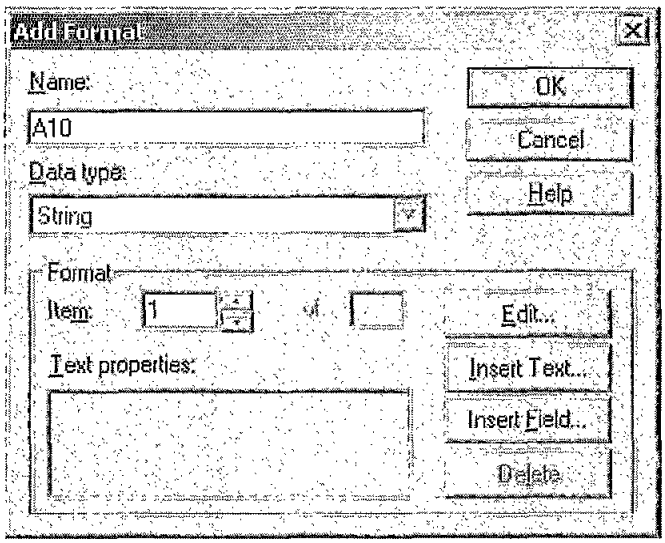
Create New Format

1. Start **Format Manager**

   a. Select **Start** > **Programs** > **Intergraph SmartPlant Engineering Manager** > **Format Manager**

2. Add a new **Format** to the **String** data types.

   a. Select **String**
   b. Select **Edit** > **Add Format**
   c. Enter **Name** = A10

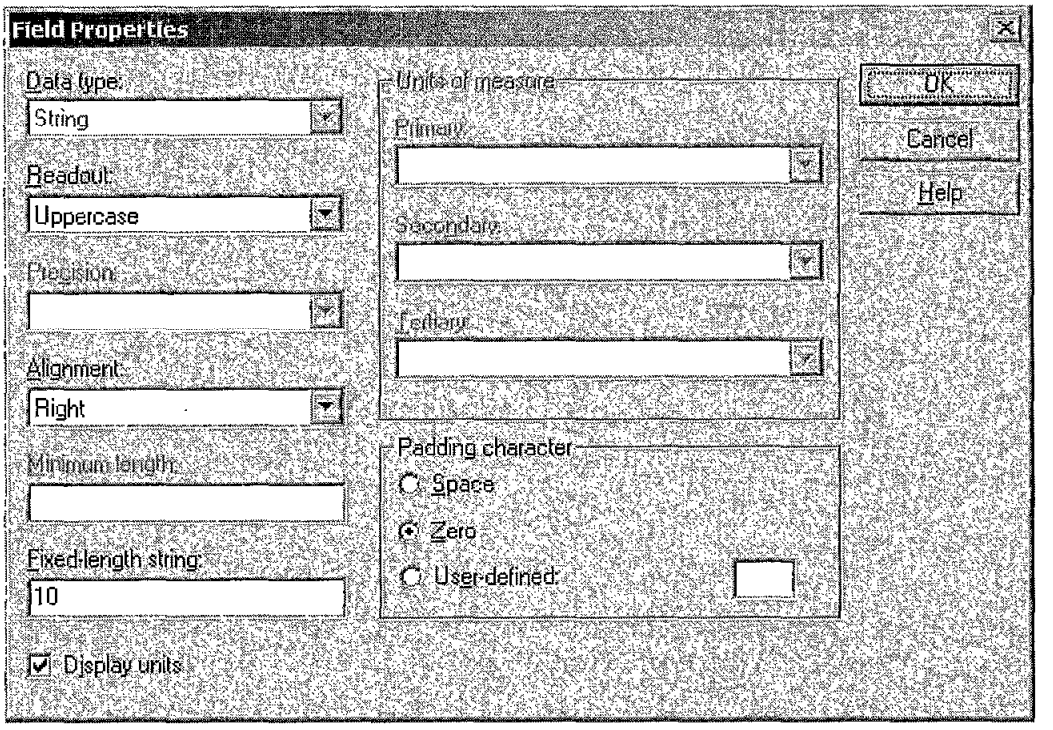


3. Select **Insert Field** to display the **Field Properties** dialog box.

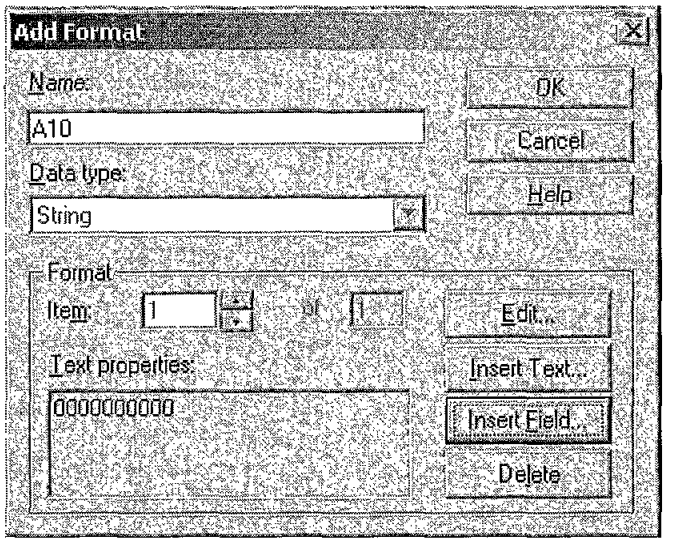
   a. Enter the following properties:

      1. **Readout** = Uppercase
      2. **Alignment** = Right
      3. **Fixed-length field** = 10
      4. **Padding Character** = Zero

   b. Select **OK**



4. The **Add Format** dialog box should display 10 zeros in the **Text Properties** field.



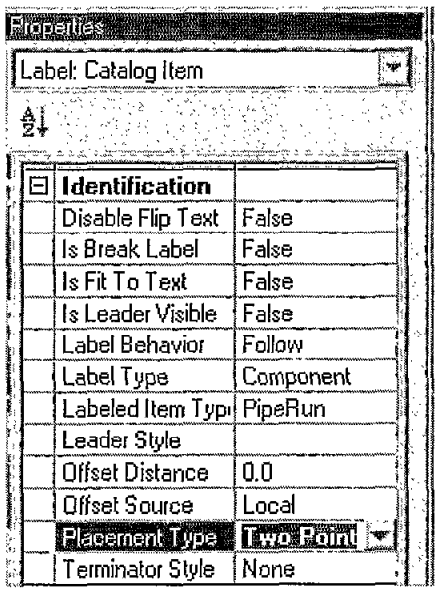
5. Select **OK** again to exit the **Add Format** dialog box.

6. **Save** the new format.
   a. Select **File** > **Save**

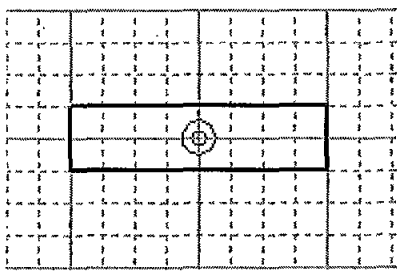
7. **Exit** from **Format Manager**
   a. Select **File** > **Exit**

Create New Symbol utilizing New Format

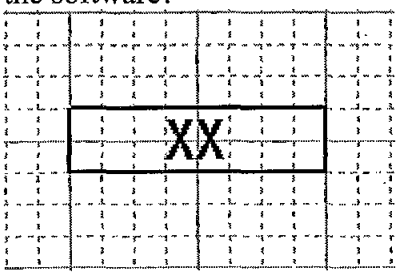
8. Enter Catalog Manager to create the label symbol.
    a. Select **Start** > **Programs** > **Intergraph SmartPlant Engineering Manager** > **Catalog Manager**
9. **Clone** the existing **Stream Number Label.**
    a. **Symbols** > **Piping** > **Labels - Piping Segments** > **Stream Number**
10. **Rename** the label symbol.
11. **Open** the label symbol.
12. In the **Properties** window
    a. define the **Identification** Category Properties as follows:
        1. **Placement Type** = Two Point



13. Change the Graphics layer to have the following symbol.
    a. Set grid spacing to be 0.10 in
        i. Select **Tools** > **Options** > **View**

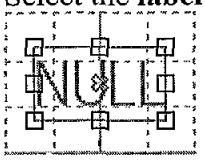


14. Define the **Icon** layer to have the following graphic. How is this layer used by the software?

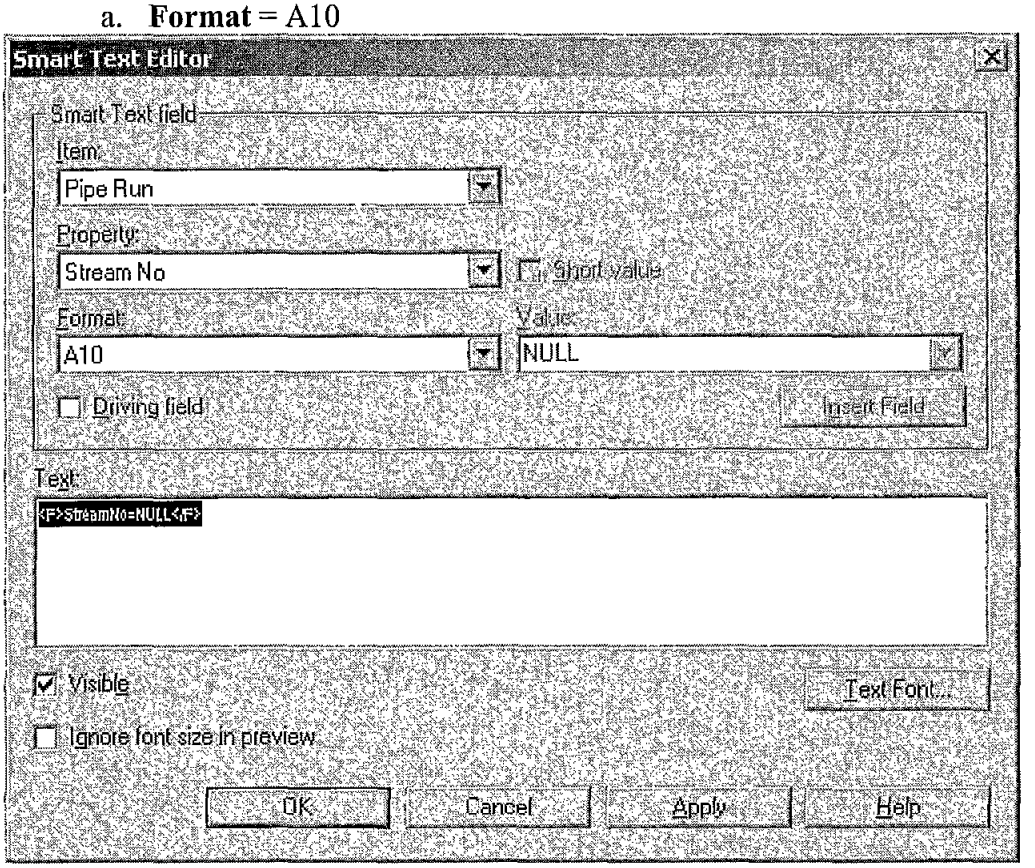


15. Select the **Label** tab.

16. **Fit** the **View**
17. Select the **label** in the **design window**.



18. Select the **SmartText Editor** command  from the toolbar.
19. Change the **Stream No** property to have the following values: (Make sure you select the property in the text box to edit the values)
    a. **Format** = A10

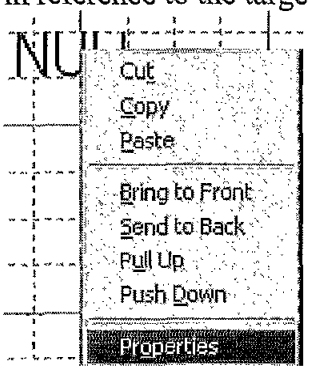


b. Select **Apply**

c. Select **OK**

20. Select the **label** in the **design window.**

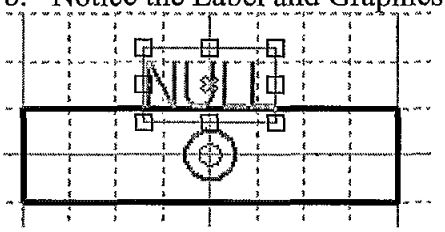
21. Right-click and select **Properties**. You can define the Justification, Text alignment, Margins, Borders, and so on, here. You can also move the text box in reference to the target (placement point).



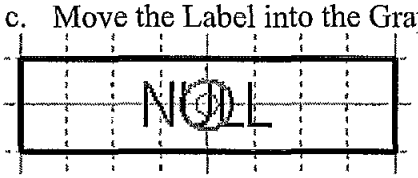
22. Display both the **Graphics** and **Label** tab.

a. Select the **CTRL** key down and select the **Graphics** tab.

b. Notice the Label and Graphics of the Stream No Label are not aligned.

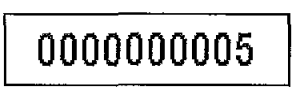


c. Move the Label into the Graphics



23. **Save** and **Exit** from **Catalog Manager.**

24. Enter a drawing in SmartPlant P&ID and route a section of pipe. Define a value for the **Stream** No property in the **Properties** window. Place the stream number label on the pipe.

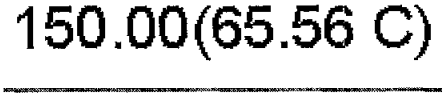


Bonus Lab

How would you create a label to display both degrees **Fahrenheit** and **Celsius** for **Design Max Temperature** with the following format? **150.00 F (65.56 C)**

(Hint: Think about using the Insert Text portion when creating a new format.)

1. Add a new Format in Format Manager
    a. **Datatype** = Temperature
    b. Utilize **Insert Field** command
        i. **Precision** = .01
        ii. **Primary** = F
    c. Utilize **Insert Text** command
        i. (
    d. Utilize **Insert Field** command
        i. **Precision** = .01
        ii. **Primary** = C
    e. Utilize **Insert Text** command
        i.)
2. Create a new label symbol in **Catalog Manager**
    a. Utilize the new format.
3. Place the label on a pipe run in a P&ID.

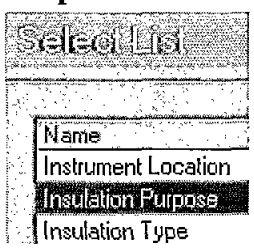


Lab 24 – Creating and Using a New Insulation Specification

From Data Dictionary Manager we will add entries to the Insulation Purpose Select List, which will be utilized in the additions for the Insulation Specs for Urethane we add later in the lab.

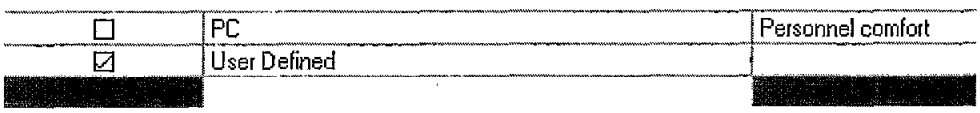
1. Start **Data Dictionary Manager**
   a. Select **Start** > **Programs** > **Intergraph SmartPlant Engineering Manager** > **Data Dictionary Manager**
   b. Select **Select List**

   c. Scroll down in the list of **Select List** and select the **Insulation Purpose** select list.

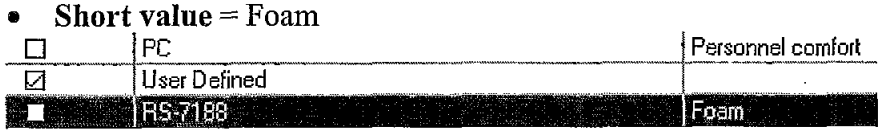


   d. Select **Select Entry** to open the **Insulation Purpose** select list

   e. In the last row click in the **Value** field



   f. Enter the following information:
      - **Value** = RS-7188
      - **Short value** = Foam

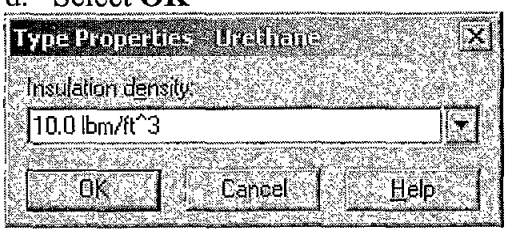


   g. Select **Add Row** from the toolbar to open a new row.
   h. Enter the following information:
      - **Value** = RS-7189
      - **Short value** = Rigid

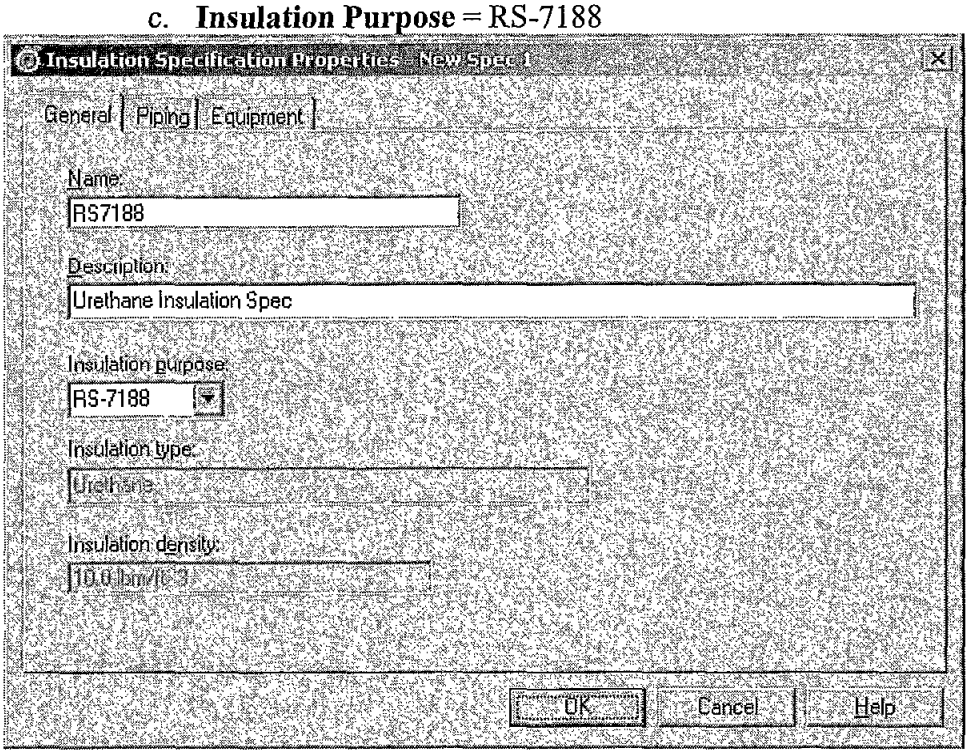
i. There should be two new entries in the Insulation Purpose select list.

☐	RS-7188	Foam
☐	RS-7189	Rigid

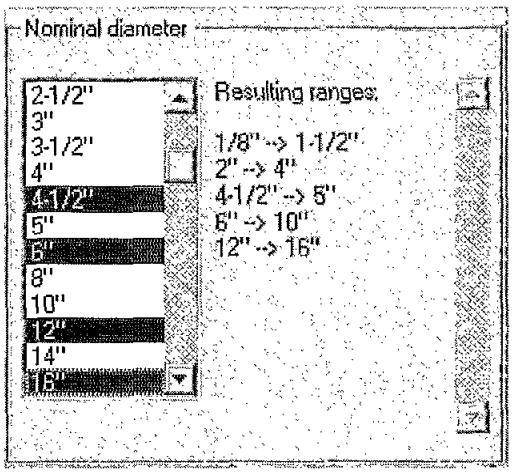
2. **Exit** from **Data Dictionary** Manager and **Save** your changes.
3. Start **Insulation Manager.**
   a. Select **Start** > **Programs** > **Intergraph SmartPlant P&ID** > **Insulation Manager**
4. Enter an **Insulation Density** for **Urethane.**
   a. Right-click on the **Urethane** folder.
   b. Select **Properties**
   c. Enter **10.0 lbm/ft^3** as the **Insulation Density.**
   d. Select **OK**

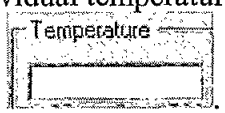


5. Add a new specification under the urethane folder.
   a. Right-click on the **Urethane** folder.
   b. Select **Add Specification**
6. Define the following property values on the **General** tab.
   a. **Name** = RS7188
   b. **Description** = Urethane Insulation Spec
   c. **Insulation Purpose** = RS-7188

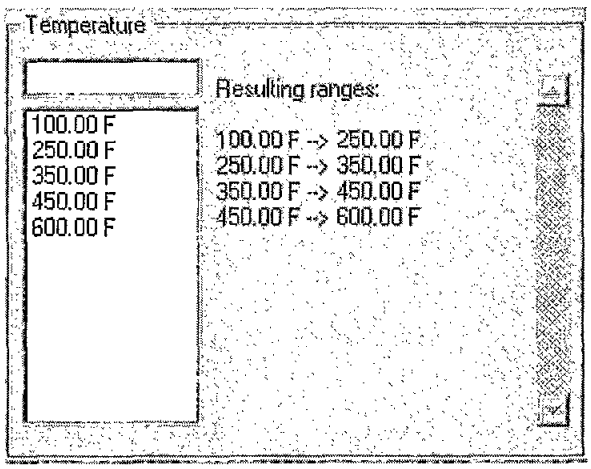


7. Define values on the **Piping** tab.
    a. Select **Range Setup** and enter the following properties for **Nominal Diameter** on the **Piping Range Setup** dialog box.
        i. Hint: To get the piping ranges shown below, select 1/8'', 2'', 4 ½'', 6'', 12'', 16''

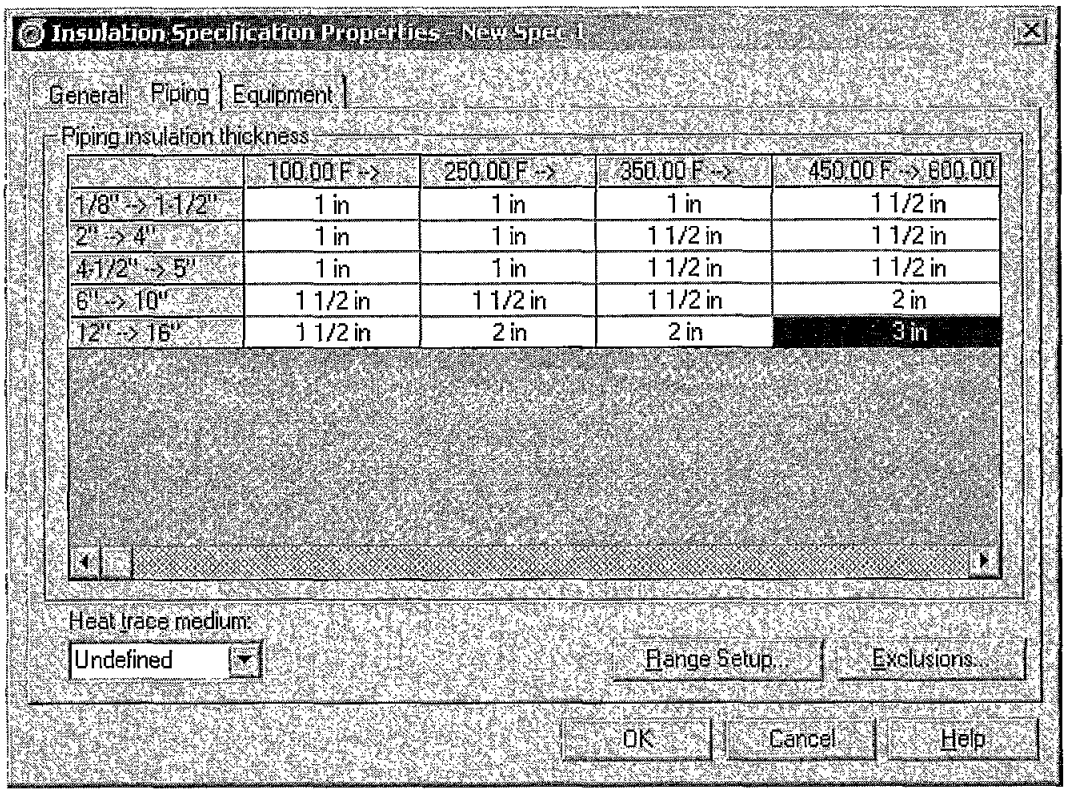


    b. Enter the following properties for **Temperatures** on the **Piping Range Setup** dialog box.
        i. Hint: Enter the individual temperatures of 100, 250, 350, 450 and 600 in the field 

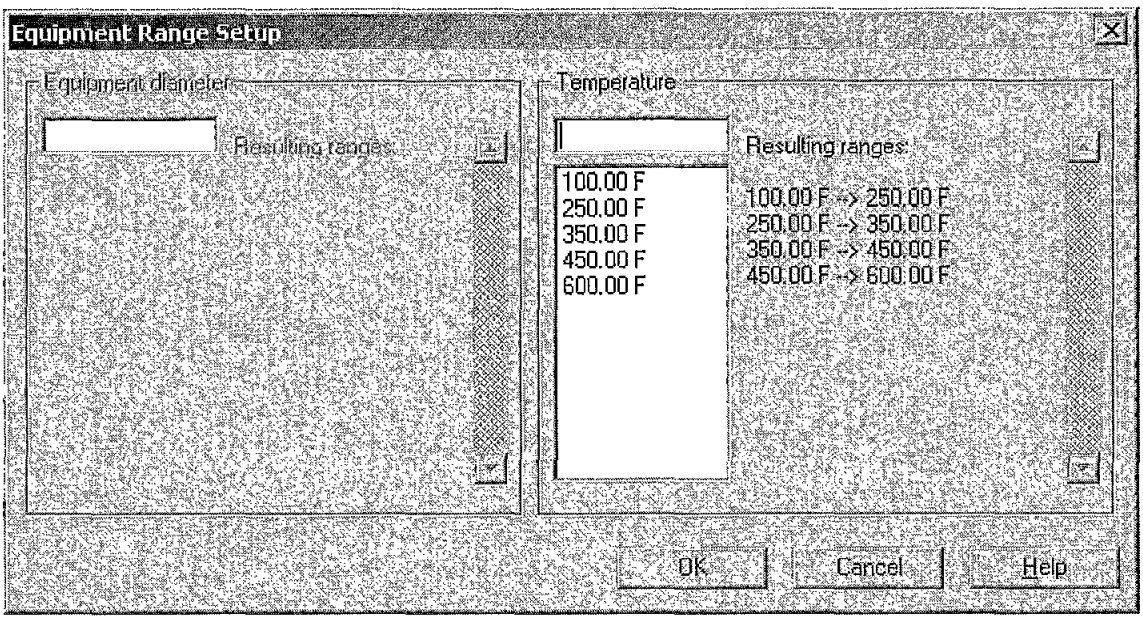
.



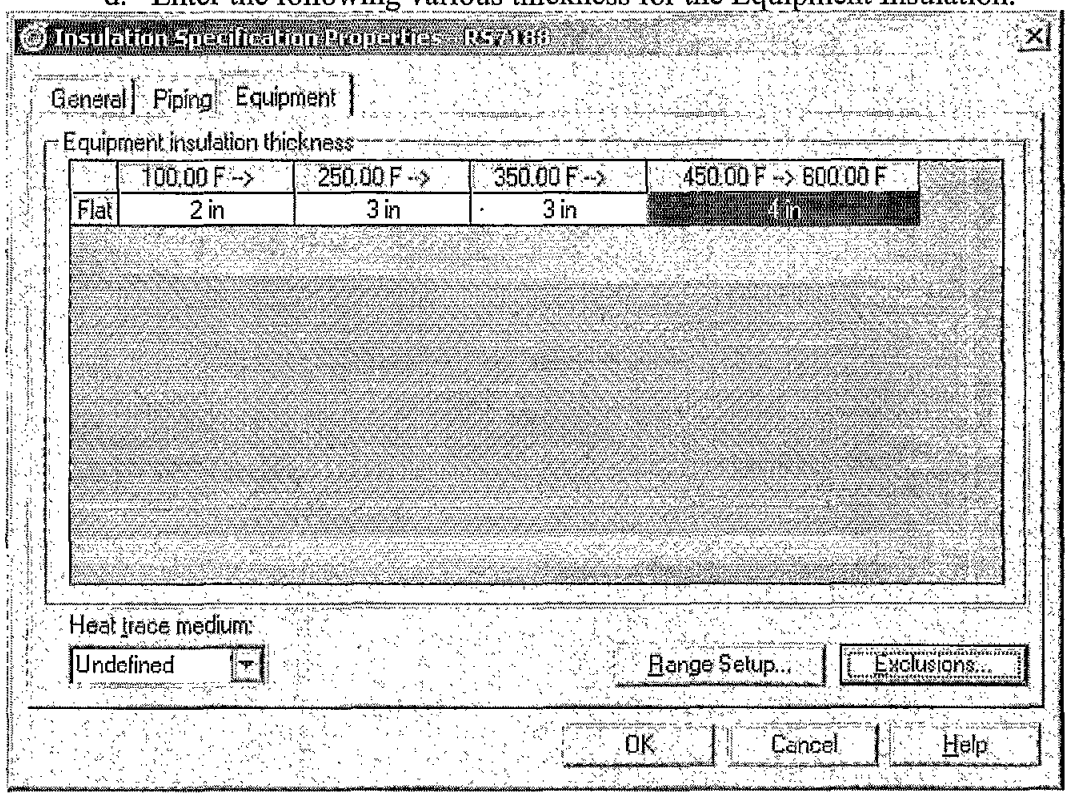
    c. Select **OK**.
    d. Enter the following various thickness for the Piping Insulation.



8. Define values on the **Equipment** tab.
    a. Select the **Equipment** tab.
    b. Enter the following properties for **Temperatures** on the **Equipment Range Setup** dialog box.
        i. Hint: Enter the individual temperatures of 100, 250, 350, 450, 600.
    c. Select **OK**.



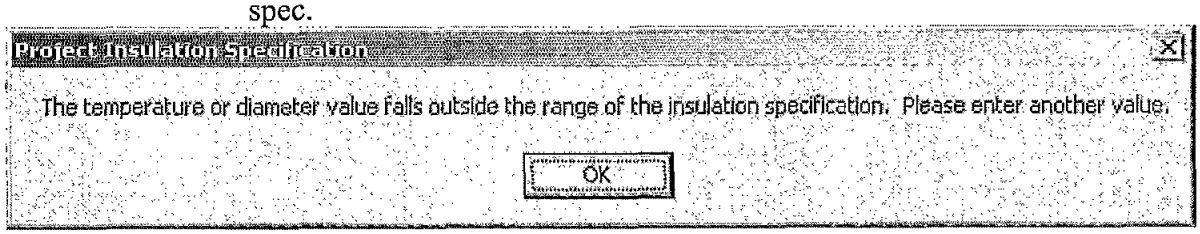
d. Enter the following various thickness for the Equipment Insulation.



e. Select **OK**.

9. **Exit** from **Insulation Manager** and **Save** your changes.
10. **Open** a drawing in SmartPlant P&ID.
11. Place two equipment items (your choice) and route two pipe runs. Place a valve on each pipe.
12. For one pipe, enter the following property values:
    a. **Nominal diameter**: 4''
    b. **Insulation temperature**: 300 F
    c. **Insulation spec**: RS7188
    d. Verify the **Insulation thickness** is set to 1''.

13. For the other pipe, enter the following property values:
    a. **Nominal diameter**: 4''
    b. **Insulation temperature**: 700
    c. **Insulation spec**: RS7188
    d. Verify that you are notified that this **Insulation temperature** is out of spec.



14. For one piece of equipment, enter the following property values:
    a. **Insulation temperature**: 300 F
    b. **Insulation spec**: RS7188
    c. Verify that the **Insulation thickness** is set to 3''.

15. For the other piece of equipment that you placed, enter the following property values:
    a. **Insulation temperature**: 400 F
    b. **Insulation spec**: RS7188
    c. Verify that the **Insulation thickness** is set to 3''.
    d. Change the **Insulation thickness** to 5''. Note that the property **Insulation Thk Source** changes to **User** rather than **Software**.

16. **Exit** from **SPPID** and **Drawing Manager**.

Lab 25 – Importing

Purpose: To use the data import functionality, and the XML import functionality.

1. Open Drawing Manager and create a drawing.

2. Open the drawing. Place a vessel. Define a **Tag Prefix** value of **V**, and a **Tag Seq No** of **107**. Also place the **Equipment ID** label on the vessel (**Equipment > Labels – Equipment**).

3. Place two **Generic 2 - Shell & Tube** heat exchangers. Define a **Tag Prefix** value of **E**, and a **Tag Seq No** of **700** for one exchanger. Select the other **Generic 2 - Shell & Tube** exchanger and define a **Tag Prefix** value of **E** and a **Tag Seq No** of **800**. Also place the **Equipment ID** label on the vessel (**Equipment > Labels – Equipment**) on each of the exchangers.

4. Run the delivered **Equipment List** for your drawing.

5. Select columns **Q** and **AD** simultaneously. Right-click and select **Unhide**. The path listed in column **T** is the path the software will use to place the symbol if it does not exist in the database. Verify that this relative path is valid for your plant.

6. Column **Y** lists the **Tag Prefix** and should match the value for the prefix in column **A** of the same row. Column **Z** lists the **Tag Seq No** and should match the value for the sequence number in column **A** of the same row. Ensure these values match. If you wish, you can select columns **R** through **AC**, right-click and select **Hide** again. This is not a requirement for the import to work.

7. Define values columns G, I and K (Materials of Construction, Piping Materials Class and Heat Tracing Medium)

    a. Save any changes and exit this file.

8. In SmartPlant P&ID, click **File > Import >Data File** and **Look In: ~\Documents and Settings\<your login>\My Reports\Output** and select the **Equipment List.xls**.

9. After the import is complete, review the **SPImport.log** file in the **c:\temp** directory. Search for any errors.

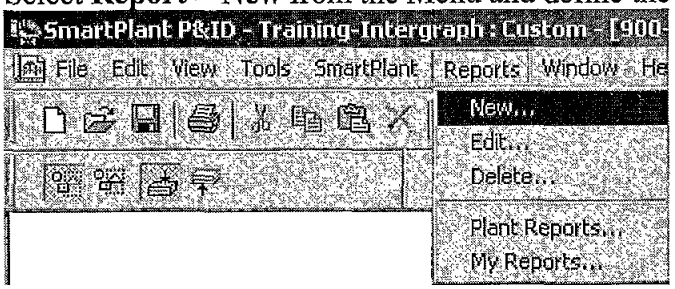
10. In the P&ID, select the vessel labeled **V-107**, and ensure the data has been properly imported from the spreadsheet.

11. Select the exchanger labeled **E-700**, review the imported data.

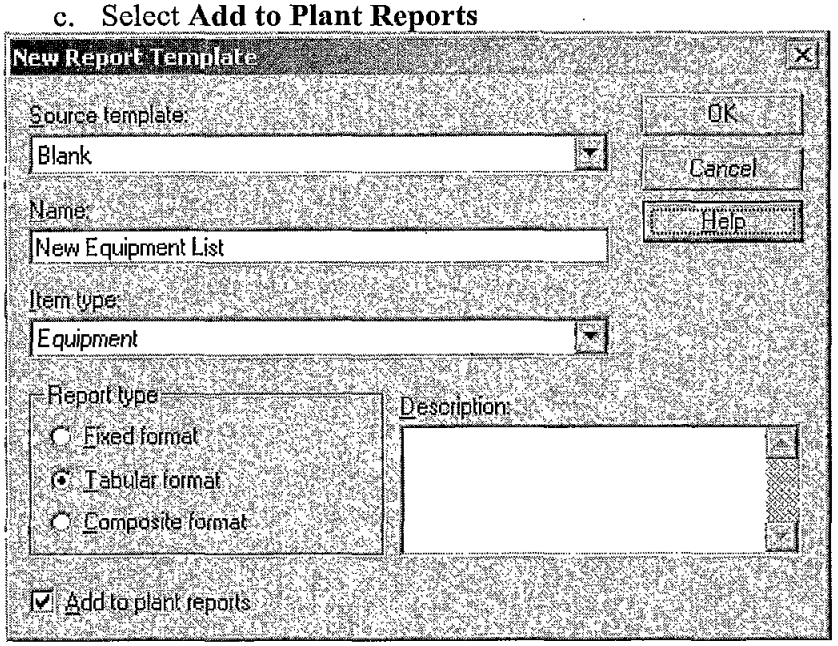
Lab 26 – Creating New Reports

Purpose: Create a new equipment list report for your plant.

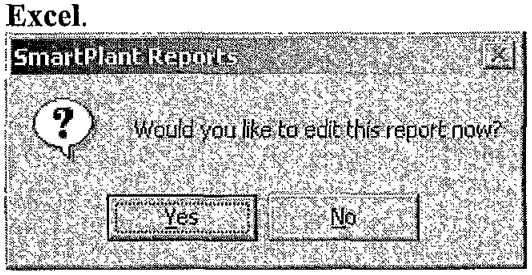
1. **Open** a **Drawing**.
2. Select **Report > New** from the Menu and define the following fields.



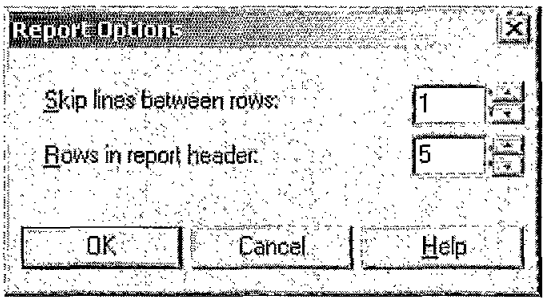
   a. **Name** = New Equipment List
   b. **Item Type** = Equipment
   c. Select **Add to Plant Reports**



3. Select **OK**
4. Select **Yes** to edit the report. The **SmartPlant Report** opens running on top of **Excel**.



5. Select **Options** to define the basic formatting of the header and printed information.



Select **OK**

6. Define your header information to be **Equipment List**. Note that the header information must be contained within the rows specified in the above step.
7. Define any cell formatting such as borders, text wrapping, etc. with the Excel functionality.
8. Define your column headings to be:

Equipment Number **Equipment Name** **P&ID Number** **Material of Const**

9. Select **Define** on the **SmartPlant Reports** toolbar.

10. Select the **Equipment** table, and then select **Define** to select the properties that will be available in the **Map Properties** button.

    Hint: The property names for the following properties are:

    - **Equipment Number** = Item Tag,
    - **Equipment Name** = Name
    - **PID Number** = Rep Drawing Name

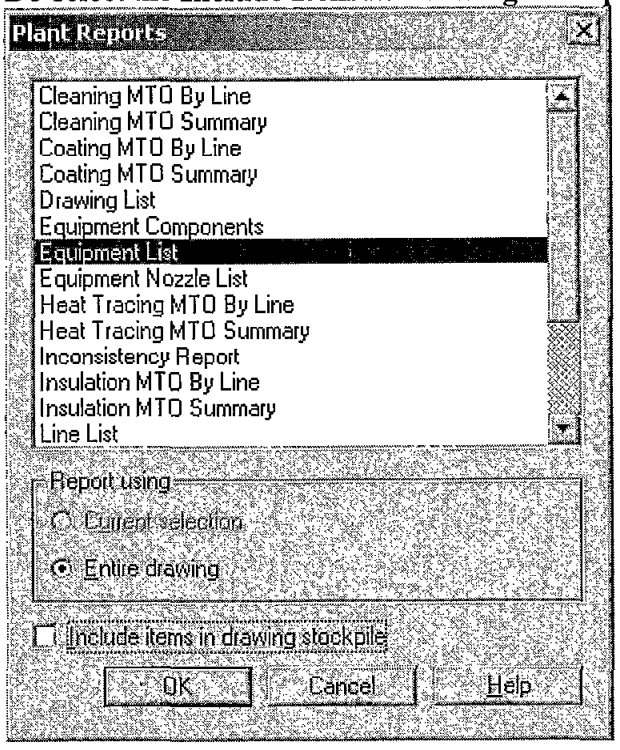
11. Review the **Sort** and **Filter** tabs.
    a. Sort by **Equipment Number**
12. Select the **Map Properties** button and map the appropriate attributes into the cells.
13. **Save** the file.
14. Run the report from:
    a. Run the report for the **Drawing**
    b. Run the report from the **EDE**.

Lab 27 – Reporting from a Drawing; excluding DrawingStockpile Items.

1. Open a Drawing which has some Equipment placed or either place several Equipment items in your drawing.

2. Select **Report** > **Plant Reports** > **Equipment List**.

3. De-select the **Include Item in Drawing Stockpile** option:

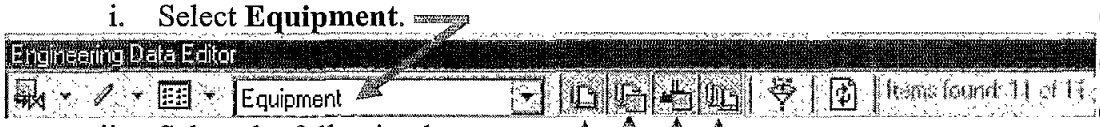


   a. Select **OK**

   b. Review the **Report** and **Exit** from **Excel.**

Lab 28 – Reporting from the EDE

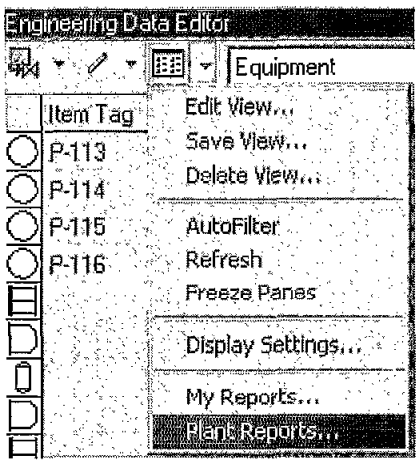
1. Create a **View** in the **Engineering Data Editor** of the **Equipment** in your plant.
   a. In the **Engineering Data Editor**
      i. Select **Equipment**.



      ii. Select the following buttons:
         1. **Active Drawing**
         2. **Active Drawing Stockpile**
         3. **Stockpile**
         4. **Other Drawings**

2. From the EDE toolbar, select **View**

   b. Select **Plant Reports > Equipment List.**



Notes:

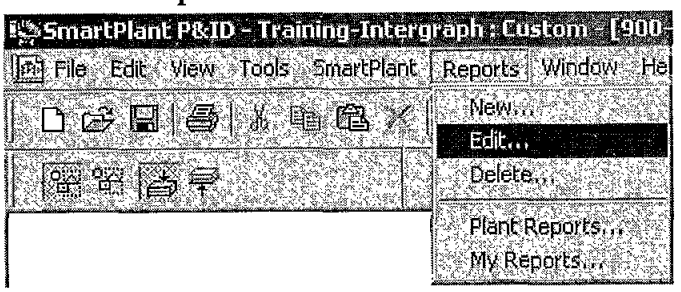
- There is not an option to include/exclude stockpile items. (You simply deselect the **Stockpile** and **Drawing Stockpile** buttons to exclude the stockpile items. However, in the next steps, we are going to edit the report so that the stockpile items are always excluded.)

   c. Select **OK**

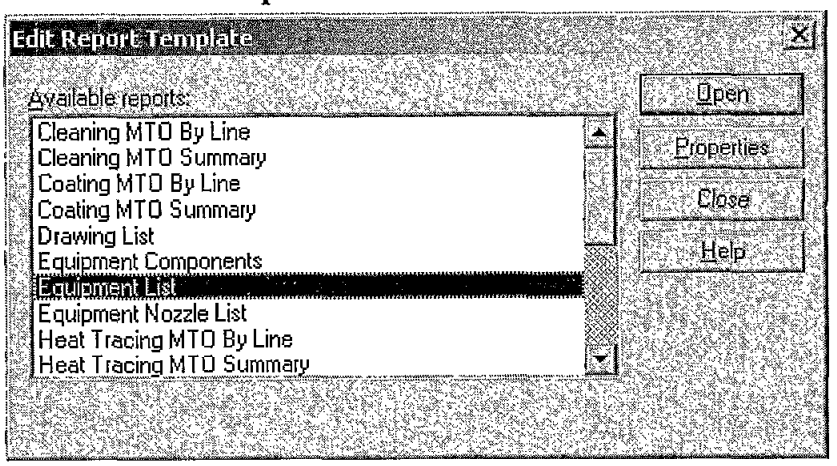
   d. Review the **Report** and **Exit** from **Excel.**

Lab 29 – Editing a Report Template to Exclude Stockpile Items

1. Select **Reports** > **Edit** from the **Menu.**

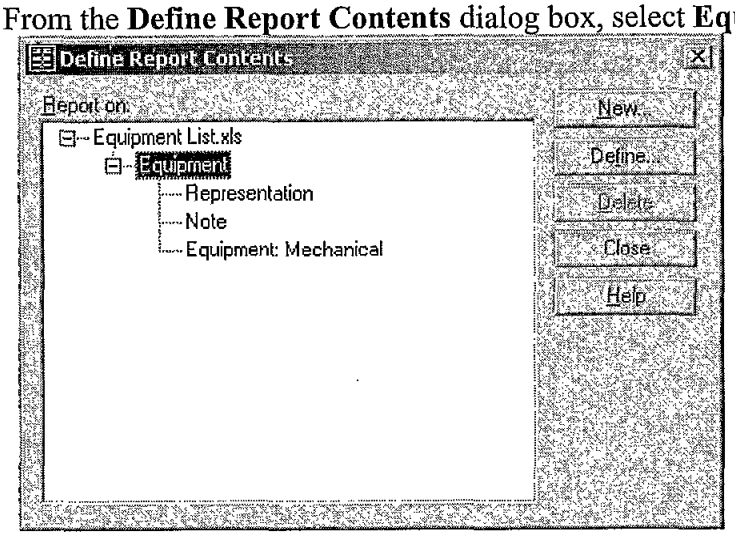


2. Select the **Equipment List**
   a. Select **Open**



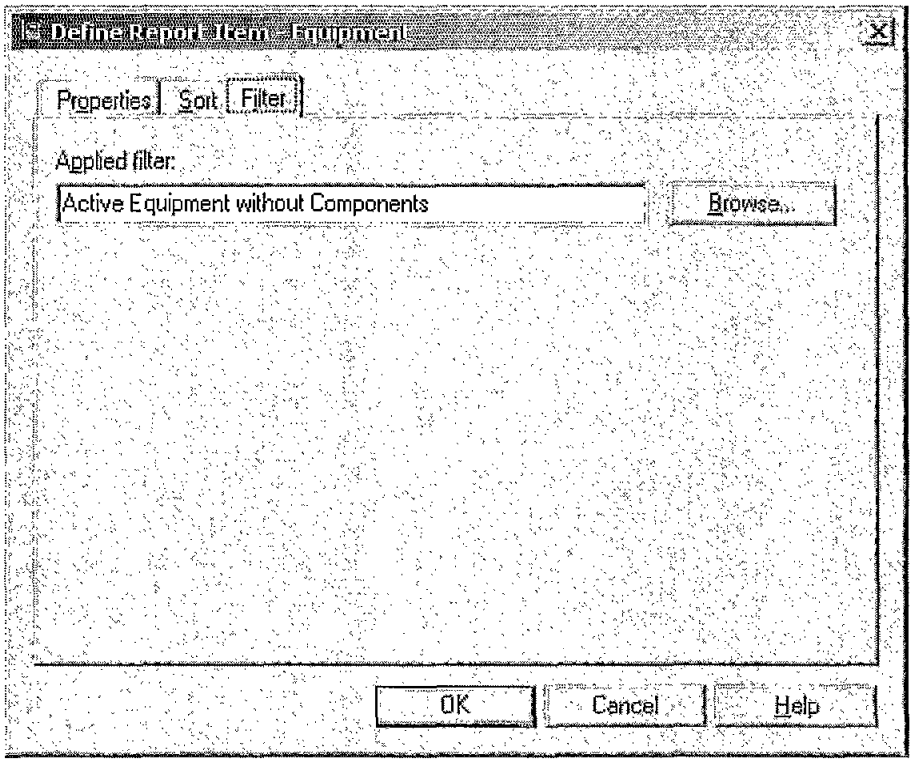
3. In Excel, from the **SmartPlant Reports** toolbar, select **Define.**

4. From the **Define Report Contents** dialog box, select **Equipment.**



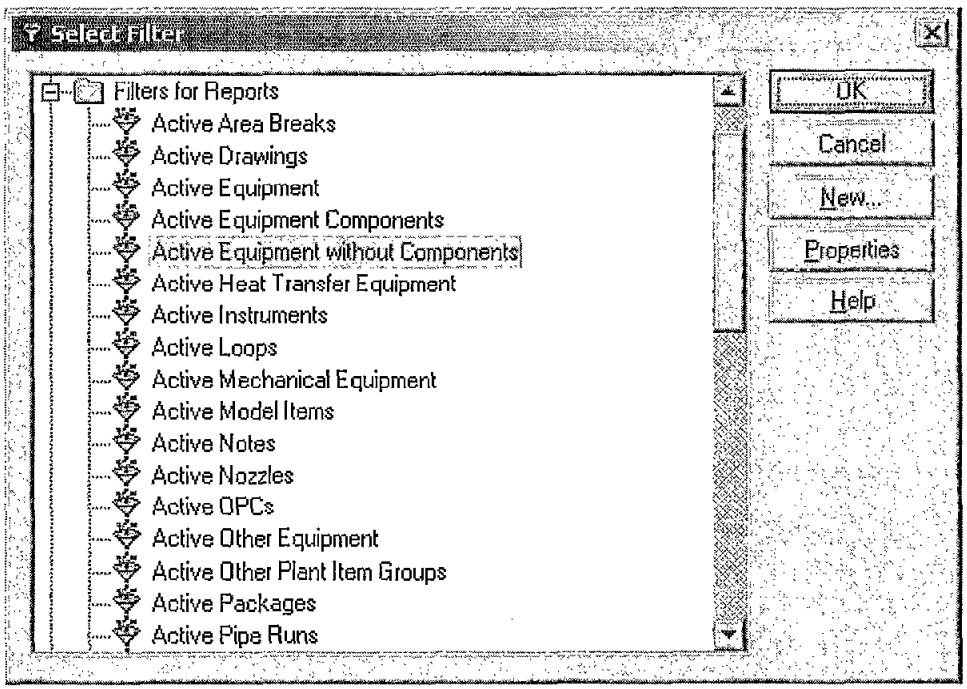
b. Select **Define** from the **Define Report Contents**

5. Select the **Filter** tab.



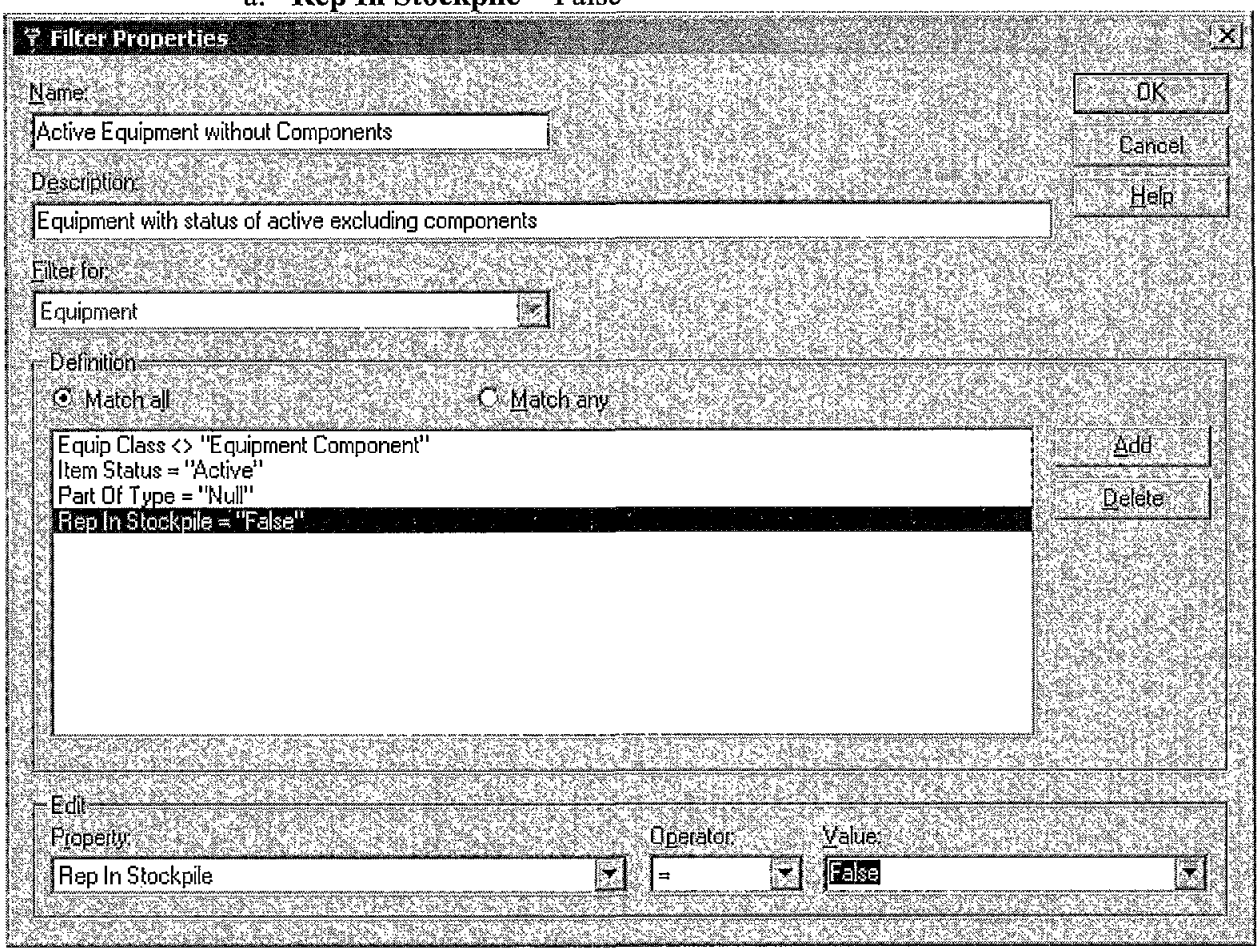
6. Select **Browse**.

7. Select **Properties** to display the **Filter** contents.



8. Add the **Rep InStockpile** criteria to the filter.

   a. **Rep In Stockpile** = False



9. Save the information, close the report contents and run the report again to determine if the items were excluded from the stockpile.

Bonus Lab

1. Create a Pump List Report. (Think Filters!)

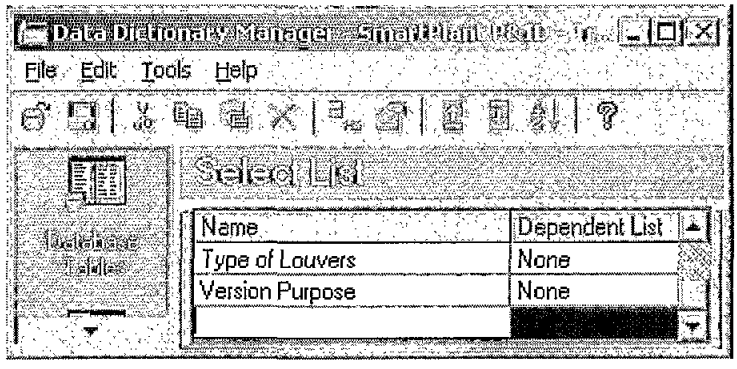
Lab 30 – Creating New Select Lists and Properties

Purpose: Create a new Select Listed property for Paint Code for ALL Equipment.

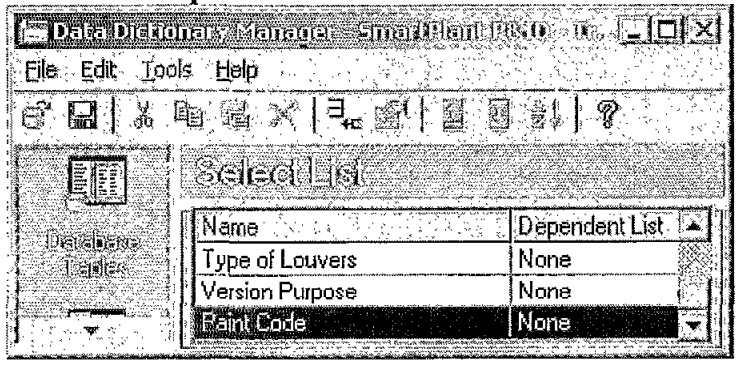
Create the Paint Code Select List.

1. **Exit** out of **SmartPlant P&ID** software.
2. Create the **Paint Code** select list.
   a. Open **Data Dictionary Manager**.
      i. Select **Start** > **Programs** > **Intergraph SmartPlant Engineering Manager** > **Data Dictionary Manager**
   b. Select the **Select List** 

button.
   c. Scroll down to the bottom of the **Select Lists**, and click in the **Name** field.



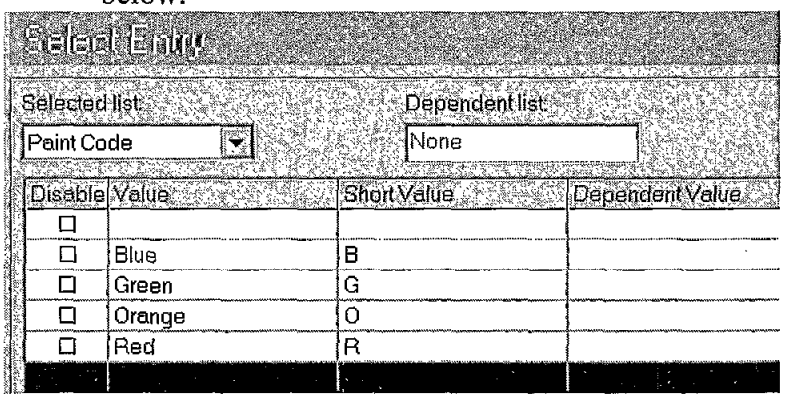
      i. Define the following:
         1. **Name**: Paint Code
         2. **Dependent List**: None



3. Select the **Select Entry** 

button and click in the **Value** field. Define the following:
    a. **Value**: Red
    b. **Short Value**: R

4. Use the **Add Row** button to add more rows of data to the **Paint Code** Select List.
    a. Add the following values to the list
        i. **Values**: Blue Green, and Orange
        ii. **Short Values**: B, G and O
    b. Add a blank line for NULL values.
        i. It is easiest to add it in last, and use the **Move Item Up** command to move it up in the list.
    c. Utilize the **Sort** command to sort the values in **Ascending** order by:
        i. Value
        ii. **Short Value**
        iii. **Dependent Value**
    d. When complete your **Paint Code** select list should be similar to the below.



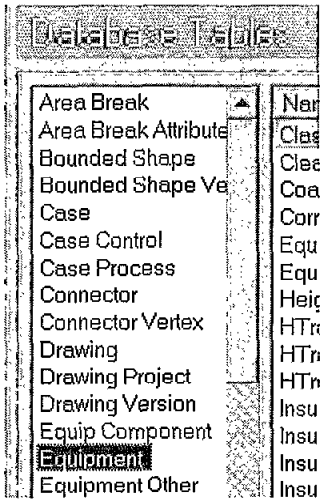
5. Select **File** > **Save**

Create the Paint Code property in the Equipment table.

6. Select **Database Tables** 

option.

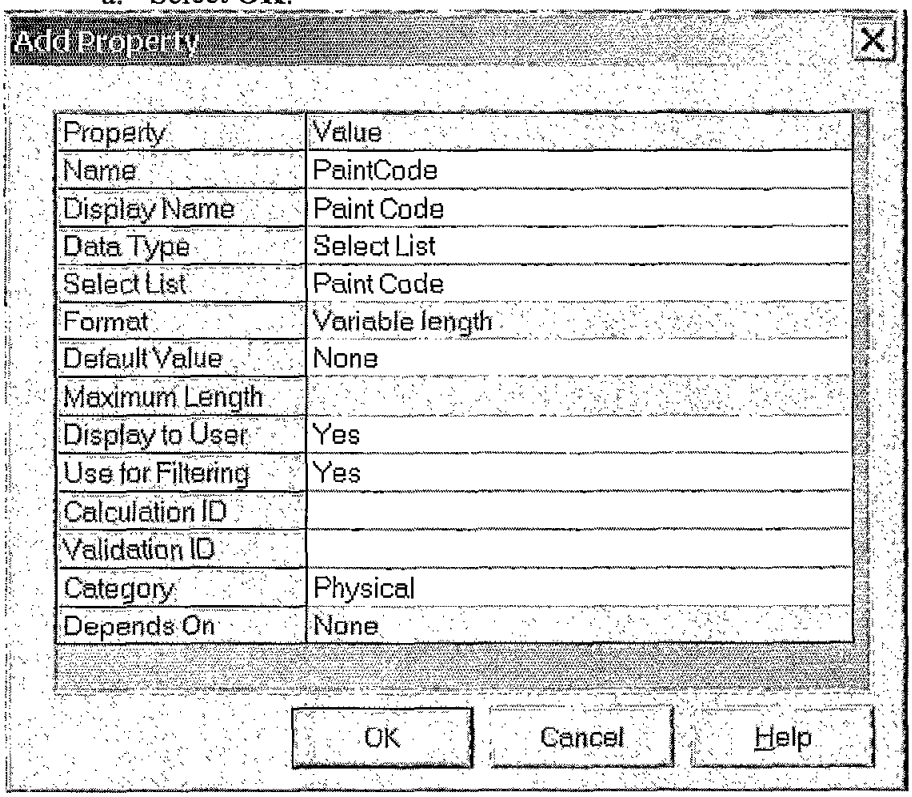
7. Select the **Equipment** table.



8. Select **Edit** > **Add Property** from the menu.

9. Enter the following information in the **Add Property** form.

   a. Select **OK**.

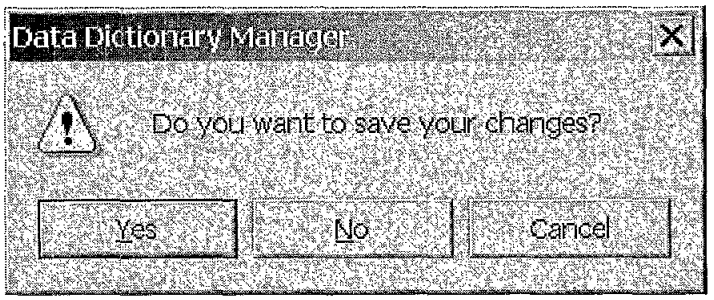


How would you have created this property differently if you only wanted it available for vessels? **Answer**: By adding the **Paint Code** Property to the **Vessel** table instead of the **Equipment** table.

10. Exit **Data Dictionary Manager** and save your changes.

a. Select **File** > **Exit**

b. Select **Yes** to save your changes.



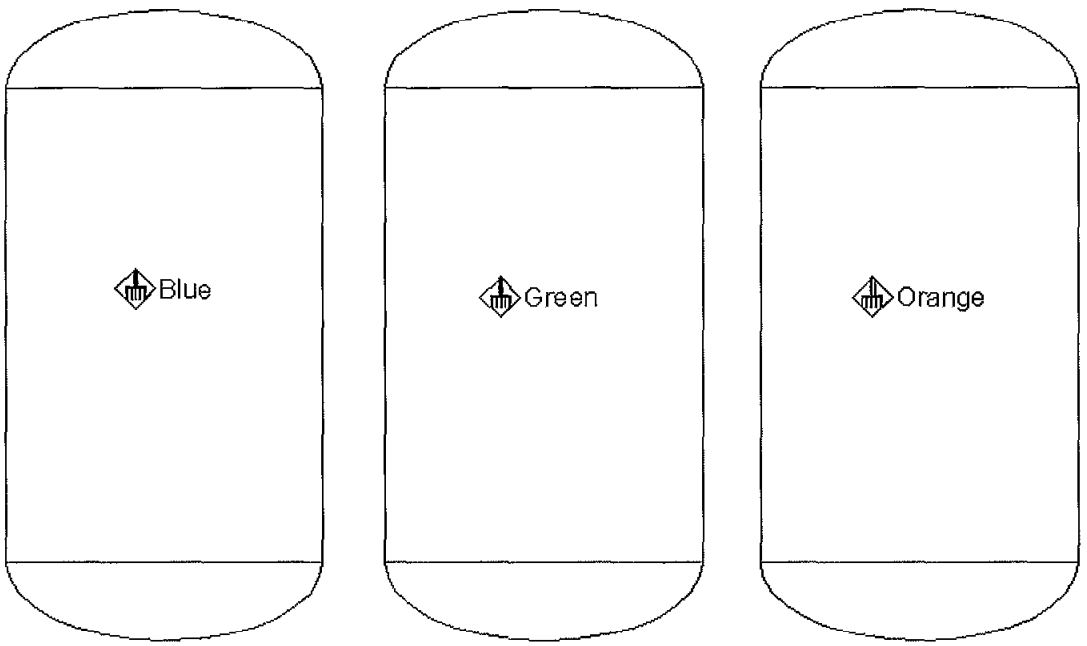
Create an Equipment Label utilizing the Paint Code property.

11. From **Catalog Manager**, **Clone** the existing **Equipment Cleaning Requirements** label to create an **Equipment Paint Code** label. The symbol name, graphics, text, icon etc. are user definable.

12. Enter the **P&ID**, place three items of **Equipment**, and define the **Paint Code** in the **Properties Window** of Blue, Green, and Orange.

13. Place the new **Paint Code** label on the **Equipment**.

14. Create a **Display Set** to display the **Equipment** in **blue** when a value for **Paint Code** is **blue**. (Hint: Look in **HELP** for **Apply Display Set**)



15. **Clear** the **Display Set.**

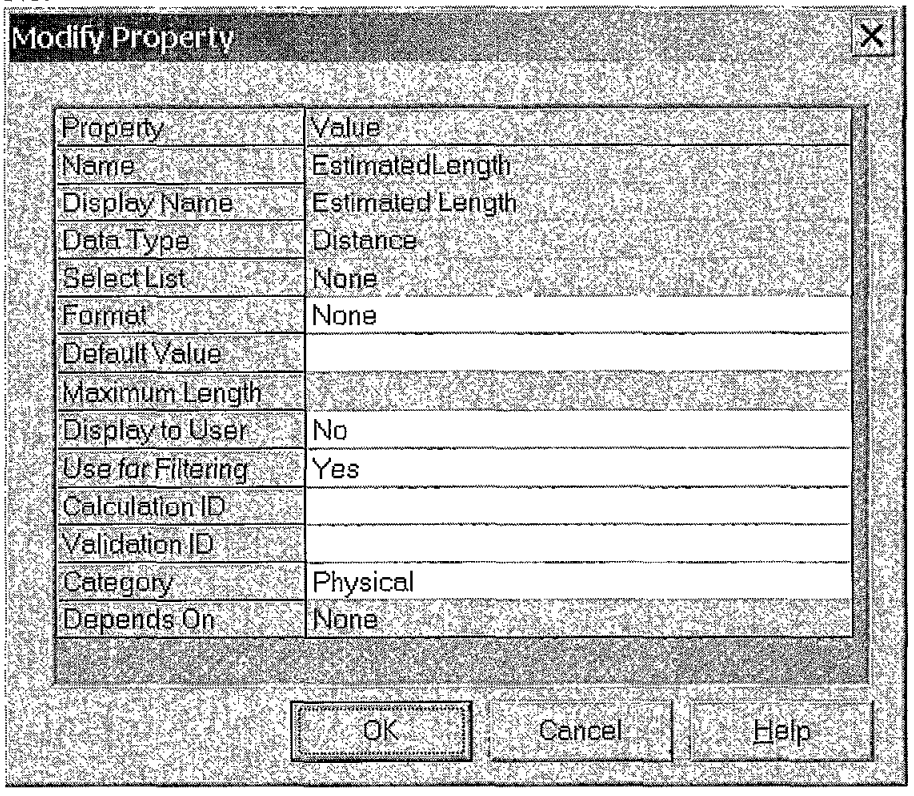
16. Exit from the **P&ID**.

Lab 31 – Changing Display Name and Controlling the Display of Properties

Purpose: Learn to control properties in SmartPlant P&ID

Turning Off the Display of a Property

1. In **SmartPlant P&ID**, select a **Pipe Run**, and note the **Estimated Length** property, and the ***MOC Class*** property.
2. Exit **SmartPlant P&ID**.
3. Open **Data Dictionary Manager**.
4. To turn off the display of a property, select the **Database Tables** button.
5. Scroll down to the **Pipe Run** table.
6. Double click the **EstimatedLength** property or select the **Estimated Length** property and select **Edit** > **Properties**, and turn the **Display to User** value to **No**.



7. Select **OK**

8. Save your changes
    a. Select **File** > **Save**

Change the Display Name of a Property

9. To change the **Display Name** of a **Property**, select the **Database Item Types** 

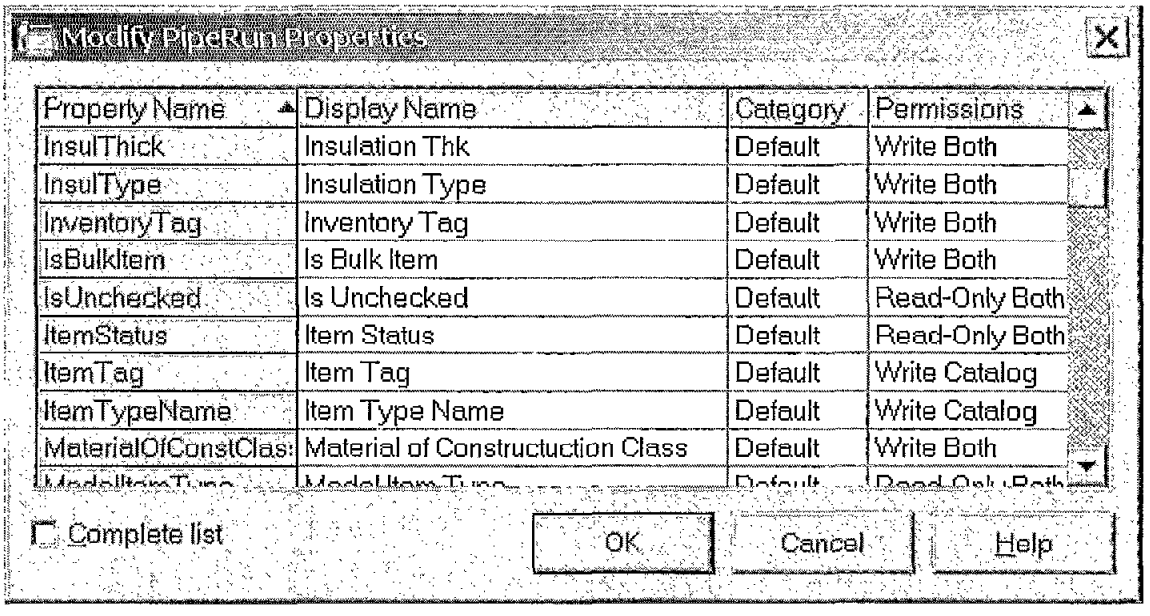
button.

10. Select the **PipeRun** database item type

11. Select **Edit** > **Properties**.

12. Select the **MaterialOfConstClass** property.

13. Edit the value of the **Display Name** from **MOC Class** to **Material of Construction Class**



14. Select **OK**

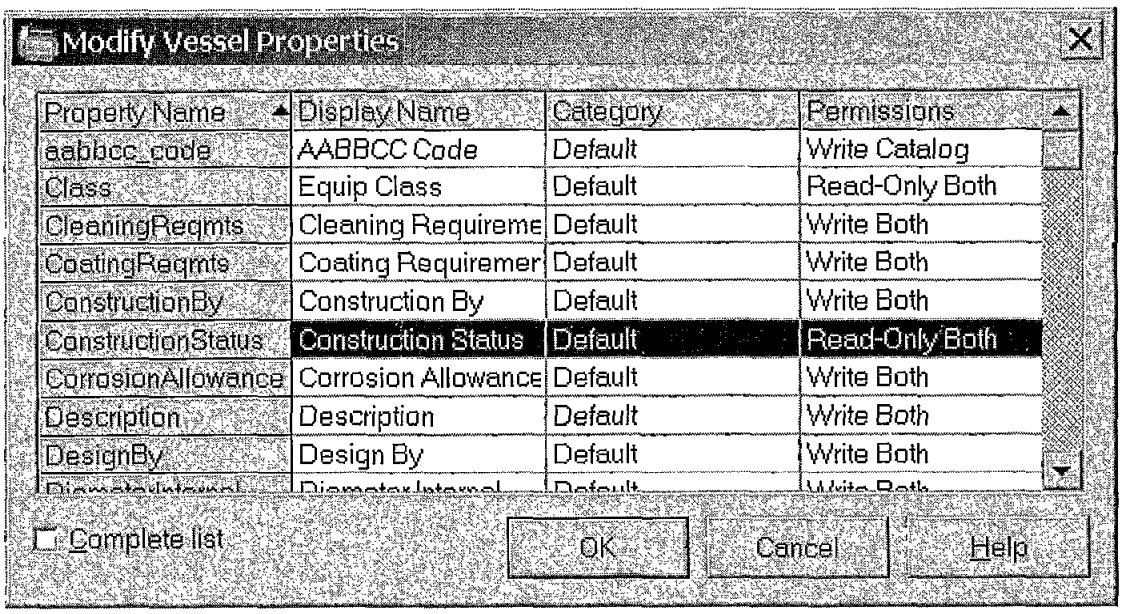
15. Select **File** > **Save**.

Changing Database Item Types

16. Double click the **Vessel** Database Item Type. Note the **Equip Subclass** property is **Write Catalog**.

17. Double click the **PipingComp** Database Item Type.

18. Set the permissions on the **Construction Status** property to **Read-Only Both**.



19. Select **OK**.

20. Select **File** > **Save**.

Testing your Changes

21. Open a drawing in **SmartPlant P&ID**.

22. Select a **Pipe Run** (place one if needed).
    a. Does the **Estimated Length** property display in the **Properties** window?
    b. Did the display value change to **Material Of Construction Class**?

23. Select a **Vessel** in the drawing (place one if needed).
    a. Can the value for **Equip Subclass** be changed? Why not?

24. Select from the menu **Tools** > **Options** > **Placement**.
    a. Set the **Default Construction Status** to **New**.

25. Place a **Valve**. The **Valve** should have a default **Construction Status** of **New**. Can the value be changed?

Bonus:

26. Create a new **Category** for the **Property Window**.
    a. Edit the **Property Category** Select List.
27. Change the **Material of Construction Class** property for **Pipe Runs** to the new **Category**.

Lab 32 – Adding Properties to Plant Groups and Drawings

Adding properties to the **Drawing** table is accomplished just as you would add properties to the **Equipment** or **PipeRun** tables.

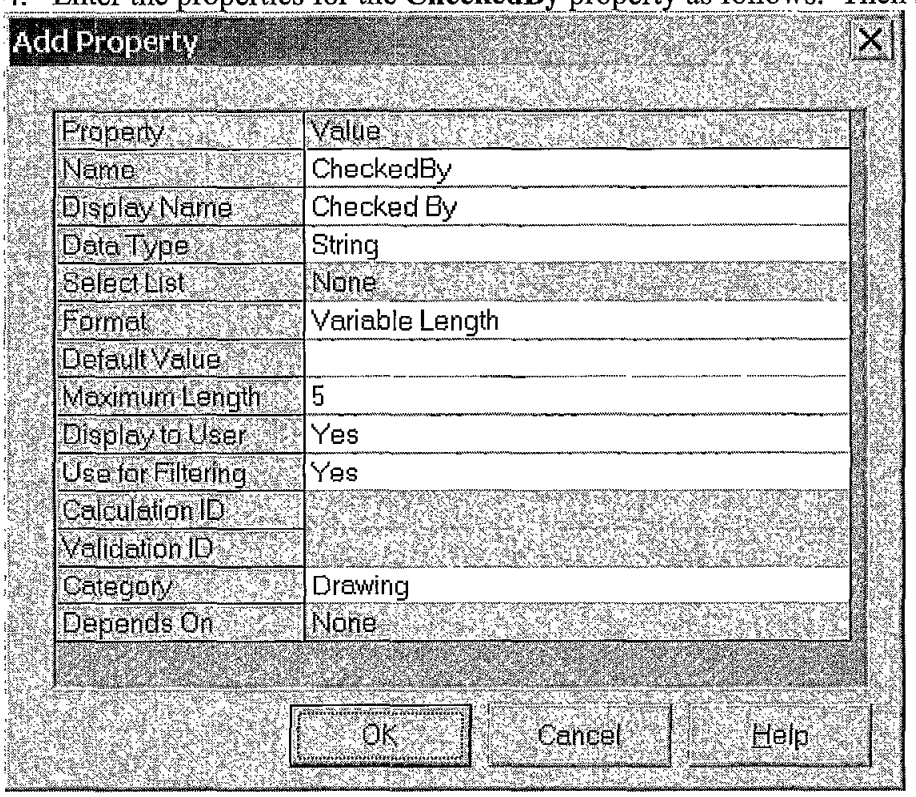
To add properties to a **Plant Group**, you will again use **Data Dictionary Manager** but you will open **Data Dictionary Manager** from within **SmartPlant Engineering Manager**.

Adding Properties to Drawings

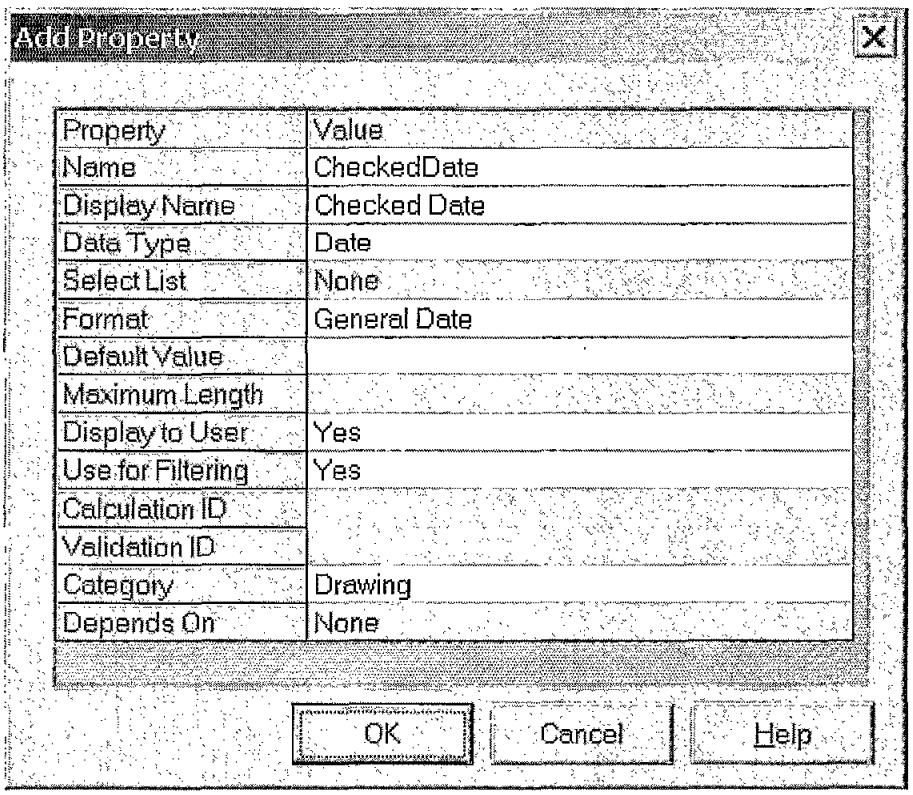
In this exercise, you will add two new Properties to the **Drawing**.

- **CheckedBy**
- **CheckedDate**

1. Open **Data Dictionary Manager**.
2. In the **Database Tables** view, select the **Drawing** item.
3. Select **Edit** > **Add Property**.
4. Enter the properties for the **CheckedBy** property as follows. Then select **OK**.



5. Enter the properties for the **CheckedDate** property as follows. Then select **OK**.



6. Click **File** > **Exit** and **Save** the changes to the **Data Dictionary**.
7. Create a new drawing entering the following property values:
    a. **Checked By**: Your Initials
    b. **Checked Date**: September 9, 2005
    c. **Drawing Number**: Enter a unique Drawing Number
    d. **Name**: Enter a unique Name
    e. Select **OK**.
8. Verify the properties of the drawings are correct.
    a. Select the **Drawing**
    b. Select **Edit** > **Properties**

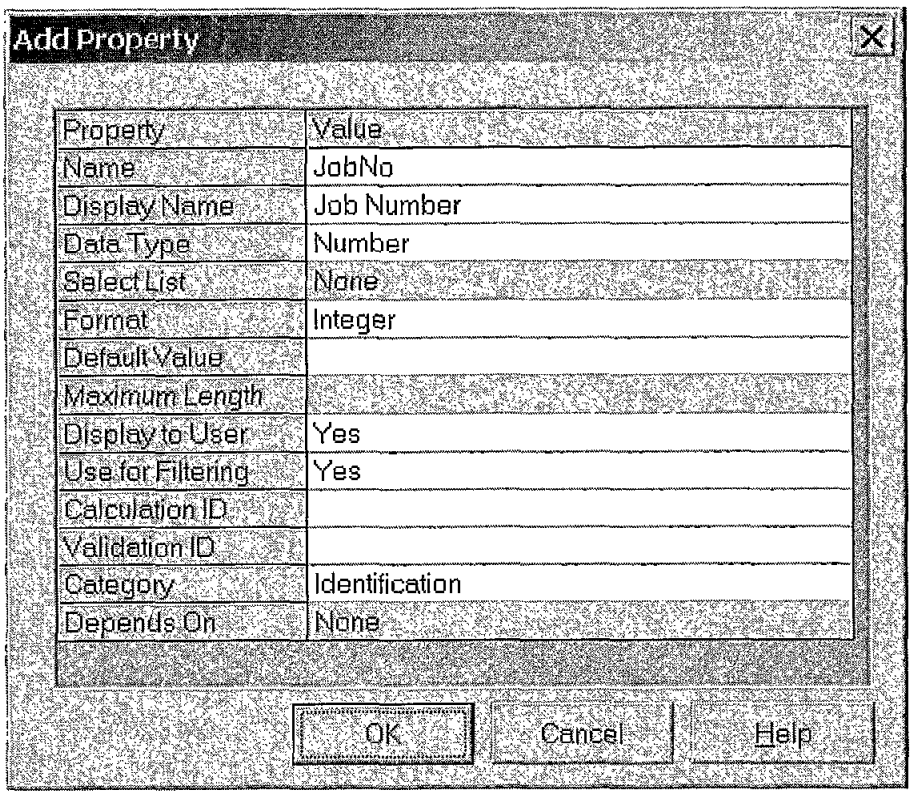
Adding Properties to the Plant

In this exercise, you will add a new attribute to your Plant.

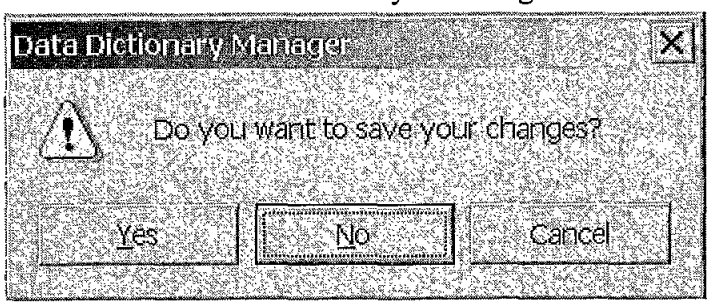
- **ProjectNumber**

9. Open **SmartPlant Engineering Manager**.
10. Select your **Plant**.
11. Select **Tools** > **Data Dictionary Manager** from the menu.

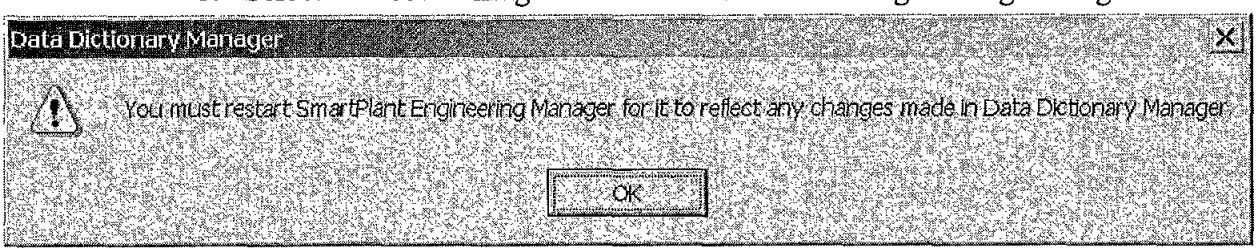
12. Select the **Plant** database table.
13. Select **Edit>Add Property** from the menu.
14. Enter the properties for the **JobNo** property as follows.
    a. Select **OK**.



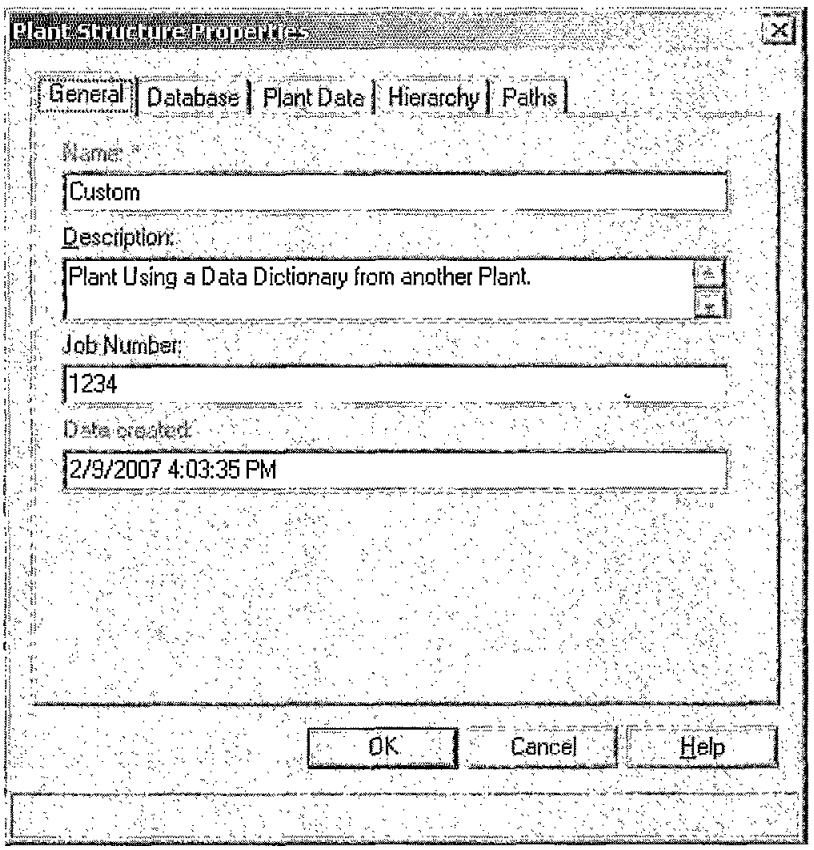
15. **Exit** from **Data Dictionary Manager**.
    a. Select **Yes** to save your changes.



    b. Select **OK** concerning the restart of SmartPlant Engineering Manager.



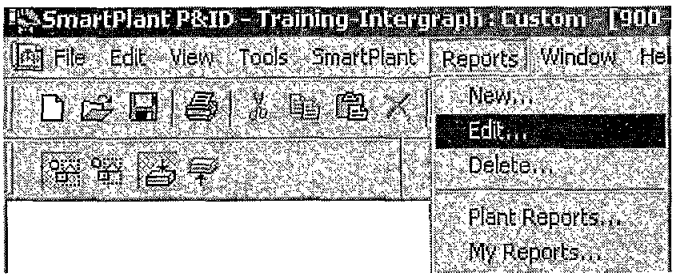
16. Restart **SmartPlant Engineering Manager**
    a. Select **File** > **Open**
    b. Select the **SmartPlantV4.ini** file
    c. Select **Open**
17. Verify the **JobNo** property is available for the active **Plant**.
    a. Select the **Plant**.
    b. Select **Edit** > **Properties** on your **Plant**
    c. Enter a value for the **Job Number**.
    d. Select **OK**.



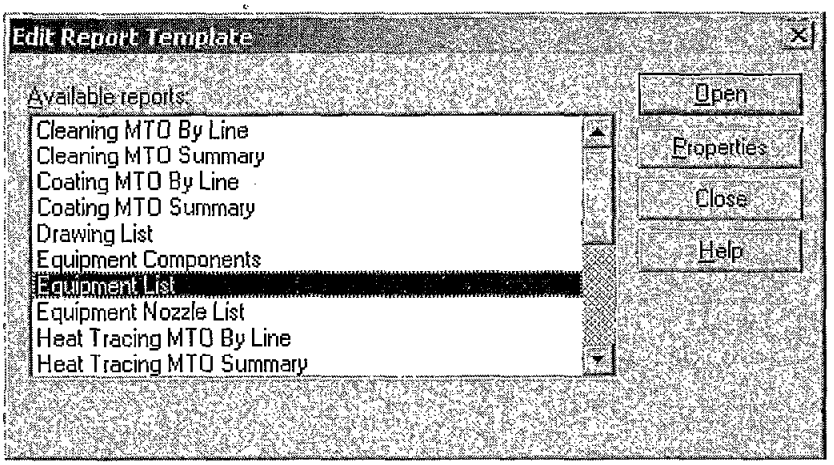
Lab 33 – Adding Properties to a Report Header.

In this exercise, you will add **Plant** properties, such as the **Plant Name** and **Job Number**, to a **Report Header**.

1. From **Drawing Manager**, open a **Drawing**.
2. Edit the **Template** used for the **Equipment List**.
   a. Select **Reports** > **Edit**



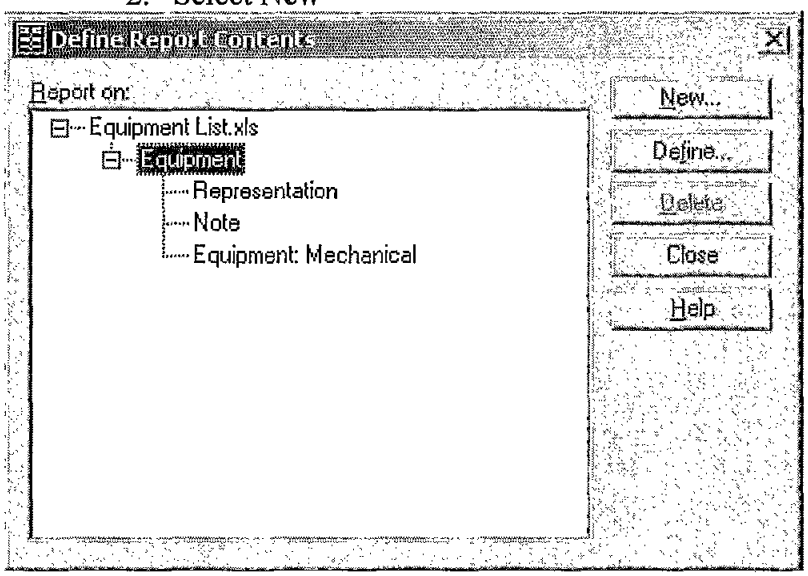
   b. Select the **Equipment List** and select **Open**.



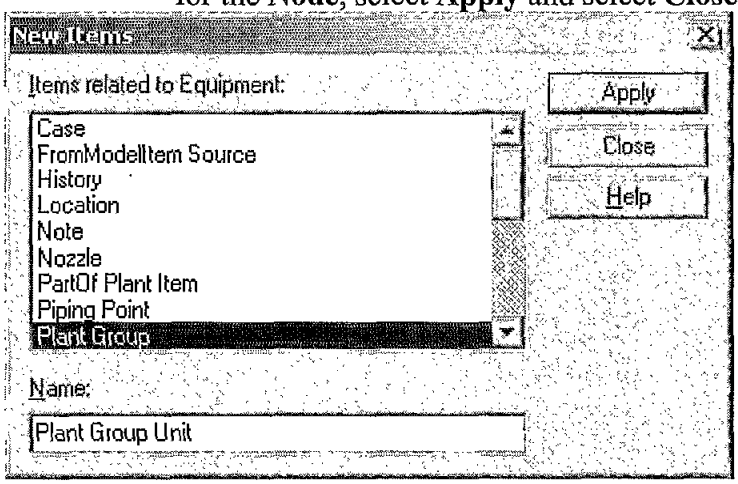
3. From the **SmartPlant Reports** toolbar select **Define**

a. Add the **Plant Group** node **Node** under the **Equipment** node.

1. Select the **Equipment** node
2. Select **New**

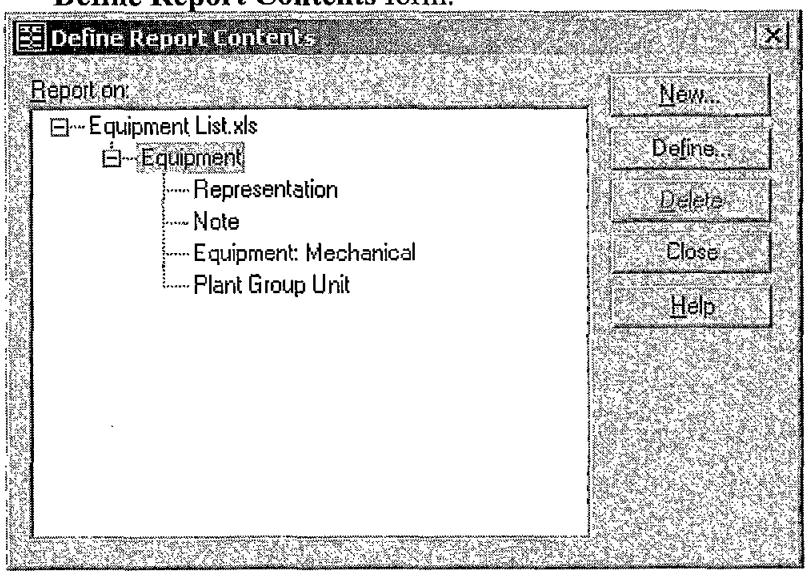


3. Select the **Plant Group,** enter a **Name**[20] **(Plant Group Unit)** for the **Node**, select **Apply** and select **Close**.

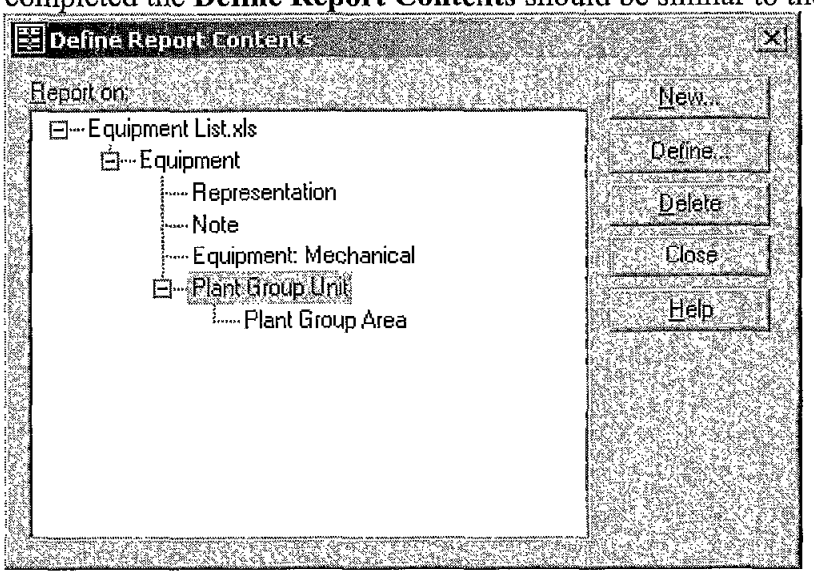


[20] We have to Name the Plant Group node we are adding to be unique. In the following steps we will be adding the Plant Group node for the Area and Plant and the Name must be unique.

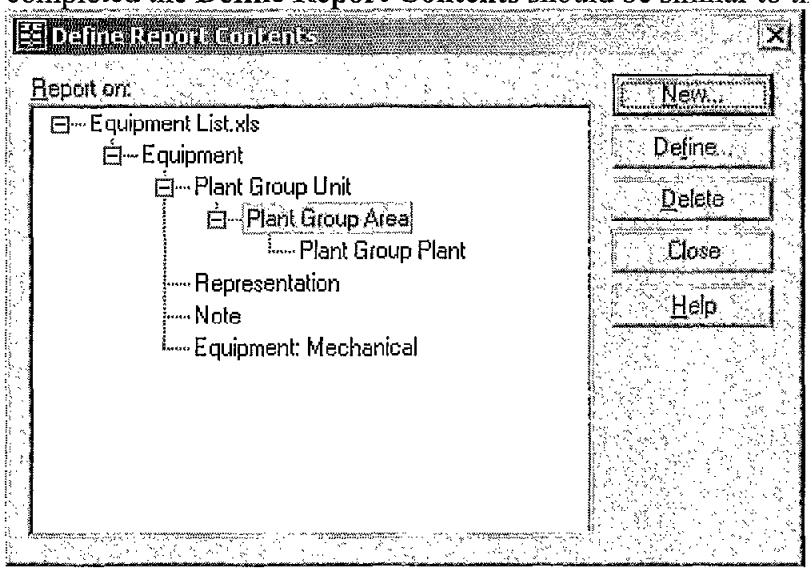
b. The **Plant Group** should be displayed similar to the below on the **Define Report Contents** form.



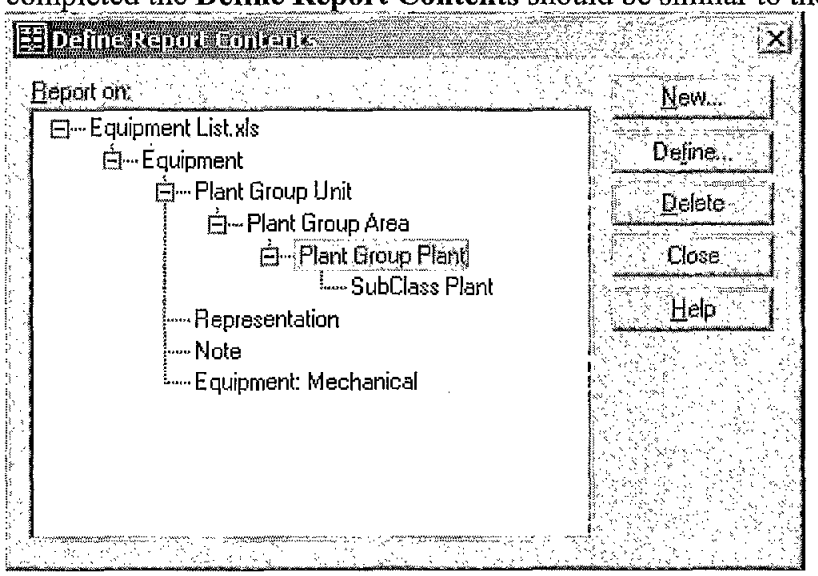
4. Add the **Plant Group** node under the **Plant Group Unit** node, before applying, **Name** the **Plant Group** node to **Plant Group Area**. Once completed the **Define Report Contents** should be similar to the below.



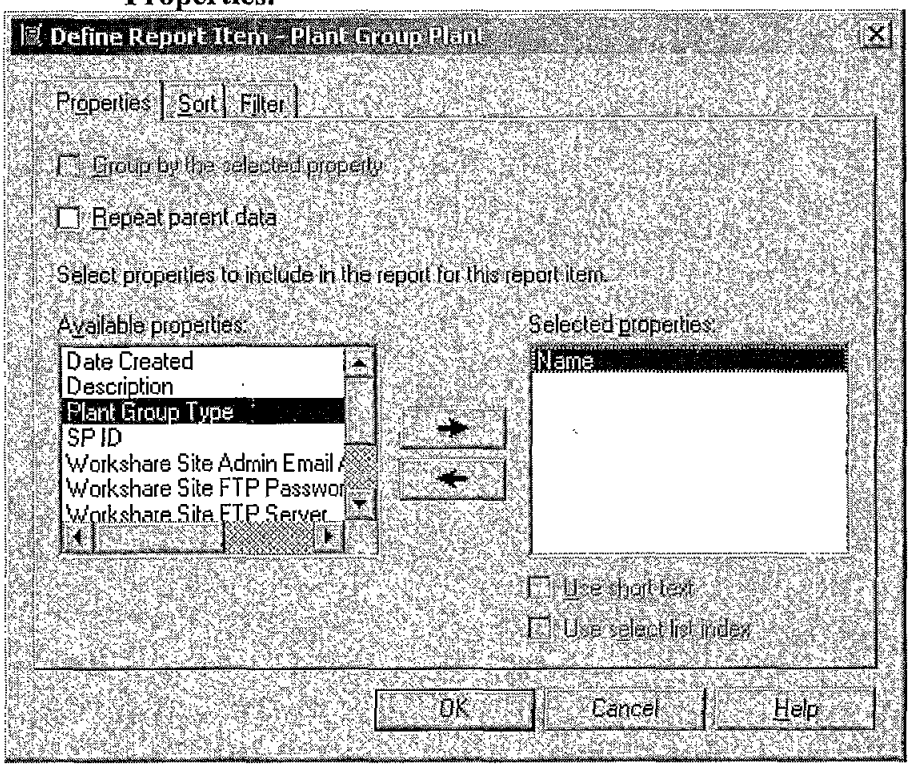
5. Add the **Plant Group** node under the **Plant Group Area** node, before applying, **Name** the **Plant Group** node to **Plant Group Plant.** Once completed the **Define Report Contents** should be similar to the below.



6. Add the **SubClass Plant** node under the **Plant Group Plant** node. Once completed the **Define Report Contents** should be similar to the below.

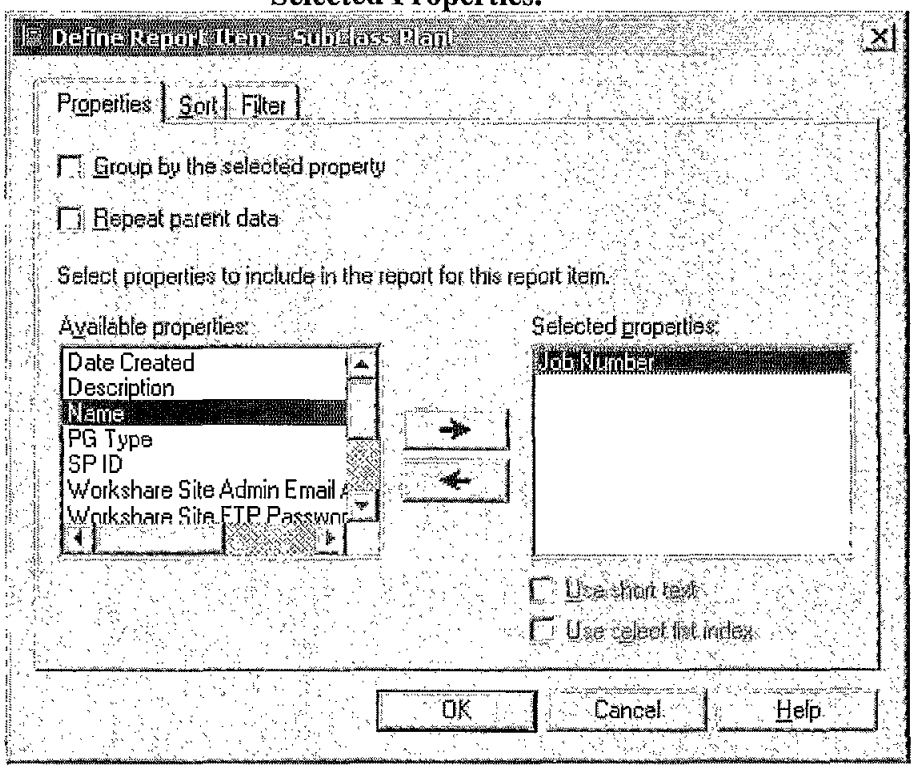


7. Define **Properties** from the **Plant Group Plant** which will be utilized in the **Report Header.**
    a. Select the **Plant Group Plant** node
        1. Select **Define**
    b. Add the **Properties (Name)** from the **Available Properties** to the **Selected Properties** on the **Define Report Item – Plant Group Plant** form.
        1. Select **Name** from the **Available Properties**
        2. Select the ➡ to add the **Name** property to the **Selected Properties.**



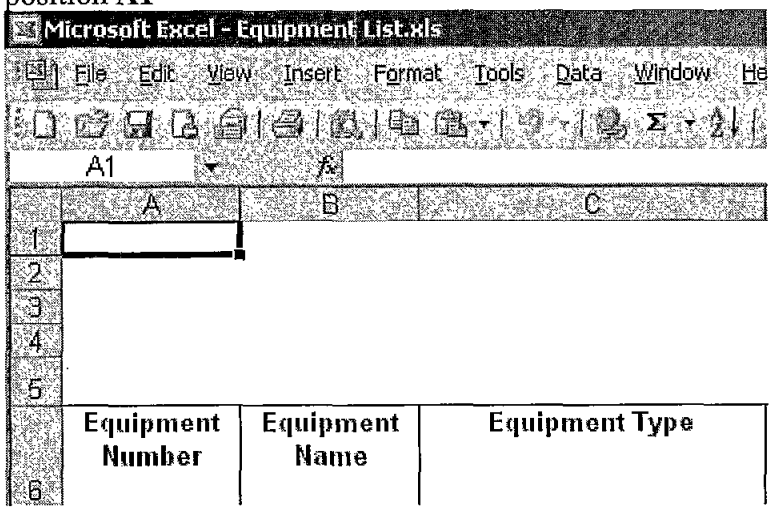
    c. Select **OK**.

8. Define **Properties** from the **SubClass Plant** node which will be utilized in the **Report Header**.
    a. Select the **SubClass Plant** node
        1. Select **Define**
    b. Add the **Properties (Job Number)** from the **Available Properties** to the **Selected Properties** on the **Define Report Item – SubClass Plant** form.
        1. Select **Job Number** from the **Available Properties**
        2. Select the ➡ to add the **Job Number** property to the **Selected Properties.**



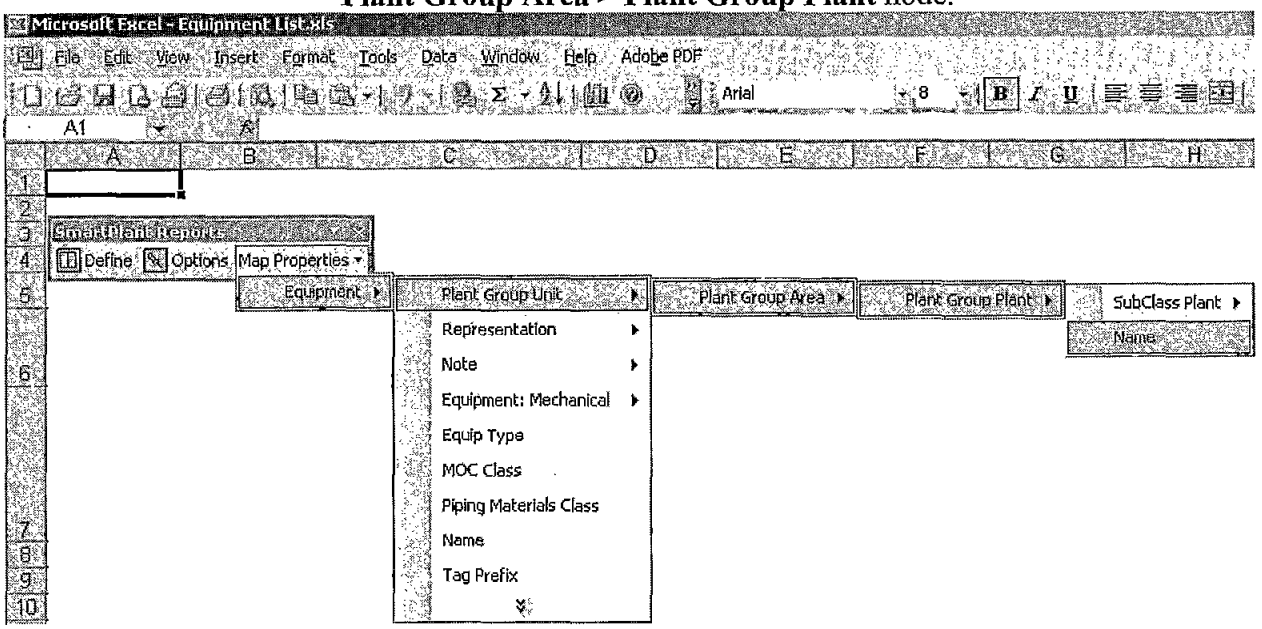
    c. Select **OK**
    d. Select **Close** on the **Define Report Contents** form.

9. Select in the spreadsheet on the **Cell** where you want to place the **Name** property. In this example we will be mapping the **Name** property to cell position **A1**

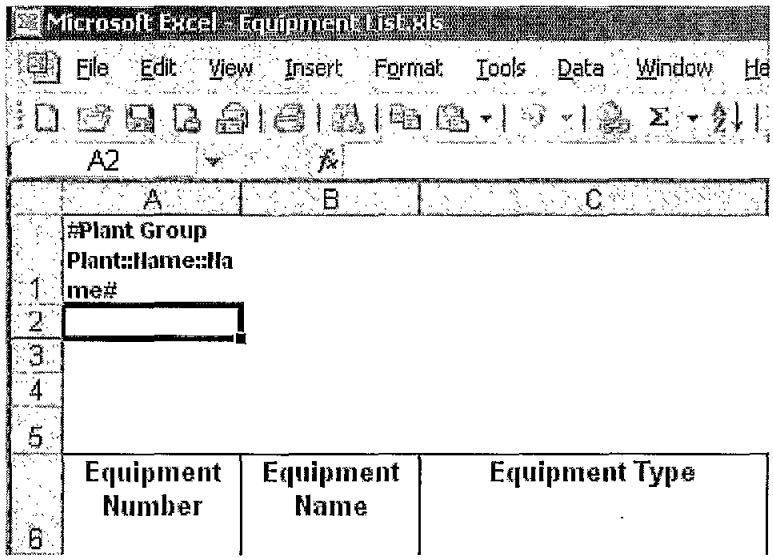


a. Select **Map Properties** from the **SmartPlant Reports** toolbar.

b. Select the **Name** property from the **Equipment** > **Plant Group Unit** > **Plant Group Area** > **Plant Group Plant** node.

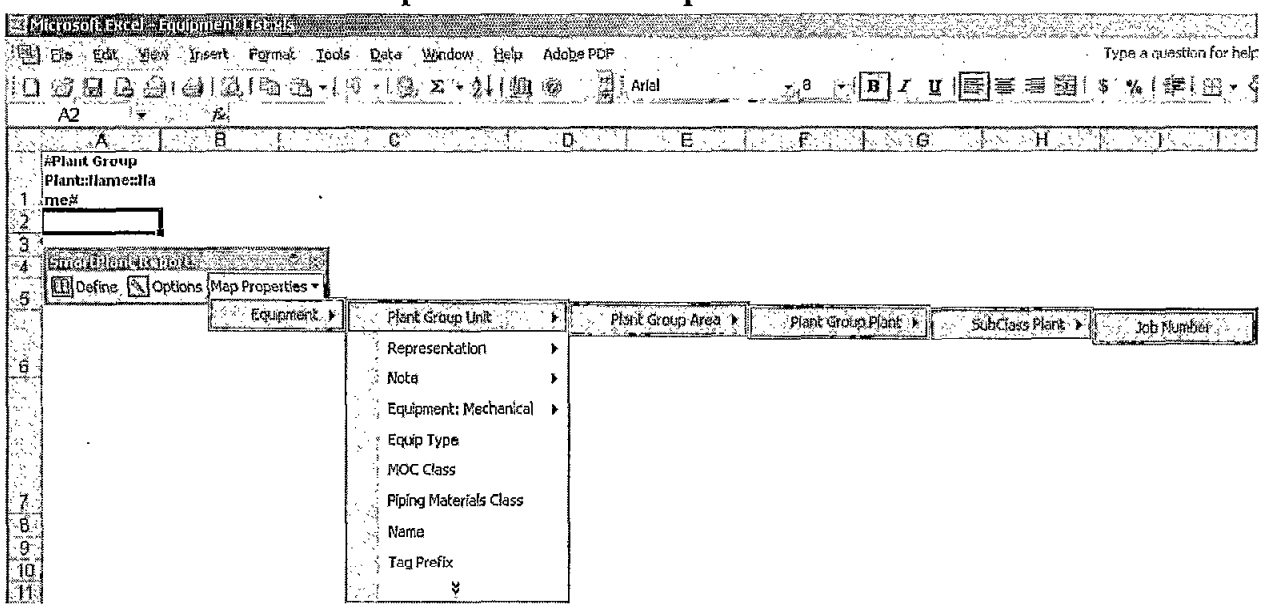


10. Select in the spreadsheet on the Cell where you want to place the **Job Number** property. In this example we will be mapping the **Job Number** property to cell position **A2.**



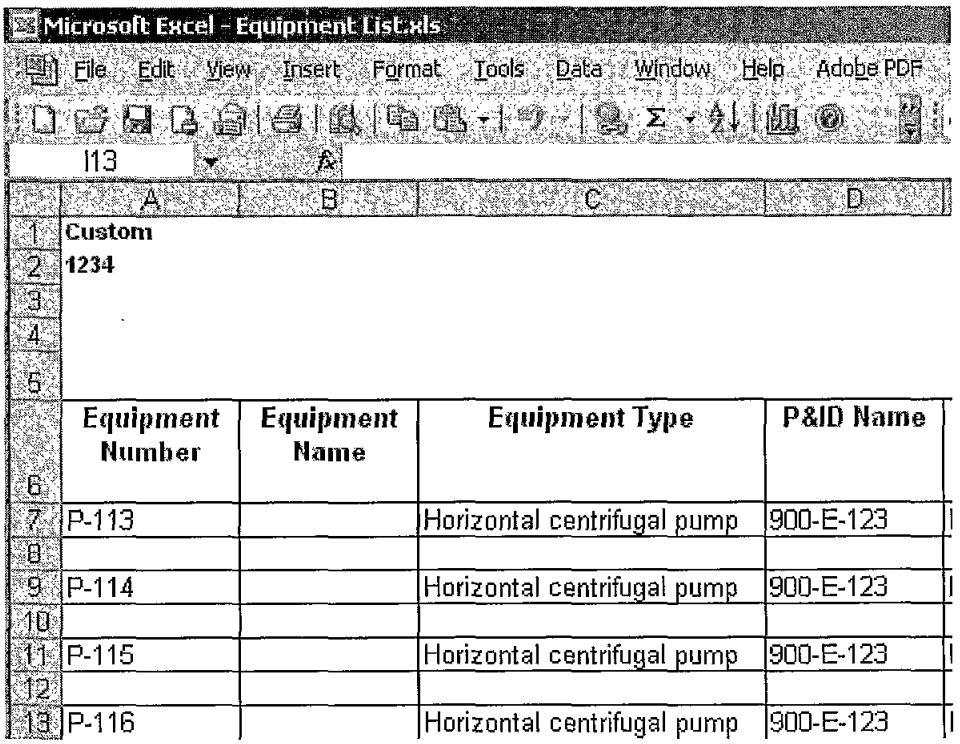
a. Select **Map Properties** from the **SmartPlant Reports** toolbar.

11. Select the **Job Number** property from the **Equipment > Plant Group Unit > Plant Group Area > Plant Group Plant > SubClass Plant** node.



12. **Exit** and **Save** the spreadsheet.
13. Run the Equipment List for the Drawing.
    a. Reports > Plant Reports
    b. Select the Equipment List

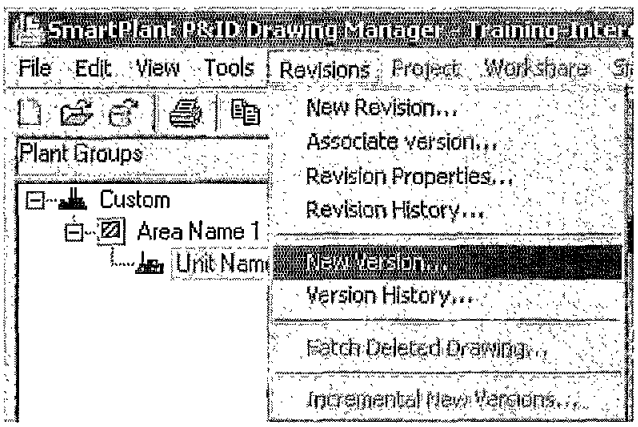
c. The report should display the Name of the Plant and the Job Number in cells A1 and A2, similar to the below.



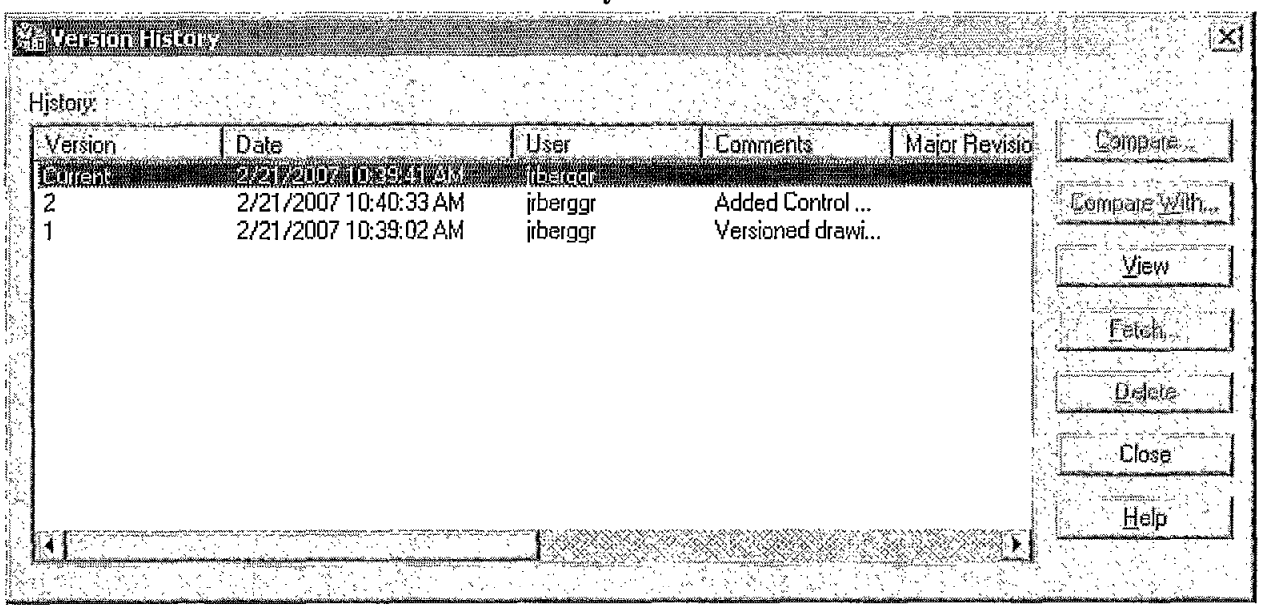
	A	B	C	D
1	**Custom**			
2	**1234**			
3				
4				
5				
6	**Equipment Number**	**Equipment Name**	**Equipment Type**	**P&ID Name**
7	P-113		Horizontal centrifugal pump	900-E-123
8				
9	P-114		Horizontal centrifugal pump	900-E-123
10				
11	P-115		Horizontal centrifugal pump	900-E-123
12				
13	P-116		Horizontal centrifugal pump	900-E-123

Lab 34 – Versioning Drawings

1. Create a new version of a **Drawing**.
   a. From **Drawing Manager**, select the drawing in the tree view.
   b. Select **Revisions** > **New Versions**



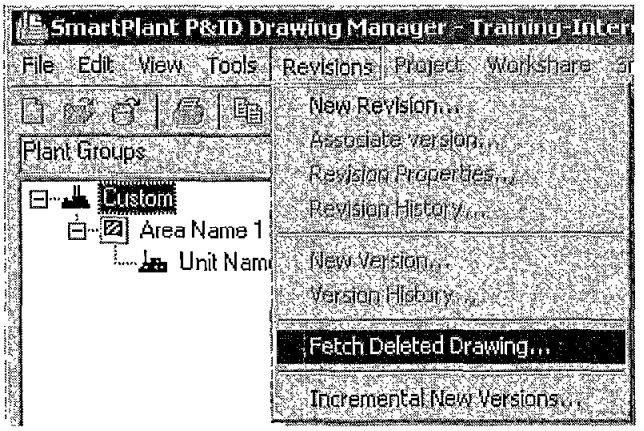
2. Open the drawing you versioned and make a change.
3. Create a new version of the **Drawing**.
4. Select **Revisions** > **Version History**



5. **Compare** two of the versions.
6. Become familiar with the commands on the **Compare** form.
7. **Delete** the **Drawing**.
8. Now **Fetch** the **Deleted Drawing**.

a. Select the **Plant**

b. Select **Revisions > Fetch Deleted Drawings**

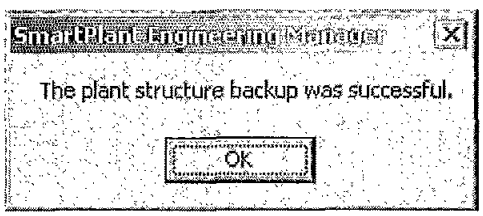


Lab 35 – Backing Up and Restoring your Plant

Purpose: To backup a plant structure and restore it to a site.

Backup the Plant

1. Enter **SmartPlant Engineering Manager**.
2. Select the **Plant** under the **Plant Structures** node.
3. Select **Tools** > **Backup** from the menu.
    a. This will launch the **Plant Structure Backup** wizard.
    b. On the fisrt dialog, verify that **Include Reference Data** is checked.
    c. Do not submit to the task scheduler.
    d. Then, select **Next**.
4. On the final dialog, review the information and then select **Finish**.
5. When the **Plant Structure Backup** has completed, you will see the following message box:
    a. Select **OK**.



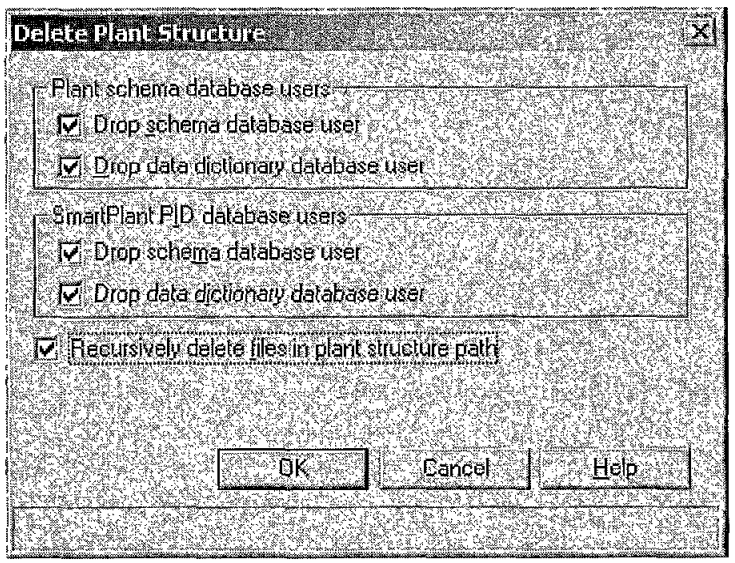
6. From **Windows Explorer** open the zip file created in the **Backup** folder.
    a. Note the different files contained within it.
    b. Double-click to open the **Export.log** file.
        1. At the end of the file, it should state "Export terminated successfully without warnings."

Delete the Plant from the Site

7. **Delete** the **Plant**.

a. Drop all database users and recursively delete files in plant structure path.

b. Select **OK**.



Restore Plant to the Site

1. From **SmartPlant Engineering Manager**, right-click on the **Plant Structures** node and select **Restore**.

   OR

   Select on the **Plant Structures** node and select **Tools > Restore** from the menu.

2. The **Restore Plant Structure** wizard. Enter the following properties:

   a. **Plant Structure Restoration Type** = Non-WorkShare Plant Structure

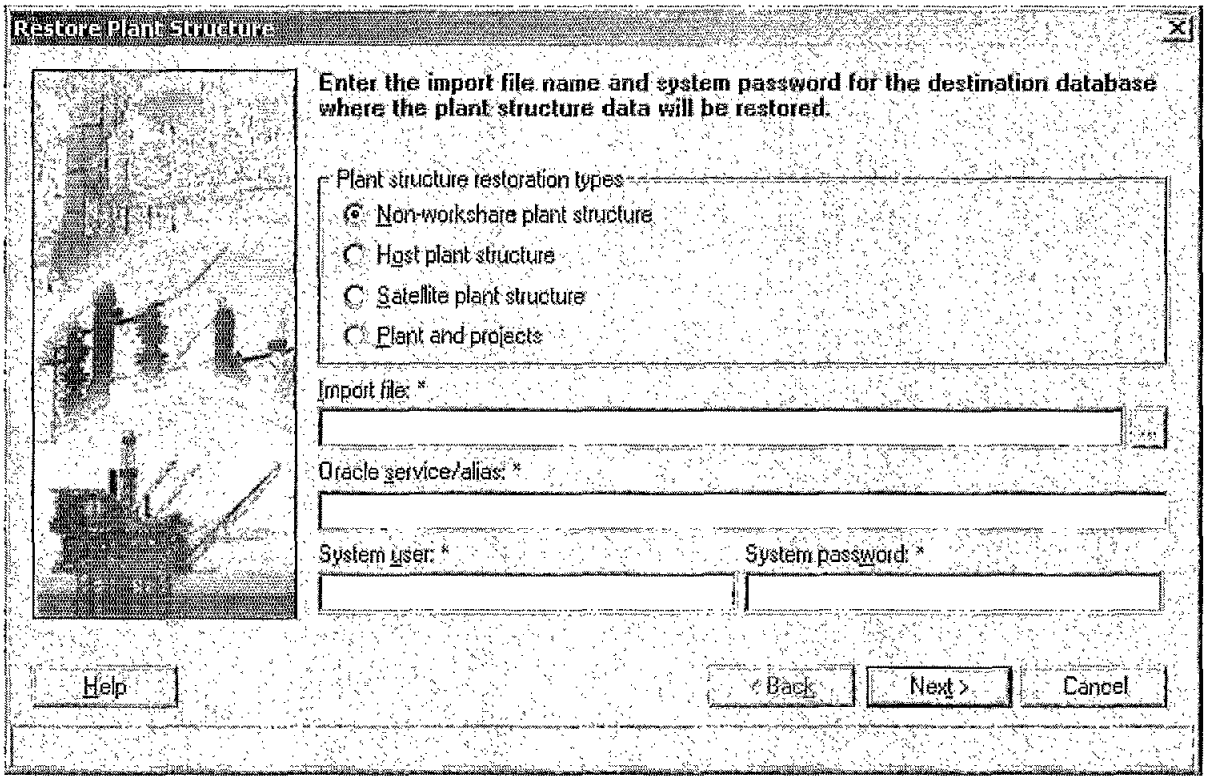
   b. **Import File** = Browse to the plant structure backup file you want to import.

   c. **Oracle alias** - Type the Oracle alias for the database the plant structure will be imported into.

   d. **System user** - Type a database system user name.

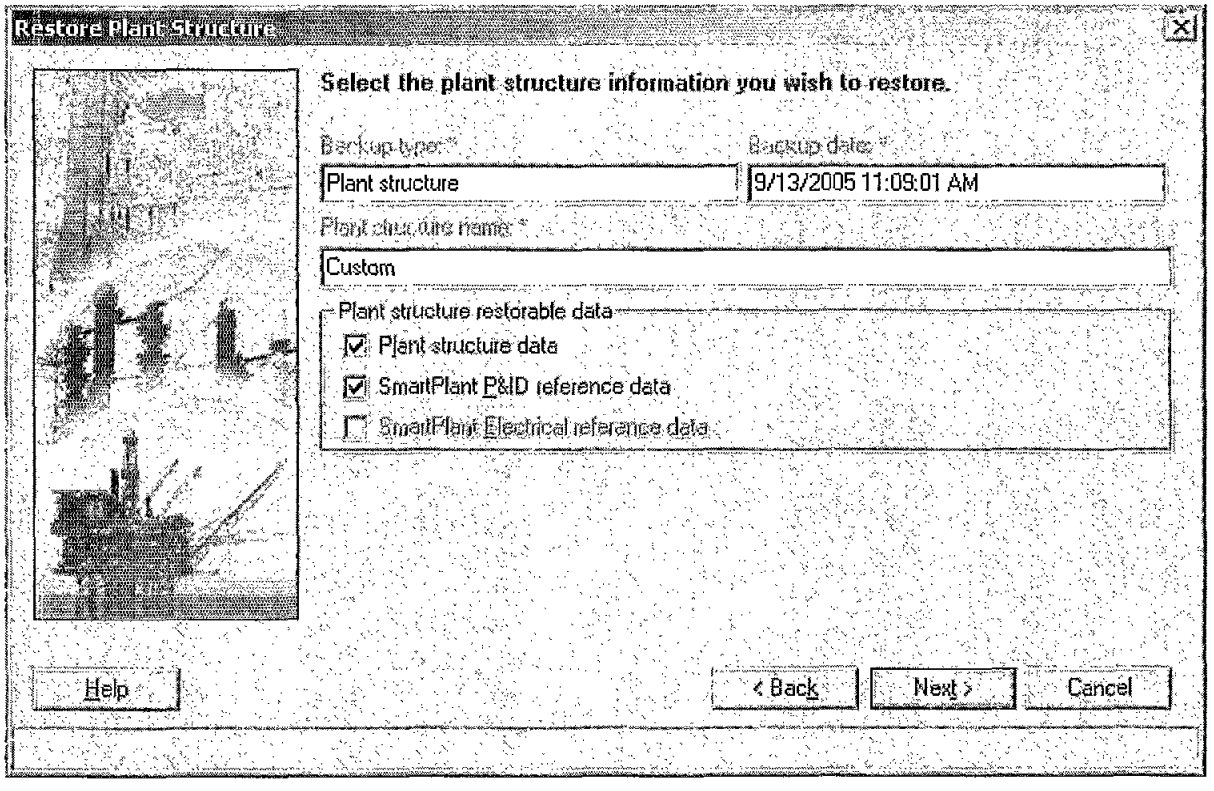
   c. **System password** - Type the database system password.

   f. Select **Next**.



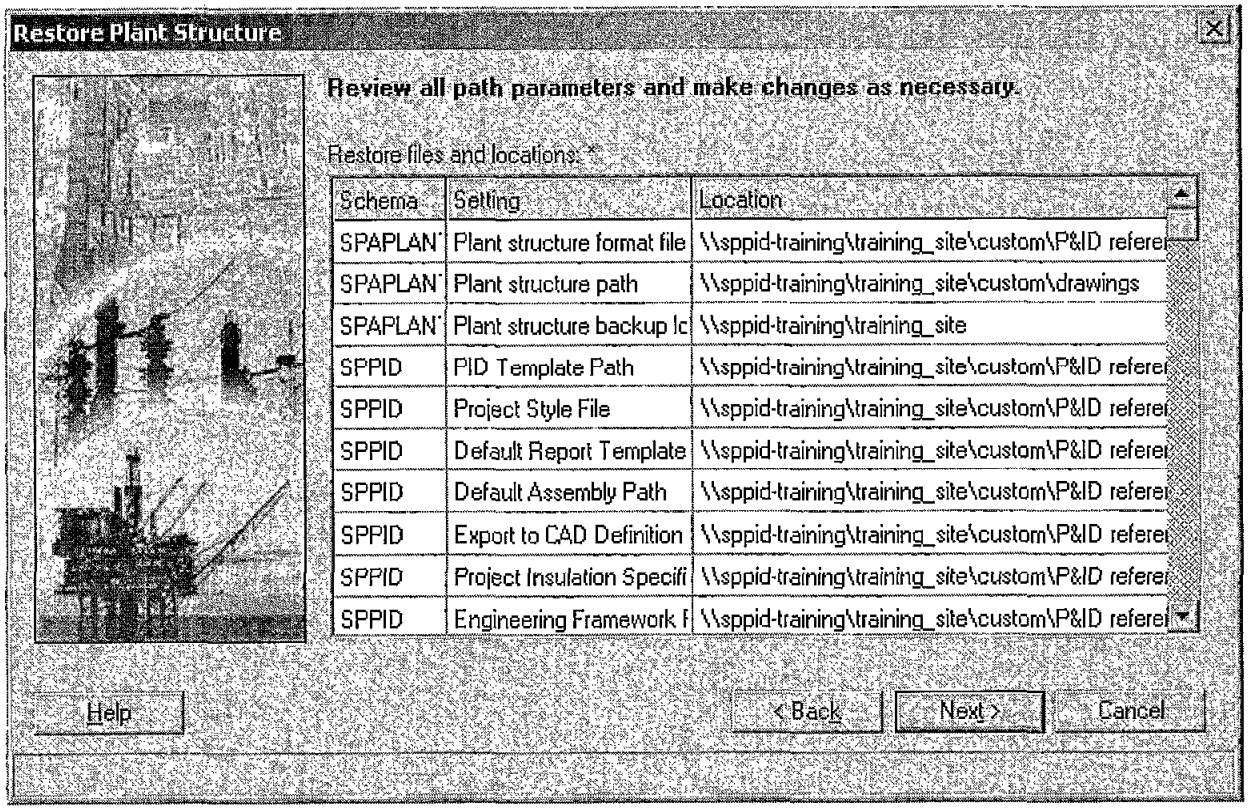
3. On the next dialog, keep the default selections.

   a. Select **Next**.



4. On the next dialog, you will again keep the default selections. This information is the locations of the reference data and the plant structure files.

    a. Select **Next**.

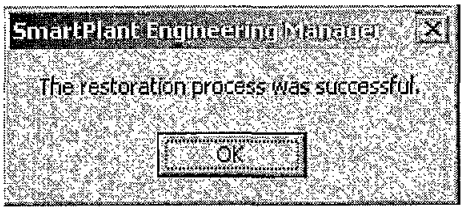


5. Review information in the last dialog.

    a. Select **Finish**.

6. When the restore has completed, you will see the following message box:

    a. Select **OK**.



7. Verify that you can open a drawing in the restored plant from **Drawing Manager**.

Lab 36 - Running Utilities

Run the following utilities.

- Check Item Paths Utility
    a. Review log file.

- Check Symbols Utility
    a. Review log file.

- Delete Orphan Model Item Utility
    a. Clean DB
    b. Model Items
        i. select all Item Types
    c. OPCs
        i. Repairable
        ii. Non-Repairable
    d. Review log files.
- Service PIDS
    a. Repair Relationship Indicators (if applicable)

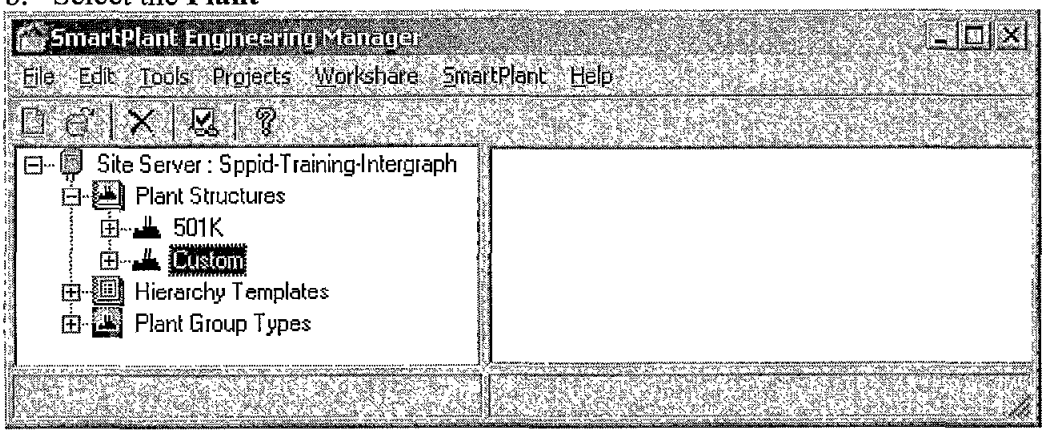
- Duplicate Item Tag Report Utility
    a. Review output.

- Database Constraint Report Utility
    a. Review output.

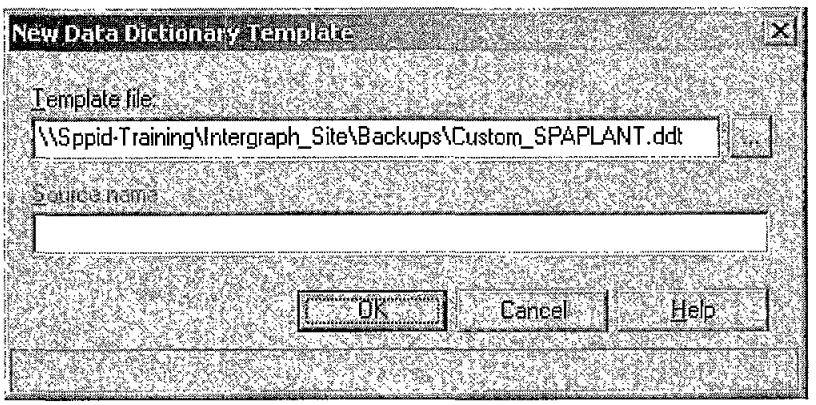
Lab 37 – Running the Data Dictionary Template Comparison Utility

Connect to the **Site**, there should be two **Plants** within this **Site**. One **Plant** is called **501K** another **Plant** is called **Custom**. We will be comparing the Data Dictionary Templates from the **Custom Plant** with the **501K Plant**.

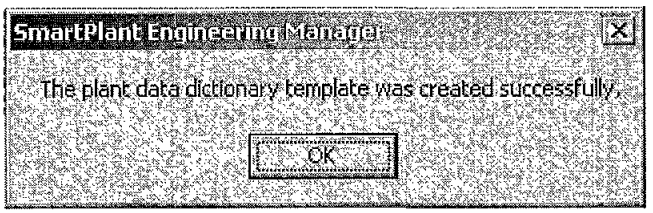
1. Create a **Data Dictionary Template** of your **Custom Plant**.
   a. Start **SmartPlant Engineering Manager**
   b. Select the **Plant**



   c. Select **Tools** > **New Data Dictionary Template** from the menu
      i. Take note of the path where the .ddt will be saved.



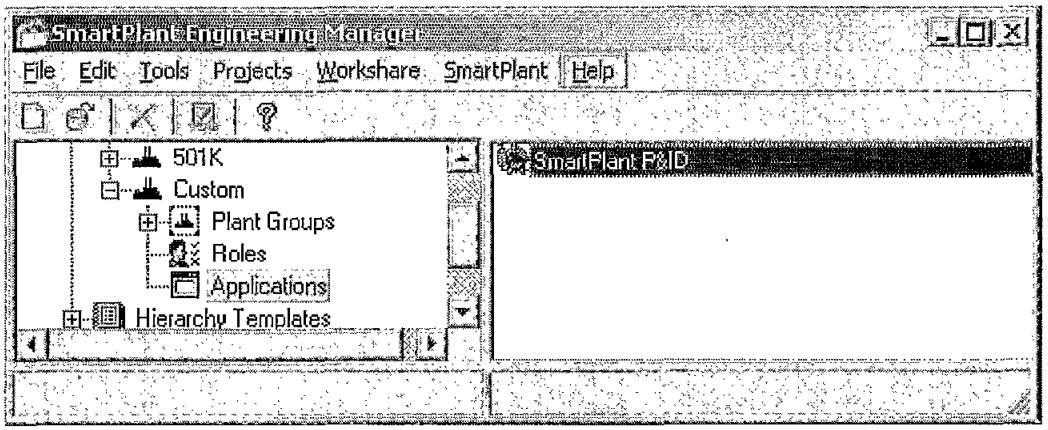
      ii. Select **OK**.



      iii. Select **OK**.

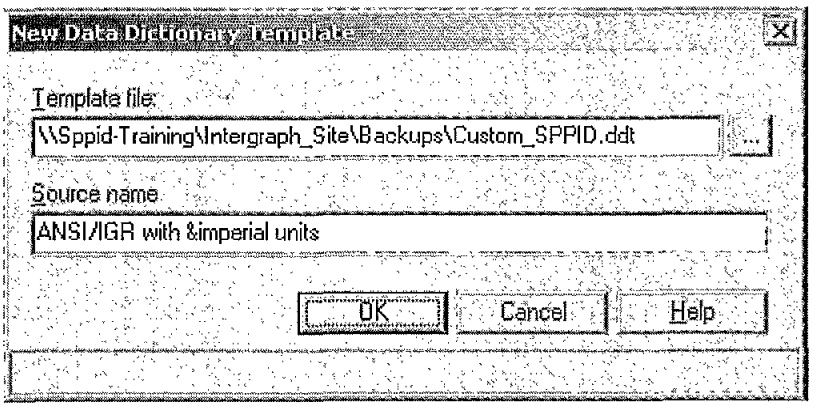
2. Create a **Data Dictionary Template** of your **P&ID Application** for your **Plant.**

   a. Select the **SmartPlant P&ID** application from the **Application** node of your **Plant**

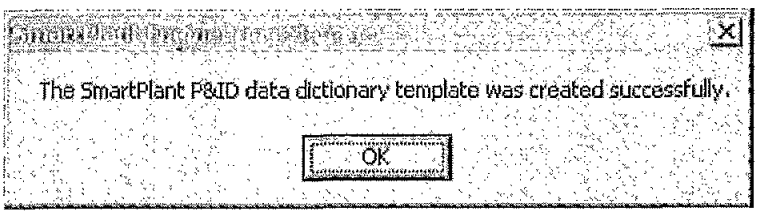


   b. Select **Tools** > **New Data Dictionary Template** from the menu

      i. Take note of the path where the .ddt will be saved.



      ii. Select **OK.**



      iii. Select **OK.**

3. Exit from **SmartPlant Engineering Manager.**
4. Start the **Data Dictionary Template Comparison Utility**

   a. Select **Start** > **Programs** > **SmartPlant Engineering Manager** > **Data Dictionary Template Comparison Utility**

5. On the **Data Dictionary Template Comparison Utility** dialog box set the following:

a. **Source Template Path** = <select the .ddt file for the Plant created in the previous steps.

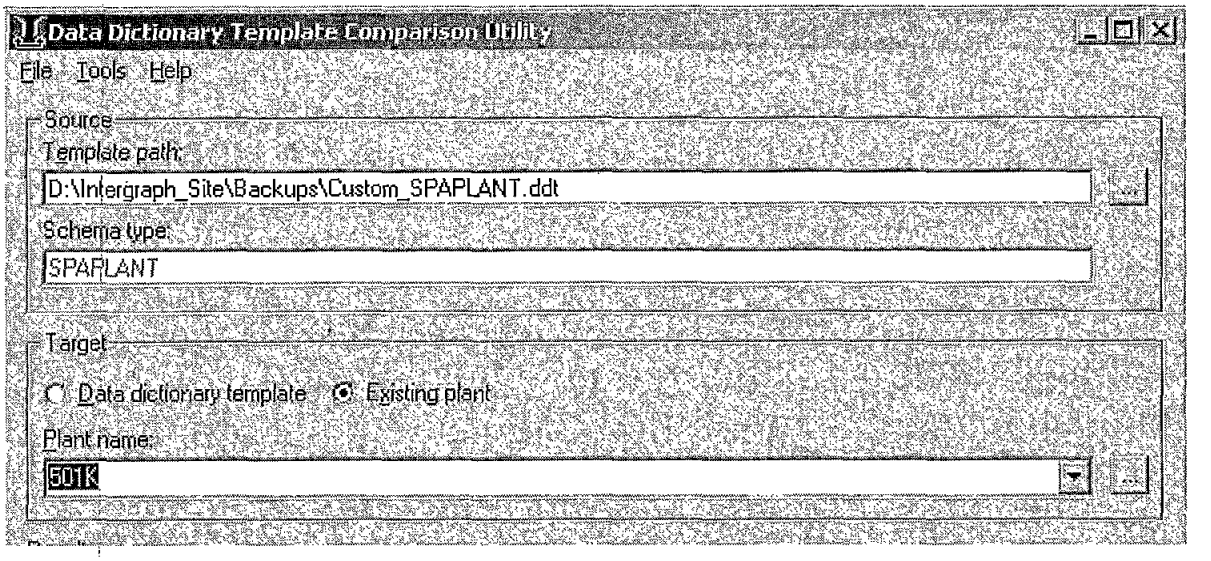
b. **Target**

   i. Select Existing plant

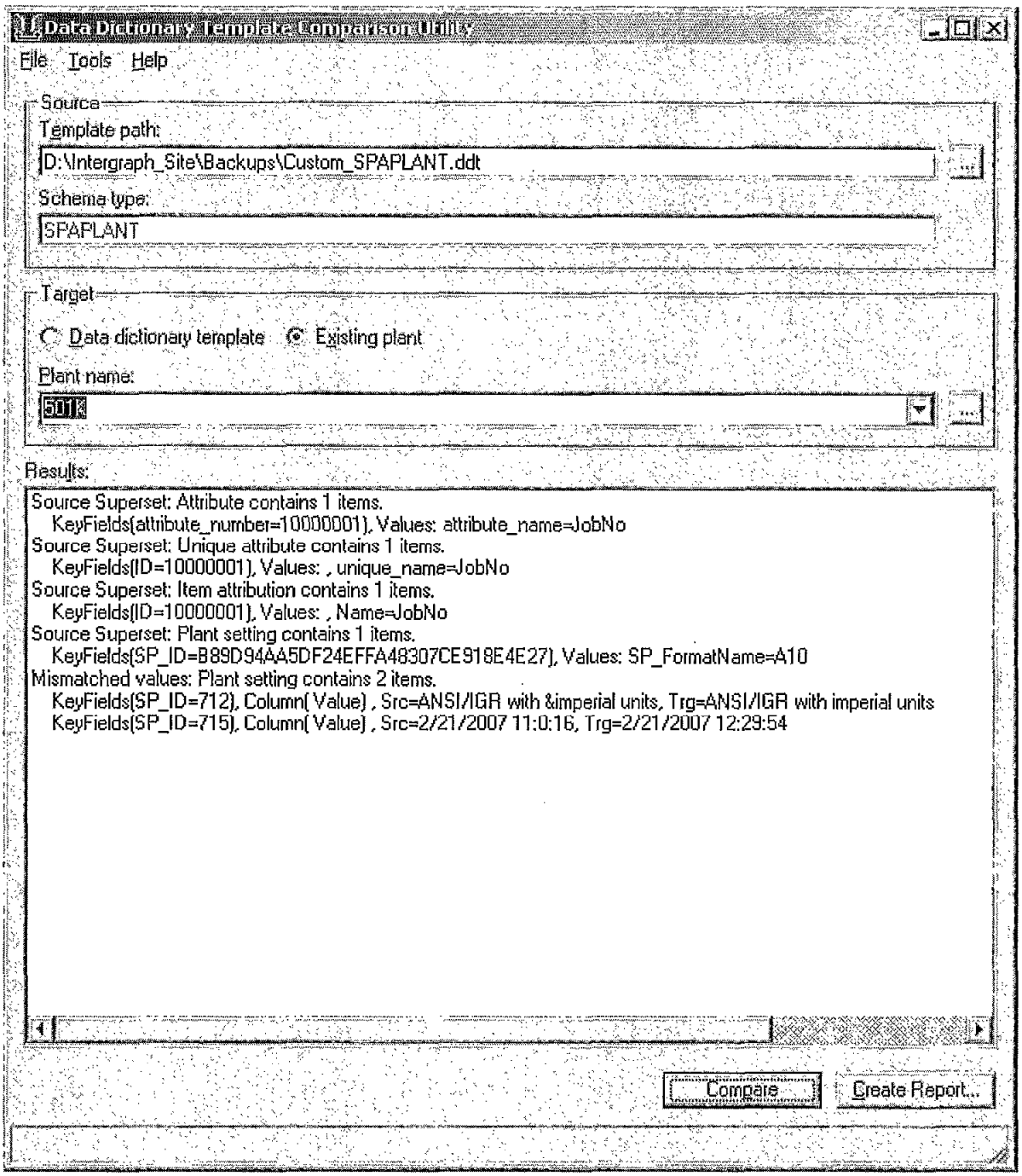
c. **Plant Name** = Select the Plant which is called **501K**.

Notes:

- If you select the down arrow to select the Plant and there is not a Plant to select utilize the Calc button to point to the **SmartPlantV4. ini** file of the Plant you would like to select.



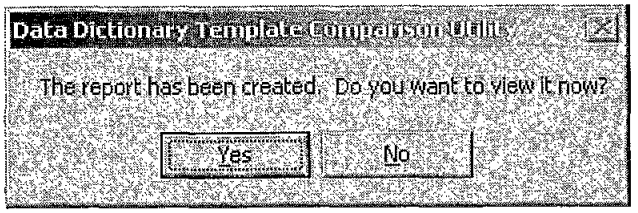
d. Select **Compare**.



e. Select **Create Report.**

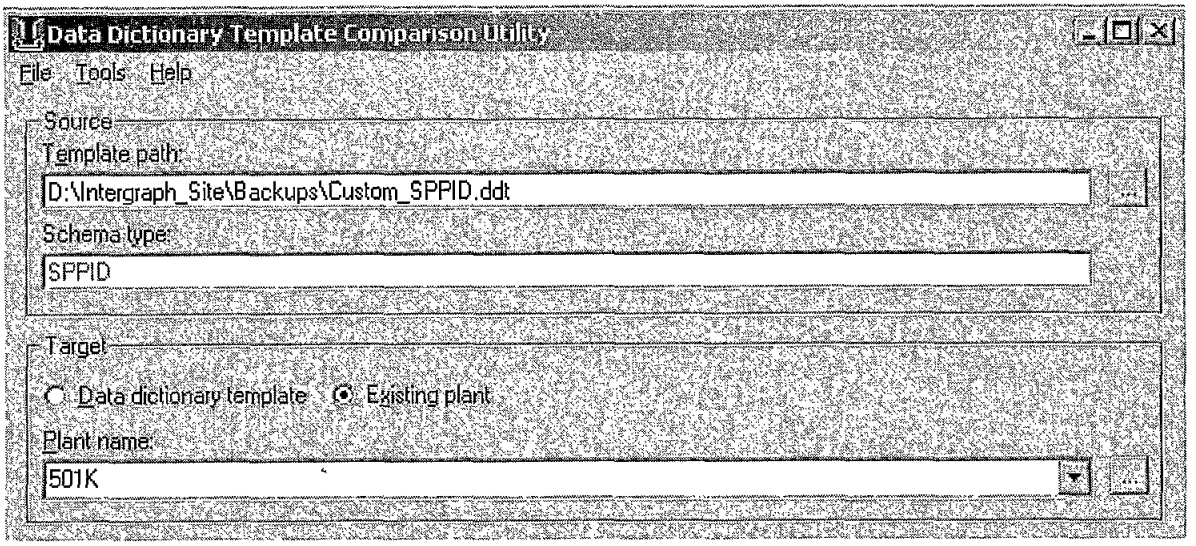
i. **Save** the Report

ii. **View** the Report.



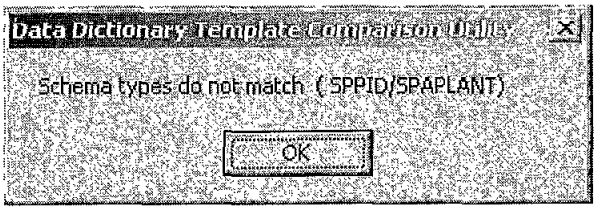
iii. **Exit** the Report.

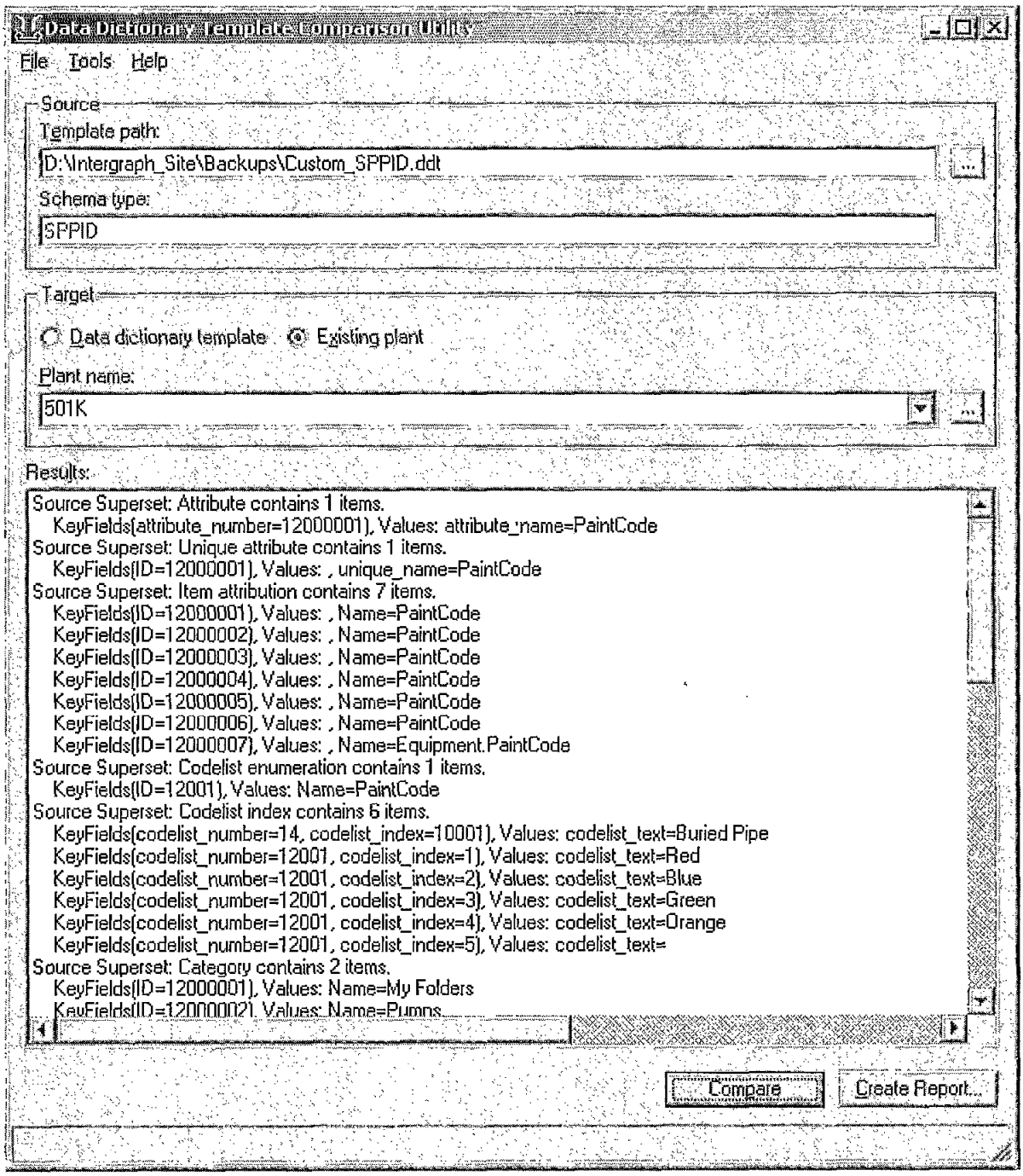
6. **Compare** the **P&ID Data Dictionary Template** with the other **Plant.**



a. **Select Compare**

b. If you receive the following message reselect the **Plant Name** then select **Compare**.

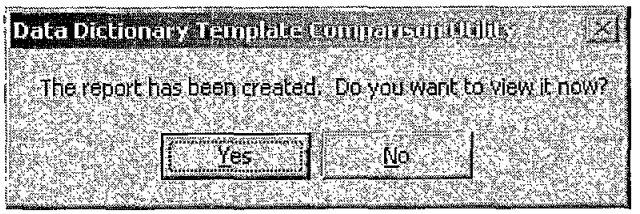




c. Select **Create Report.**

i. **Save** the Report

ii. **View** the Report,



iii. **Exit** the Report.

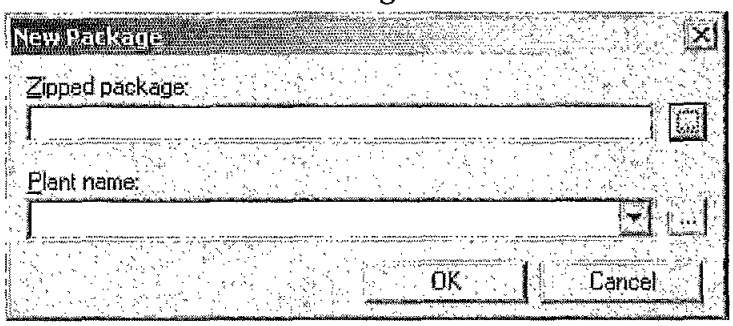
7. **Exit** the **Data Dictionary Template Comparison Utility**.

Lab 38– Running Reference Data Synchronization Manager

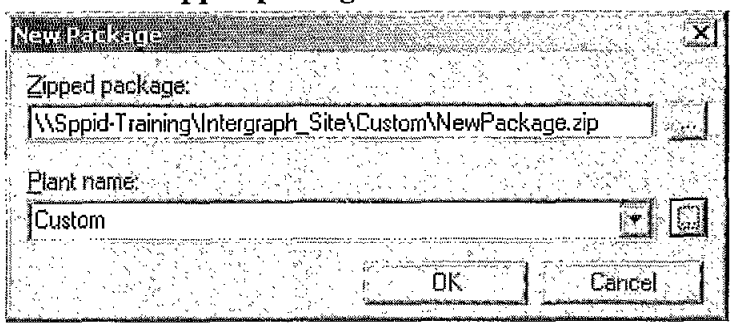
Connect to the **Site,** there should be two **Plants** within this Site. One Plant is called **501K** the other plant is called **Custom**. We will be synching the **Reference Data** from the **Custom** Plant into the **501K** Plant.

Before beginning determine the two plants are capable of synching by the previous documentation.

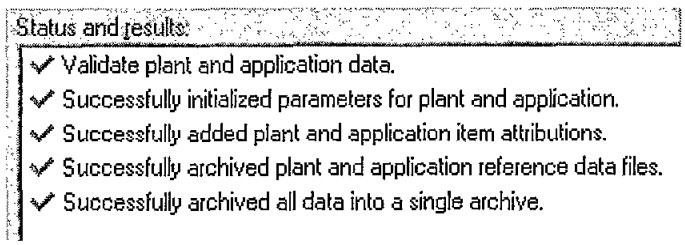
1. Start SmartPlant Reference Data Synchronization Manager to create a Package of the reference data of the Plant we will be synching with.
    a. Select **Start** > **Programs** > **Intergraph SmartPlant Engineering Manager** > **Reference Data Synchronization Manager**
2. Select **File** > **New Package** from the menu.



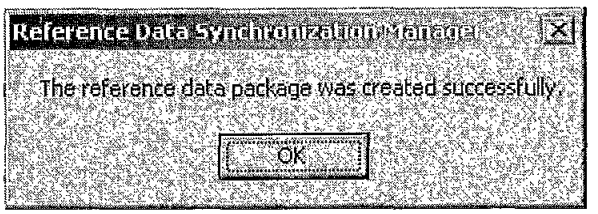
3. Set the **Zipped package** file location and **Plant name**.



    a. Select OK.
4. The **Reference Data Package** should be created successfully.



    a. Select **OK.**



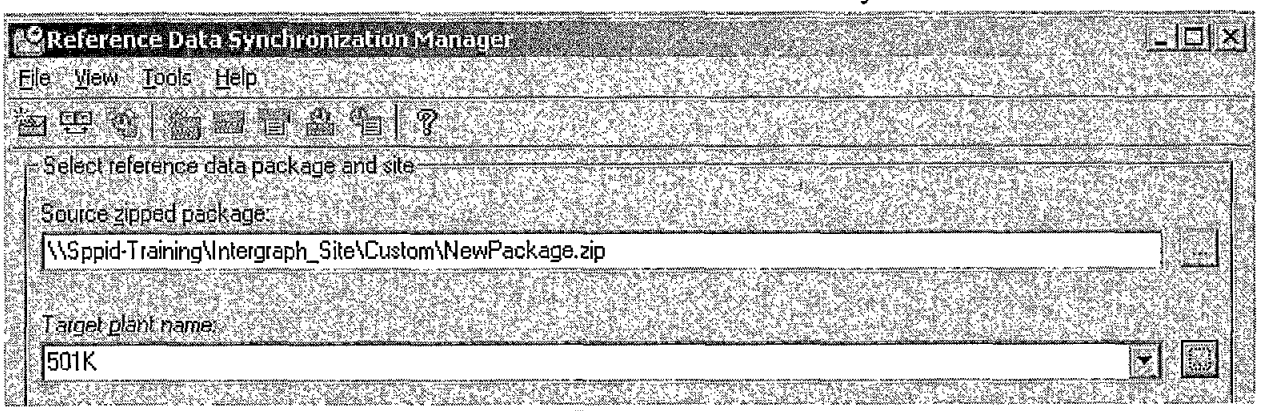
5. Now **Compare** the reference data package with the Plant we'll be synching to.

   a. **Source zipped Package** = <the package we created in the previous steps>

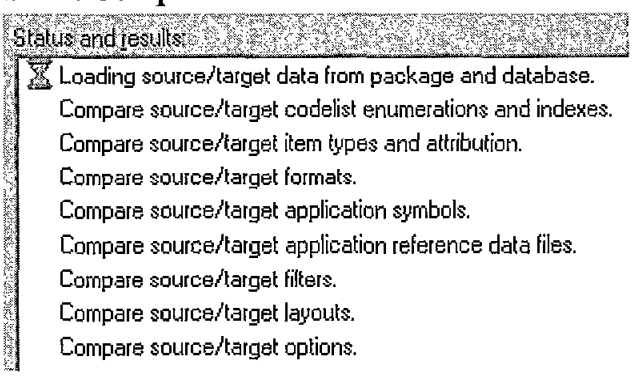
   b. **Target plant name** = Plant we will synch to.

   Notes:

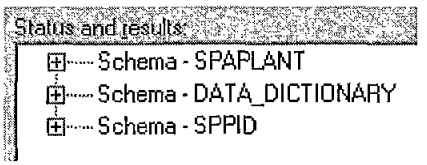
   - If you select the down arrow to select the Plant and there is not a Plant to select utilize the Calc button to point to the **SmartPlantV4. ini** file of the Plant you would like to select.



   c. Select **Compare** from the toolbar.



   d. When the **Compare** is finished select the expand button and review the comparison information.

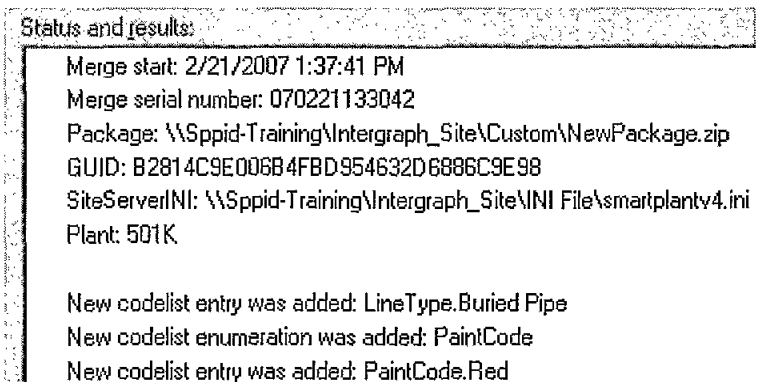


Notes:

- **Do you have a recent backup of the plant were about to synch to? If not create a Plant Backup from SmartPlant Engineering Manager before proceeding**

e. To synchronize the Plant select the **Synchronize** command from the toolbar.

f. Review the results



6. Create a **Report**

   a. Select **Tools** > **Create Report** from the menu.

7. **Exit** from **Reference Data Synchronization Manager**.