

Process, Power and Marine Division

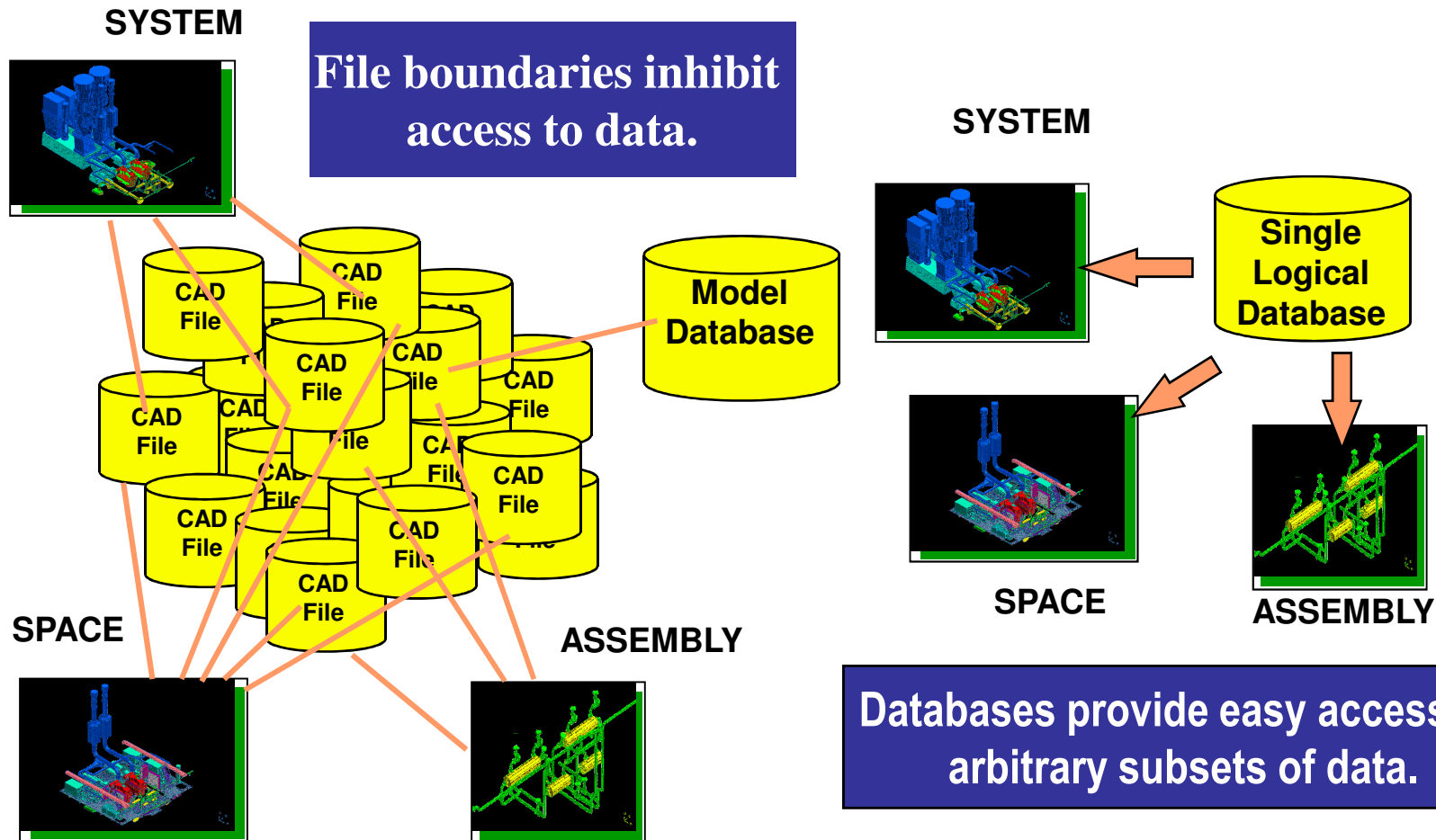
SmartPlant 3D Common Task



Agenda

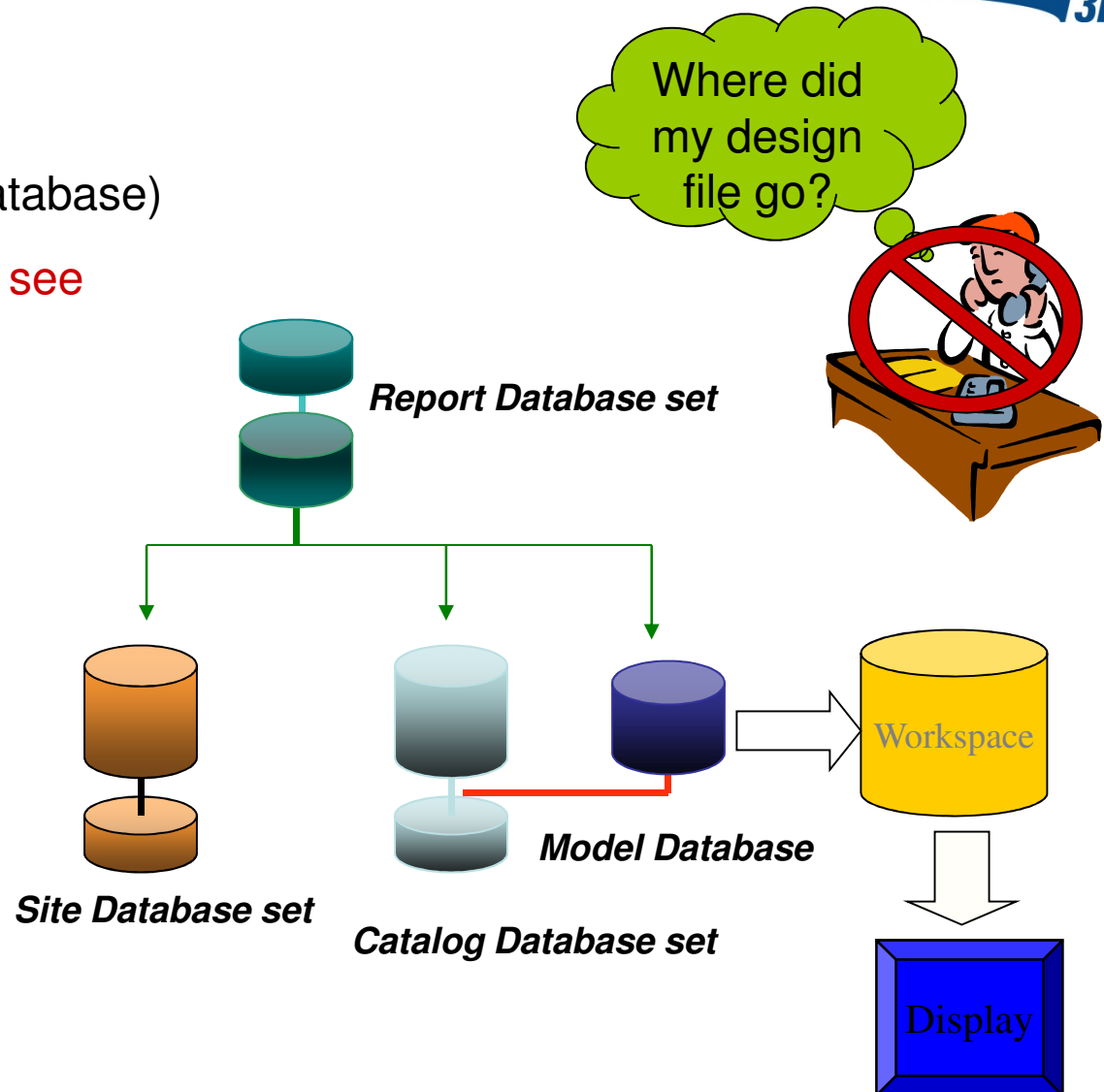
- **SmartPlant Overview**
- User Interface
- Workspace
- Filters
- Common Task
- Control Point / Notes
- Work Breakdown Structure (WBS)
- Interference Detection (IFC)
- To Do List

Single Database



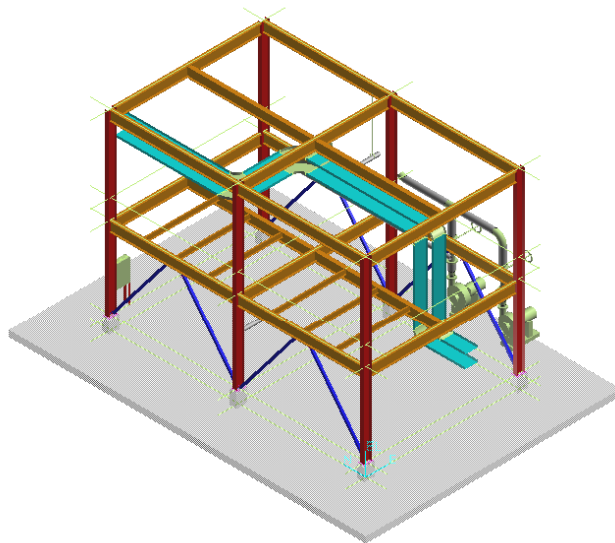
Query

- Define Workspace (filter on database)
- See only the data you want to see
- Builds a logical “Working Set”
 - System
 - Assembly
 - Spatial (Volume or Planes)
 - Logical Permission Group
 - Object Types/Properties
- Saved Session Files



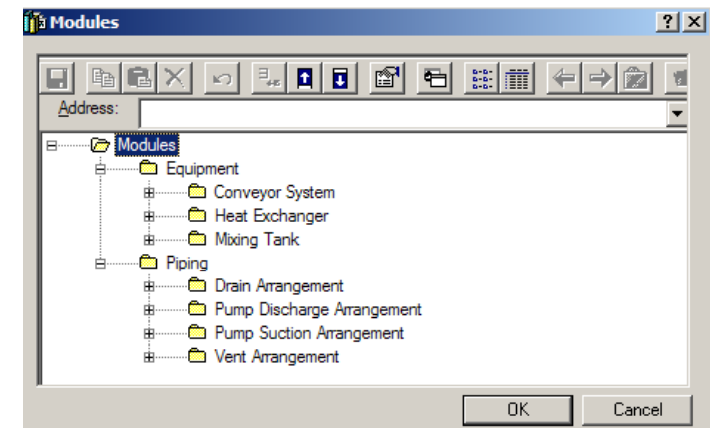
Design Re-use

SmartPlant[®]
3D



Unit1

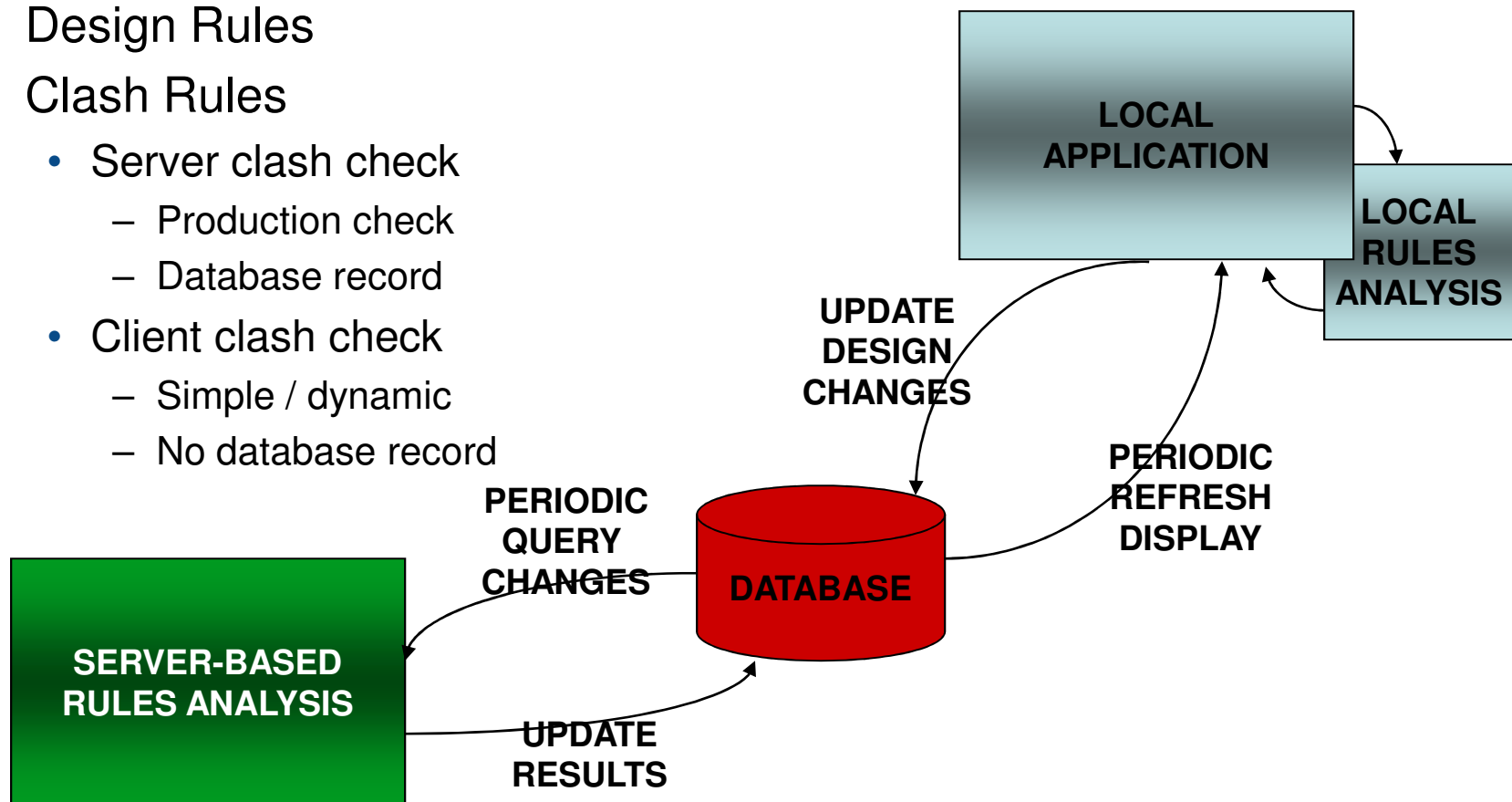
Copy to Catalog
or
Instance in
Another Location



Internal Relationships Maintained.
External Relationship Exposed.

Rules Services

- Design Rules
- Clash Rules
 - Server clash check
 - Production check
 - Database record
 - Client clash check
 - Simple / dynamic
 - No database record

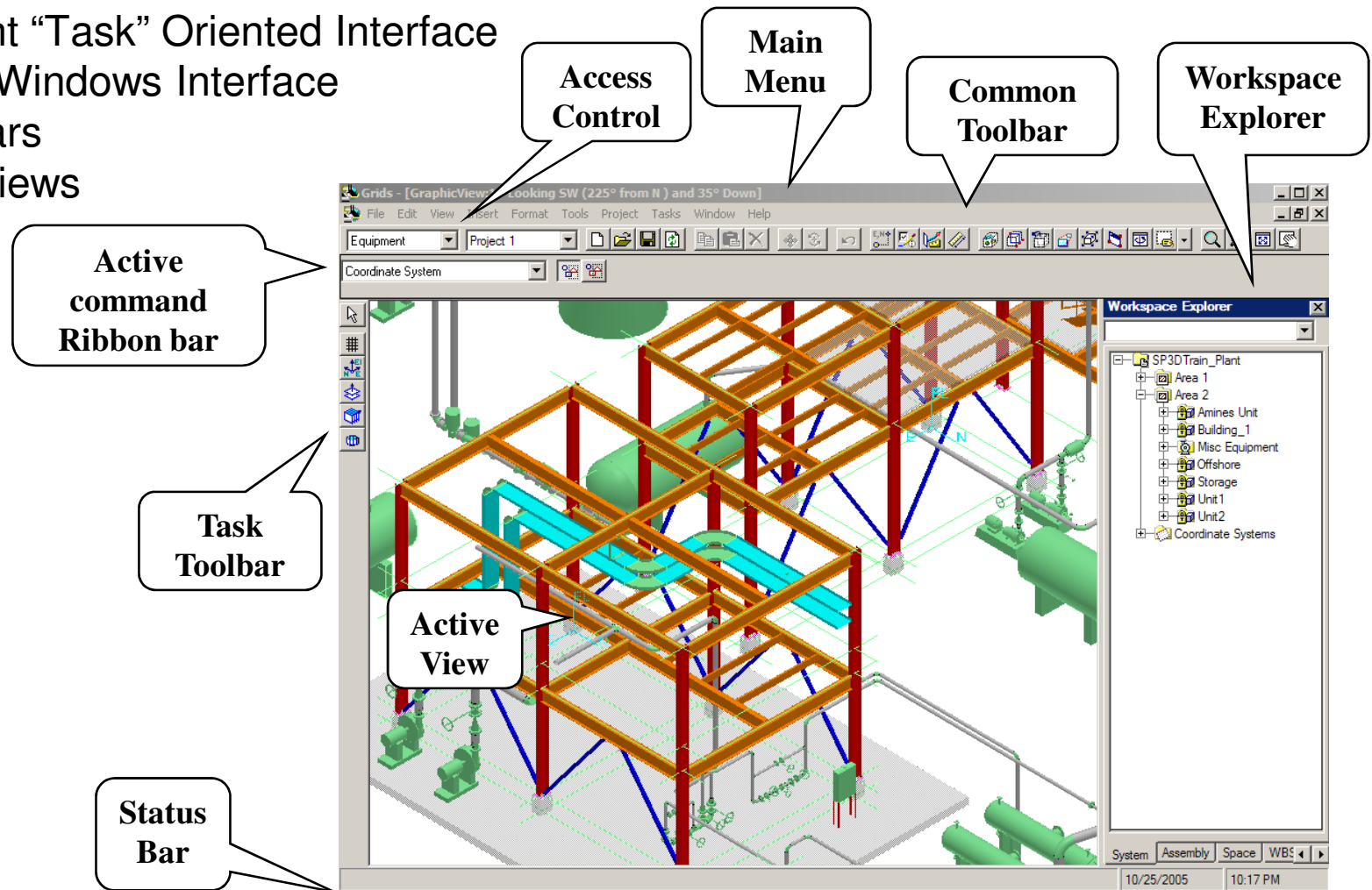


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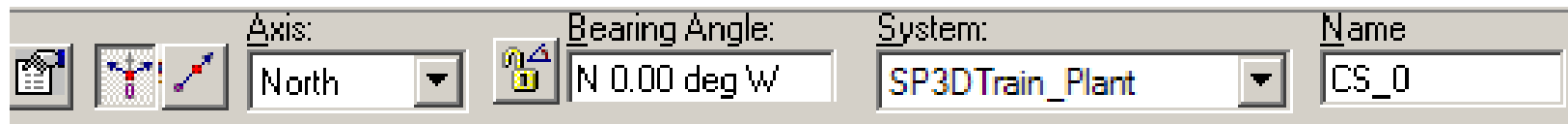
Common Windows Based User Interface

- SmartPlant “Task” Oriented Interface
- Common Windows Interface
- Ribbon Bars
- Graphic Views



SmartStep Commands

- **Same task specific ribbon bars** for placement and object-action modify commands in all disciplines



SmartSteps

Active Properties

Data Fields

SmartStep Commands

Property Dialogs

- Same properties interface available for place/modify in all disciplines

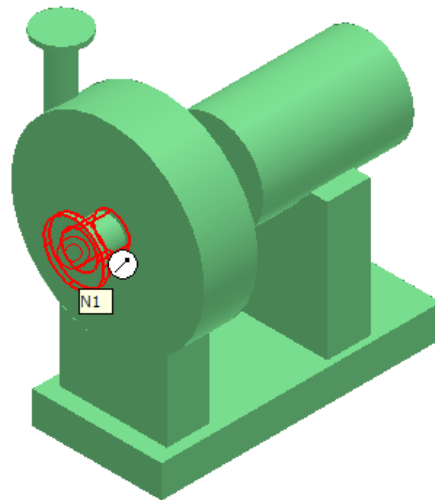
Tabbed Dialogs

Edit Controls

Property	Value
Name	MemberSystem-0019
Name rule	DefaultNameRule
Parent system	Beams
Type Category	Beam
Type	Beam
Priority	Undefined
Continuity Type	Continuous
Continuity Priority Number	0
Start East	104 ft 0.00 in
Start North	30 ft 0.00 in
Start Elevation	30 ft 0.00 in

SmartSketch

SmartSketch is the graphic environment with the mechanism to automatically find special points when the command is looking for a graphic reference. This locking mechanism is similar to what is found in CAD environments

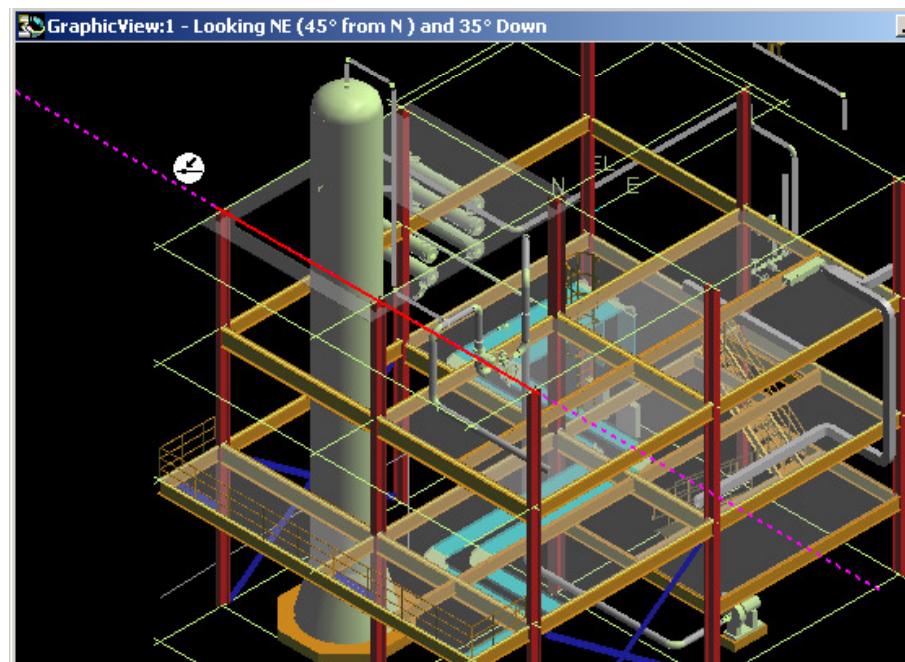


Parallel	
Perpendicular	
Angle	
Reference axis aligned	
Point on Surfaces	
Offset	
Intersection	
Divisor	
Point on curves	
Key point	
Add to stack	

SmartSketch

The system finds Key point and Point on Geometry whenever you move the cursor over those graphics

SmartSketch uses only those points and checks for linear relationship points against every object in the workspace



Select Objects

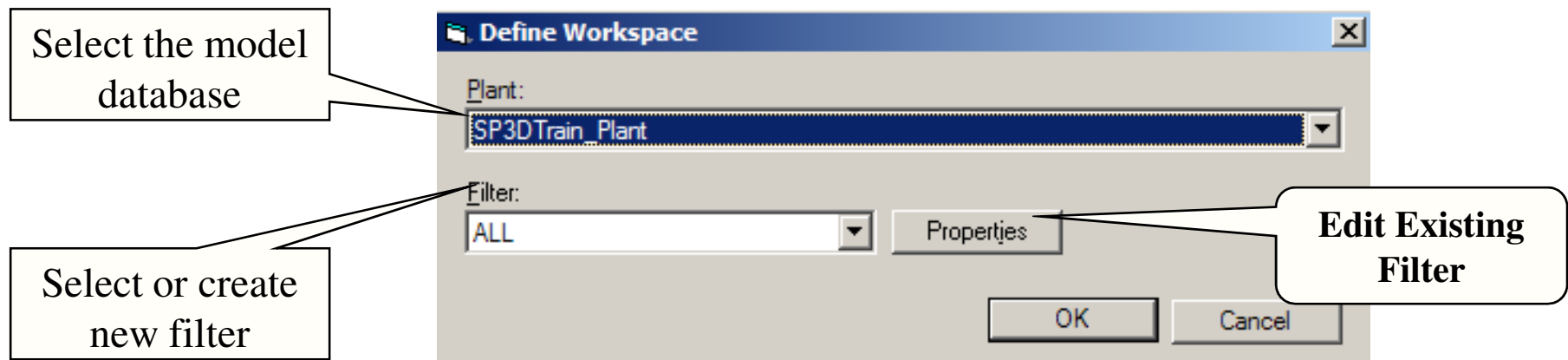
- Select Command
- By Fence (inside or overlap control)
- Use shift or ctl key to add or remove objects from the select set.
- Tools -> Select by Filter
- Use Workspace Navigator
- Quick pick tool

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Workspace (Ctrl-w)

- Allows user to define how much of the model to display during the active session:
 - Whole model, all disciplines
 - Single area/multiple areas
 - Partial areas
 - Whole model, select discipline(s)
 - Select areas, select discipline(s)



Session Management

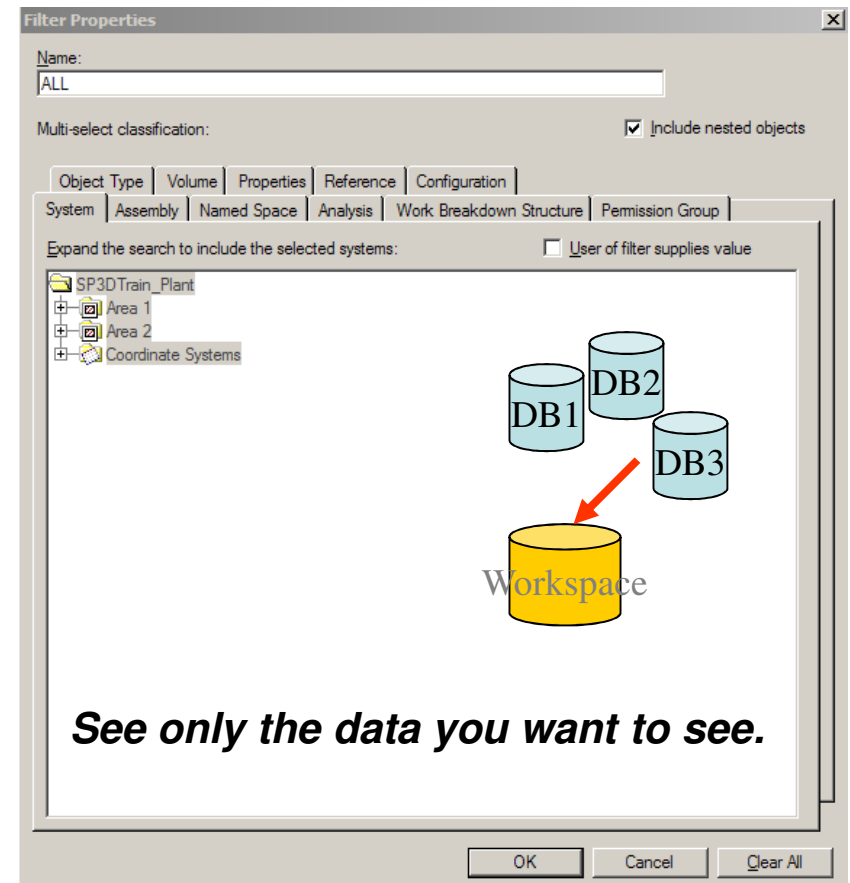
Session Templates

Store option settings such as task list,
window views, orientations,
Background colors, graphics views, etc

Filter

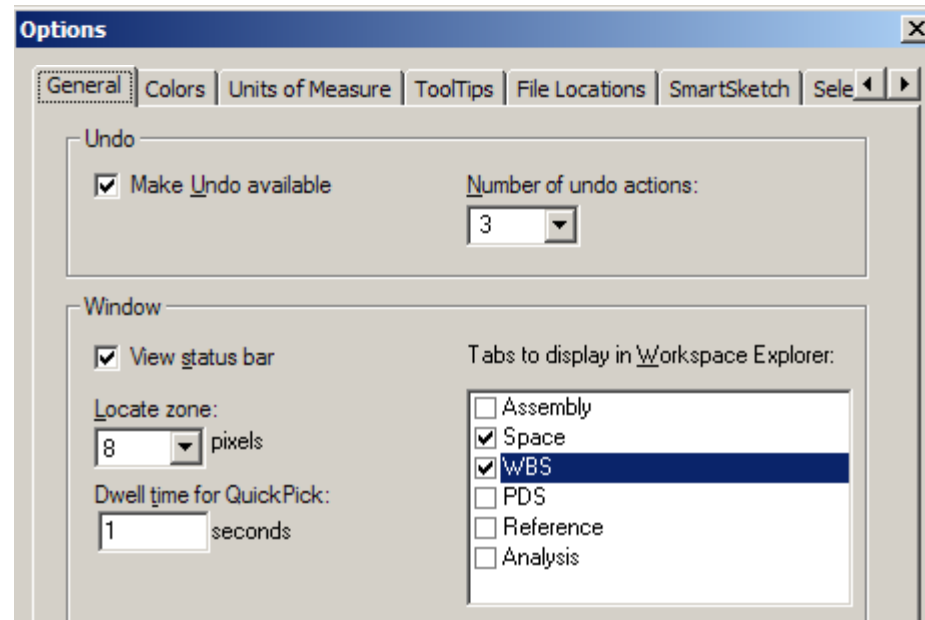
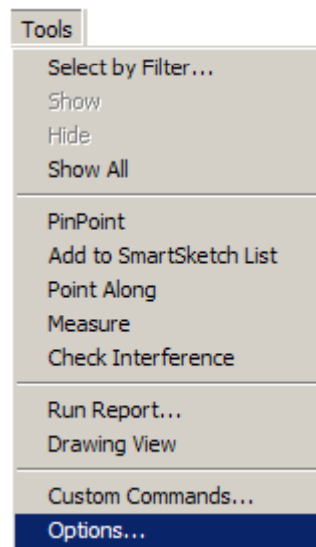
A set of search criteria that define a
query to the model database

Workspace/Session =
Session Template + Filter



General Options

- Allows you to enable the Undo command and the status bar
- The activation time of the quick pick tool
- Define the locate zone for SmartSketch
- Define the Tabs to display in the Workspace Explorer



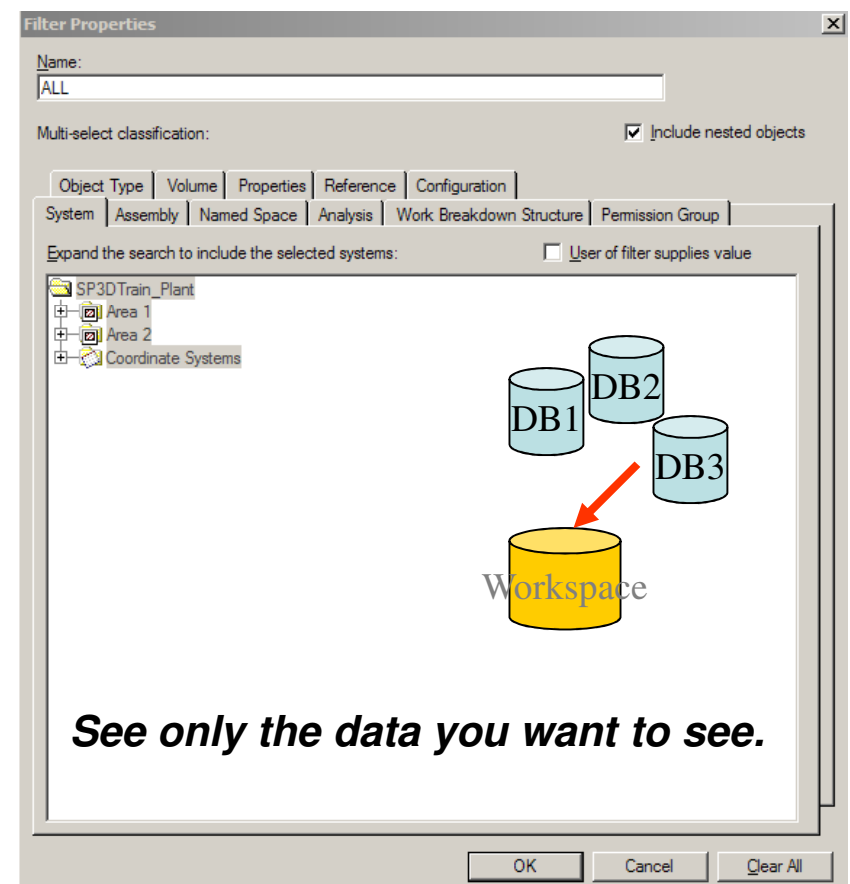
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Filters

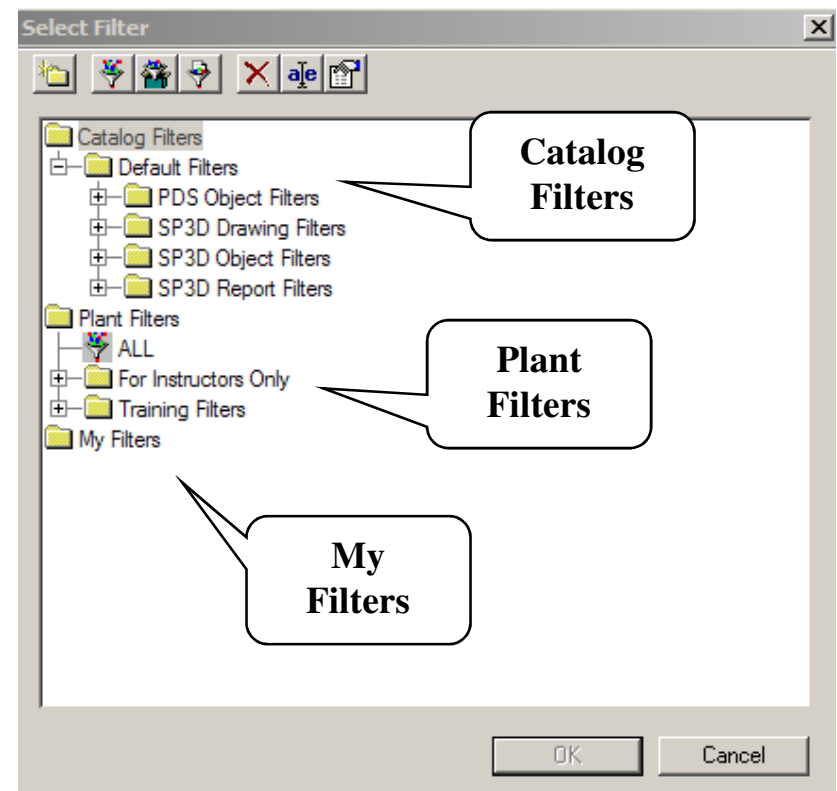
A filter is a set of search criteria that selects or retrieves data based on the object properties:

- System
- Assembly
- Named Space
- Work Breakdown Structure (WBS)
- Analysis
- Permission group
- Object Type
- Spatial (Volume)
- Reference
- Properties
- PDS (If PDS project attached)



Filters

- Catalog Filters are filters which are stored in the catalog and are available to all users that use the same catalog
- Plant Filters are filters available to all users in a model. These filters are stored in the model database
- My Filters are created by the user and are only visible to him. These filters are stored in the model database



Filters

Simple Filters

Simple Filter is a query based on the object properties defined through GUI

Compound Filters

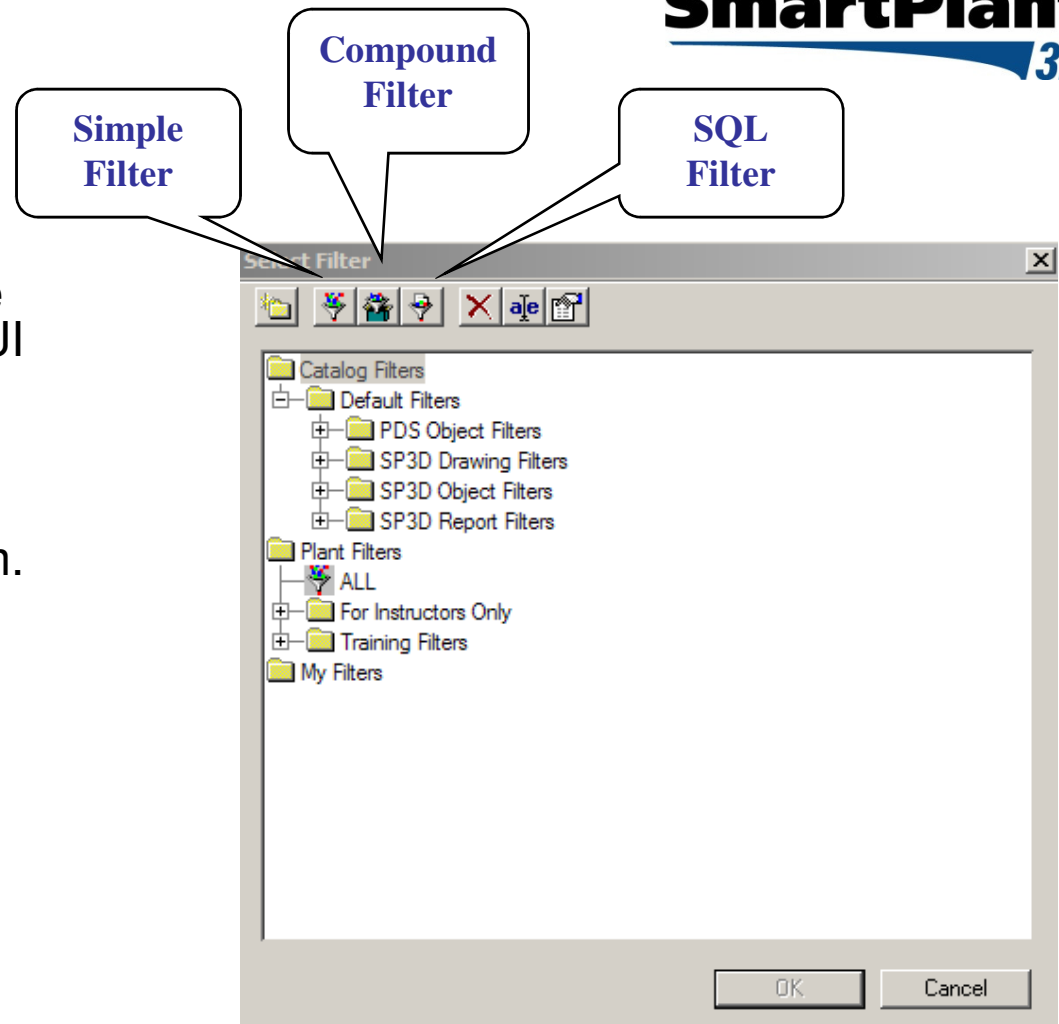
A “Compound” filter is two or more filters with an operator between them.

SQL Filters

Is a filter which provides a place to store user-written SQL query

Asking Filters

Is a filter that has left specific values for certain properties as variables to be filled in by the user when user uses the filter



Compound Filters

- Display Properties of each filter used in the compound query by selecting the individual filter name and then clicking the Properties button
- An AND of two filters results in only those objects that the two filters had in common.
- A OR of two filters results in getting together the list of objects from both filters.
- A NOT operator on a filter results in a list of objects opposite to the selected filter return.
- Show the Compound Query string in a text box

The screenshot shows the 'Compound Filter Properties' dialog box. At the top, there are two text boxes: 'Compound filter name:' containing 'All with WBS' and 'Filter type:' containing 'Plant Filters'. Below these is a section 'Select filter to use in compound expression' with a tree view on the left and two buttons ('Add to String' and 'Properties') on the right. The tree view shows a hierarchy: 'Catalog Filters' (expanded), 'Default Filters', 'Plant Filters' (expanded), 'ALL' (selected), 'For Instructors Only', 'Object based on Note', 'Training Filters', and 'My Filters'. Below the tree view is a section 'Select operator to use between each filter name' with a text box containing 'Enter Or (Union), And (Intersection) or Not operator. Use parenthesis to sequence the operations.' and a row of buttons: 'Or', 'And', 'Not', '(', and ')'. At the bottom is a large text box labeled 'Place pointer in the text box where you want to add a filter name or operator' containing the text 'WBS Or ALL'. At the very bottom are three buttons: 'OK', 'Cancel', and 'Clear All'.

SQL Filters

SQL (Handwritten Query) Filter Properties Dialog

- Key in the SQL text statements

Select o.oid from jobject o join jrange r on r.oid = o.oid where r.zmax < 2

New SQL Filter Properties

Name:
Select objects above Zmax < 2

General | Configuration

Text of SQL query:
Select o.oid from jobject o join jrange r on r.oid = o.oid where r.zmax < 2

Asking Filters

Using a Parameterized “Asking” Filter

When the creator of a filter checked any **“User of filter supplies value”** checkboxes, then that filter is an **“Asking” or “Parameterized” Filter**. When someone uses that filter, automatically the properties page for that filter is displayed with the “User of filter supplies value” checkboxes as read-only, but the gadgets to set the values (associated with the checked “User of filter supplies value” checkboxes) are displayed so that the user can edit only the values of the checked items. If a compound filter uses multiple Parameterized Filters, the Properties dialogs appear sequentially, automatically, in the same order that the parameterized filters appear in the compound query string.

System	Assembly	Named Space	Analysis	Work Breakdown Structure	Permission Group
--------	----------	-------------	----------	--------------------------	------------------

Expand the search to include the selected systems: ☒ User of filter supplies value

Asking Filters

Using a Parameterized “Asking” Filter

Object Type | **Volume** | Properties | Reference | Configuration

Restrict search to return only objects with the following criteria:

Filter method

☒ Match all ☐ Match any

	Property	Operator	Value	Ask
	Object to Note : GeneralNote : Purpo			<input checked="" type="checkbox"/>
				<input type="checkbox"/>

Filters

Managing Filter Names when Copy Filters

- Users can copy and paste or move filters via drag and drop to a different category directory in the Select Filter dialog's tree view
- Filters in My Filters folder can have the same name as Filters in someone else's My Filters Folder. If the filter is moved up to a Plant Filter or Catalog Filter folder, then the software must check whether there is already a filter by the same name and change the name of the cloned filter to "<filter name> n" where n is some number so that the name of the filter is unique
- Compound Filters are made up of AND, OR and Not operators between existing filters. A Compound Filter that will be stored in the Catalog must be made from other filters that are already existing in the Catalog

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Common Task

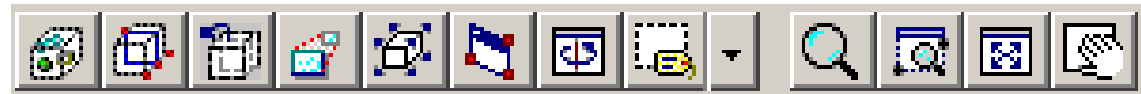
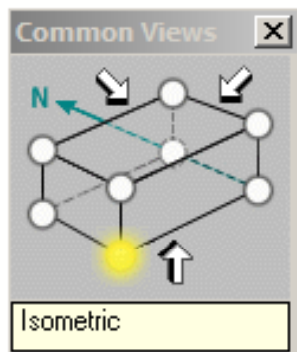
- Provide common functionality for all SP3D User Environment:
 - Session Management
 - General Options/SmartSketch 3D
 - Viewing Commands
 - Aspects/Surface Styles/Rules
 - Show/Hide
 - Measure

View Manipulation

- Common Views
- Zoom Tool
- Window Area
- Refresh View
- Active View Control
- Rotate View
- Looking at Surface
- View by 3 points
- View along line
- Clipping

View Manipulation

Common Environment Toolbar



Common Views

Common views command allow you quickly change the view orientation to any standard isometric/orthogonal orientation

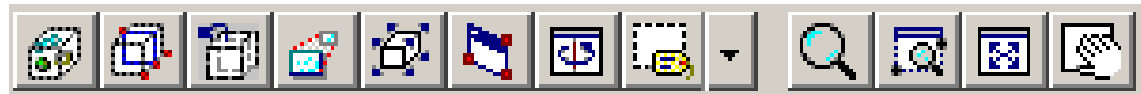
View Manipulation

Establishing Clipping Volume

- Clipping by Object
- Clipping by Volume
- Clear Clipping

View Manipulation

Common Environment Toolbar



Clip by
Object

Clip by Object command:

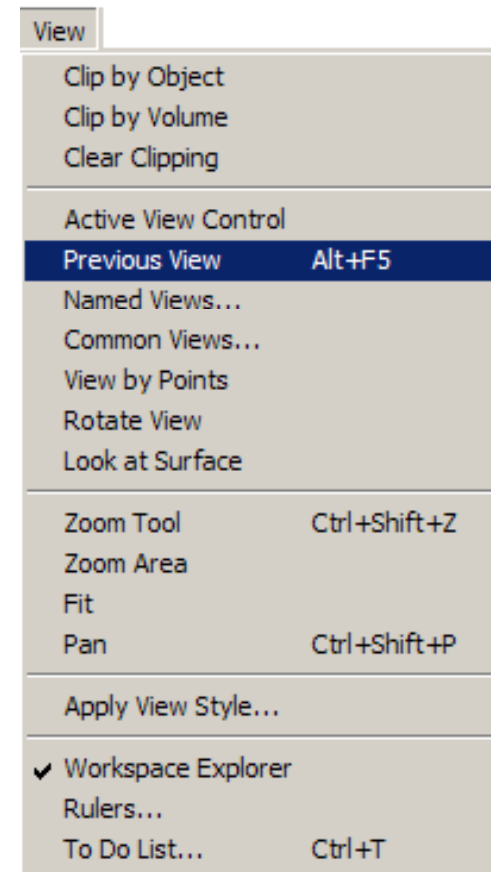
Allows you to define the view clipping volume (rectangular parallopiped) to be the same as the object's range box in your active view

View Manipulation

Restore the Previous View

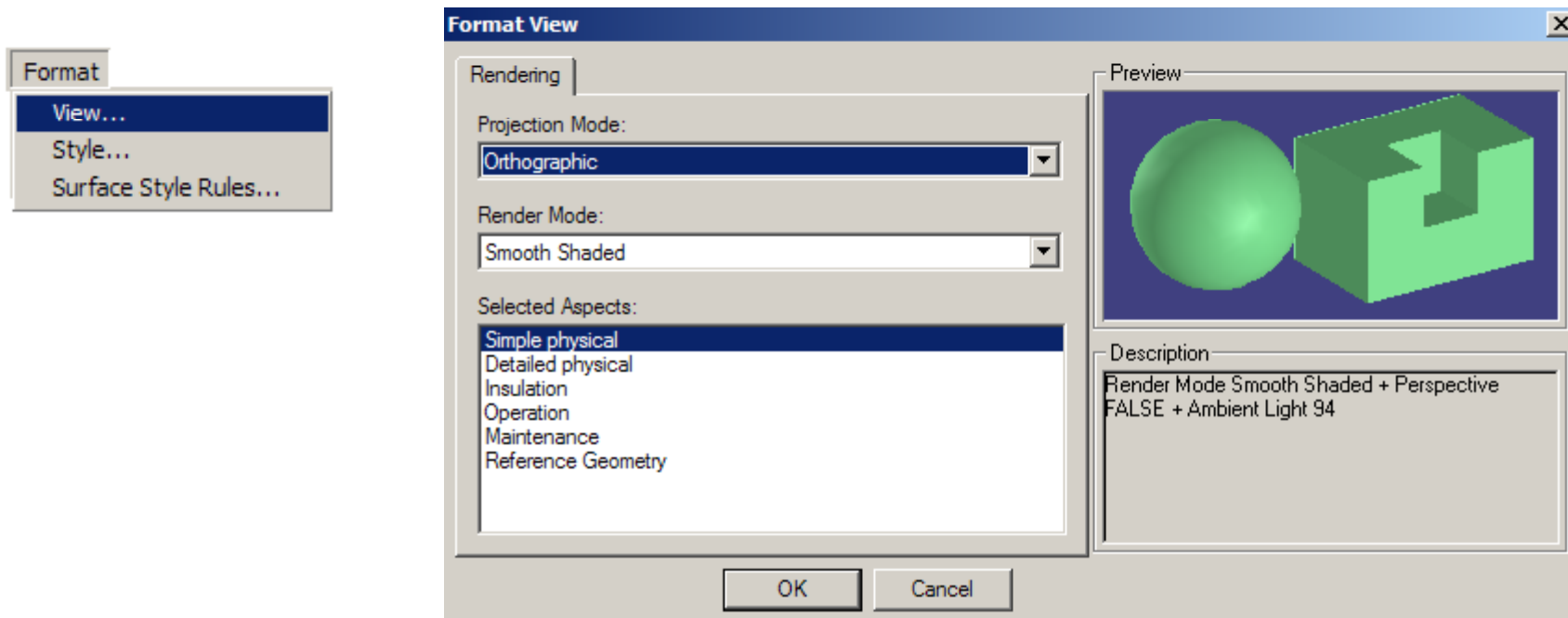
User can go back one view for the active window

Main Menu



Formatting the Active View

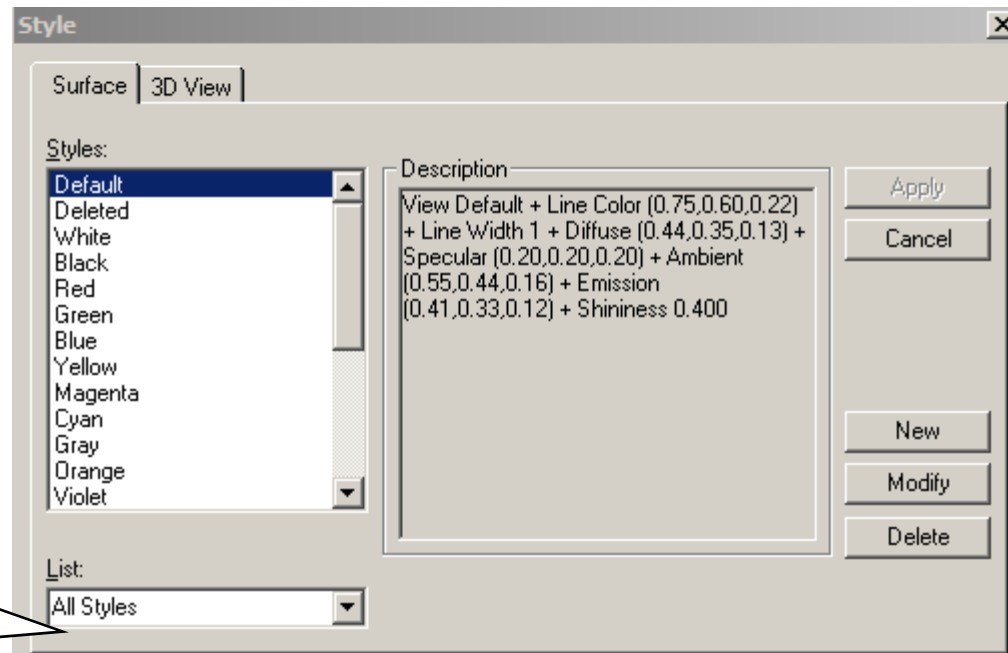
- You can format a View by defining a render mode and perspective setting
- Render mode: Outline, Smooth Shaded and Shaded with Enhanced Edges
- Aspect is a geometric representation for an object, like a working category.



Applying Styles

Styles are collections of color, lighting, and render modes that you can apply to all views or to specific items in the views. New user styles are stored in the database

- View Style
- Surfaces Style



All Styles
Or
Styles used in
workspaces

Applying Surface Style

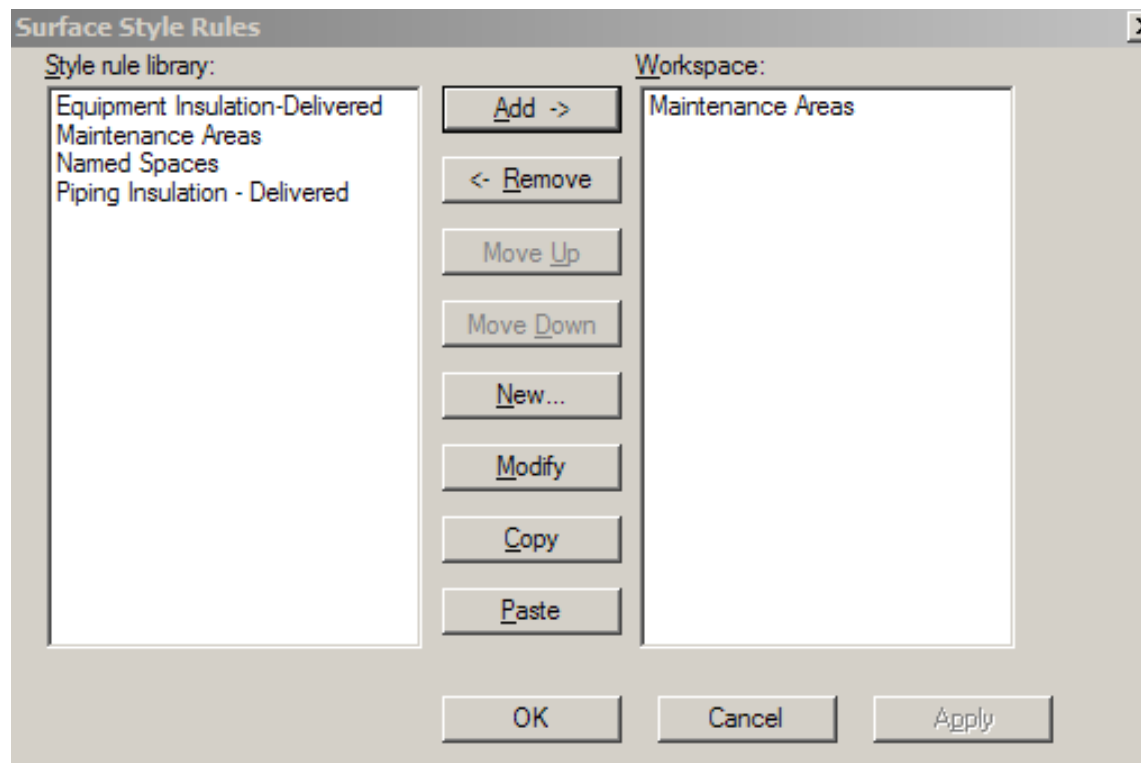
- A Surface Style Rule consists of a filter and the named surface style to be applied to the specific aspects of the objects identified by the filter

The screenshot shows the 'Surface Style Rule Properties' dialog box with the 'Configuration' tab selected. The 'Rule name' field contains 'Named Spaces'. The 'Filter' dropdown is set to 'Named Spaces' with a 'Properties' button next to it. The 'Style applied' dropdown is set to 'Translucent White' with a 'Properties' button next to it. Below these, a section titled 'Select all aspects to which the style will be applied:' contains a list of checkboxes: 'Simple physical' (checked), 'Detailed physical', 'Insulation', 'Operation', 'Maintenance', and 'Reference Geometry'. At the bottom right are 'OK' and 'Cancel' buttons.

Aspect	Selected
Simple physical	Yes
Detailed physical	No
Insulation	No
Operation	No
Maintenance	No
Reference Geometry	No

Applying Surface Style

- Surface style Rules is saved in the model database
- Surface style rule applied to the workspace is saved in the session file
- Copy/Paste functionality



Measure

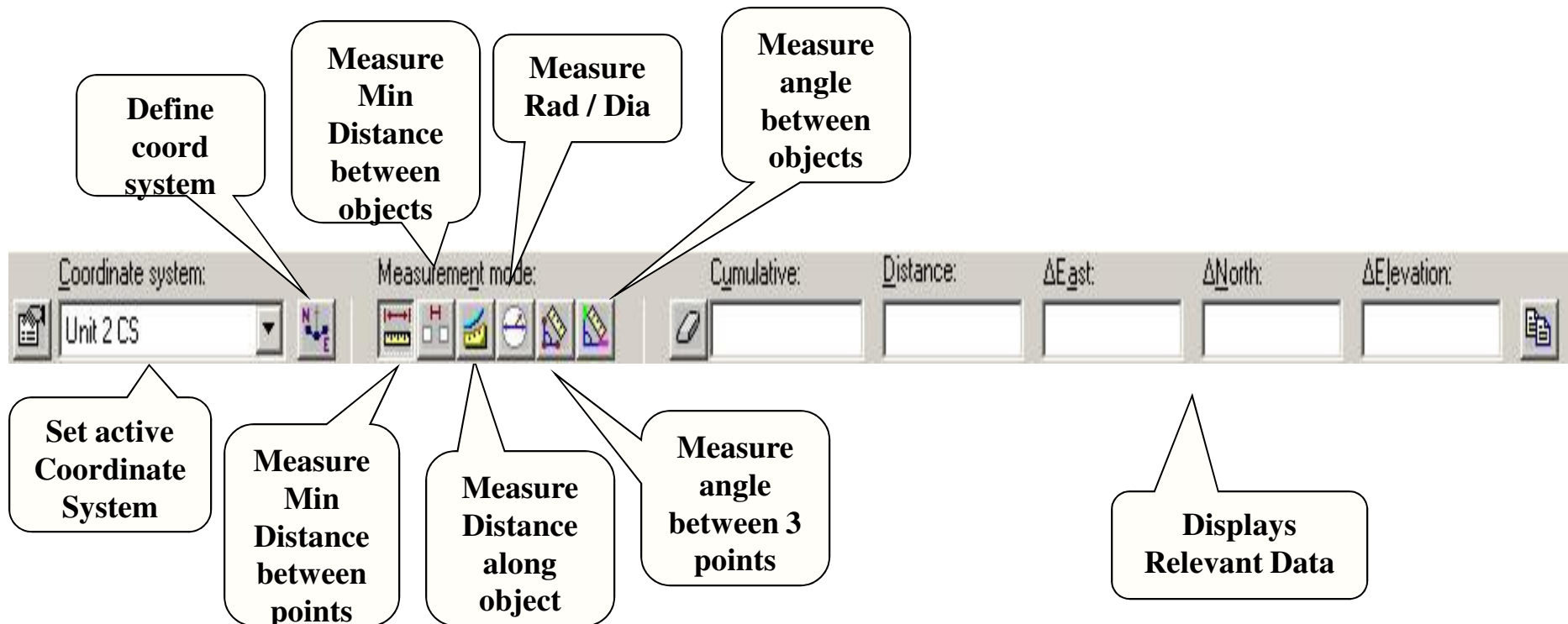
Tool -> Measure

Measure Actual or Minimum 3D linear distance between two points

Measure delta E, N, EL distance between two points

Measure actual angle defined by three points

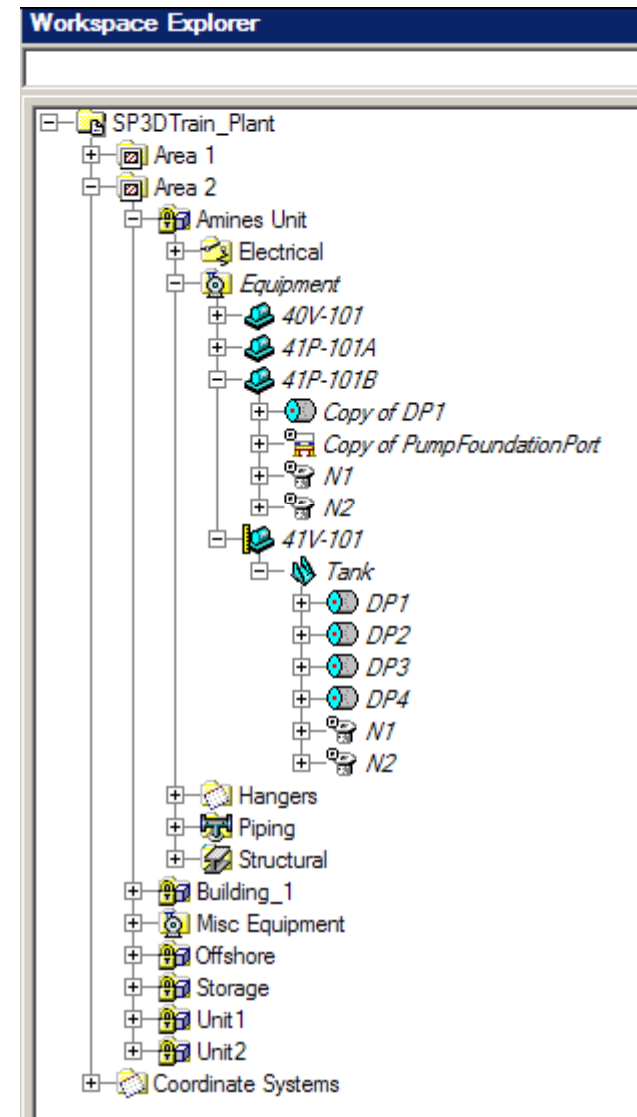
Measure radius and diameters



Hide/Show command

Hides selected items from display

Hidden objects are displayed in *Italic text* in the Workspace Explorer



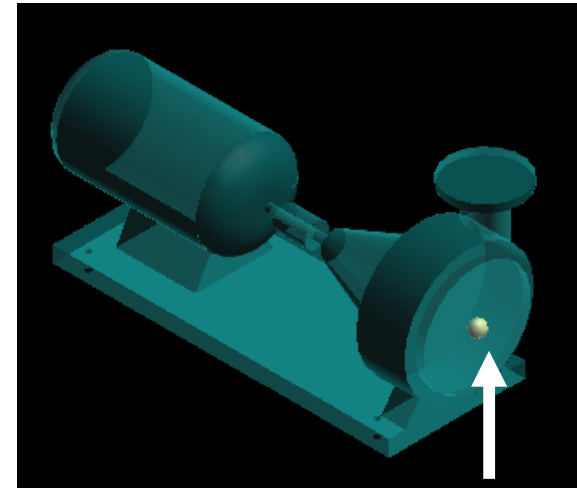
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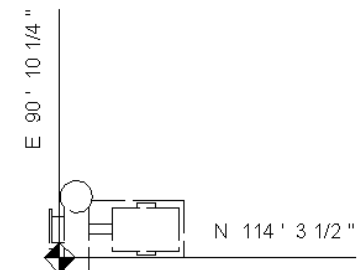
Control Points

Definition

- A 3D object representing a point in the model
- Drive label locations on orthographic drawings
- Placement method:
 - Insert Control Point Command
 - Define in the Symbol Definition
- Control point location is user defined
- The position can be declared to be at a fixed global position or the positioning method can be associatively maintained.
- The control point is associative to a parent object
- Control Point graphics is a sphere that does not support interference detection
- Control Point is displayed in Reference Geometry Aspect



**Control
Point**

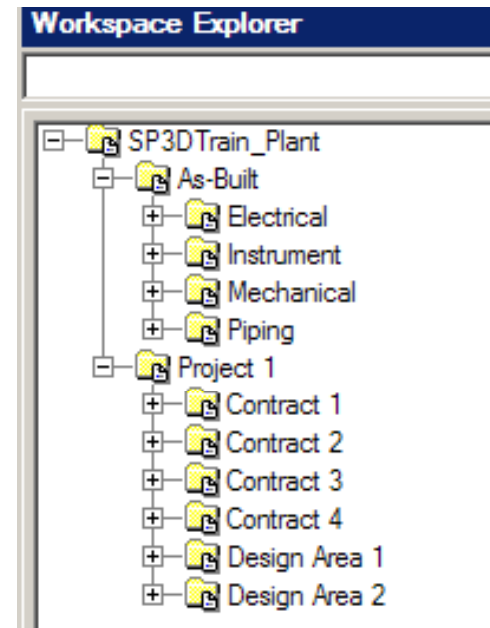


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Work Breakdown Structure

- Logical grouping for items sharing a common attribute or task, referred to as “project”. E.g. All items (piping/eqp/str) to be painted/coated by the same vendor can be grouped under a common project
- Hierarchy to handle Projects
- The Project object serves as a grouping function for both As-Built and Projects
 - Create WBS Command
 - Claim Command
 - Release Claim Command



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Checking Interferences

SP3D provides two mode of operations:

- Server-based Interference checking (Database Detect).
 - Run on a separate IFC server
 - Look for all interferences for the full model
- Interactive interference checking (Local Detect).
 - Help the designer in real time
 - Local to a session (what you see in your workspace)

Checking Interferences

Three type of checking (based on the object aspects):

- Required
- Optional
- Not Checked

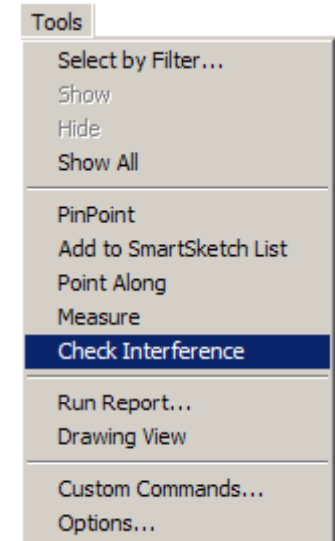
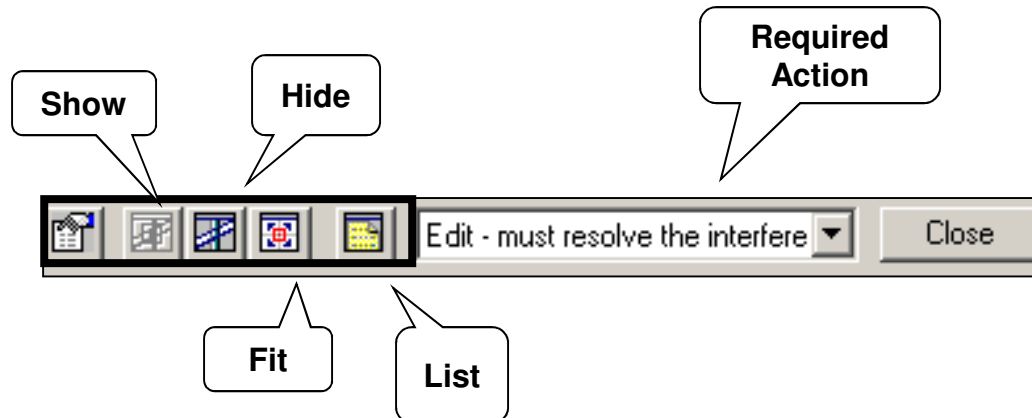
Can process:

- Required – Required
- Required – Optional
- Optional – Optional

A clearance rule can be used

Checking Interferences

Check Interference ribbon bar controls review of database (permanent) clashes and local (temporary) clashes



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To Do List

- If an object's relationship with another object is lost or corrupt, the system generates an **Error** entry in the To Do List
- If a relationship has changed between two objects, but the person who modified the relationship only has write access to one of the objects, the system generates an **Out of Date** entry in the To Do List



	Object name	State	Changed by	Date modified
	Cableway Straight Feature	In Error	INGRPPD\rhim	10/29/2005 6:46:11
	Cableway Along Leg Feature	In Error	INGRPPD\rhim	10/29/2005 6:46:11
	Route Connection	Out of date	INGRPPD\rhim	10/29/2005 8:03:37

Displays list of objects that are in Error or Out-of-date