ENDUR V12.1

VIEWING MARKET CURVES TRAINING WORKBOOK

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Conventions Used in this Manual

The following table describes the conventions and icons used in this manual:

Feature	Description	Examples
Bold	Field names Window buttons Menu selections	**User ID** **Save** **File→Save**
Italics	Window titles and tabs	The *Portfolio Groups* window The *General Administration* tab
Underline	The data you type, select from a pick list, and so forth	Type Last 3 day average Select NG (natural gas).
<Carets>	Keyboard key	<Enter> <F1>
Note:	Additional useful information	**Note:** Holidays affect date sequences when determining good business days.

Objectives of this Manual

By the end of this training session, the participant will be able to:

- Navigate through the Market Manager
- Query for curves
- Create a new curve as well as copy existing curves
- Create and edit grid points
- View volatilities
- Save and load prices, volatilities, and rates

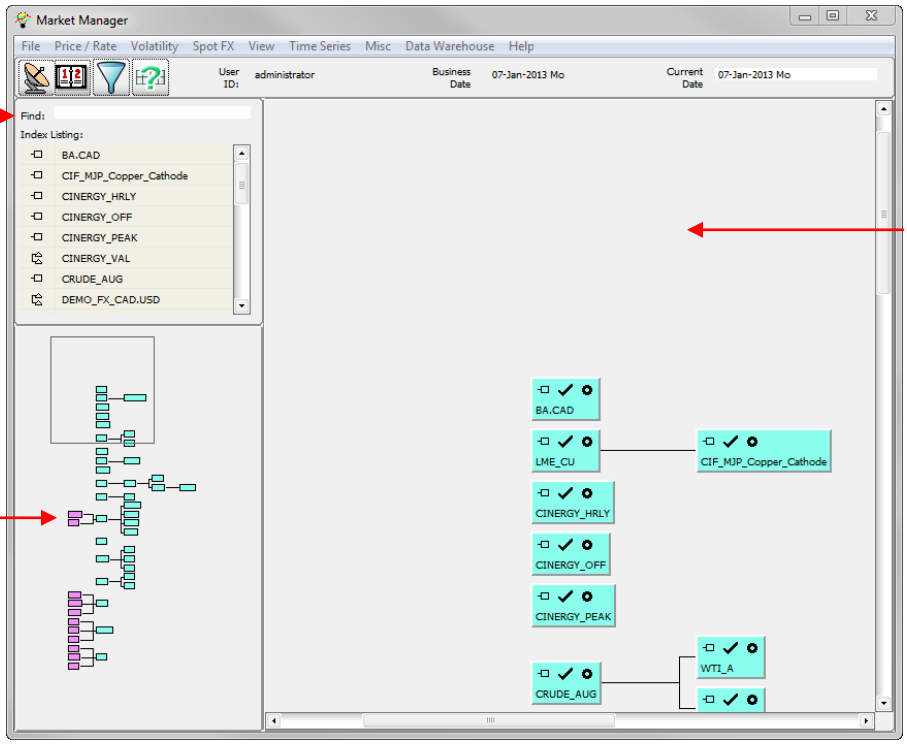
1.0 MARKET MANAGER

The Market Manager is a warehouse of indexes (also referred to as curves). An Index is a structure used to hold prices or rates. For example, a natural gas index (such as NYM_NG) is used to hold prices representing natural gas futures contracts. In addition, volatilities and correlations are also stored in the Market Manager (discussed in *Chapter 5.0 Volatility* on page 30).

Curves or indexes are composed of grid points. Grid points help define or calculate prices and rates for different time periods. Grid point values (prices or rates) can be updated manually, imported via spreadsheet, or direct market feed (such as Bloomberg).

To open the Market Manager:

1. Click the **Market Manager** icon  located on *OpenLink Central*.
2. The *Market Manager* window displays:



Once a query is executed, **Find** is used to search for the first match of a particular string.

The **Focus Box** is a condensed view of the indexes found through the query.

The **Focus View** or **Browser** window shows all indexes as nodes.

2.0 INDEXES

Indexes are considered the building blocks of the Market Manager. Indexes can hold prices, rates and other information, and are used to price deals.

Indexes must have one or more grid points associated with them before it can be saved. For certain markets, such as Natural Gas, date sequences may be used to set up grid points. Date sequences are a reoccurring pattern of dates. Date sequences are set up in the *Admin Manager*.

2.1 Types of Indexes

Indexes may be Official Standard, Official Composite, Custom Standard or Custom Composite curves (or a child of one of these classifications).

Type of Index	Symbol	Definition
Official Index	**O**	• Validates deals and used for end-of-day portfolio revaluations • Only transactions that reference official indexes may be validated • Official indexes may have volatility definitions used for end-of-day processing, profit and loss reporting, and risk measurement
Custom Index	**C**	• Used for pricing and running simulations • Has custom volatility definitions representing an individual user's view of the market
Template	**+**	• Template used to build other curves
Standard Index	**-□**	• Represents a single market view • Underlying components are observable prices and rates; for example, Futures and Treasuries)
Composite Index		• Derived from one or more indexes based on some formula • Used when there are no observable prices for a given market • Examples of a composite index could be: CINERGY_VAL curve, which may consist of the CINERGY_PEAK, CINERGY_OFFPEAK AND CINERGY_HOURLY CURVES
Stand alone Index		• Values are not derived from or passed to another index
Child Index		• Can be created from any index • Defaults to the structure of the parent index
Parent Index		• An index whose values are used by another index

3.0 SYMBOLS AND CONVENTIONS

This chapter discusses the symbols and conventions that are used in the *Market Manager*.

3.1 Node Color

Nodes represent indexes in the Market Manager. The nodes are color coded to indicate the type of curve. The following colors display in the Market Manager:

Color	Definition
Aqua	Validated Index
Purple	An index included in a composite index
Red	Index that has an error
Black	Index has been selected in the index listing box (upper left panel of the Market Manager browser window)
Yellow	This is an index that has been saved as a template.

3.2 Node Symbols

The symbols that display on the index nodes indicate what type of index it is. The following chart defines the symbols:

Symbol	Status
O	Official index
C	Custom index
-□	Standard index
	Composite index
+	The index is a template
	Validated index

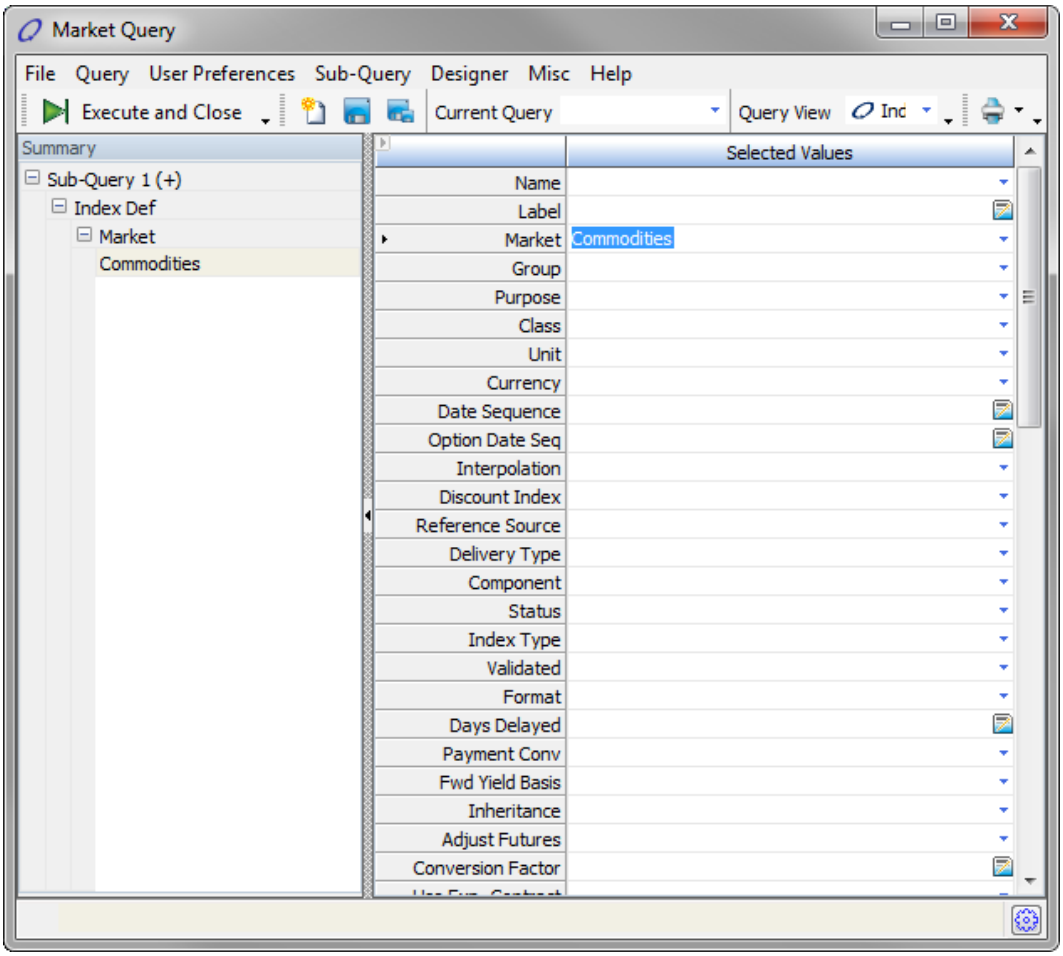
4.0 LOADING INDEXES

Indexes may be loaded through the *Market Query* window or by selecting specific indexes in the *Load Indexes* window. The following example queries for all indexes whose Market is Commodities.

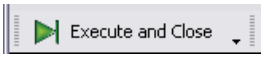
4.1 Query

To execute a query through the Market Manager:

1. Click **File→Query** from the menu bar. The *Market Query* window displays.



2. In the Market field select Commodities and click **OK.** The Summary side of the window is automatically populated.

3. Click the 

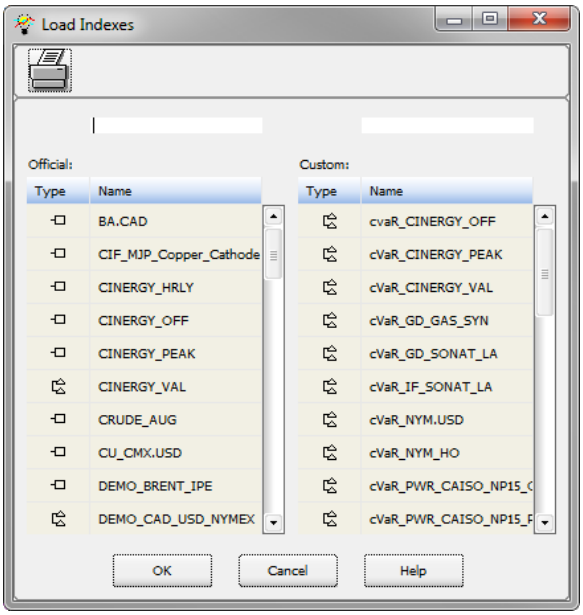
icon to execute the query.

4.2 Load Indexes

The *Load Indexes* window contains saved official and custom indexes. The user selects which indexes to load in the *Load Indexes* window.

To load indexes through the Load Indexes window:

1. Click **File→Load Indexes** from the menu bar. The *Load Indexes* window displays.



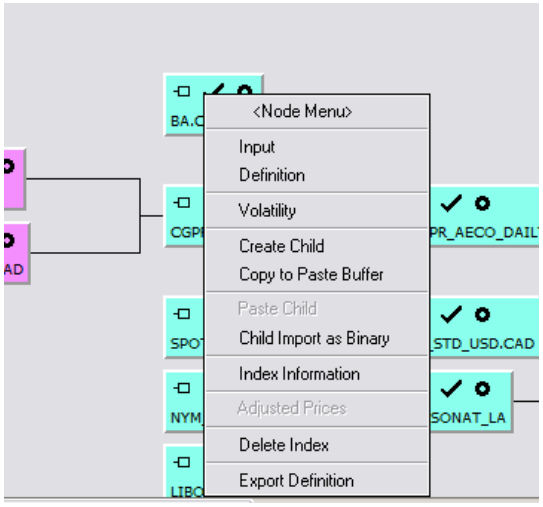
2. Select the indexes to load. (Highlight to select/deselect one or more individual indexes, or drag the cursor through a series of indexes.)

Note: Type entries in the boxes above the Official or Custom lists to search for specific curves.

3. Click **OK**. The selected index display in the *Market Manager* Browser window.

4.3 Node Menu

Right-click on a node to display the **<Node Menu>**.



4.3.1 Node Menu Options and Descriptions

Option	Description
Input	Displays the *Index Input* window for this index, which represents the user's view of a given market.
Definition	Displays the *Index Definition* for this index. The system uses index definitions to specify relevant attributes of market indexes used to structure instruments and deals.
Volatility	Displays the *Volatility* browser for this index.
Create Child	Displays the *Index Input* window for the new index. The user then fills in the missing information to create a child index.
Copy to Paste Buffer	Copies the input for the index to the Windows clipboard. The user may then use the paste feature to create a new Index.
Paste Child	Opens the *Index Input* window with all the information copied from an index to be used to create a child index.
Child Import as Binary	Displays a list of child indices that the user may import as the basis for a new index.
Index Information	Displays index information. The *Index Info* window is used to define values for Index Info fields. (Set up in **Admin Manager→Index Info**).
Adjusted Prices	Displays the *Adjusted Price Viewer where you may* view Prices. It can view prices on an hourly granularity and can view normalized prices.
Delete Index	Deletes indexes listed in the *Index Definition* window. The index cannot be deleted if it is referenced by any other trade in the system or by another index. The deletion of indexes should

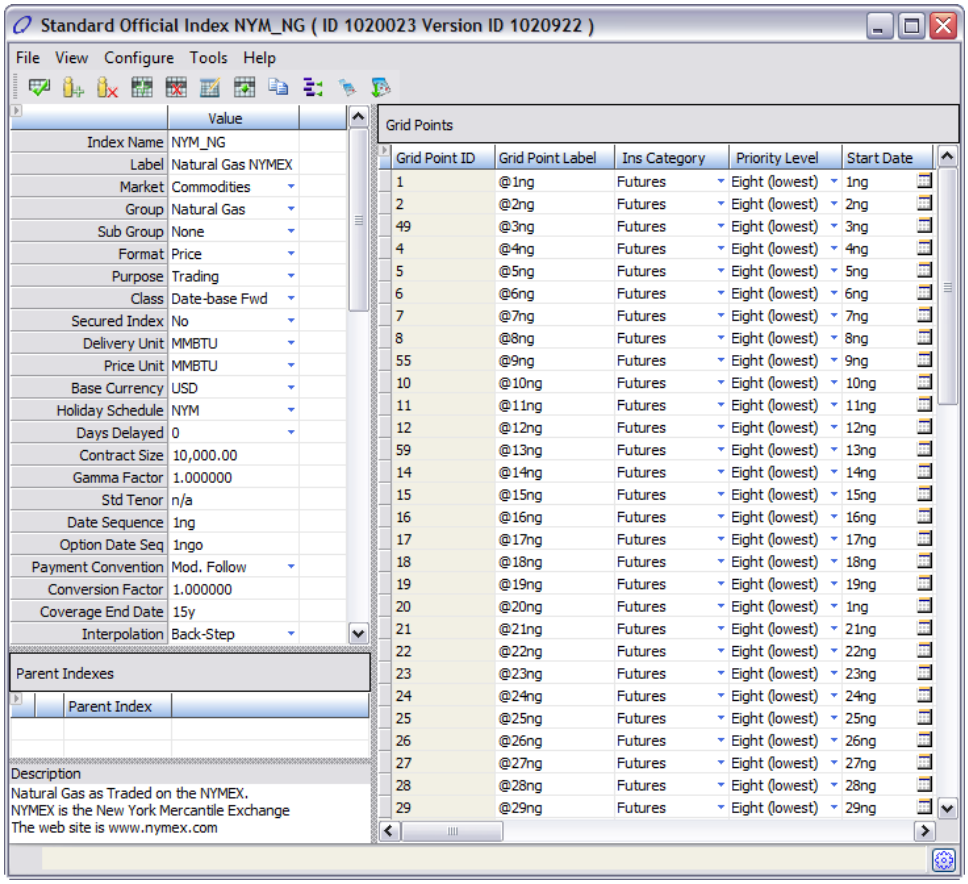
Option	Description
	only occur when no other users are logged into the system. Deleting an Index does not delete volatilities and Correlations attached to that index. Be sure to delete any attached Volatilities/Correlations before deleting the index.
Export Definition	Opens the standard *Index Definition Export* window. In this window, one or multiple index definitions can be exported via xml or csv.

4.4 Index Definition

Indexes are defined in the *Standard Official/Custom Index* window. This window includes relevant attributes of market indexes. When an index is used within a deal the attributes of that index becomes the default attributes of that deal. Refer to *Appendix A—Standard Official Index Window Fields* for field descriptions.

To view an index definition:

1. Query for the index. The example below shows the NYM_NG index.
2. Right-click the NYM_NG node and select Definition. The *Standard Official Index NYM_NG* window displays:



- **Fields** identify and define the Index's attributes and output parameters. Refer to *Appendix A—Standard Official Index Window Fields* on page 48 for more information about **Index Definition** fields
- **Description** is a free-form text field that is used to describe the index
- **Parent Index** lists the indexes associated with a child or composite index
- **Grid Points** table displays the grid point formula data

4.5 Create a New Index

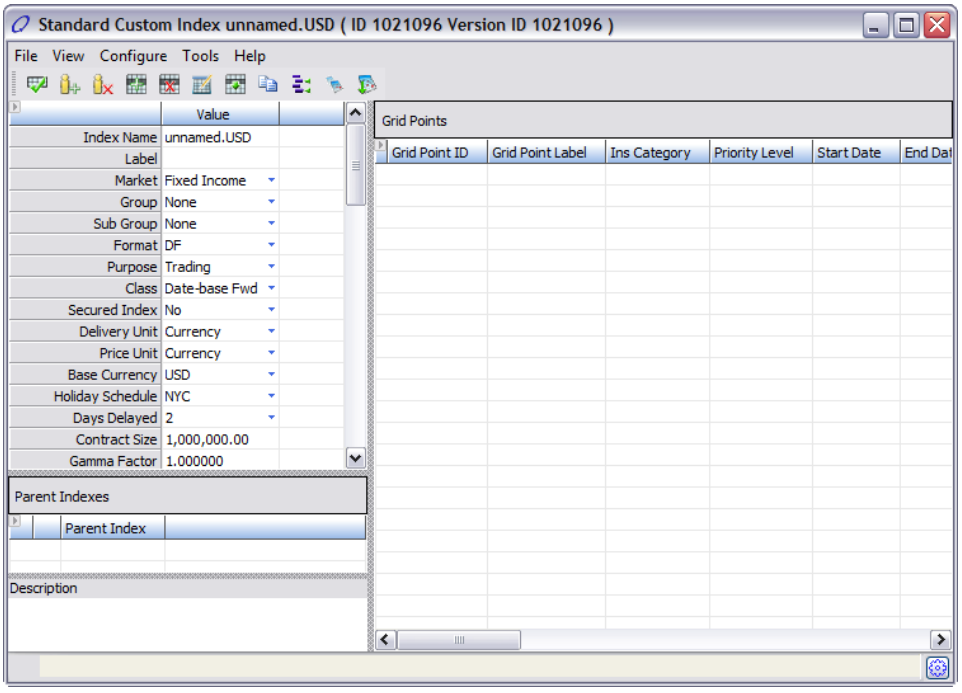
There are three ways to create a new index:

- Create a new index and grid points
- Copy an existing index and change the information as necessary
- Use an index template

In the following exercise, a natural gas curve is created. Refer to *Appendix A—Standard Official Index Window Fields* for field descriptions.

To create a new index:

1. Select **File→New Standard Index** from the menu bar of the *Market Manager* window. The *Standard Custom Index unnamed.USD* window displays.
2. Select **No Template** from the *New Standard Index* window and click **OK**.



3. Click in the **Index Name** field and enter an index name—in this example, enter XY_NATGAS where XY is your initials.

4. Click in the **Market** field and select a value, then click **Group** and select a value. In this example, Commodities and Natural Gas are selected. Other field values defaults according to the Market and Group.

a. Click the **Format** field and select a value. For this example, select Price.

b. Click the **Class** field and select a value. For this example, select Date-base Fwd.

c. Click the **Delivery Unit** field and select a value. For the natural gas example, select MMBTU.

Note: The **Price Unit** field defaults to the selection made in the **Delivery Unit** field.

d. Click the **Std Contract Size** field and input a value. For the natural gas example, input 10,000.

e. Input a value in the **Date Sequence** field. For this example, input 1ng.

f. Input a value in the **Option Date Sequence** field. For this example, input 1ngo.

g. Input a value in the **Coverage End Date** field. For this example, input 15y.

h. Click the **Interpolation** field and select from the menu. For this example, select Back-Step. (Refer to *Section 4.5.1 Interpolation* on page 10 to understand interpolation)

i. Click **the Discount Index** field and select an Index. For this example, select LIBOR.USD.

j. Click the **Reference Source** field and select the supplier of pricing data. For this example, select NYMEX.

k. Click the **Input Style** field and select from the menu. For this example, select Cluster. This displays both the current and the parent curve values for child curves.

l. Click the **Delivery Type** field and select from the menu. For this example, select NatGas.

m. Click the **Projection Method** field and select Daily Physical – US.

n. Click the **Use Separate BMO** and select Yes.

Note: The index cannot be saved until a grid point is created.

4.5.1 Interpolation

Interpolation is used to calculate prices or rates between grid points. Methods include:

- Linear
- Linear-contract
- Log-linear
- Back-step
- Front-step

Method	Description
Back-Step	Back-step uses the next available point to fill in values between points.
Front-Step	Front-step uses the prior available point to fill in values between points.
Linear	Estimation of a value by assuming that there is a straight line between two values.
Linear-Contract	Linear contract works the same as back step with one exception. If the time between grid points is greater than 1 month (like one year), it does a linear for each month and then a back step.
Log-Linear	This is similar to linear, but the system takes the log of the data point values and linearly interpolates. Then the system takes the inverse log on the interpolated value to get the actual value to be used.

4.5.2 Create Grid Points

The *Grid Point ID* window describes a grid point. An index is composed of one or more user-defined grid points. Grid points are sorted by:

- Instrument Category
- Effective Form (such as Price, Rate, Ratio, or Spread)
- End Date

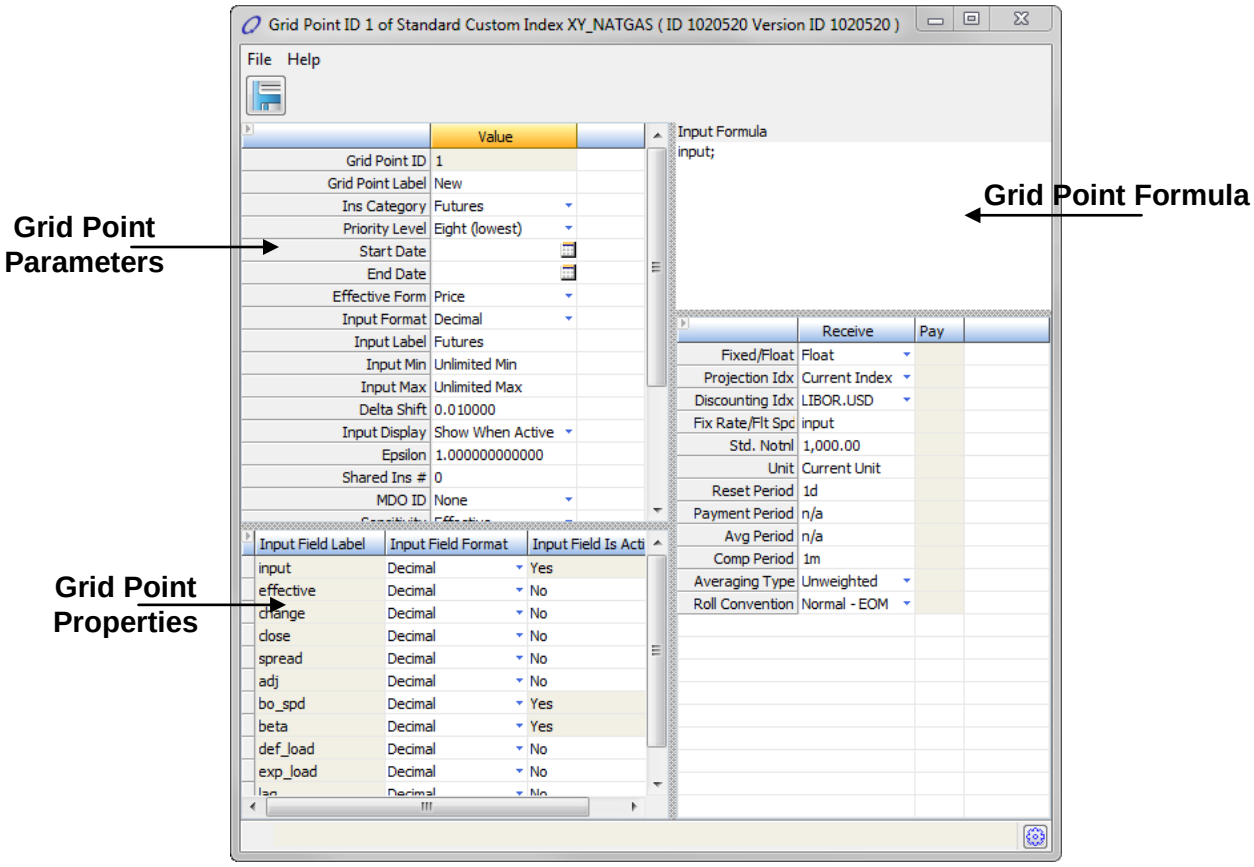
The *Grid Point ID* window describes a grid point.

Note: The window's fields are defined in *Appendix D—Grid Point ID Window* on page 60 of this workbook.

Grid points contain rates or prices and may be entered or imported.

To add a grid point:

1. Click the **Add** button () in the *Standard Custom Index* window *to* create and define a new grid point. The *Grid Point ID 1* window displays.



Refer to *Appendix D—Grid Point ID Window* for information regarding this window.

2. Click **Grid Point Label** and enter a name. The following example uses @1ng.

> **Note**: Using the **@** symbol allows for users to see the actual date the grid point represents in the date label field.

3. Click **Ins Category** and select an instrument category; in the example select Futures. The **Instrument Category** enables categorization of grid points based on the instruments they represent. Refer to *Appendix E—Price Curve Grid Point Instrument Categories* on page 64 for additional information.

4. Select a **Priority Level**; for this example, select highest (one displays in the field).

> **Note**: The **Priority Level** field determines which grid point receives precedence when the dates of two or more grid points overlap. One is the highest and eight is the lowest.

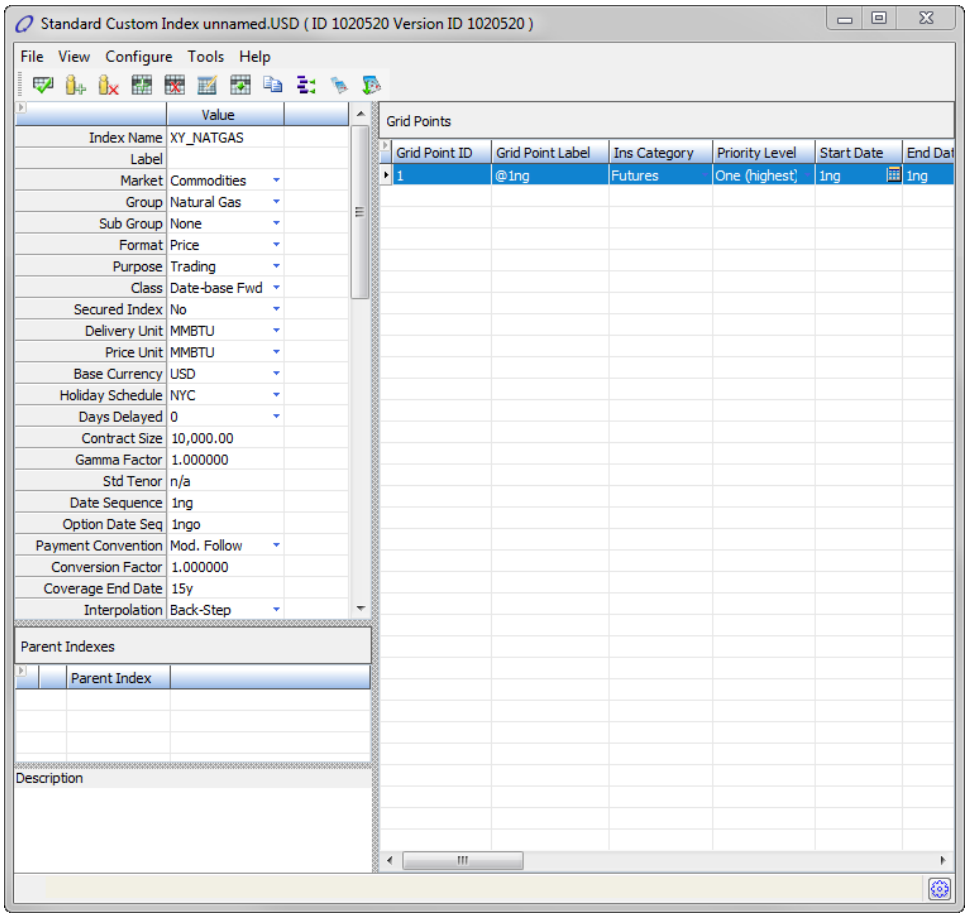
5. Enter a **Start Date** and **End Date**. For this example, enter 1ng for both.

> **Note**: The specific **ng** dates in the **Start** and **End Date** in this example are derived from the Natural Gas date sequence setup in the *Admin Manager→General Administration→Date Sequence* module.

6. Click to select an **Effective Form**; for this example, choose Price.

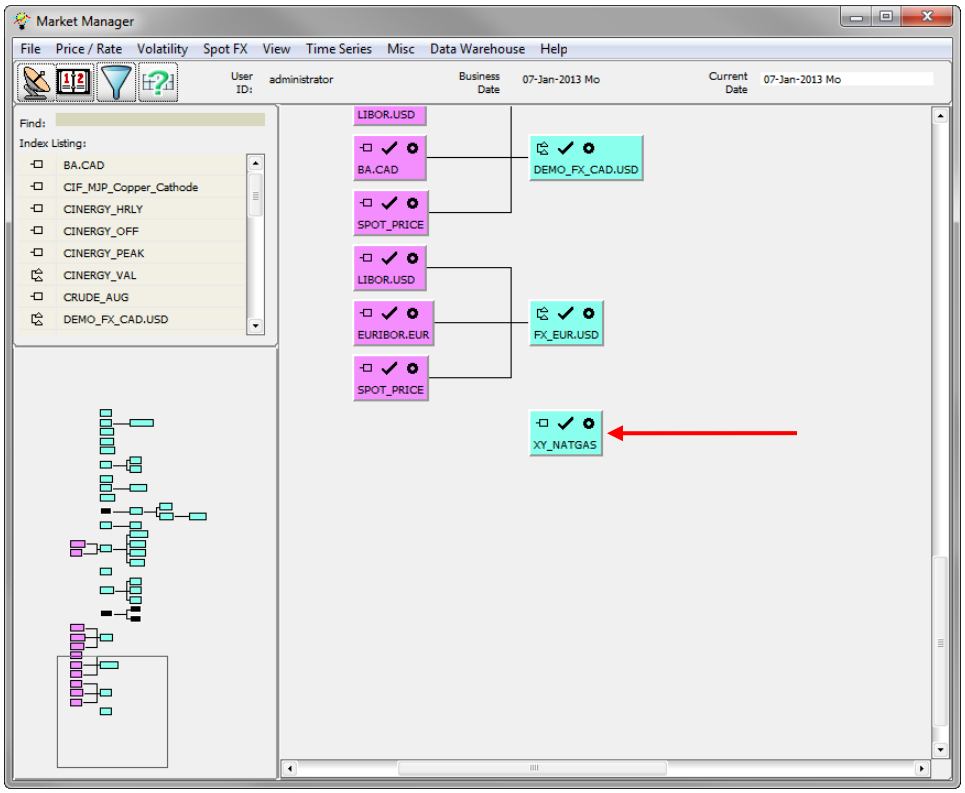
7. Click to select an **Input Format**; choose Decimal for this example.

8. Click the **Save** button. The *Grid Point ID* window closes and the *Index* window returns.



Note: The newly-created grid point displays in the right-hand side of the the *Grid Points* table.

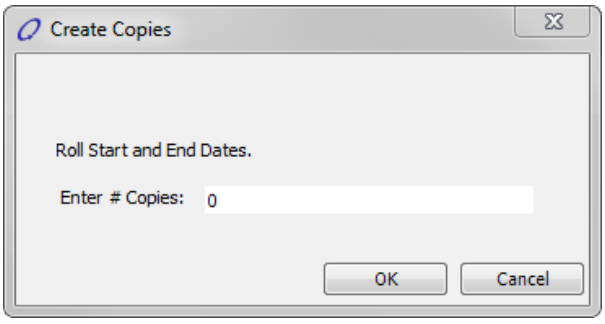
9. Select **File→Save Index Definition→Official** from the menu bar to save the index. Once the index is saved, it displays as a node within the Market Manager Browser window.



To copy a grid point and roll dates:

An index may have as few as one to as many as hundreds of grid points. Instead of manually creating each grid point, there is an easier way to do this. Grid points can be copied where the start and end dates are rolled. The rolled date equals the original date plus one increment. For example, if the original date is @2ng, the rolled date is @3ng. In the following examples, grid points' start and end dates are rolled.

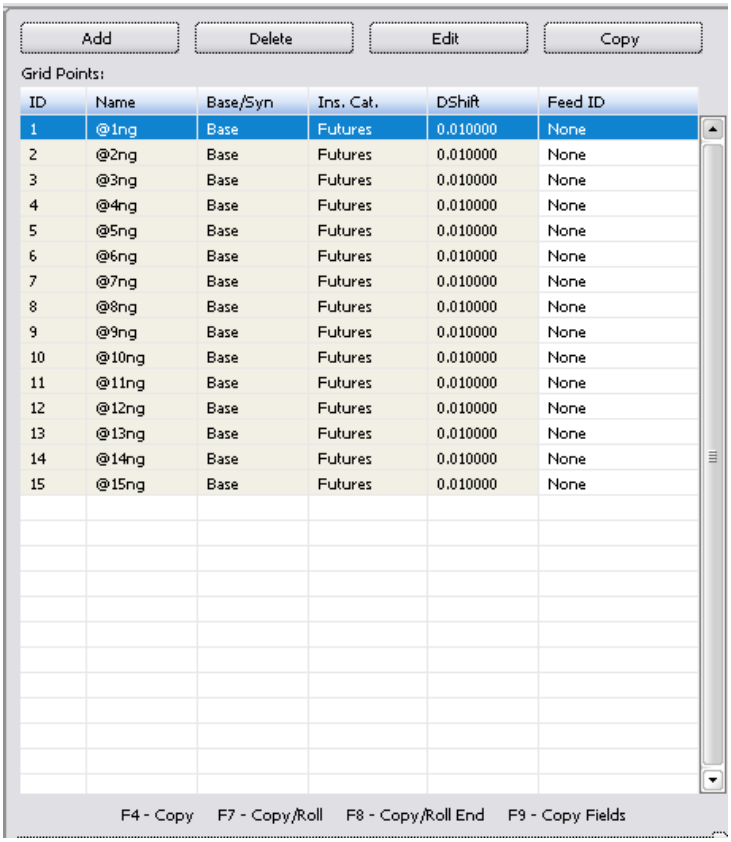
1. Right-click the newly-created index and select **Definition**.
2. Highlight the grid point and press the <**F7**> (Copy/ Roll) key.



3. Enter the number of copies of the grid point to make; enter 179 in this example.
4. Click **OK**. Additional points are created with the dates rolled.
5. Select **Save → Official** from the menu.

To copy a grid point and roll the end date only (explanation only):

1. Highlight the last grid point and press the <**F8**> key to roll the end date (Copy/ Roll End).
2. Enter the number of copies of the grid point to make; enter 1 in this example. An additional grid point is created with the end date rolled.



ID	Name	Base/Syn	Ins. Cat.	DShift	Feed ID
1	@1ng	Base	Futures	0.010000	None
2	@2ng	Base	Futures	0.010000	None
3	@3ng	Base	Futures	0.010000	None
4	@4ng	Base	Futures	0.010000	None
5	@5ng	Base	Futures	0.010000	None
6	@6ng	Base	Futures	0.010000	None
7	@7ng	Base	Futures	0.010000	None
8	@8ng	Base	Futures	0.010000	None
9	@9ng	Base	Futures	0.010000	None
10	@10ng	Base	Futures	0.010000	None
11	@11ng	Base	Futures	0.010000	None
12	@12ng	Base	Futures	0.010000	None
13	@13ng	Base	Futures	0.010000	None
14	@14ng	Base	Futures	0.010000	None
15	@15ng	Base	Futures	0.010000	None

4.5.3 Edit a Grid Point (explanation only)

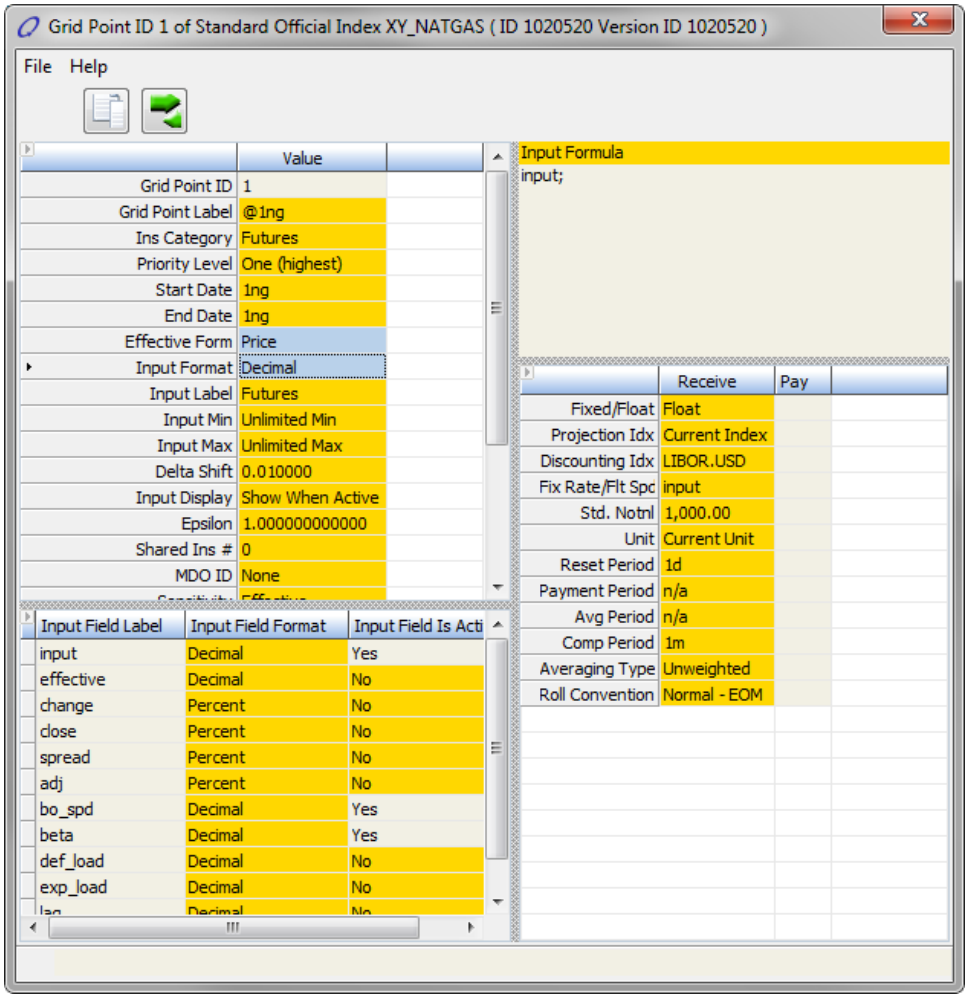
1. Highlight the first grid point and click **Edit** (or double-click the grid point).
2. Click a field to edit.
3. Select **File→Save** from the menu bar to save the information.

To copy fields in a grid point to another grid point:

You may need to copy some of the fields to other existing grid points. In this example, we will copy the first grid point's **Input Format**.

1. Starting with the modified grid point, highlight all grid points for which the change will be copied.
2. Press the <**F9**> key. The *Select Grid Points Fields to Copy* window displays. All fields are in yellow.
3. Click the field(s) to copy; that field turns blue. In this example, select the **Input Format** field.

Note: The **Effective Form** field also turns blue.



4. Click **Copy**, and then click **OK**. The other grid points contain the revisions.
5. Double-click the other grid points to see the **Input Format** change.

4.5.4 Delete a Grid Point (explanation only)

You can highlight single or multiple grid points and delete them all at once.

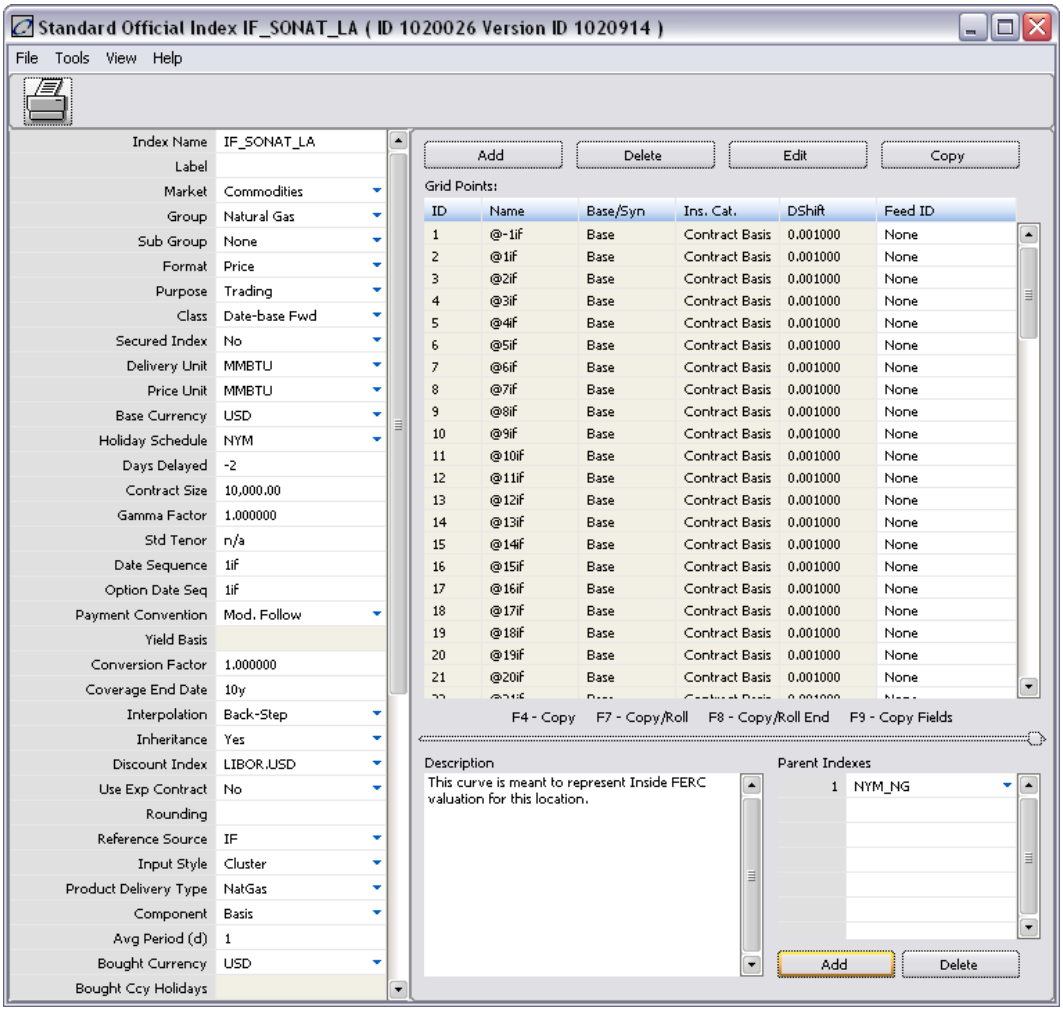
1. Highlight the last grid point and click **Delete**.
2. Select **File→Save** to save the grid point information and the index.

Exercise: Grid Point

1. Add a grid point to the curve recently created.
2. Copy the grid point and roll the end date only. Enter 10 for the number of copies.
3. Copy the Input Format and Input Label of the fifth grid point through to the tenth grid point.

4.5.5 Create a Child Index

A child index can be created from any index, which then becomes the parent index. The child index defaults to the same structure as the parent index. The screen shot below is an example of the definition window of a child index. See the **Parent Indexes** table.



To create a Child Index:

1. Right-click on the index that will be designated the parent index. For this example, select the NYM.NG index. The <Node Menu> displays.
2. Select Create Child from the menu. The *Standard Custom Index Child* window displays.

   Note: The child index definition will default to the parent index definition.

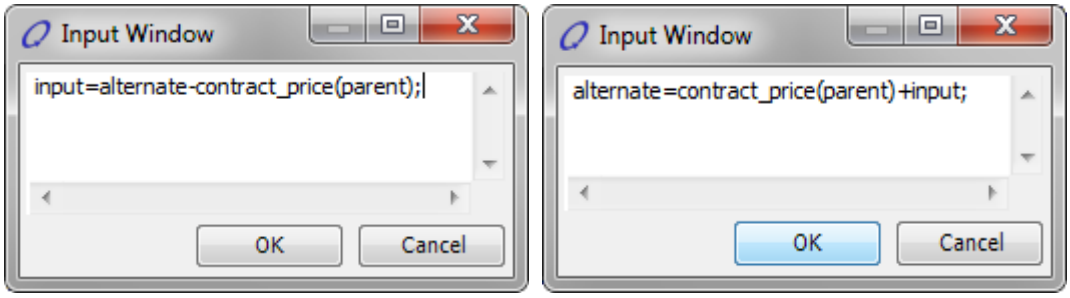
3. Input the index name in the **Index Name** field. For this example, input XY_IF where XY are your initials.
4. Click the **Add** button to add a grid point.

4.5.6 Alternate Inputs

Alternate inputs are formula-based grid point values. For example, child curves' grid point values may be based on their parent curves' grid point values. In this scenario, the child curve's grid point values may be a computation using the parent curve's values.

To Enter Grid Point Formulas:

1. Click in the **Alternate to Input Formula** field. Enter input=alternate-contact_price(parent);
2. Click in the **Input to Alternate Formula** field. Enter alternate=contract_price(parent)+input;



In the above example, the alternate input is the parent curve's value plus the given input (Contract Basis). For example:

If:

The parent curve 1d grid point value was **1**

The input for the child curve 1d grid point value was **.02**

Then:

The alternate input for the child curve's 1d grid point value would be **1.02**

Note: When using this calculation (input to alternate), a reverse formula (alternate to input) must be entered. For example, if the *input to alternate* formula were `alternate = input + spread`, the reverse formula for the *alternate to input* would be `input=alternate–spread`.

To toggle the window display between the default input formula and the alternate input formula in the Standard Official Index window:

- Select **Options→Alternate Inputs** from the menu bar, or
- Click the alternate inputs icons to toggle the display:


Default input formula


Alternate input formula

Grid Point Summary

The following features are available through the *Standard Official Index* window:

Feature	Described
	Opens the *Grid Point Definition* window to create a new grid point.
	Deletes the highlighted row in the **Grid Point** list box.
	Opens the *Grid Point Definition* window of a highlighted grid point where the grid point may be modified.
	Creates a new grid point with the same name and details as the highlighted entry.
<F4> key	Copy a grid point one or more times.
<F7> key	Copy a grid point one or more times, roll the start, and end dates.
<F8> key	Copy a grid point one or more times and roll the end date only
<F9> key	Copy selected fields within a grid point to another grid point • Highlight the *source* grid point and the *destination* grid points and press the **<F9>** key • Select the fields to copy (they will turn from yellow to blue) • Click **Copy**

4.6 Copy an Existing Curve

To copy an existing curve:

1. Right-click the curve to copy in the main *Market Manager Browser* window. The <**Node Menu**> displays.
2. Select **Copy to Paste Buffer** from the menu.
3. Right-click within the gray area of the browser window. The <**Misc Menu**> displays.
4. Select **Paste** from the menu. The *Standard Custom Index* window displays.
5. Enter an **Index Name** and modify the fields, as necessary.
6. Select **File→Save→Official** from the menu bar to save the curve.

Exercise: Index

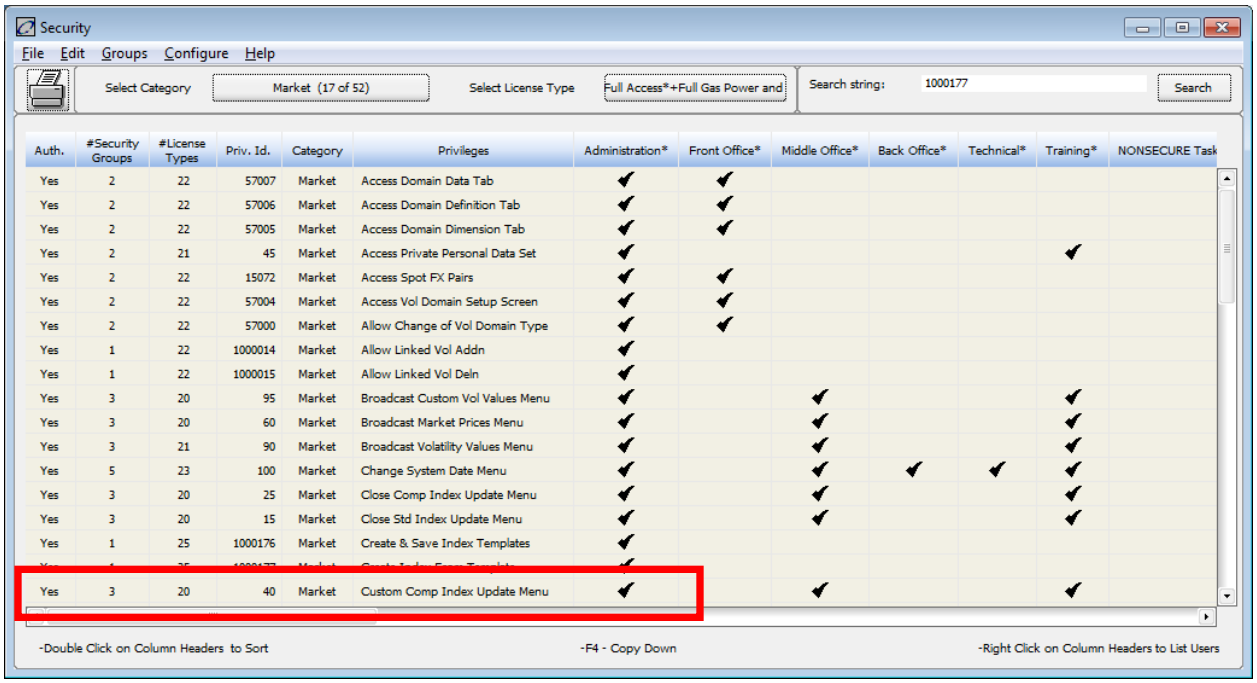
1. Copy the **IF_SONAT_LA** curve that is a child curve **of NYM_NG**.
2. Paste it as a child curve of the **NYM_NG** curve by right clicking the node.
3. Save it as **XY_IF**, where **XY** are your initials.

4.7 Index Templates

Users now have the ability to create templates for curve definitions within the *Market Manager*. These templates allow users to recall a curve definition structure as a base for a new curve.

4.7.1 Security Privileges

In order to create a template, a user has to have security privileges: 1000176 and 1000177. Security privileges can be accessed via the *Admin Manager*. For more information on this, please refer the **Admin Manager** training workbook.



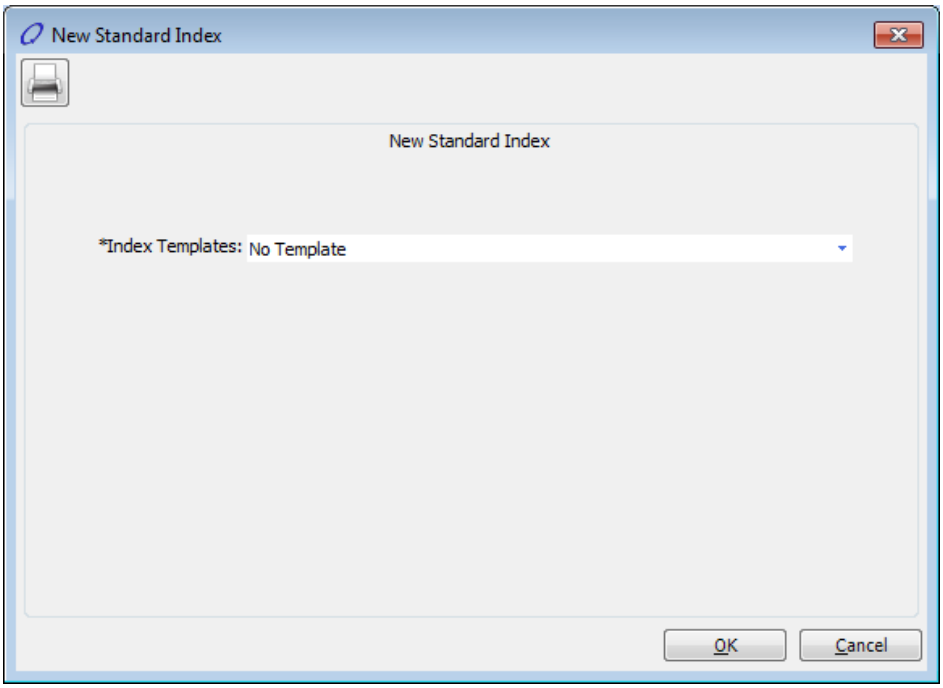
Auth.	#Security Groups	#License Types	Priv. Id.	Category	Privileges	Administration*	Front Office*	Middle Office*	Back Office*	Technical*	Training*	NONSECURE Task
Yes	2	22	57007	Market	Access Domain Data Tab	✓	✓					
Yes	2	22	57006	Market	Access Domain Definition Tab	✓	✓					
Yes	2	22	57005	Market	Access Domain Dimension Tab	✓	✓					
Yes	2	21	45	Market	Access Private Personal Data Set	✓					✓	
Yes	2	22	15072	Market	Access Spot FX Pairs	✓	✓					
Yes	2	22	57004	Market	Access Vol Domain Setup Screen	✓	✓					
Yes	2	22	57000	Market	Allow Change of Vol Domain Type	✓	✓					
Yes	1	22	1000014	Market	Allow Linked Vol Addn	✓						
Yes	1	22	1000015	Market	Allow Linked Vol Deln	✓						
Yes	3	20	95	Market	Broadcast Custom Vol Values Menu	✓		✓			✓	
Yes	3	20	60	Market	Broadcast Market Prices Menu	✓		✓			✓	
Yes	3	21	90	Market	Broadcast Volatility Values Menu	✓		✓			✓	
Yes	5	23	100	Market	Change System Date Menu	✓		✓	✓	✓	✓	
Yes	3	20	25	Market	Close Comp Index Update Menu	✓		✓			✓	
Yes	3	20	15	Market	Close Std Index Update Menu	✓		✓			✓	
Yes	1	25	1000176	Market	Create & Save Index Templates	✓						
Yes	3	20	40	Market	Custom Comp Index Update Menu	✓		✓			✓	

4.7.2 Creation of Templates

Templates can be created by selecting **File→New Template Index** and by going through the same steps highlighted in the earlier curve creation exercise. Users can also create a using a copy of a curve as the source, by copying the curve as shown in the previous exercise and selecting **File→Save Index Definition→Template** from the *Index Definition Screen*.

4.7.3 Using a Template to Create an Index

One a template has been saved; users have the ability to create indexes from based upon the template. This can be accomplished by selecting **File→New Standard Index**. If templates exist, the following screen will display.



The pick-list for **Index Templates* is pre-loaded with all templates available for standard indexes. In addition, templates can also be created for composite indexes.

4.8 Index Input Data

Data sets, market rates, or prices for a standard index (or a user's view of the market for a custom index) are displayed in the *Index Input* window. Once a curve is created, the *Input Window* data can be saved in different forms: Universal, Close, Personal, and Historical.

4.8.1 Index Data Windows

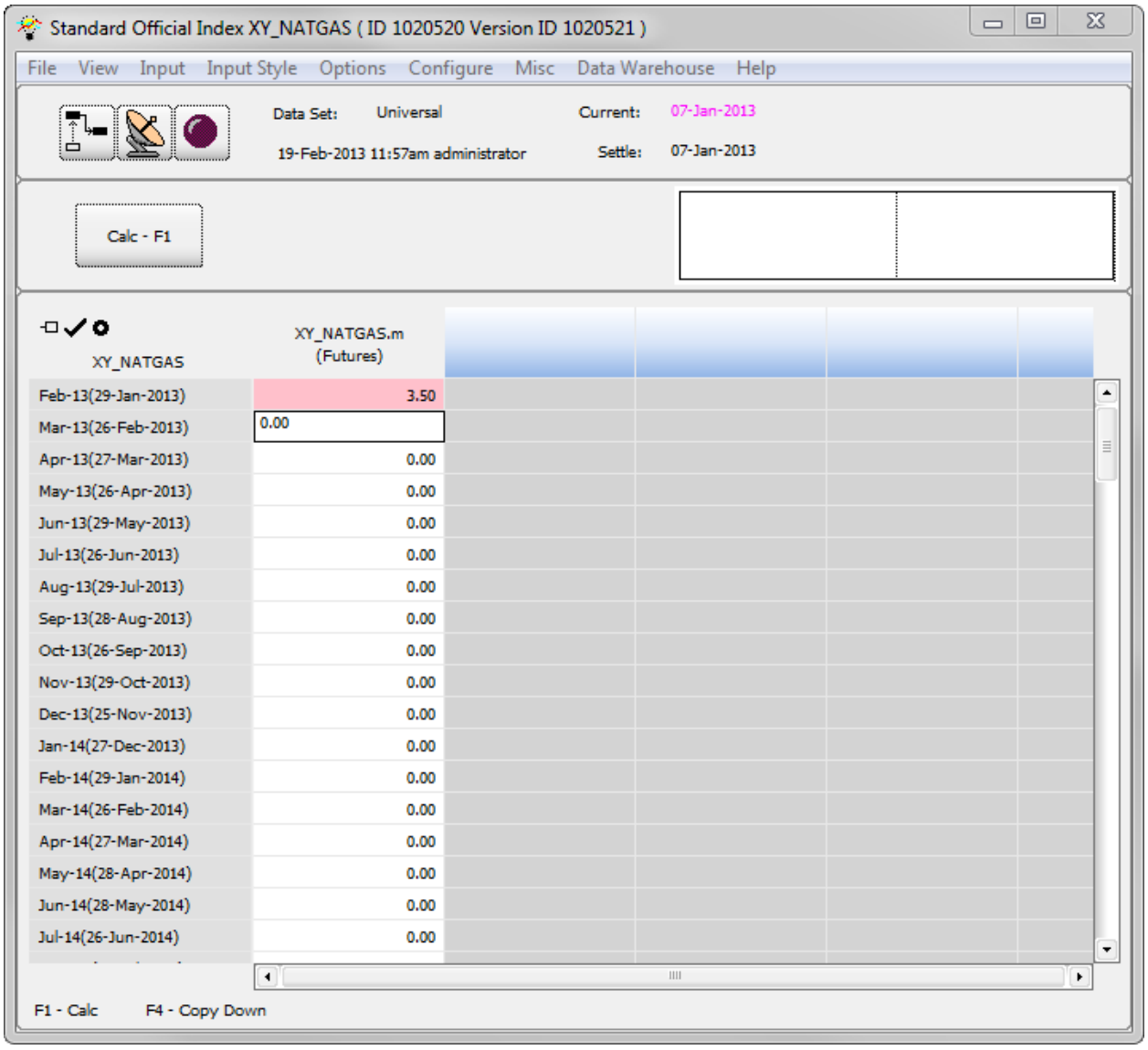
Data sets are stored in the *Index Input* window. Input and output types vary based on the type of curve:

	Type of Input	Type of Output
Interest Rate	Rates and prices	Discount factors
Effective Interest Rate (example: LIBOR)	Rates	Discount factors
Commodity	Spreads	All-in prices

The *Definition* window specifies the type of output produced in the **Format** field. The following example uses the NYM_NG curve to preview index data. The window is divided by the Instrument Category (for example, Cash or Futures).

To edit index data:

1. Click an index (the curve we created was selected here) or right-click and select Input. The *Standard Official Index* window displays.



2. Click the **Bid, Mid**, and **Offer** radio buttons.

Note: The **Bid**, **Mid**, and **Offer** fields change if a bid-offer spread is entered.

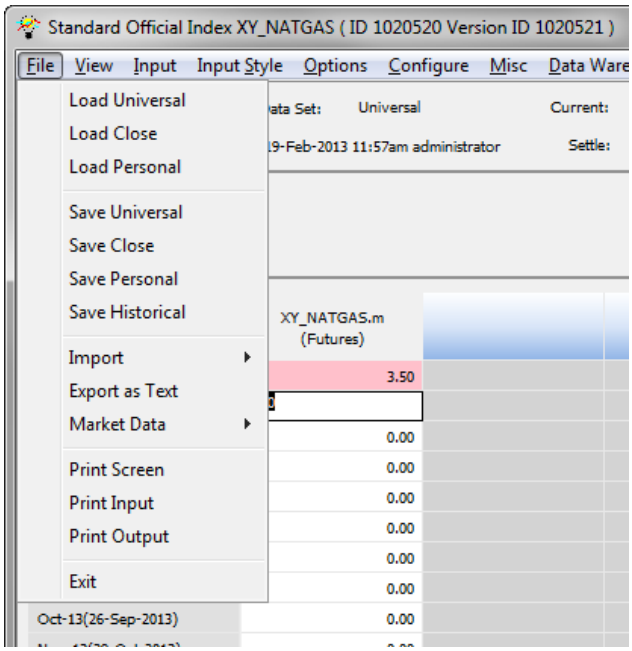
3. Change a value and click **Calc** from the menu bar or press <**F1**>. The cell(s) turn pink when a change is made. It stays pink until **Calc** is clicked.

4. Select **File**→ **Save Universal** to save the data as the *Universal* dataset.

4.8.2 Save or Load Additional Data Sets

Data sets, market rates, or prices for a standard index (or a user's view of the market for a custom index) are displayed in the *Index Input* window. Once a curve is created, the *Input Window* data can be saved in different forms: *Universal*, *Close*, *Personal*, and *Historical*.

1. Select **File→Save** from the *Index Input* Window.
2. Select the appropriate data set from the drop-down menu.



Menu Item	Defined
Load Universal	Loads the universal data set into the *Index Input* window. If the universal data set changes while you are viewing it, this option refreshes the window with the latest universal data. If there are saved personal data sets for an index, a drop-down list displays.
Load Close	Loads closing data for the selected index for a given date.
Load Personal	This loads a personal data set. If there is only one Personal Data Set, the system loads it. If there are multiple Personal Data Sets, then there is a pick list from which to choose the data set.
Save Universal	Saves the current data in the *Index Input* window as the universal data set for that index. One universal set of data that is used for pricing. Everyone can retrieve them and it is automatically loaded when you log into a session.
Save Close	Contains closing data for a given index and date. Usually, this is part of end of day processing. Only one closing data set can be saved for a given index and date.

Menu Item	Defined
Save Personal	Represents an individual's unique view of the market and can be used for simulations and "what-if" scenarios. This then can only be accessed by the user who created it. The system may save an unlimited number of personal data sets, as long as they have unique names.
Save Historical	Saves the historical prices for the current index based on the historical price configuration settings. This is typically used for pricing power deals.

To load a data set:

Select **File→Save / File→Load** from the menu bar.

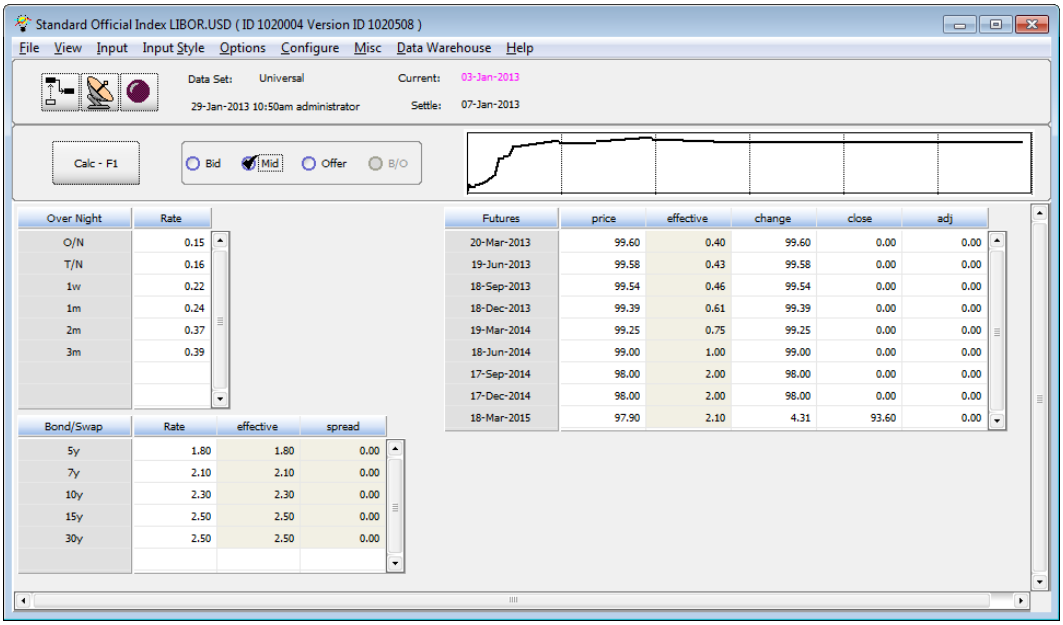
4.8.3 Introduction to the Input Window

Click the index node 

in the *Market Manager* browser, or

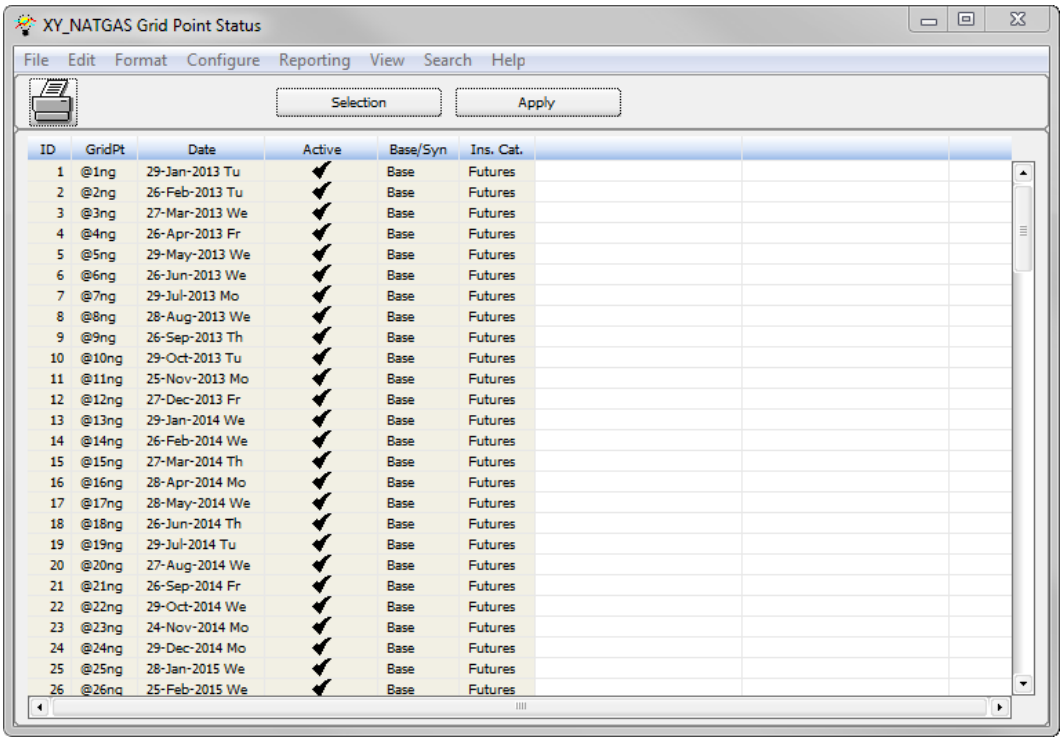
Right-click and select **Input** from the **<Node Menu>**.

The index's *Standard Official Index Input* window displays. The *Input* window represents the user's view of a given market. The *Input* window of an index is used to enter market-observed rates and prices for the benchmark securities that have already been defined for this index.



To Configure Grid Points:

1. Select **Configure→Grid Point Config** from the menu bar of the *Index* window. The *Grid Point Status* window displays:



ID	GridPt	Date	Active	Base/Syn	Ins. Cat.
1	@1ng	29-Jan-2013 Tu	✓	Base	Futures
2	@2ng	26-Feb-2013 Tu	✓	Base	Futures
3	@3ng	27-Mar-2013 We	✓	Base	Futures
4	@4ng	26-Apr-2013 Fr	✓	Base	Futures
5	@5ng	29-May-2013 We	✓	Base	Futures
6	@6ng	26-Jun-2013 We	✓	Base	Futures
7	@7ng	29-Jul-2013 Mo	✓	Base	Futures
8	@8ng	28-Aug-2013 We	✓	Base	Futures
9	@9ng	26-Sep-2013 Th	✓	Base	Futures
10	@10ng	29-Oct-2013 Tu	✓	Base	Futures
11	@11ng	25-Nov-2013 Mo	✓	Base	Futures
12	@12ng	27-Dec-2013 Fr	✓	Base	Futures
13	@13ng	29-Jan-2014 We	✓	Base	Futures
14	@14ng	26-Feb-2014 We	✓	Base	Futures
15	@15ng	27-Mar-2014 Th	✓	Base	Futures
16	@16ng	28-Apr-2014 Mo	✓	Base	Futures
17	@17ng	28-May-2014 We	✓	Base	Futures
18	@18ng	26-Jun-2014 Th	✓	Base	Futures
19	@19ng	29-Jul-2014 Tu	✓	Base	Futures
20	@20ng	27-Aug-2014 We	✓	Base	Futures
21	@21ng	26-Sep-2014 Fr	✓	Base	Futures
22	@22ng	29-Oct-2014 We	✓	Base	Futures
23	@23ng	24-Nov-2014 Mo	✓	Base	Futures
24	@24ng	29-Dec-2014 Mo	✓	Base	Futures
25	@25ng	28-Jan-2015 We	✓	Base	Futures
26	@26ng	25-Feb-2015 We	✓	Base	Futures

2. Check the **Active** column in the rows (grid points) to activate and remove check marks to de-activate grid points.
3. Click **Apply** to apply your changes. The activated grid points are displayed as fields in the main *Index* window.
4. Click **File→Save Configuration** from the menu bar to save the changes.

4.8.4 View Index Input and Output

Data set input displays the grid point dates and marks the activated ones. The output displays the grid point's rate/price using the calculation specified in the definition.

To view the input or output of a data set:

Select **View** from the *Standard Official Index* window menu bar and choose the appropriate sub-menu item:

- **Output**: Rates or discount factors (as defined in the Definition window)
- **Grid Point Data**: List of grid point input and definition information
- **Graph**: A pictorial representation of the output over the time period specified (The x-axis represents the month/year and the y-axis represents the market rates/prices)

4.8.5 Print Index Data

You may print the index input and the index output from the *Index* window.

To print index data:

1. Select **File→Print Screen** from the menu bar to print the current *Index* screen. A standard *Print* dialog box opens.
2. Select the printer and click <**OK**>.
3. Select **File→Print Input** or **Print Output** from the main index window menu bar. A message *File Saved As*: and options (**View**, **Print**, and **OK**) display.

Note: Click **View** to display the report in the *Report Viewer* window.

4.8.6 Export Index Data

Exporting the index data can be done to a text file.

4.8.6.1 Export to Text

Select **File→Export as Text**.

4.8.7 Input Style

There are four input styles for index:

Style	Defined
Individual	• This is the default style • Groups grid points by category and input format • Is used in interest rate indexes
Cluster	• Displays the input fields, as well as the input fields of all parent indexes • Designed to use with Power indexes • Groups input fields by type and date
Cluster by Month (CBM)	• Displays the input fields, as well as the input fields of parent curves by month • Is used with energy indexes
Listing	• Displays the category for each grid point as well as input, format, effective, coverage start and end dates • Input can be modified

To change the input style:

1. Click **Input Style** from the *Standard Official Index* window menu bar.
2. Select an input style (**Individual, Cluster**, and **Cluster by Month)** from the drop-down menu.
3. Click the different input styles and note the differences.

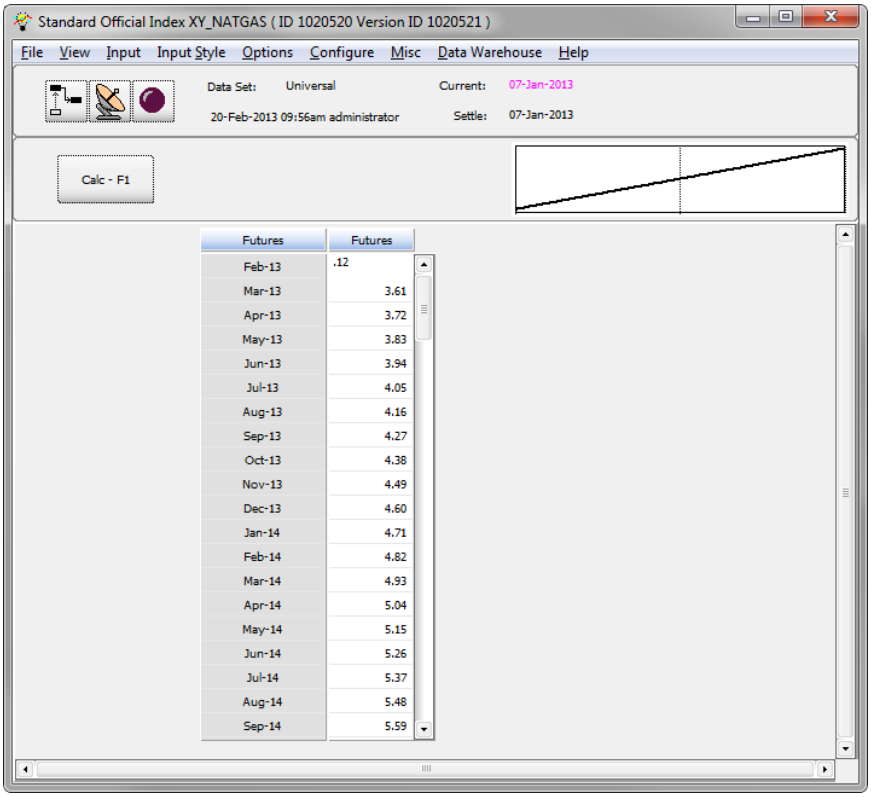
4.8.8 Configuring the Standard Official Index Window

Modify the number of decimal places and font size through the **Configure** menu option. In the following exercise, the number of decimal places is changed to two.

To change the number of decimal places in the Standard Official Index window:

Note: This only works if the *Input Style* is Individual.

1. Select **Configure→Display Config Mode→O**n from the menu bar. The index input fields turn white.
2. Click a field and type a number containing the number of decimal places to display. Below, the number .12 is entered in the first cell to display two decimal places. (Inputting *.123* would represent three decimal places.)
3. Press the **<Enter>** key to continue to change the display in all cells.



4. Select **Configure→Display Config Mode→Off** from the menu bar once configuration of the data input window has been completed.

Note: Reset the default values by selecting **Configure→Display Config Mode→Reset to Default** from the menu bar.

4.8.9 Refresh Index Data

An internal user may change a price manually or the price may change via a live market feed. Indexes need to be refreshed throughout the day to obtain the latest prices.

To retrieve the market feed:

Click the **satellite** icon  on the toolbar. A status bar displays the refresh progress. (Note that the MDD must be running.)

Note: Waves display on the icon when there is new market data to receive.

To retrieve changes made to the Universal dataset:

Click the **ball** icon  on the toolbar.

Note: The ball flashes if the most recent universal data set is not loaded.

Exercise: Index Data

1. Change a grid point value within the index (of the universal data set). The ball flashes.
2. Click the **Calc** button and save the information as Universal.
3. Retrieve the changes the other students performed in this exercise.

4.8.10 View / Modify Bid-Offer Spread

A bid-offer spread may be created for any curve input:

- When the spread and the bid price are entered, the system calculates the offer price
- When the spread and the offer price are entered, the system calculates the bid price

The following table depicts the system calculations for one of the values when changes are made to the other two values:

Bid	Offer	Bid-Offer Spread
Entered	Changed	**Calculated**
Entered	**Calculated**	Changed
Changed	Entered	**Calculated**
Calculated	Changed	Entered

The following example illustrates entering a mid, bid, or offer price/rate given a bid-offer spread in the NYMEX curve.

To view the bid-offer spread:

1. Select **Input→Bid-Offer Spread** from the *Standard Official Index* window menu bar. The data fields next to each grid point contain rate spreads.

   Note: A value of zero indicates that the bid and offer prices are the same.

In this example, enter a value of 1.00. Press **<F4>** to copy down the first value. The cells become pink indicating that a change has been made

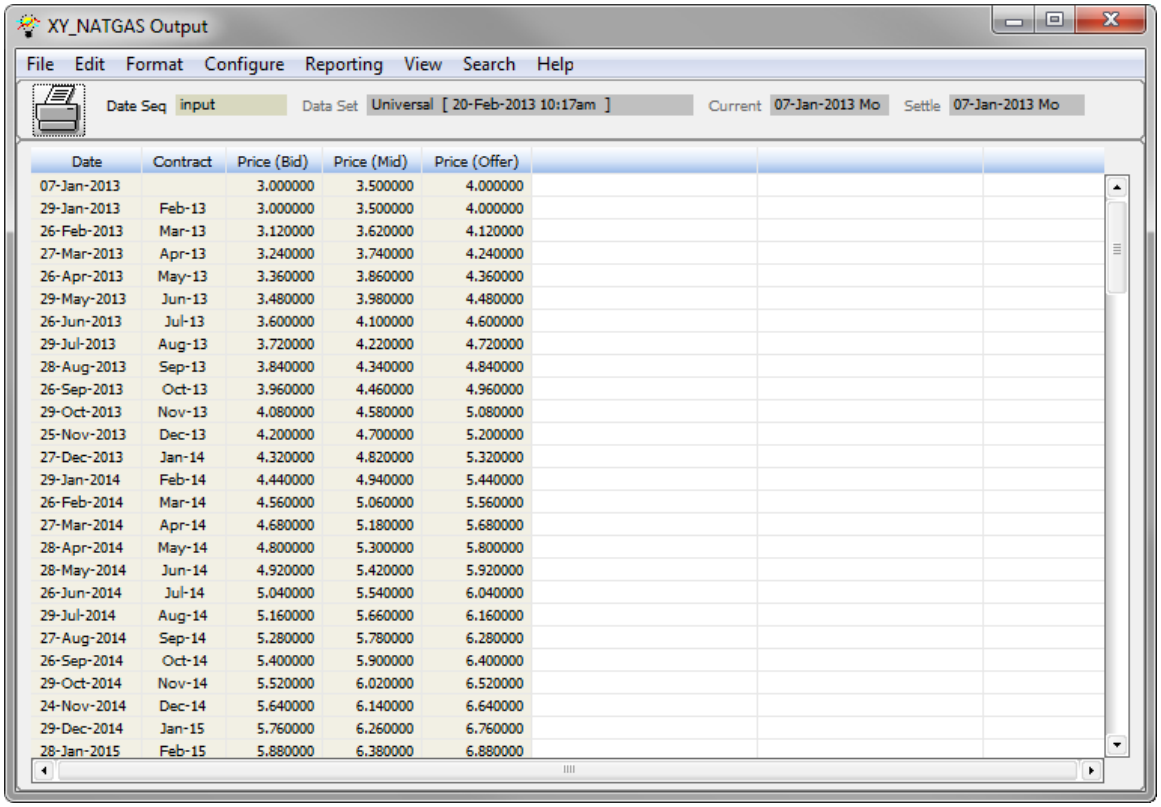
   Note: The value, -1.00, indicates that bid and offer prices are entered and the mid point is calculated by the system.

2. Click **Calc**. The cells become white.
3. Select **Input→Bid** from the menu bar to display the bid rates/prices.
4. Click the **Mid** and **Offer** radio buttons.

   Note: The curve automatically calculates the bid, mid and offer rates. To disable the link, enter a negative bid-offer spread.

Enter bid and offer rates. The mid-point is computed (the average of the bid and offer rates) each time an entry is made.

5. Select **View→Output**. The *Output* window displays:



Date	Contract	Price (Bid)	Price (Mid)	Price (Offer)
07-Jan-2013		3.000000	3.500000	4.000000
29-Jan-2013	Feb-13	3.000000	3.500000	4.000000
26-Feb-2013	Mar-13	3.120000	3.620000	4.120000
27-Mar-2013	Apr-13	3.240000	3.740000	4.240000
26-Apr-2013	May-13	3.360000	3.860000	4.360000
29-May-2013	Jun-13	3.480000	3.980000	4.480000
26-Jun-2013	Jul-13	3.600000	4.100000	4.600000
29-Jul-2013	Aug-13	3.720000	4.220000	4.720000
28-Aug-2013	Sep-13	3.840000	4.340000	4.840000
26-Sep-2013	Oct-13	3.960000	4.460000	4.960000
29-Oct-2013	Nov-13	4.080000	4.580000	5.080000
25-Nov-2013	Dec-13	4.200000	4.700000	5.200000
27-Dec-2013	Jan-14	4.320000	4.820000	5.320000
29-Jan-2014	Feb-14	4.440000	4.940000	5.440000
26-Feb-2014	Mar-14	4.560000	5.060000	5.560000
27-Mar-2014	Apr-14	4.680000	5.180000	5.680000
28-Apr-2014	May-14	4.800000	5.300000	5.800000
28-May-2014	Jun-14	4.920000	5.420000	5.920000
26-Jun-2014	Jul-14	5.040000	5.540000	6.040000
29-Jul-2014	Aug-14	5.160000	5.660000	6.160000
27-Aug-2014	Sep-14	5.280000	5.780000	6.280000
26-Sep-2014	Oct-14	5.400000	5.900000	6.400000
29-Oct-2014	Nov-14	5.520000	6.020000	6.520000
24-Nov-2014	Dec-14	5.640000	6.140000	6.640000
29-Dec-2014	Jan-15	5.760000	6.260000	6.760000
28-Jan-2015	Feb-15	5.880000	6.380000	6.880000

To modify the bid-offer spread:

Note: If the Bid-Offer spread is fixed, as in this example, and the bid, mid, or offer is changed, the others change accordingly.

1. Select **Input→Bid-Offer Spread** from the *Standard Official Index* window menu bar.
2. In this example, change the spread to .5 by entering the value in the field. Press <**F4**> to copy down the first value. The cells become pink indicating that a change has been made e field.
3. Click <**Calc**.>. The cells turn white.
4. Select **Input→Bid** from the menu bar to display the bid rates/prices.
5. Click the **B/O** radio button to see the change.

Note: If the bid, offer or the bid offer spread is changed, the other numbers adjust accordingly.

The following table summarizes the three possible scenarios:

Bid	Mid	Offer
Entered	Bid + ½ * Spread	Bid + Spread
Mid - ½ * Spread	Entered	Mid + ½ * Spread
Offer – Spread	Offer - ½ * Spread	Entered

5.0 VOLATILITY

Volatility is a measure of random variability (in a price, rate, or other underlying pricing factor). It is usually expressed as one standard deviation number quoted as a percentage of the price, rate, or other underlying factor.

In the system, volatilities are used for two purposes. First, they store pricing parameters for option pricing models. The price of an option is determined by the volatility, price of the underlying security, interest rate, time to expiration, and the strike price. Second, volatilities are used in Value-at-Risk calculations and store correlations for VaR calculations.

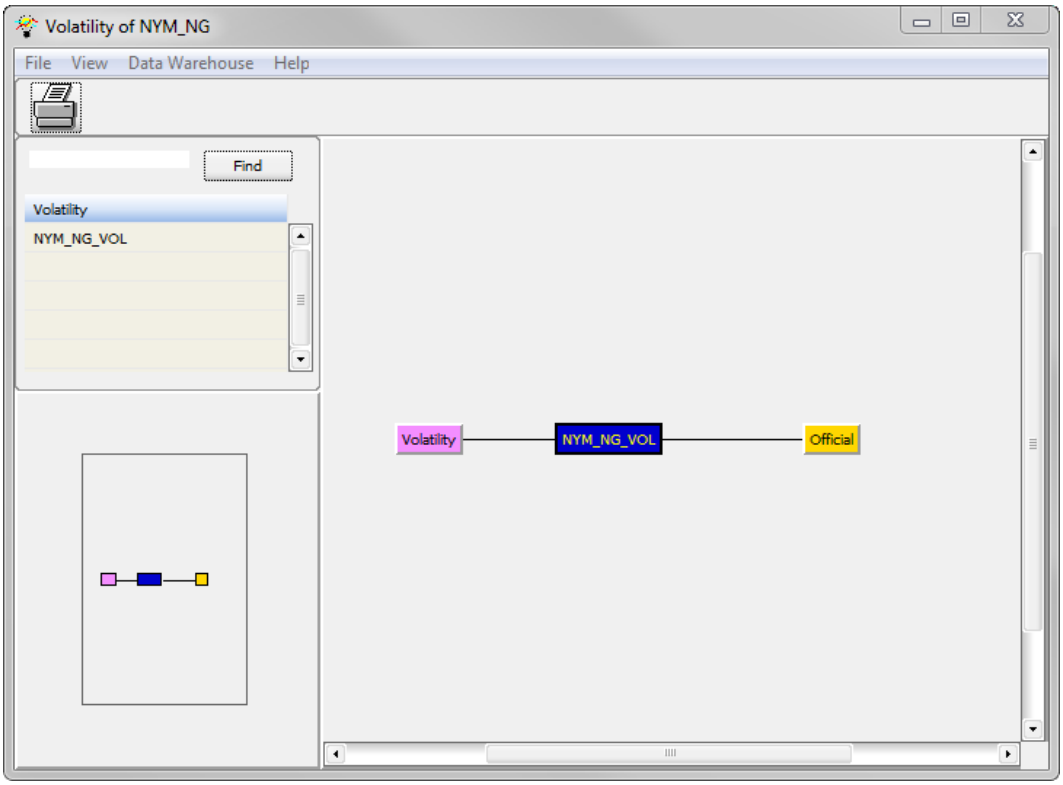
5.1 Creating Volatility Definitions

When creating a volatility definition, the user must create a volatility domain. A volatility domain defines the association between pricing models, deals and the volatility data used in valuing deals. Domains can be created as private or shared. The ability to create a shared domain allows for easier setup and maintenance.

In the following example, a volatility definition will be created for the NYM_NG index, using a shared domain.

To create a volatility definition:

1. Right-click on the **NYM_NG** index. The <*Node Menu*> displays.
2. Select Volatility. The *Volatility of NYM_NG* browser window displays.

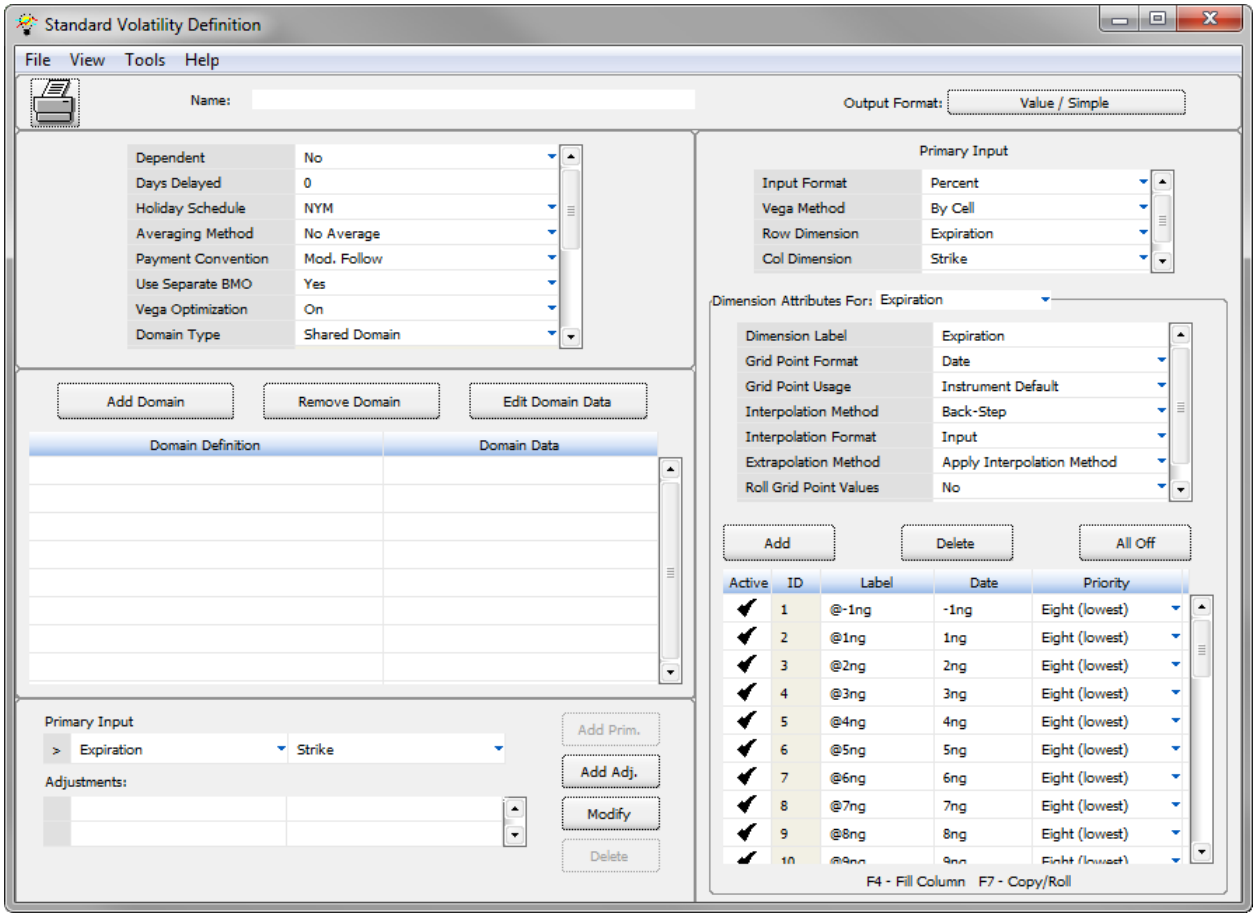


✓ The pink node represents the volatility domain

- ✓ The blue node represents volatility definitions
- ✓ The yellow node represents volatility input

3. Click the Volatility definition node. The *Standard Volatility Definition* window displays.

Note: The fields are defined in *Appendix B – Standard Volatility Definition Window* on page 52.



1. Assign a name in the **Name** field at the top of the window. For this example, input NYM_VOL.

2. Select No in the **Dependent** field.

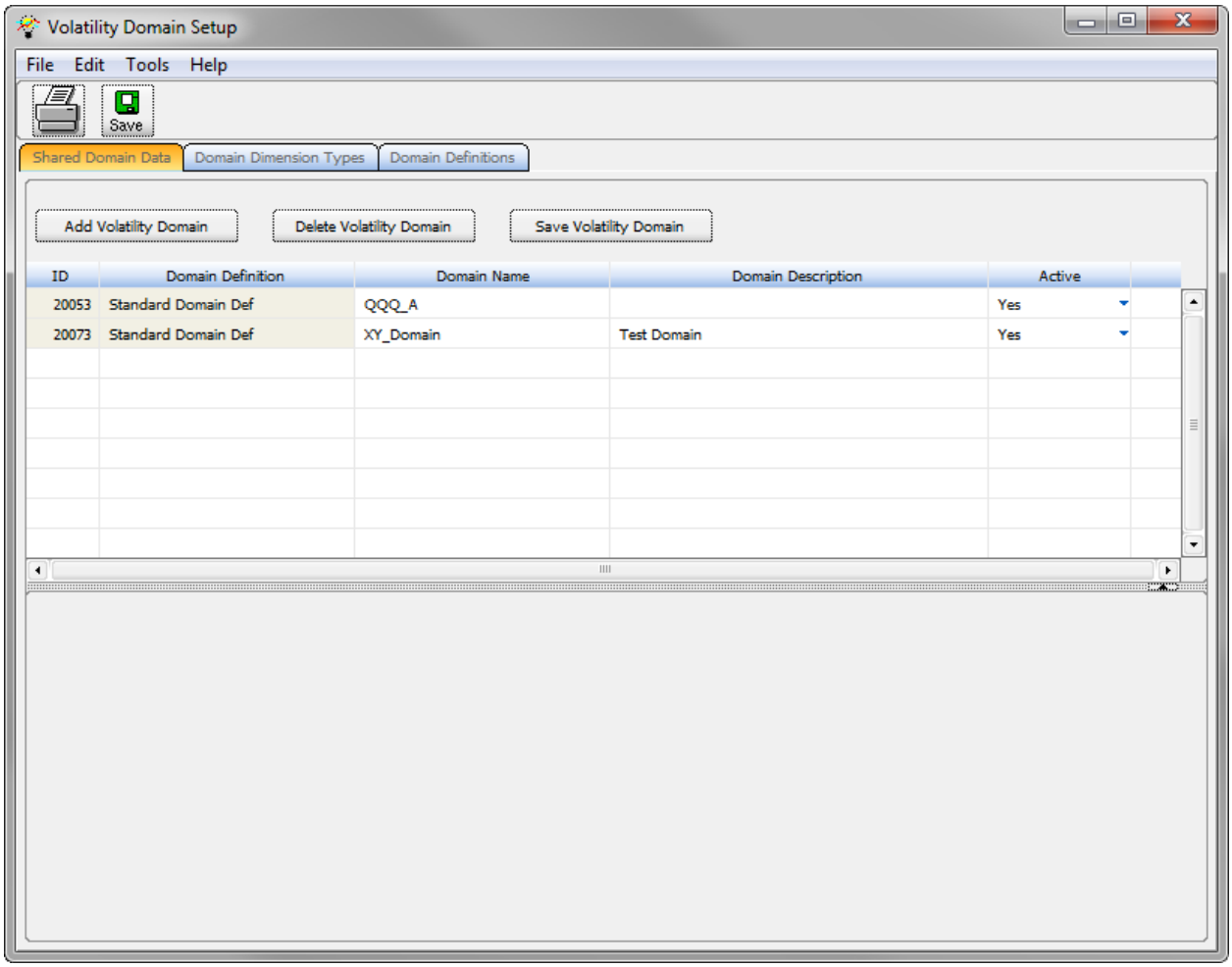
- ✓ **Dependent** identifies the index as a dependent volatility definition
- ✓ **Independent** identifies the index as an independent volatility definition

3. Select Shared Domain in **the Domain Type** field. Follow the steps below to create a shared domain:

a. Click the **Add Domain** button.

b. Select the **Standard Domain Def**. Once this is selected, highlight that row by clicking on the row.

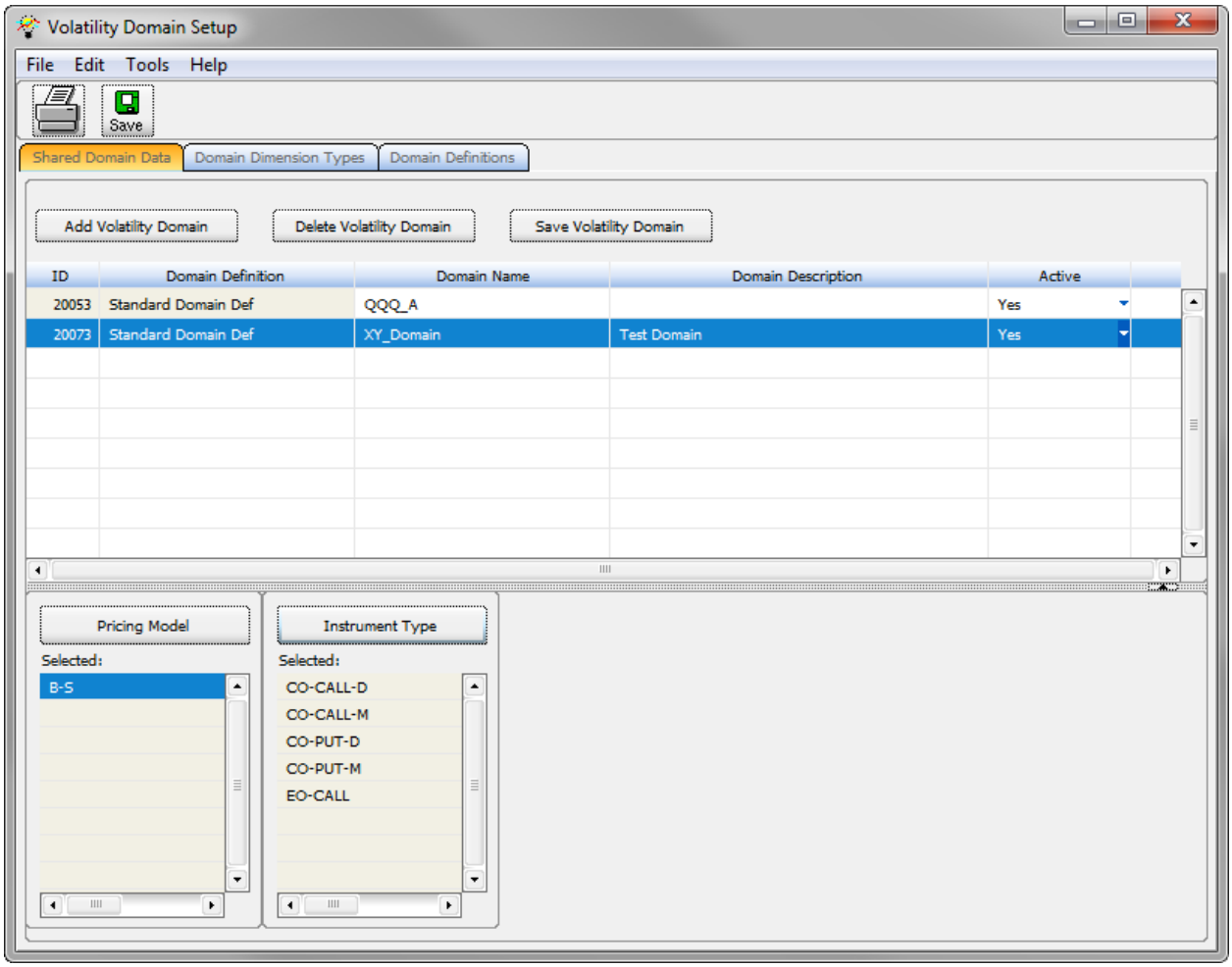
c. Click the **Edit Domain Data** button. The *Volatility Domain Setup* window displays.



To create a Shared Domain Definition (within the Volatility Domain Setup Window):

1. Click the **Add Volatility Domain** button located at the top left-hand corner and select Standard Domain Def.
2. Assign a name within the **Domain Name** field. For this example, input XY Domain where XY are your initials.
3. Input a description in the **Domain Description** field. For this example, input Test Domain.
4. Set the definition to active by selecting Yes in the **Active** field, and then click the **Save Volatility Domain** button.
5. Highlight the row by clicking on the ID number. The **Pricing Model** button and the **Instrument Type** button become enabled in the gray panel (see the following graphic).

Note: A domain must be set up in order to create the volatility definition. A domain is the pairing of a pricing model with its selected instruments. **Domains can be shared or private.**



6. Click the **Pricing Model**(s) button to display a pick list of pricing models. For this example, select B-S.

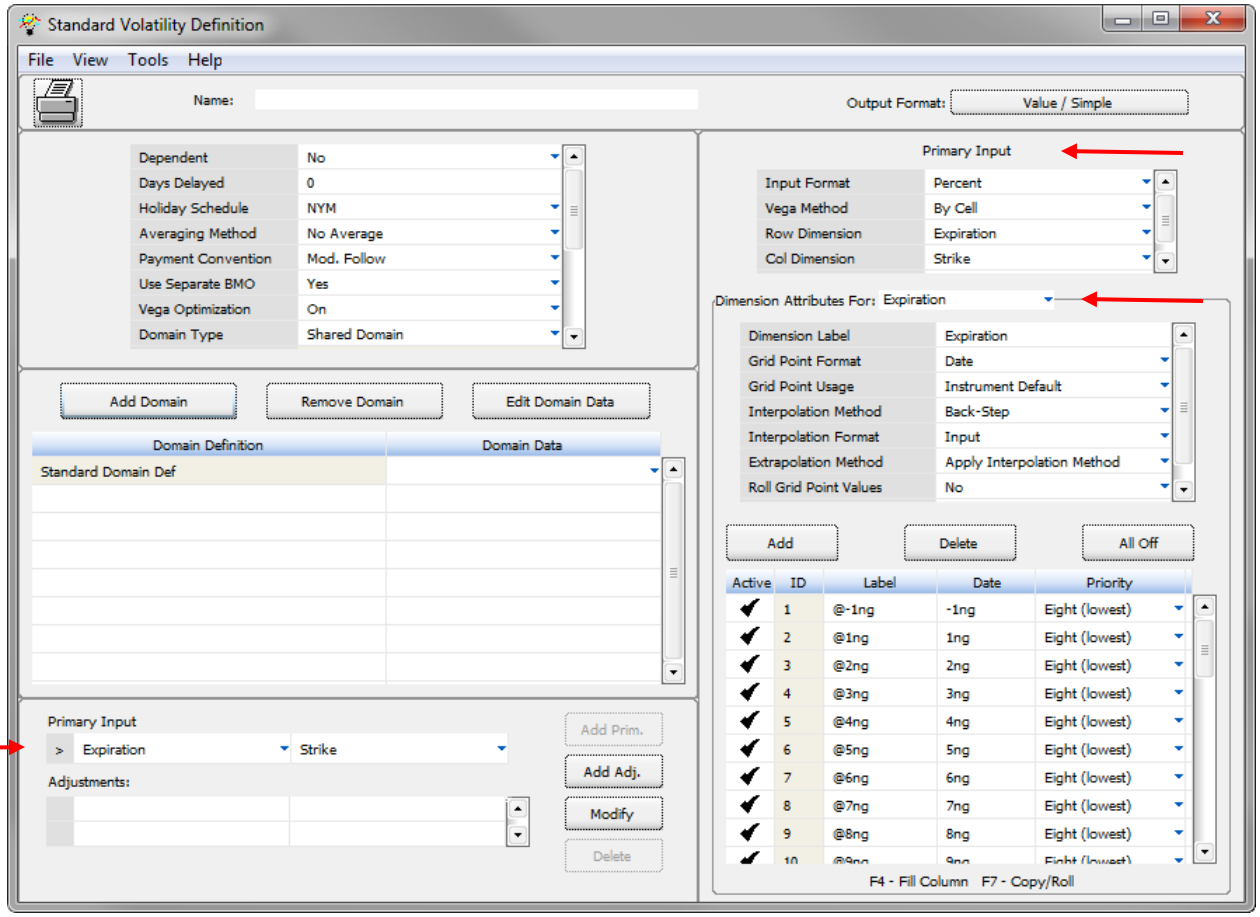
Note: After clicking the **Pricing Model** button, select a pricing model from the drop-down list. Once the pricing model is selected, the cell is highlighted red in order to enable the Instruments menu. Click on the pricing model to enable the **Instrument Type** button.

7. Click the **Instrument Type** button to select the Instruments to use for each pricing model. For this example, select CO-CALL-D, CO- CALL-M, CO-PUT-M, CO-PUT-D and EO-CALL

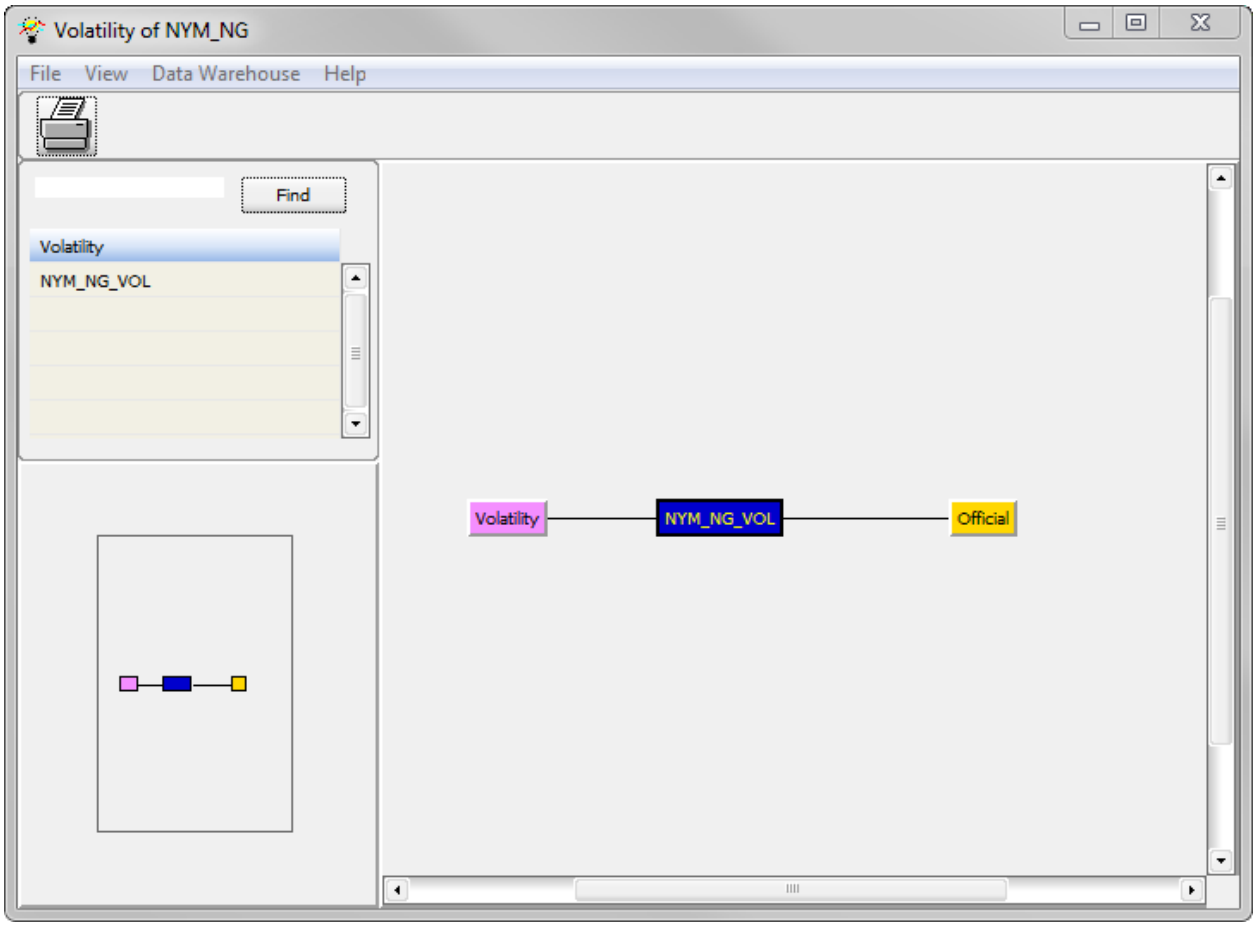
8. Click the **Save** button from the *Volatility Domain Setup* window.

To complete the Volatility Definition: (Via the Standard Volatility Definition Window)

1. Within the **Domain Data** field, select the Shared Domain that was previously created.



2. Select Expiration and Strike within the **Primary Input** field.
3. Set the **Input Format** field to Percent in this example. **Grid Point Format** is set to Date, and **Interpolation** is set to Back Step.
4. **Add, Delete**, and activate or de-activate all (**All Off**) of the appropriate points.
5. Click in the **Dimension Attributes For:** field and select Strike.
6. In the **Strike** Price fields, enter 2, 3, 4, 5, 6.
7. Select **File→Save** to save the information. The *Volatility for NYM_NG* window displays.



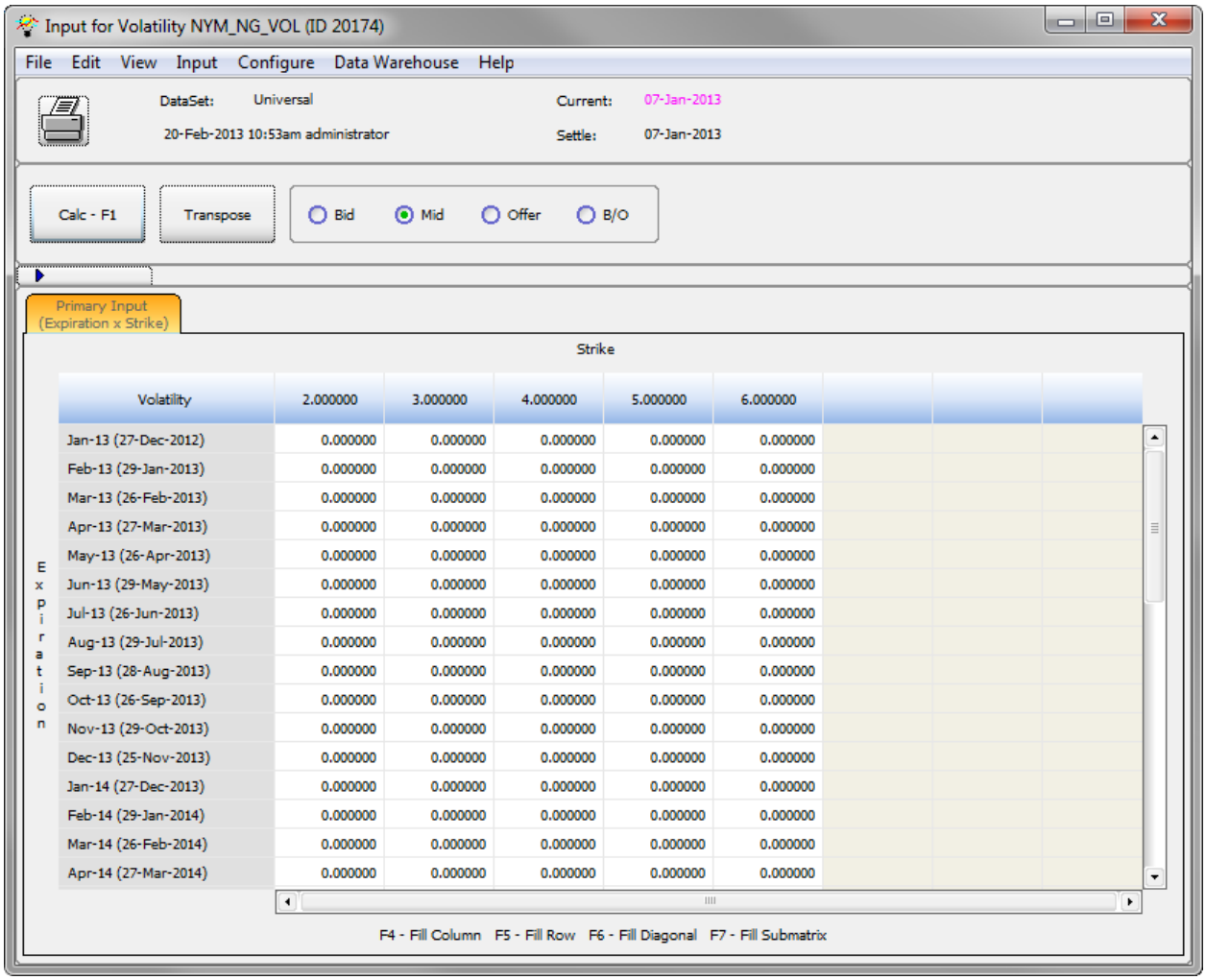
5.2 Volatility Input

Volatility curve inputs calculate prices. The input box (whose label "Official" may be changed by right- clicking and selecting Rename) contains the volatilities used. Additional volatilities may be added; however, they will not affect the volatility used. A user may load and save personal, universal, and closing input data.

To modify the volatility input:

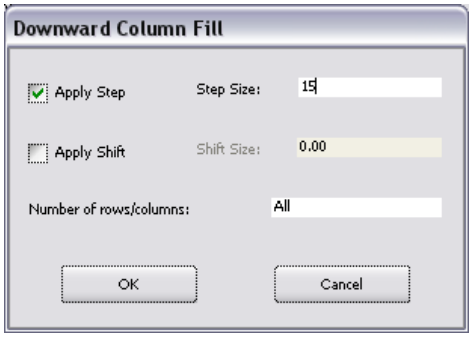
1. Right click the **Official** (yellow) node in the *Index Volatility* window.
2. Select Input. The *Input for Volatility* window displays.
3. Click a cell to change the volatility, as required. The field turns pink. In our example, we will enter 15 in the first row and column.

Note: The dimensions for the matrix were defined in the *Definition* window.



4. Click the **Calc** button or press <**F1**>.

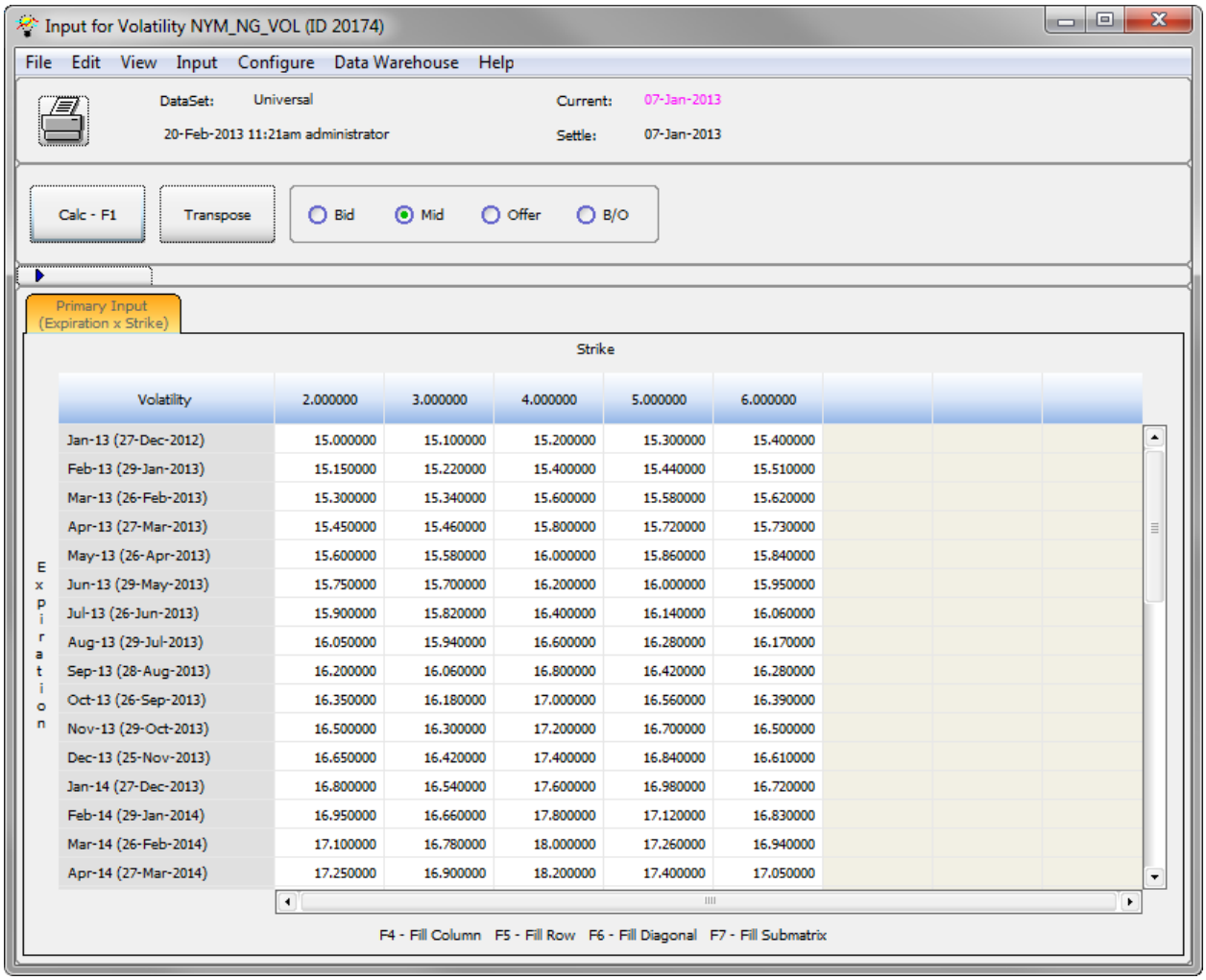
5. Press the **<F4>** key. The *Downward Column Fill* window displays.



6. Enter a value in the **Step Size** and **Number of Rows** fields and click **OK**. In this example, enter .15 and select All. Then fill in all the columns. Then fill in all the columns.

7. Click **OK**. The volatility for each expiration date is populated.

8. Select **File→Save Universal** from the menu bar to save the information.

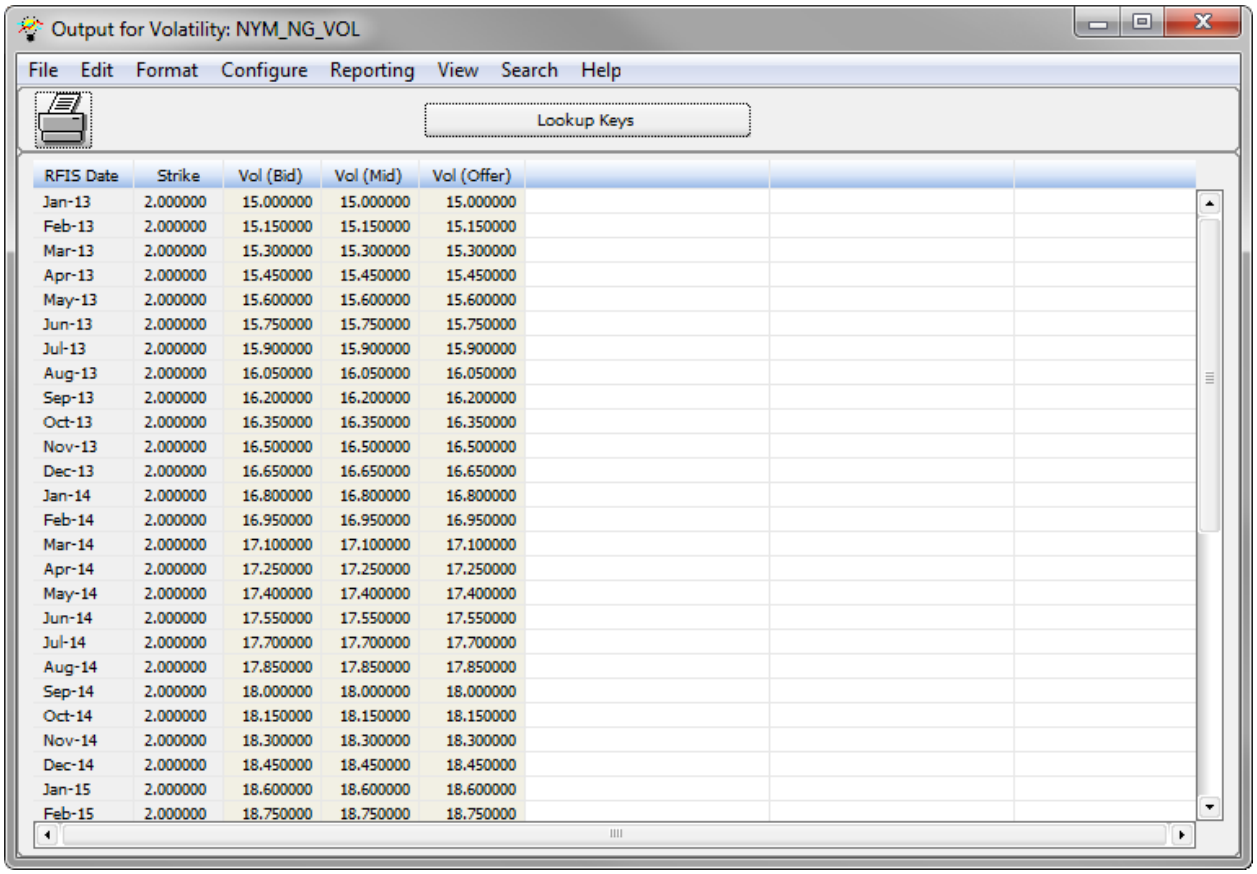


5.2.1 Output Information

Users can view the output from the *Input for Volatility* window. The output is computed based on the volatility input. It allows users to see interpolated points and calculate spreads off the parent.

To view the output of volatility:

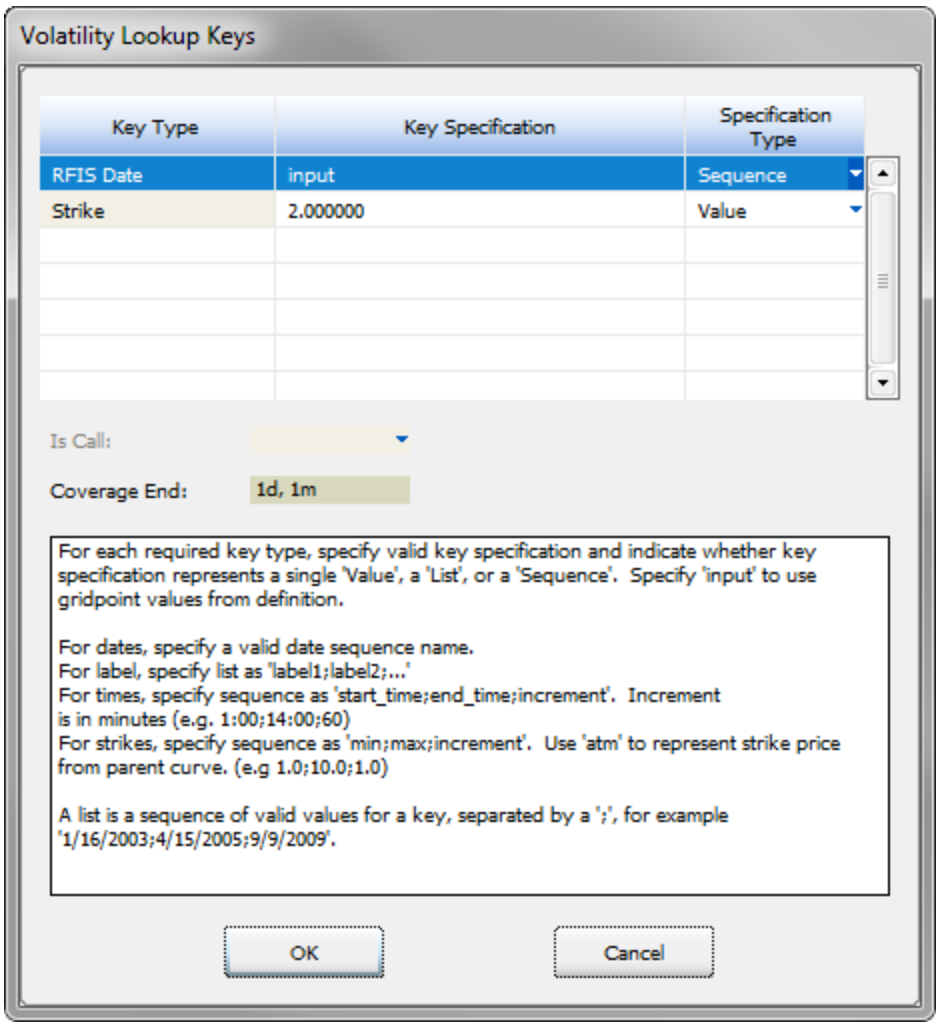
Select **View→Output** from the menu bar. The *Output for Volatility* window displays.



RFIS Date	Strike	Vol (Bid)	Vol (Mid)	Vol (Offer)
Jan-13	2.000000	15.000000	15.000000	15.000000
Feb-13	2.000000	15.150000	15.150000	15.150000
Mar-13	2.000000	15.300000	15.300000	15.300000
Apr-13	2.000000	15.450000	15.450000	15.450000
May-13	2.000000	15.600000	15.600000	15.600000
Jun-13	2.000000	15.750000	15.750000	15.750000
Jul-13	2.000000	15.900000	15.900000	15.900000
Aug-13	2.000000	16.050000	16.050000	16.050000
Sep-13	2.000000	16.200000	16.200000	16.200000
Oct-13	2.000000	16.350000	16.350000	16.350000
Nov-13	2.000000	16.500000	16.500000	16.500000
Dec-13	2.000000	16.650000	16.650000	16.650000
Jan-14	2.000000	16.800000	16.800000	16.800000
Feb-14	2.000000	16.950000	16.950000	16.950000
Mar-14	2.000000	17.100000	17.100000	17.100000
Apr-14	2.000000	17.250000	17.250000	17.250000
May-14	2.000000	17.400000	17.400000	17.400000
Jun-14	2.000000	17.550000	17.550000	17.550000
Jul-14	2.000000	17.700000	17.700000	17.700000
Aug-14	2.000000	17.850000	17.850000	17.850000
Sep-14	2.000000	18.000000	18.000000	18.000000
Oct-14	2.000000	18.150000	18.150000	18.150000
Nov-14	2.000000	18.300000	18.300000	18.300000
Dec-14	2.000000	18.450000	18.450000	18.450000
Jan-15	2.000000	18.600000	18.600000	18.600000
Feb-15	2.000000	18.750000	18.750000	18.750000

To change the expiration sequence:

1. Click the **Lookup Keys** button on top of the window.
2. Enter the frequency; for example, 1d, 1m, in the **Coverage End** field and click **OK**. This field represents the last date to generate or the range of the date sequence.



6.0 DEFAULT ENVIRONMENT

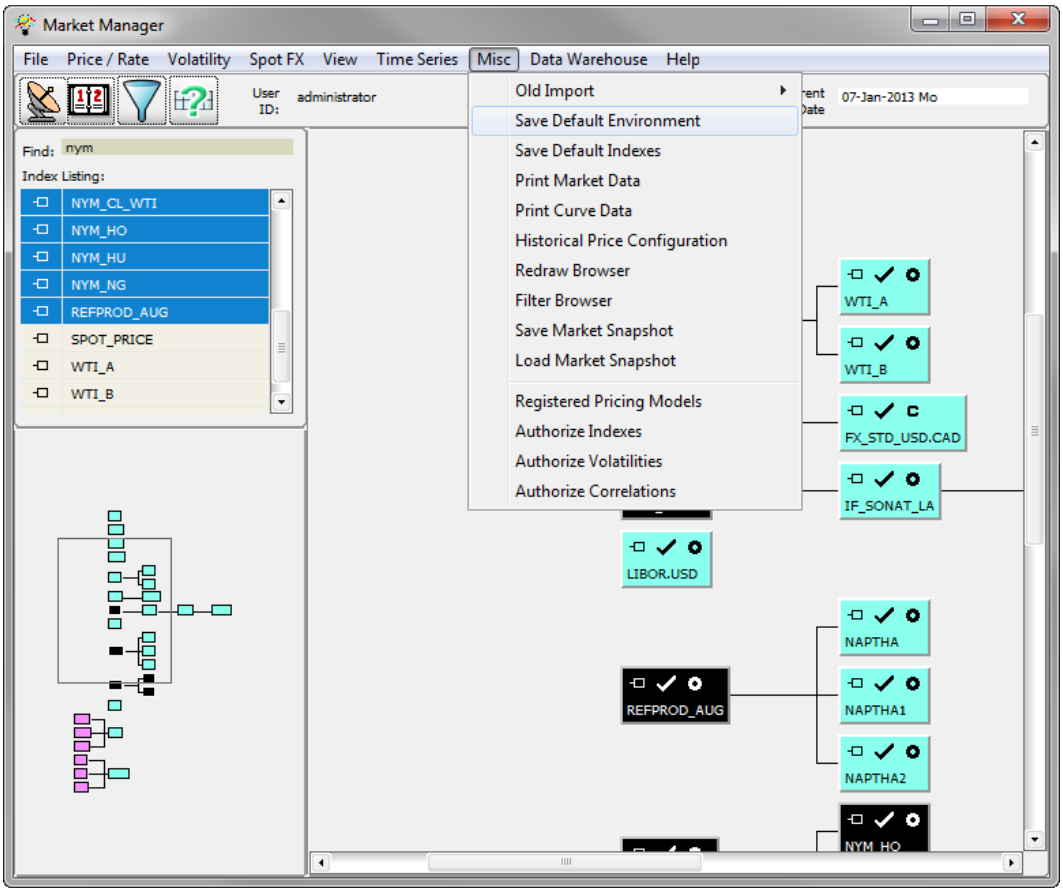
The *Market Manager's* **<Misc>** menu item is where the default currency, holiday schedule, date format, and other default values are defined. In addition, you can load indexes automatically by saving them as environment defaults in the Market Manager.

6.1 System Default Configurations

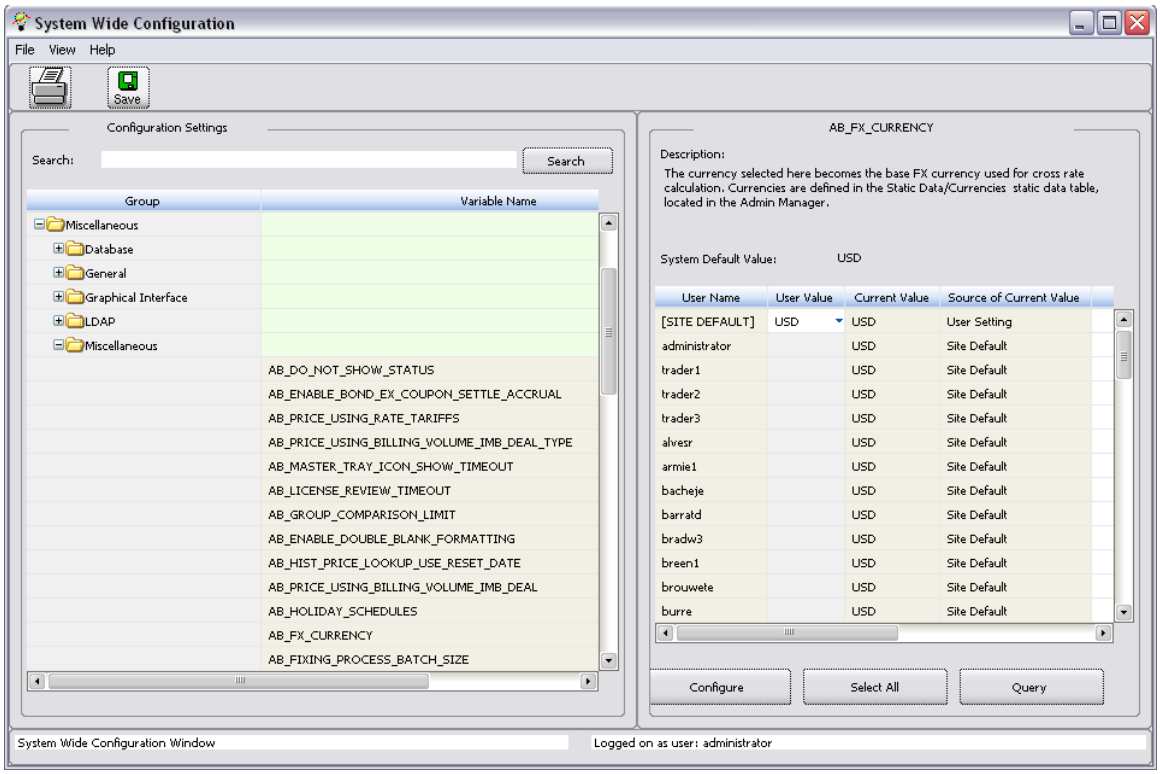
To set up system default configurations:

Note: The following example is set up for the United States. Set the defaults according to your location.

1. Select **Misc→Save Default Environment** from the menu bar.



The System Wide Configuration window displays.



2. Expand the **Miscellaneous, Miscellaneous** folders respectively. Click **AB_FX_CURRENCY;** verify that USD was selected.
3. Click **AB_HOLIDAY_SCHEDULES;** verify that NYC was selected.
4. Expand the **Administration**, **Date** folders respectively. Click **AB_DATE_LOCALE;** verify that US was selected.

   Note: Select **AB_DATE_ LOCALE** before **AB_DATE_FORMAT** for the correct selection of date formats.

5. Click **AB_DATE_FORMAT;** verify that MDY_SLASH (mm/dd/yy) was selected.

   Note: The **DATE FORMAT** depends on the **DATE LOCALE**. For example, if the date is the second day of the month January in the year 2008, US displays 01/02/2008, Europe displays 02/01/08 and Asia displays 2008/01/02.

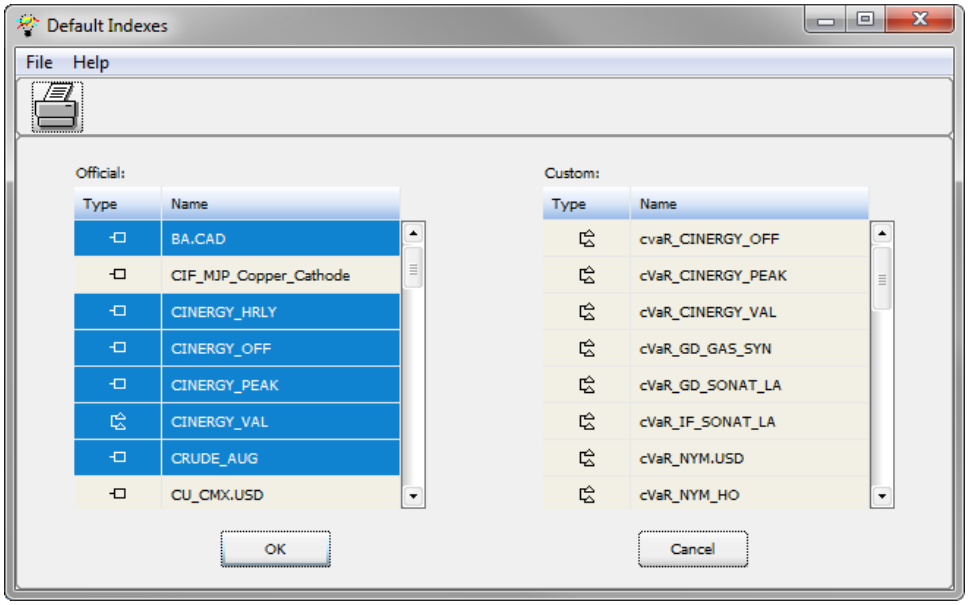
6. Expand the **Graphical Interface** folder. Click **AB_FONT;** verify that Normal was selected.
7. Click the **Save** button to save the settings. The settings will be the default when logged into the system in future.

6.2 Default Indexes

To save default indexes:

Note: The *Default Indexes* window lets you create default system information for specific markets and indexes.

1. Select **Misc→Save Default Indexes** from the menu bar. The *Default Indexes* window displays.



2. Select the index by clicking in the **Name** field. In this example, select the indexes created in previous exercises.

3. Select **File→Save** from the menu bar to save the index.

7.0 MARKET EXPLORER

The Market Explorer is a module that offers many of the same functions as the Market Manager including:

- Viewing, modifying, creating and loading indexes
- Importing and saving prices and volatilities
- Importing and exporting data

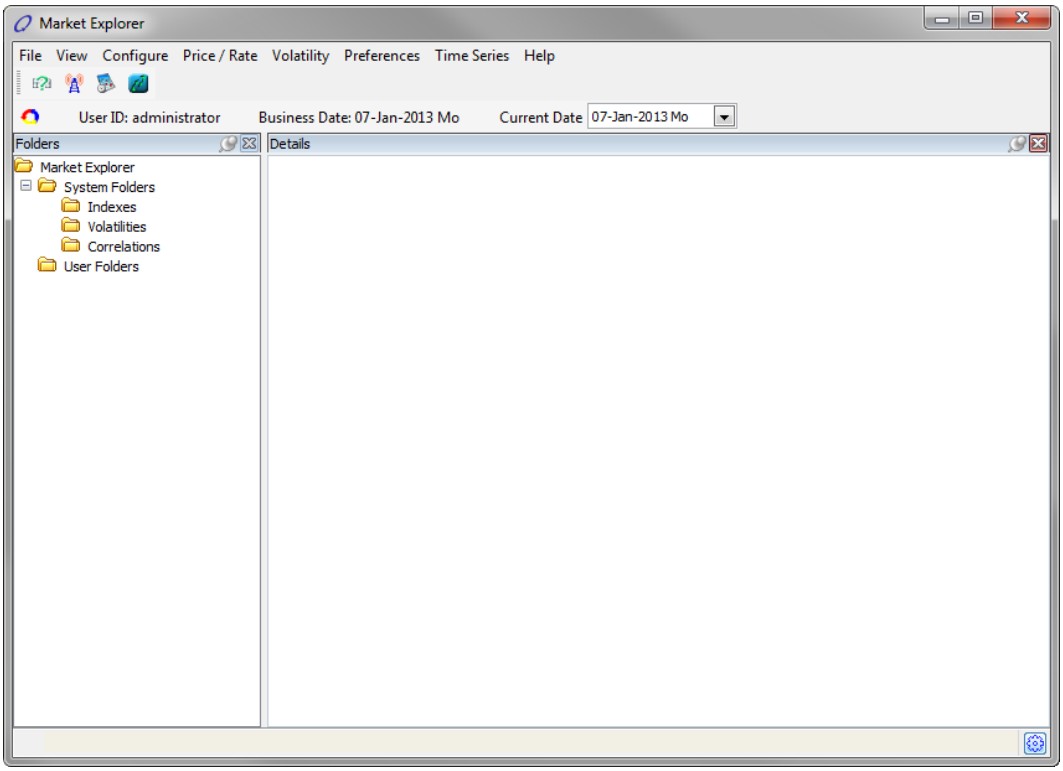
The Market Explorer offers an alternative way of viewing, organizing, and filtering the market data and is highly configurable.

The format is similar to a table viewer while incorporating organizational folders and tree view functionality.

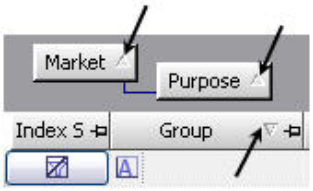
To open the Market Explorer:

1. Right click on the header bar of OpenLink Central and select *Launch Available Services*. The list of available services displays.

2. Select Market Explorer to launch the Market Explorer.



Icon	Defined
	Opens the Market Query Manager.
	Retrieves Market Data feeds.
	Displays Calendar.

Icon	Defined
	Refreshes Files.
	Refresh icon.
	Expand the tree view (by clicking the  button) to display the properties. Collapse (by clicking the  button) to hide the properties.
	Sort a column—ascending or descending. The sort option can be applied via the column header or the group headers of the *Blotter Properties*. 
	Engage / Cancel Auto Hide on a Panel.
	Opens a list of available services.

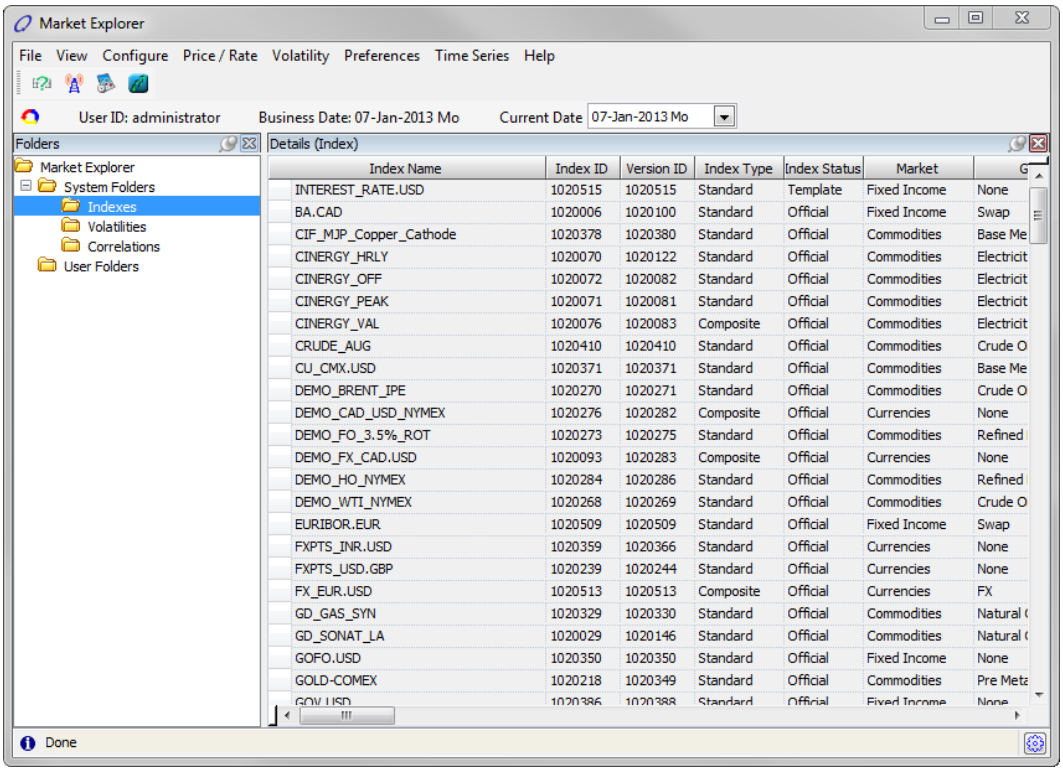
7.1 System Folders

There are three system folders:

- Indexes
- Volatilities
- Correlations

Clicking on each of the system folders then list all of the corresponding data in the *Details* window.

Click the **Indexes** folder to load all the Index data (listing of all the curves).



7.2 User Folders

New folders may be added to the Market Explorer. These folders can be linked to a specific saved query. These queries must be created and saved in either the Market Manager or the Market Explorer. Folders can also be linked to an *ad-hoc* query.

To create a new user folder:

1. Right-click on **User Folders** and select **New Folder**.
2. Name the folder Natural Gas.
3. Right click on the folder and select **Folder Properties**. A *Folder Properties* window displays on the right-hand side of the screen.
4. Select a saved query to be used to populate the *Details* window with data.

> **Note**: AdHoc queries can also be linked to user folders by executing a query in the Market Explorer. Once executed, a *Query Results* folder will be created and can be renamed.

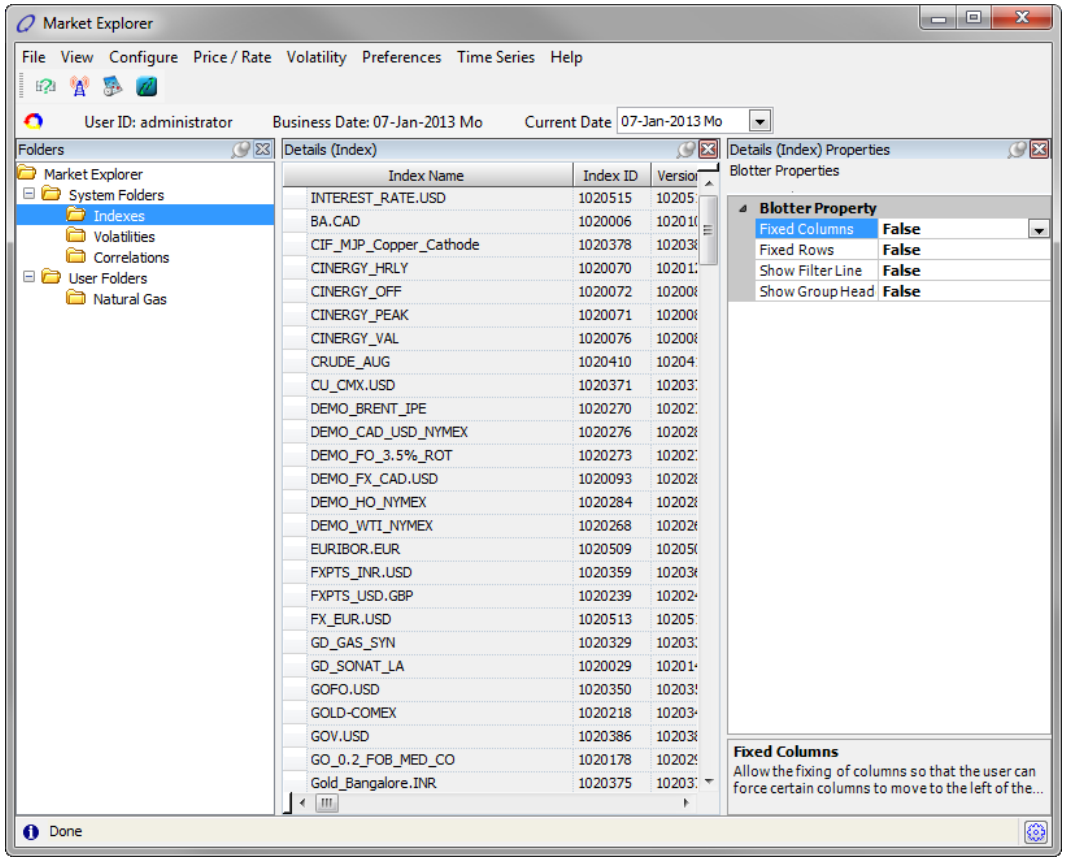
5. Select the Natural Gas saved query (if created).

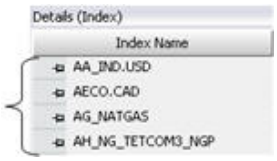
7.3 Configuring

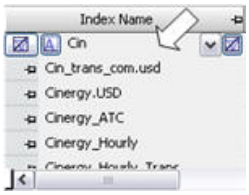
Each *Details* listing window can be configured to be more useful. Below are a few of the main features:

1. Click the Indexes system folder.

2. Click **Configure→Blotter Properties** to see the *Blotter Properties Details window* display on the right hand side of the screen. The properties can be turned on or off by toggling between **True** and **False**.



Properties	Defined
Fixed Rows 	This is used to select specific columns to fix and remain fixed in its place while scrolling. When fixing a row, it is first moved to the top-most position and kept locked in its place.
Fixed Columns 	Use this to select specific columns to fix and remain fixed in its place while scrolling. When fixing a column, it is first moved to the left-most position and kept locked in its place.

Properties	Defined
Show Filter Line 	Enables each column to be filtered by user-defined criteria. In addition to inputting specific filtering criteria, the user can also specify what type of filter will be performed by clicking on the icon to the left of the filter entry space ( ).
Show Group Header	Opens a group header window that enables drag-and-drop functionality of columns to organize data in the *tree view* mode. • Set the value for **Show Group Header** to True • Click and drag the **Group** column header up to the **Group Header** window area (tree view will be formed) • Click and drag the **Purpose** column header up to the **Group Header** window area and drop it to the right of the **Group** category

7.4 Saving or Opening Configurations

Configurations can be saved by naming it and specifying permissions using the **File → Save** or **File → Save As** commands. Saved configurations can then be opened from the **File → Open** menu or can be set as the default configuration from the **File → Set As Default** menu.

8.0 APPENDIX A—STANDARD OFFICIAL INDEX WINDOW FIELDS

The following fields are displayed on the left side of the Standard Official Index Window in the Market Manager: (*For more information on this window and the fields, see the Market Manager Online User's Guide).*

Field	Defined
Index Name	Specifies the name of the index. Should be named according to the following convention: INDEX NAME.CURRENCY ABBREVIATION (for example, NYMEX.USD).
Label	Identifies label (such as to define a trading region such as "West").
Market	Defines the market this index is a measure of and determines select field values. For example, the NYMEX.USD index is a measure of the fixed income market so the Market is Fixed Income. A selection in this field controls which other attributes are applicable to this index definition and triggers default values in some of these fields.
Group	Further defines the market. Choices are based on the **Market** value.
Sub Group	Further defines the market. For example, each location in Energy Delivery has a subgroup (used in trading crude and refined products). Subgroups may hold grades of commodities.
Format	Determines the type of output this index produces. This is a dropdown list containing various formats of indexes including discount factor (DF), CC Zero Rate, Price, and Annualized Zero Rate.
Purpose	Defines the purpose of the curve, which helps control the application of each curve in the system. [This field should display Trading since the NYMEX.USD index is used for trading purposes.]
Class	Specifies what each grid point interval represents: **Date-Base Fwd**–indicates the grid point pertains to a date. **Time-Base Fwd**–indicates the grid point pertains to an interval of time.
Secured Index	Specifies whether or not an index is "secured" (set up in the Reference Manager, *Personnel Maintenance* window) for saving universal or closing data sets.
Delivery Unit	Defines the contract delivery units associated with the index.
Price Unit	Defaults to the delivery unit selected above.

Field	Defined
Base Currency	Defines the base currency for this index. The currency table is maintained in the Admin Manager's Static Data.
Holiday Schedule	Defines the holiday schedules for this index. More than one can be selected. Holidays are factored into calculations that require good business day logic.
Days Delayed	Represents the number of business days between the current (or trade) date and the settlement date. This is more applicable for interest rate indexes than commodity indexes, which typically are set to a zero settlement period.
Std Contract Size	Represents the standard contract size for this market and is used as the default standard contract size for grid points associated with this index. (Changes to this field do not affect existing grid points.)
Gamma Factor	Specifies a scaling factor to be used in gamma calculations.
Std Tenor	Sets the standard maturity of grid points for this index; not applicable for commodities.
Date Sequence	For the Commodities market, this field references a user-defined Date Sequence (maintained through the Admin Manager→Date Sequence module). For the Fixed Income market, this field is used for curve smoothing if smoothing is turned on. For composite indexes, it is used to determine dates for which output is generated. The Date Sequence applies to a parent index if it triggers a price on a child index. For example, if the parent index uses the end of month date sequence, the child uses the start of month sequence, and the price of the parent on March 31 is $20; the price for the child on April 1 is $20.
Option Date Seq	The date sequence used for option instruments.
Payment Conv	Identifies how payment dates will be modified for instruments using this index when the non-modified payment date does not fall on a good business day. The payment convention selected for this index will be used as the default. The options are: **None**: The payment date is not shifted. **Follow**: Shifts the payment date to the next good business day. **LME**: London Metal Exchange is a variant on Mod Follow. **Mod Follow**: Shifts the payment date forward unless it falls into the next month, in which case it is shifted to the previous good business day.

Field	Defined
	Preceding: Shifts the payment date to the previous good business day. **Mod Preceding**: Shifts the payment date to the prior good business day unless it falls into the prior month, in which case it is shifted to the next good business day. This is the standard convention for most energy trades. **Mod Weekend**: Shifts the payment date to the preceding Friday if the payment day is Saturday. Shifts the payment date to the following Monday If the payment day is Sunday. If Monday is not a good business day, Mod Following is used.
Yield Basis	Applicable only to indexes that are not child indexes. This is a dropdown field containing the yield bases available within the system. **The field is displayed for all markets except "Commodities."** Yield basis on the curve level is used to default the yield basis on deals. Therefore, when you book a new "Swap" toolset deal using LIBOR.USD, the Yield Basis will be set to "Act/365 Fixed" for the deal, if that was what was set on LIBOR.USD. On the curve level, the yield basis determines the displayed values of the zero and forward rates on the output table.
Conversion Factor	This field only displays if the selected market is "commodities." The user can enter a value for conversion in this field when enabled. The conversion factor converts units of Child curves in instances where they do not match Parent Curve units.
Coverage End Date	Represents the appropriate coverage end date for the index type. Grid points that exceed the coverage date will be deactivated.
Interpolation	Defines the interpolation method that will be used to calculate prices between grid points. This is a dropdown list containing the interpolation methods available within the system. (Log-Linear is an appropriate choice for the LIBOR.USD index. For commodities, Back-Step should be selected.)
Inheritance	Determines if child curve inherits the delta sensitivity of the parent or calculates it independently.
Discount Index	Indexes available to use as the default discounting index for instruments.
Use Exp. Contract	This field is not currently functional.
Rounding	This field is not functional and is included for backwards compatibility.

Field	Defined
Reference Source	Displays the Reference Sources available in the system. It is maintained in the *Admin Manager→Static Data→Reference Source* window.
Input Style	Controls the input style of the index window.
Delivery Type	Used in the *Accounts* option of the *Reference Manager* and for inventory tracking. It is the mechanism to support physical delivery for the commodities market.
Component	This is a reference field that describes indexes. The information is sometimes used in hedge scripts for calculating a delta neutral position: **Basis**: Defines spreads off the fixed price curve (for example, a child curve spread off the parent). **Fixed Px**: Specifies that a price is associated with the commodity. **Loc Diff**: Used as a label for child indexes spread off the physical premium curve. **Phys Prem**: Identifies that an index is spread off the basis curve.
Avg Period (d)	Sets the default averaging structure for rate resets.
Bought Currency	Used for currency indexes.
Bought Ccy Holidays	Only applies if market is *Currencies*. Displays a list of holiday schedules.
Time Zone	This field applies for power and electricity curves.
Price Band	This field applies for power and electricity curves.
Density Adjustment	This is used for unit conversions on the ComSwap input screen to adjust for non-standard densities when converting from volumetric to mass units.
Projection Method	The projection method is used to default the financial side of deals in the Commodity Toolset.
Delta Optimization	The purpose is to speed up delta calculations. This feature enhances the performance of delta calculations only for commodities deals.
Output Delta Shift	Shows the Output Delta Shift used in the Output Delta Sim Result. This field is only available in version 6.0 or later.

9.0 APPENDIX B – STANDARD VOLATILITY DEFINITION WINDOW

The *Standard Volatility Definition* window is used to define the models that determine the volatility of each instrument, switch grid points *On* or *Off* for use in calculations, and specify parameters and formats for features such as strike, tenor, delay, and so forth. For detailed information, refer to the online help user guide.

9.1 Menu Bar

This window contains the following menu items:

Menu	Item	Description
File	**Save**	Saves the volatility as *Official*.
	Export→Definition	Opens the *Volatility/Correlation Definition Export* window. This is used to export volatility and correlation definitions.
	Export→Data	Opens the *Volatility/Correlation Export* window. This is used to export volatility and correlation data.
	Import→Definition	Opens the *Volatility/Correlation Definition Import* window. This is used to export volatility and correlation definitions.
	Import→Data	Opens the *Volatility/Correlation Import* window. This is used to export volatility and correlation data.
	Print Screen	Sends a copy of the current window display to the printer.
	Exit	Closes the current window.
View	**Volatility Info**	Opens the *Volatility Info For* window for the selected volatility definition.
Tools	**Validate**	Test two different Volatility Domains for Overlap. This becomes a useful tool during Volatility Domain conversion because of the enforcement of non-overlapping domains.
	Reset To Default	Resets the volatility definition to the system-defined default definition. A *Private Domain* is reset to the new default *Shared Domain*.
Help	**Help**	Displays the system Help files.

9.2 Buttons

This window contains the following buttons:

Button	Description
	Sends a copy of the current window display to the printer.
Output Format **Value / Simple**	Opens the *Volatility Output Configuration* window that is used to input volatility output type, lookup type, and formula (optional). The label of the button shows the Output Type and the Lookup Type.
Pricing Models	A listing of available pricing models displays.
Instrument Type	A listing of available instruments for the pricing model highlighted on the selected (pricing models) listing opens.
Products	This button is only available if the volatility is for a Power index. A listing of available products for the instrument highlighted on the Selected (instruments) listing opens.
Pricing Model	Displays a listing of available pricing models opens. Highlight and select one or more models, then click the **OK** button. **This displays when Private Domain is selected in the Domain Type field.**
Instrument Type	Displays a listing of available instruments for the pricing model highlighted on the **Selected** (pricing models) listing opens. **This displays when Private Domain is selected in the Domain Type field.**
Products	Button is only available if the volatility is for a Power index. A listing of available products for the instrument highlighted on the Selected (instruments) listing opens. Highlight and select one or more instruments, then click the **OK** button. **This displays when Private Domain is selected in the Domain Type field.**
Add Domain	Add a domain reference to the volatility definition. **This displays when Shared Domain is selected in the Domain Type field.**
Remove Domain	Delete a domain reference from the volatility definition. **This displays when Shared Domain is selected in the Domain Type field.**
Edit Domain Data	Displays the Volatility Domain Setup window where the domain definition setup may be modified. **This displays when Shared Domain is selected in the Domain Type field**.
Add Prim.	This button is active if no Primary Definition has been defined. Primary Definitions need only be added when converting a Dependent Volatility to an Independent Volatility.
Add Adj.	Adds a secondary dimension row to the table.

Button	Description
Modify	Modifies the row type and column type within a secondary dimension table.
Delete	Deletes the selected secondary dimension row.
Add	Adds a grid point to the grid point table.
Delete	Deletes the selected grid points from the table. To select a grid point, position the cursor inside the third column (not the Active, ID, or Priority column). The column title depends on how the volatility is setup; for example, Tenor. Be sure to click within the cell. You cannot multi-select multiple rows for deletion at one.
All Off / All On	This toggles the activation or deactivation of all the grid points. Active grid points are checked.

9.3 Fields on Left Side of the Window

Field	Description
Name	Represents the name of the Standard Volatility Definition. The name can be modified later if the definition is saved.
Dependant	Indicates if the volatility definition is Dependant or Independent.
Days Delayed	A numeric field that is used when parsing symbolic dates. Symbolic dates are parsed using the value of the Settle Date from the parent curve as the date of origin. After parsing, the symbolic dates are adjusted by the number of days delayed that are specified here.
Holiday Schedule	Enables the selection of a holiday schedule.
Averaging Method	Enables the selection of the averaging method to be applied to the volatility of the reset structure.
Payment Convention	Payment Convention to volatility definition screen. This allows volatilities to be loaded without loading their parent volatilities.
Use Separate BMO	Uses separate Bid, Mid and Offer values. If this is set to “Yes” (default), it enables different values to be stored. This takes up more memory than when this is set to “No.” This should be set to “No” if users do not plan to have separate values.
Vega Optimization	Turns on (default) or off Vega Optimization. This should normally be set to “On” as it makes the Vega Result run potentially much faster. This field is only here in case there is some unanticipated reason why the volatility definition cannot use the system’s Vega Optimization.
Domain Type	A volatility domain is comprised of a volatility domain definition and domain data. The specific domain data is governed by the

Field	Description
	domain dimensions and definitions. **Private Domain**: This is legacy support. Previously, each volatility definition had an independent set of domain data, with a high degree of redundancy across volatility definitions. Two buttons display at the bottom of the window when this is selected: • Pricing Model • Instrument Type **Shared**: This functionality gives the ability to share volatility domain data across multiple volatilities, streamlining volatility setup, and maintenance. The bottom part of the window displays three buttons: • Add Domain • Remove Domain • Edit Domain Data
Domain Definition	Displays a pick list of domain definitions. A volatility domain definition is a collection of volatility domain dimensions and rules that govern how they work together. Domain definitions can contain any number of dimensions. Dimensions can be dependent on another dimension or can be independent of all other dimensions. This column displays when Shared Domain is selected in the Domain Type field.
Domain Data	Displays a data pick list of domain data. Domain data is governed by the domain dimensions and definitions. This column displays when Shared Domain is selected in the Domain Type field.
Primary Input	Select the dimension types for the Primary Input of volatilities. A minimum of one and a maximum of two dimension types must be selected. If the volatility requires more than two dimensions, then users can select additional ones as adjustments.
Adjustments	Select additional dimensions types if more than two are needed. The available dimensions are the same as the **Primary Input** field. To modify adjustments in an AVS script, the function **SIM_AddVolMod** adds a complete volatility modification entry, which includes the adjustments. This function returns the modification table from the scenario. A scripter could find the mod_sub_tbl for the volatility nested in the returned table and set the modifications accordingly.

Field	Description
Input Label	Displays whether the Primary Input or an Adjustment; for example, Adjustment 1, Adjustment 2, and so forth, is selected for input or modification. Highlight the Primary Input field to input or modify Primary Input details. To input or modify details of other adjustments, highlight the corresponding row in the Adjustment field.

9.4 Fields on Right Side of the Window

Field	Description
Category	Enabled if Adjustments. This displays the category of the adjustment that is being displayed.
Form	Displays the form of the adjustment that is being displayed.
Input Format	The format of the volatility input number.
Vega Method	Specifies the granularity that all Vega results for the selected volatility are reported in
Dimension Attributes For	Displays the dimension type of the highlighted primary input or adjustment. If there are two dimension types defined for the Primary Input/Adjustment, a pick list of the dimension types is available for selection.
Label	Defaults to the dimension type selected in the **Dimension Attributes For** field but the user can overwrite it.
Grid Point Format	Specifies the type of grid point. The available choices depend on the selected dimension in the **Dimension Attributes For** field. Not all choices are valid for each dimension. • Expiration, Tenor, Delay, Maturity, or Reset • Strike • Label • Disabled for Delta
Interpolation Method	Displays a pick list of *Volatility Interpolation Methods*. Select the interpolation routine that defines the method to be used to calculate prices between grid points. This field is not available to the “Label” dimension type.

Field	Description
Interpolation Format	Enabled only if the dimension is Expiration, Tenor, Delay, Maturity, Delta, and Reset. If **Interpolation** is *Delivery Month*, this field will not be enabled. For other dimension types, all interpolations are done using **Input Format**. The available choices depend on the selected dimension in the **Dimension Attributes For** field. For the "Standard Deviation" and "Variance" interpolation formats, the volatility input values are assumed to be annualized volatilities. This field is disabled for Strike and Label
Grid Point Usage	Refers to the usage of the grid point. The available choices depend on the selected dimension in the **Dimension Attributes For** field. Field is disabled for Tenor, Delay, or Label dimensions
Grid Point Form	The form used in the grid point. The available choices depend on the selected dimension in the **Dimension Attributes For** field. This field is disabled for Expiration, Tenor, Delay, Label, Maturity, or Reset.
Reference Value	Enabled if dimension is "Strike," and **Grid Point Usage** is set to "Rel. to Ref. Value." A numeric value meant to represent the Reference Value used by the ratio or spread may be entered in this field.
Active	Check this column to activate the grid point. Checked grid points have an active status.
ID	The system-generated ID number assigned to the grid point.
<Other Columns>	The succeeding columns that display depends on the selected dimension in the **Dimension Attributes For** field. **Expiration** – Date and Priority **Strike** – Strike **Tenor** – Tenor and Priority **Delay** – Delay and Priority **Label** - Label **Maturity** – Maturity and Priority **Delta** - Delta **Reset** – Date and Priority where, **Date** - Represents how far into the future the volatility is projected **Priority** - The grid point's priority. Priorities range from One (highest) to Eight (lowest)

10.0 APPENDIX C - DATE INPUT

When entering functional periods of time in the system, enter a number followed by the function. Compounding functions are implemented using ">" to denote "after." Relative dates are denoted by **@** (such as **@2ng** is the second date of the **ng** date sequence relative to the current date). The functions are listed in the following table. *n* can be a positive or negative integer (such as **3d** = **3 days** from the current date).

Function	Defined
current	Current date
next	Next good business day
settle	Settlement date
psettle	Parent index settlement date
tomo	Tomorrow's date
nd	Move n days from the current date
nw	Move n weeks from the current date
nm	Move n months from the current date
ny	Move n years from the current date
n day	Move n good business days from the current date
n mon	Move n Mondays from the current date
n tue	Move n Tuesdays from the current date
n wed	Move n Wednesdays from the current date
n thu	Move n Thursdays from the current date
n fri	Move n Fridays from the current date
n sat	Move n Saturdays from the current date
n sun	Move n Sundays from the current date
n week	Move n weeks from the current date
n fom	Move to the first day of the nth month
n som	Move to the first good business day of the nth start of the month
n lom	Move to the last day of the nth month
n eom	Move to the last good business day of the nth end of month from the current date
n year	Move to the good business day n years from the current date
n soy	Move to the first good business day of the nth start of year from the current date

Function	Defined
n eoy	Move to the last good business day of the nth end of year from the current date
n cq	Move to the nth calendar quarter from the current date
n imm	Move to the nth imm date from the current date where imm is defined as the third Wednesday in March, June, September or December
n mimm	Move to the nth mimm date from the current date where mimm is defined as the third Wednesday of the month
N date_sequence	Move to the nth date as defined in the date_sequence from the current date

11.0 APPENDIX D—GRID POINT ID WINDOW

The following fields are displayed on the Grid Point ID window in the Market Manager:

Grid Point Parameters	
Grid Point ID field	Shows the system-generated ID number
Grid Point Label	Grid point name
Ins Category	Categorizes grid points based on the instruments they represent (for the index data input window).
Priority Level	Determines which grid point receives precedence when the dates of two or more grid points overlap (one is the highest priority and eight is the lowest priority).
Start Date	Settlement date of the index. Can be a: • fixed date (such as 7/16/96) • relative date (such as the current date) • next (next good business day) • settle (settle date in the index) • psettle (parent index settle date)
End Date	Can be a: • Fixed date, such as 8/16/96, • Relative date; for example, 1m indicates one month after the start date

Grid Point Properties	
Effective Form	Specifies form output values for this grid point take: • Price • Rate • Ratio (of parent) • Spread
Input Format	Specifies the format input values for this grid point take: Percent, Decimal, BPS, 32nd, 64th, and 128th.
Input Label	Specifies the column heading for this grid point in the Index Data Input window.
Input Min	Defines the minimum value that can be entered.
Input Max	Defines the maximum value that can be entered.
Delta Shift	Specifies the value used to calculate the delta result for this grid point.

Grid Point Properties	
Input Display	Indicates whether or not the grid point is displayed on the Index Data Input window.
Epsilon	Determines when to stop the back solving for curves in the fixed income market. Used as a tolerance factor when solving for a zero NPV (a typical value range for epsilon is 1.00000 to 0.000001).
Shared Ins #	Identifies the shared instrument the grid point is based on (as defined in the Trading Manager). When a portfolio revaluation is performed (in the Trading Manager) and Use Market Prices is selected, the *Market Data* window displays the latest market prices obtained from the Market Manager. Use Market Prices is checked if the market price is to be used instead of calculating a price for an instrument. This shared instrument number remains with the grid point until the contract rolls off. The Shared Ins# field is also used to share market prices between indexes and shared instruments regardless of the setting of the Trading Ins field.
MDO ID	Market Data Object Identification This identifies the live data feed to be used to supply input values for this grid point. MDO IDs are maintained in the Admin Manager, Static Data module.
Trading Ins	Bases the grid point calculation for bond grid points on the bond instrument specified by the Shared Ins number instead of the bond structure on the grid point definition window. This allows curves to use a more complex bond structure than can be defined in the grid point bond structure.
Sensitivity	Controls how delta sensitivity is calculated for this grid point: • **Effective**: Calculates delta sensitivity based on shifts to the effective fields of the grid points—the grid point formulas are not recalculated during the delta calculations • **Raw**: Calculates delta sensitivity based on shifts to the input fields of the grid points—grid point formulas are recalculated during the delta calculations • **No**: Delta is not calculated
Other Input/Display Fields	Contains the possible fields to include in the index's Data Input window. Check the Use column for the column to display in the data entry grid. The input, bo_spd (bid-offer spread), and beta fields are checked because they are required.

Grid Point Formula	
Input Formula	Displays the input formula for the grid point. "Input" indicates that the system uses the input value for the first grid point to calculate the grid point's output value.
Alternate Formulas	Displays alternate input formulas for this grid point. There are two alternate input formulas for computing purposes. When the Ins Category field is Contract Basis, the formulas should be: "input = alternate – contract_price(parent); " and "alternate = contract_price(parent) + input; ". When the Ins Category is *Calendar_Basis* the formulas should be: input = "alternate – average_price(parent);" and "alternate = average_price(parent) + input;" Contract basis calculates the output price on a child curve by taking the input value and using it as a spread off the same month's contract from the parent curve. A typical example is a NYMEX parent curve with a date sequence (such as ng). Calendar basis computes the output value as a spread off the average of a range of dates' prices from the parent curve (based on the start and end dates of the grid point).

Grid Point Structure	
These fields are more relevant for interest rate indexes (with the exception of standard contract size). They depend on the Ins Category field (the instrument category) and define the underlying instrument structure of the selected grid point.	
Fixed / Float	Indicates the grid point is fixed or floating. This field is not relevant for commodities because the Fixed/Float attribute is set at the deal level.
Projection Idx	Shows the desired projection index for child indexes only. This defaults to the Current Index for parent indexes. This field is not relevant for commodities.
Discounting Idx	Shows the desired discounting index for child indexes only. This defaults to the Current Index for parent indexes. This field is not relevant for commodities.
Fix Rate / Flt Spd	For fixed rate structures, this field contains the value of the fixed rate. For floating rate structures, this field refers to the floating rate spread. This field is not relevant for commodities.
Standard Notnl	Specifies the notional value for new grid points of the curve and for default deals that reference this index.
Index Tenor	Specifies the default index tenor for deals that reference this index.

Grid Point Structure	
Yield Basis	Defines the yield basis to be used for this grid point. This field is not relevant for commodities.
Reset Period	Defines the rate reset period for this grid point; for example, 3m or 6m. This field is not relevant for commodities because commodity resets are set at the deal level.
Payment Period	Is a symbolic date field; for example, 3m This field is not relevant for commodities.
Avg Period	Applies to averaging structures. This field is not relevant for commodities.
Comp Period	Applies to compounding structures. This field is not relevant for commodities.
Averaging Type	Indicates whether the index is weighted or un-weighted.

12.0 APPENDIX E—PRICE CURVE GRID POINT INSTRUMENT CATEGORIES

Price or DF Curves	
Futures, Forward, Futures-D/M/Q/W, Forward-D/M/Q/W -	Input = Output
Px % Chg (child curve)	Child output = (Parent output) * (1 + effective input value)
Px Exp Chg (child curve)	- Child output = (Parent output) * exp(effective input value)
Px Shift (child curve)	Child output = (Parent output) + (effective input value)

Price Curves	
Calendar Basis (child curve)	Spread off an average of prices over a range of dates from a parent curve. The date range is based on the start and end date of the grid point.
Calendar Spread	Spread off a grid point within the same curve. Creates a series of curve output points. Typically used with the input formula group_spd(x)+ input, where x represents the prior grid point
Contract Basis (child curve)	Contract basis is used to calculate the output price on a child curve by taking the input value and using it as a spread off the same month's contract from the parent curve.

13.0 APPENDIX D—GLOSSARY

Term	Defined
Bid-Offer spread	The spread between the Bid and the Offer prices. Bid-Offer spread = Offer-Bid.
Child index	A child index can be created from any index. The child index defaults to the same structure as the parent index and inherits the risk associated with the parent.
Closing data set	Contains closing data for a given index and date.
Composite index	An index derived from one or more indexes. They are used when there are no observable prices for a given market.
Discount Factor	Present value of $1 received at a future date.
Index	Represents projected rates or prices based on current rates or prices.
Input Style: Cluster	Displays the input fields, as well as the input fields of all respective parent curves.
Input Style: Cluster by month	Displays the input fields, as well as the input fields of all respective parent curves by month. This is designed for use with energy indexes.
Input Style: Individual	The default input style that displays input fields as defined in the grid points grouped by category.
Personal data set	Represents an individual's unique view of the market.
Standard index	An index that represents a single market view. Cash, futures, and treasuries are used as underlying components. Examples of standard indexes are LIBOR and COB.
Standard Official/Custom Index window	The primary window in which to define an index.
Universal data set	Contains the default input. A data set saved as Universal becomes the effective data set for that index to all users and overwrites the previous universal data set.
Volatility	A measure of random variability (in a price, rate, or other underlying pricing factor).