Meridium APM Production Loss Accounting

3.6.1.2.0

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About This Document

This file is provided so that you can easily print this section of the Meridium APM Help system.

You should, however, use the Help system instead of a printed document. This is because the Help system provides hyperlinks that will assist you in easily locating the related instructions that you need. Such links are not available in a print document format.

The Meridium APM Help system can be accessed within Meridium APM itself or via the Meridium APM Documentation Website (https://www.meridium.com/documentation/WebHelp/WebHelpMaster.htm).

Note: If you do not have access to the Meridium APM Documentation Website, contact Meridium Global Support Services.

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Overview of Production Loss Accounting

The goal of all companies is to lower risk, reduce expenses, and produce a quality product at a predictable rate and cost while maintaining reliability. While owners and managers know the maximum amount they can produce during optimal operating and financial conditions, most companies rarely produce this amount on a regular basis. Inevitably, unplanned events occur that cause them to produce less than the desired amount. For example, a machine might stop working, causing workers to stop production while they wait for the machine to be repaired. In other cases, planned events cause production to slow down or stop. For example, planned shutdowns and predictable decreases in demand based on historical patterns can lead to production losses.

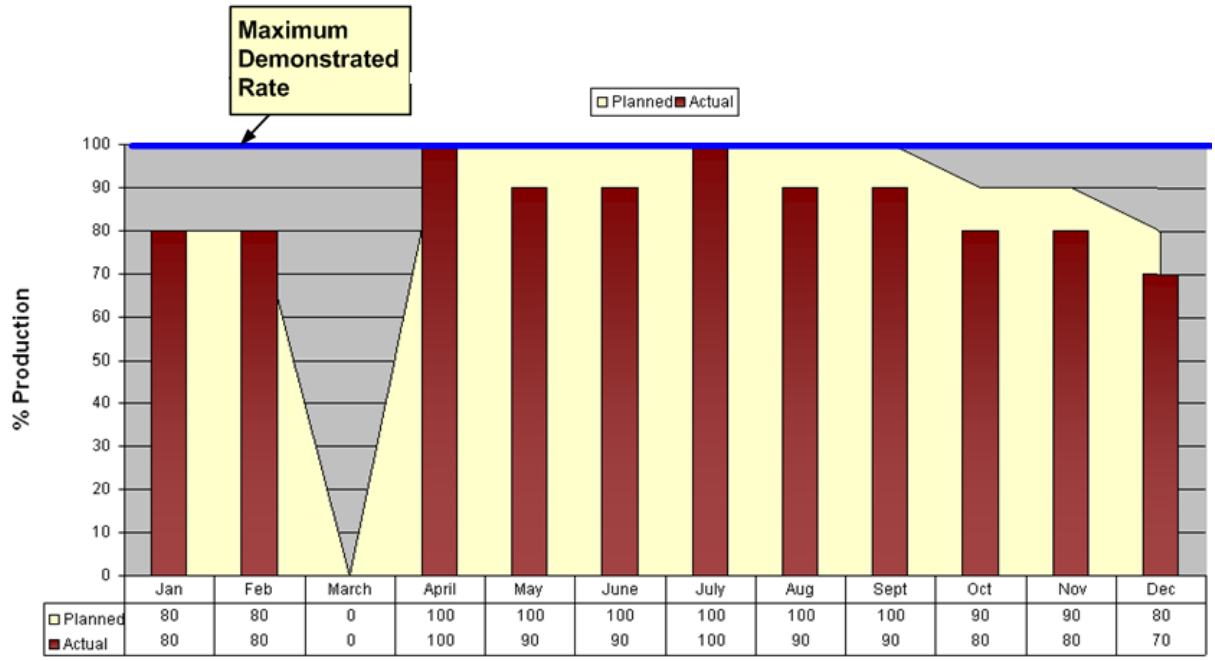
As a result of decreased production, companies incur costs and are unable to earn maximum profit.

Meridium APM *Production Loss Accounting* (PLA) allows you to:

- Enter production data.
- Identify production losses and associate them with the events that caused them.
- Determine what types or categories of events cause your company to lose the most production.

By entering and evaluating production data, you can more easily identify ways in which you can reduce unplanned downtime and increase production in the future, which will result in reduced cost and increased profit.

Consider the following graph, which represents a company's optimal, planned, and actual production percentage for a year.



	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Planned	80	80	0	100	100	100	100	100	100	90	90	80
Actual	80	80	0	100	90	90	100	90	90	80	80	70

In this graph, you can see from the blue line that the maximum demonstrate rate, or the percentage of output the company can produce during optimal operating conditions, is 100%.

The yellow area displays the *planned* production percentage for each month. Because the managers know that they cannot produce 100% of this maximum output each month, the planned production rate is lower than 100% during some months. In March, the planned production rate is 0% because the company plans to shut down that month to perform maintenance, install new equipment, and so on.

The red bars indicate the *actual* production rate each month. You can see that in some months, the company produced the amount they planned, and in other months, they produced less than they had planned.

From this graph, managers might conclude that more than half of their lost production for the year was due to the shutdown in March. If they could find a way to reduce this shutdown time or eliminate it completely, they would see a great increase in overall production.

Based on other data entered using PLA, managers would also be able to determine exactly how much money they lost during the March shutdown and how much money they lost during other months in which they did not reach the 100% production rate. They could then categorize these losses into planned and unplanned losses.

PLA System Requirements

The *Production Loss Accounting* license is required to take advantage of PLA functionality. In addition, your system must contain the basic Meridium APM system architecture.

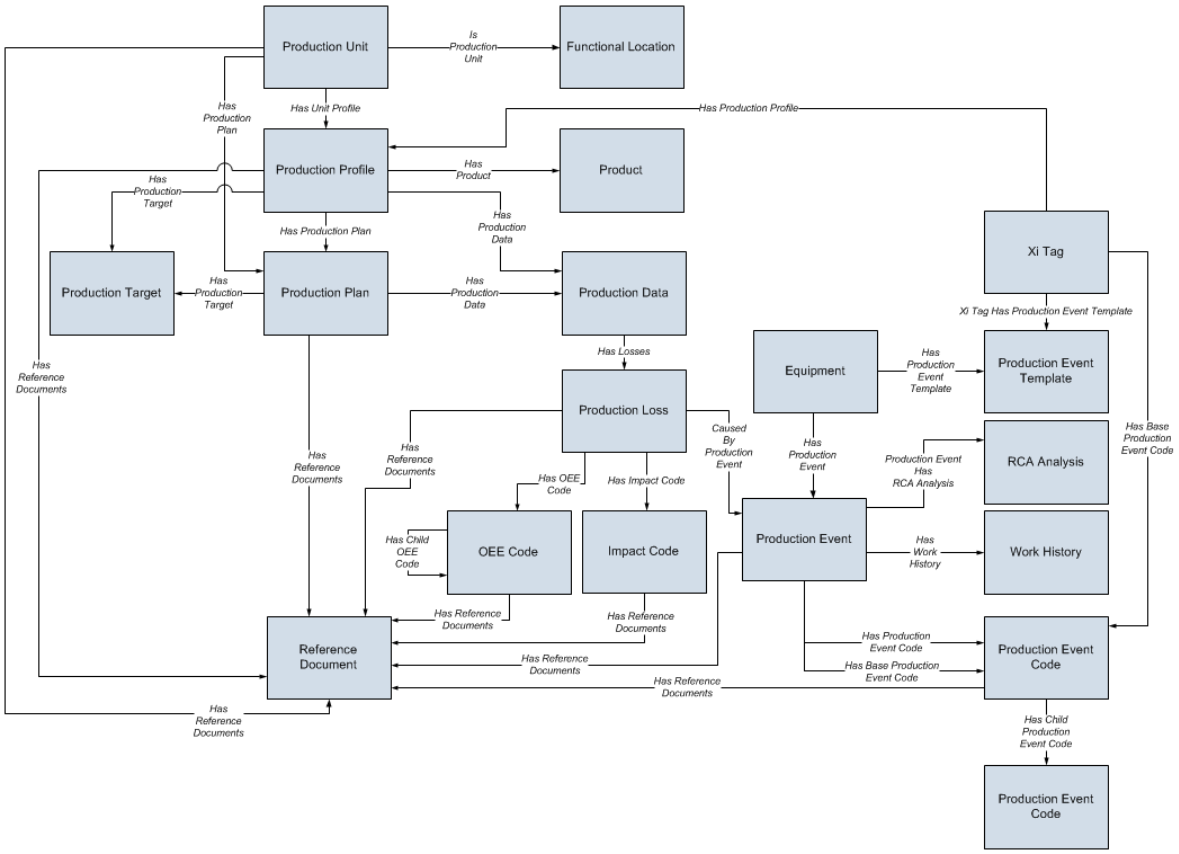
Hint: Details on the system requirements for the basic architecture and activating licenses can be found in the Installation, Upgrade, and System Administration section of the Meridium APM Help system.

After you have installed and configured the basic architecture, you will need to perform some configuration tasks specifically for the PLA feature.

Additionally, if you want to view Metric Views that are provided as baseline PLA content, you will need to deploy the Metrics and Scorecards module. This module requires additional hardware and software.

PLA Data Model

The following image provides a diagram of the entity families and relationship families involved in the PLA data model. In the image, boxes represent entity families, and arrows represent relationship definitions.



Notice that in the baseline PLA data model, you can link:

- A *Production Unit* record (predecessor) to a *Functional Location* record (successor) that stores additional information about that production unit. This allows you to assign losses and production information to hierarchical elements to provide a comprehensive view of production data and the costs associated with unreliability.
- A *Production Event* record (successor) to an *Equipment* record (predecessor) to represent the piece of equipment that caused the production event.
- A *Production Event Template* record (successor) to an *Equipment* record (predecessor) to represent the piece of equipment that caused the production events that will be created from the Production Event Template record.

Note: The Production Long Range Plan family is activated with the Production Loss Accounting license, but it is not used in the PLA workflow. It is excluded, therefore, from the data model image.

About Production Profile Record States

When you are working with Production Profile records, you can use state management to facilitate an approval process to enable specific workflow.

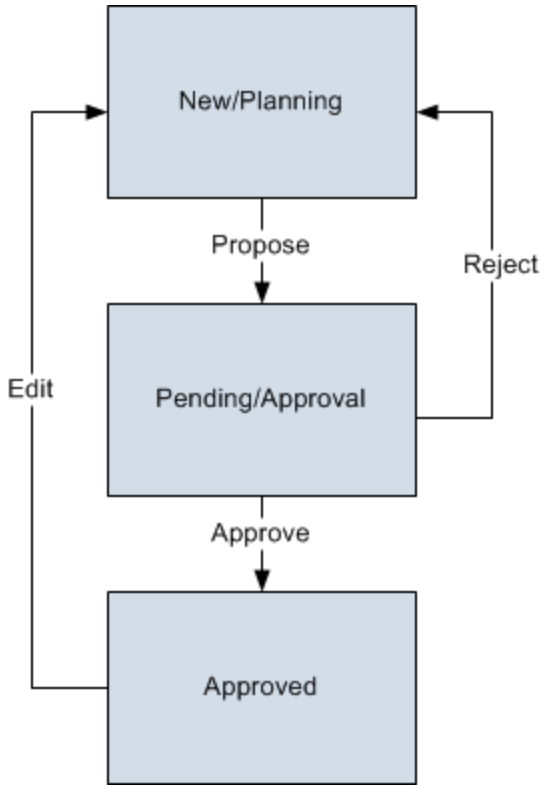
On the **Production Profiles** tab, options appear that you can use to manage the states for Production Profile records. You can follow the standard procedure for managing record states. The following baseline states are configured for the Production Profile family:

- **New/Planning:** Indicates that the Production Profile is in the new or planning state.
- **Pending/Approval:** Indicates that the Production Profile has been reviewed and is awaiting approval. After a Production Profile record state is changed to *Pending/Approval*, you *cannot*:
  - Edit any field on **Production Profile** or **Profile Margin** tab.
  - Delete the Production Profile record.
- **Approved:** Indicates that the Production Profile has been approved. After a Production Profile record state is changed to the *Approved* state, you *cannot* delete the record. Note that the Products associated with a Production Profile record appear on the **Select Products** screen on the **Production Plan Builder** *only* after the state of the Production Profile record is changed to *Approved*.

Note: To change the Production Profile record state, you must be a member of the specific security groups.

Illustration of Production Profile Record States

By default, the following baseline State Configuration exists for the Production Profile family.



Reserved States and Operations

The following table lists the baseline states and operations and indicates which of these states and operations are reserved. You *cannot* remove or modify reserved states or operation. You can, however, add your own states and operations to the State Configuration.

States	
State	**Is Reserved?**
New/Planning	No
Pending/Approval	Yes
Approved	Yes

Operations	
Operation	**Is Reserved?**
Propose	No

Operations	
Approve	No
Reject	No
Edit	No

State Configuration Roles

The following table lists the baseline states and indicates which State Configuration Roles are assigned to each state.

State	Operation	Security Group
New/Planning	Propose	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager MI Production Loss Accounting User
Pending/Approval	Approve Reject	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager
Approved	Edit	MI Production Loss Accounting Administrator

About Production Plan Record States

When you are working with Production Plan records, you can use state management to facilitate a workflow that tracks the progress of the Production Plan.

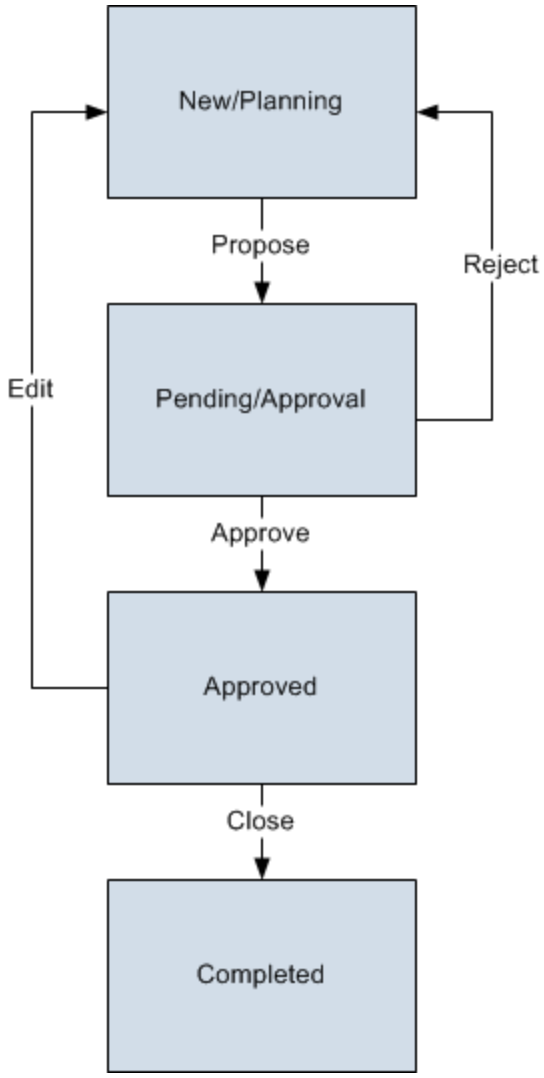
In the **Production Plan Details** area, options appear that you can use to manage the states for Production Plan records. You can follow the standard procedure for managing record states. The following baseline states are configured for the Production Plan family:

- **New/Planning:** Indicates that the Production Plan record is in the planning state.
- **Pending/Approval:** Indicates that the Production Plan record has been reviewed and is awaiting approval. After the state of a Production Plan record is changed to *Pending/Approval*:
  - In the **Production Plans** pane, you *cannot* regenerate the selected plan or delete the selected plan.
  - On the **Production Plan Management** page, in the **Plan Details** grid, you *cannot* add a new row, remove the last row, or change the value in any of the **<Product Name (<UOM>)>** columns.
  - In the **Production Data** section, you *cannot* change the value in the **Short Range Plan** column.
- **Approved:** Indicates that the Production Plan record has been approved. The state of the Production Data record also changes to *Approved.*
- **Complete:** Indicates that the Production Plan is complete. After the state of a Production Plan record is changed to *Complete*:
  - You *cannot* modify the Production Plan record.
  - In the **Production Data** section, the state of the Production Data records changes to *Complete*, and you cannot modify the Production Data records.

Note: To change the Production Plan record state, you must be a member of the specific security groups.

Illustration of Production Plan Record States

By default, the following baseline State Configuration exists for the Production Plan family.



Reserved States and Operations

The following table lists the baseline states and operations and indicates which of these states and operations are reserved. You *cannot* remove or modify reserved states or operation. You can, however, add your own states and operations to the State Configuration.

States	
State	**Is Reserved?**
New/Planning	No
Pending/Approval	Yes
Approved	Yes

States	
Complete	Yes

Operations	
Operation	**Is Reserved?**
Propose	No
Approve	No
Complete	No
Reject	No
Edit	No

State Configuration Roles

The following table lists the baseline states and indicates which State Configuration Roles are assigned to each state and corresponding operation:

State	Operation	Security Group
New/Planning	Propose	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager MI Production Loss Accounting User
Pending/Approval	Approve Reject	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager

State	Operation	Security Group
Approved	Close	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager
	Edit	MI Production Loss Accounting Administrator
Complete	Close	MI Production Loss Accounting Administrator

About Production Event Record States

When you are working with Production Event records, you can use state management to facilitate a workflow that tracks the progress of the Production Event.

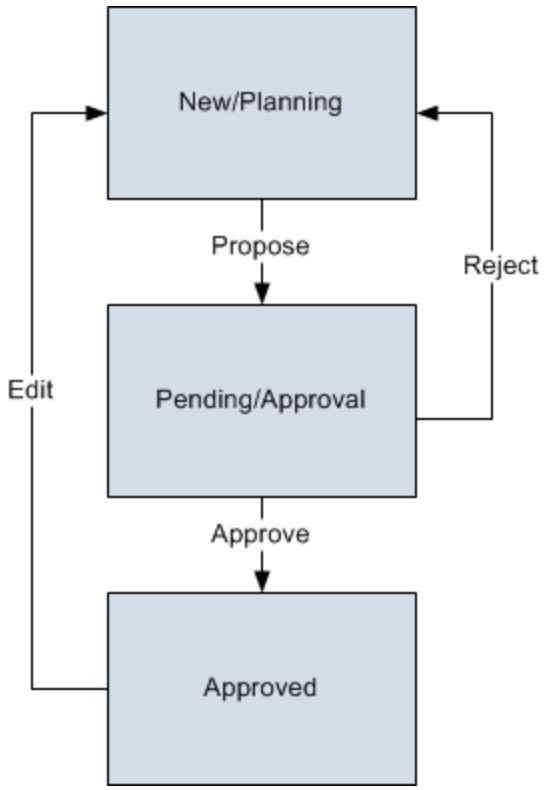
In the **PLA - Production Event Management** workspace, options appear that you can use to manage the states for Production Event records. You can follow the standard procedure for managing record states. The following baseline states are configured for the Production Event family:

- **New/Planning:** Indicates that the Production Event is in the new or planning state.
- **Pending/Approval:** Indicates that the Production Event has been reviewed and is awaiting approval. After the state of a Production Event record is changed to *Pending/Approval*, you *cannot* edit any field on the datasheet.
- **Approved:** Indicates that the Production Event record has been approved.

Note: To change the Production Event record state, you must be a member of the specific security groups.

Illustration of Production Event Record States

By default, the following baseline State Configuration exists for the Production Event family.



Reserved States and Operations

The following table lists the baseline states and operations and indicates which of these states and operations are reserved. You *cannot* remove or modify reserved states or operation. You can, however, add your own states and operations to the State Configuration.

States	
State	**Is Reserved?**
New/Planning	No
Pending/Approval	Yes
Approved	Yes

Operations	
Operation	**Is Reserved?**
Propose	No
Approve	No
Reject	No
Edit	No

State Configuration Roles

The following table lists the baseline states and indicates which State Configuration Roles are assigned to each state.

State	Operation	Security Group
New/Planning	Propose	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager MI Production Loss Accounting User

State	Operation	Security Group
Pending/Approval	Approve Reject	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager
Approved	Edit	MI Production Loss Accounting Administrator

About Production Data Record States

When you are working with Production Data records, you can use state management to facilitate a workflow that tracks the progress of the Production Data.

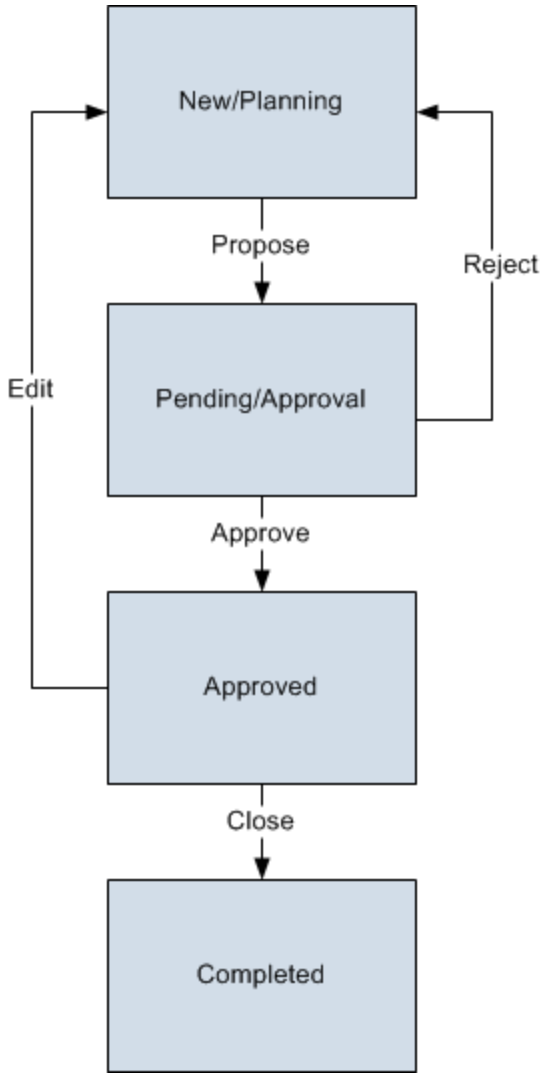
In the **Production Data** section, options appear that you can use to manage the states for Production Data records. You can follow the standard procedure for managing record states. The following baseline states are configured for the Production Data family:

- **New/Planning:** Indicates that the Production Data records are in the new state.
- **Pending/Approval:** Indicates that the Production Data record have been reviewed and are awaiting approval. After the state of Production Data records is changed to *Pending/Approval*:
  - In the **Production Data** section, you *cannot* change the value in the **Short Range Plan** column.
  - On the **Production Plan Management** page, you *cannot* change the value in any of the **<Product Name (<UOM>)>** columns.
- **Approved:** Indicates that the Production Data records have been approved.
- **Complete:** Indicates that the Production Data entry is complete. After the state of Production Data records is changed to *Complete*:
  - You *cannot* modify the Production Data records.
  - On the **Production Plan Management** page, the state of the Production Plan changes to *Complete*, and you cannot modify the Production Plan record.

Note: To change the state of Production Data records, you must be a member of the specific security groups.

Illustration of Production Data Record States

By default, the following baseline State Configuration exists for the Production Data family.



Reserved States and Operations

The following table lists the baseline states and operations and indicates which of these states and operations are reserved. You *cannot* remove or modify reserved states or operation. You can, however, add your own states and operations to the State Configuration.

States	
State	**Is Reserved?**
New/Planning	No
Pending/Approval	Yes
Approved	Yes

States	
Complete	Yes

Operations	
Operation	Is Reserved?
Propose	No
Approve	No
Complete	No
Reject	No
Edit	No

State Configuration Roles

The following table lists the baseline states and indicates which State Configuration Roles are assigned to each state and corresponding operation:

State	Operation	Security Group
New/Planning	Propose	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager MI Production Loss Accounting User
Pending/Approval	Approve Reject	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager

State	Operation	Security Group
Approved	Close	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager
	Edit	MI Production Loss Accounting Administrator
Complete	Close	MI Production Loss Accounting Administrator

About Production Loss Record States

When you are working with Production Loss records, you can use state management to facilitate a workflow that tracks the progress of a Production Loss record.

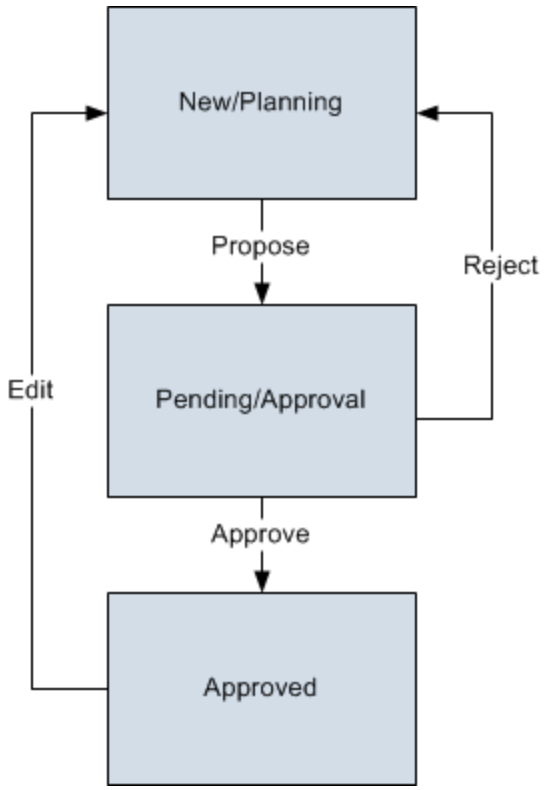
In the **Losses** section, options appear that you can use to manage the states for a Production Loss record. You can follow the standard procedure for managing record states. The following baseline states are configured for the Production Loss family:

- **New/Planning:**Indicates that the Production Loss record is in the new or planning state.
- **Pending/Approval:** Indicates that the Production Loss record has been reviewed and is awaiting approval. After a Production Loss record state is changed to *Pending/Approval*, you *cannot* modify any field in the **Losses** section.
- **Approved:** Indicates that the Production Loss record has been approved.

Note: To change the Production Loss record state, you must be a member of the specific security groups.

Illustration of Production Loss Record States

By default, the following baseline State Configuration exists for the Production Loss family.



Reserved States and Operations

The following table lists the baseline states and operations and indicates which of these states and operations are reserved. You *cannot* remove or modify reserved states or operations. You can, however, add your own states and operations to the State Configuration.

States	
State	**Is Reserved?**
New/Planning	No
Pending/Approval	Yes
Approved	Yes

Operations	
Operation	**Is Reserved?**
Propose	No
Approve	No
Reject	No
Edit	No

State Configuration Roles

The following table lists the baseline states and indicates which State Configuration Roles are assigned to each state and corresponding operation:

State	Operation	Security Group
New/Planning	Propose	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager MI Production Loss Accounting User

State	Operation	Security Group
Pending/Approval	Approve Reject	MI Production Loss Accounting Administrator MI Production Loss Accounting Manager
Approved	Edit	MI Production Loss Accounting Administrator

Example Used Throughout the PLA Documentation

Throughout this documentation, we explain PLA terminology and concepts using the example of a facility that produces the following products:

- Bottles
- Labels
- Caps

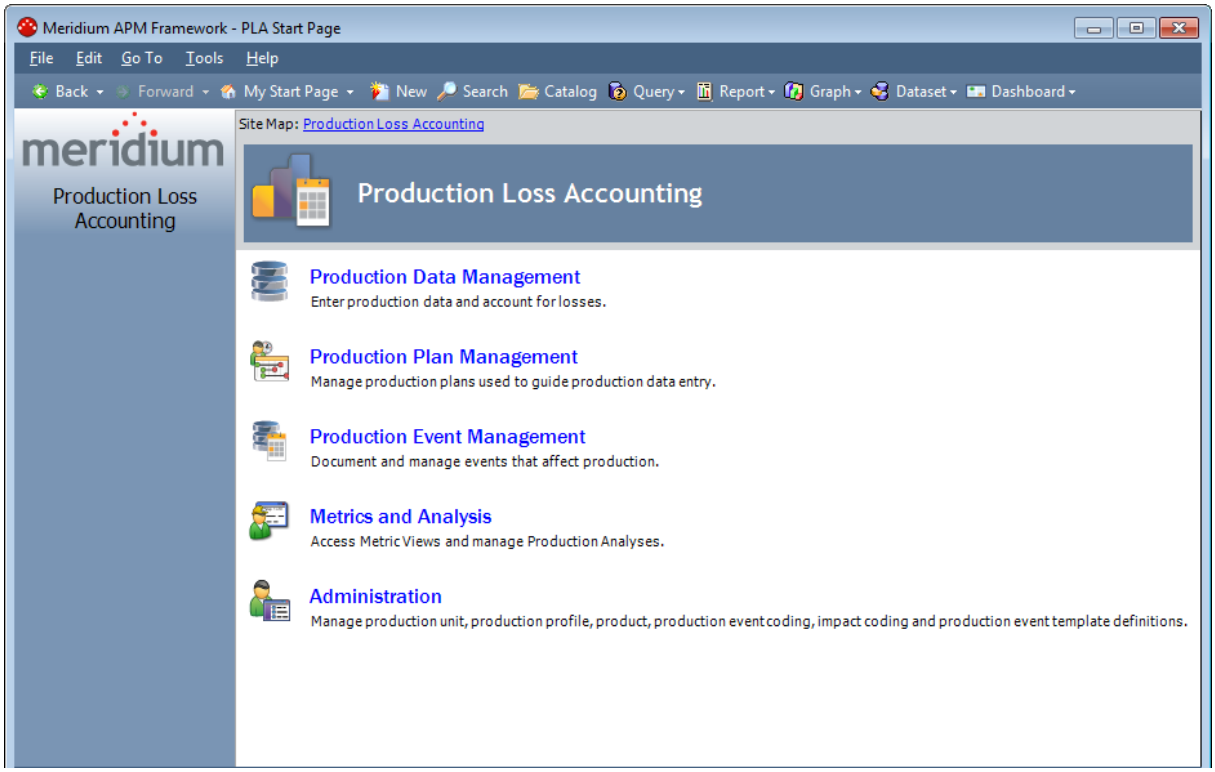
We assume that these products are shipped to another facility that is responsible for processes that you might analyze using a Production Analysis, such as filling the bottles with water, attaching the labels and caps, and distributing the finished water bottles to customers such as grocery stores and vending machine companies.

Accessing the PLA Start Page

To access the PLA Start Page:

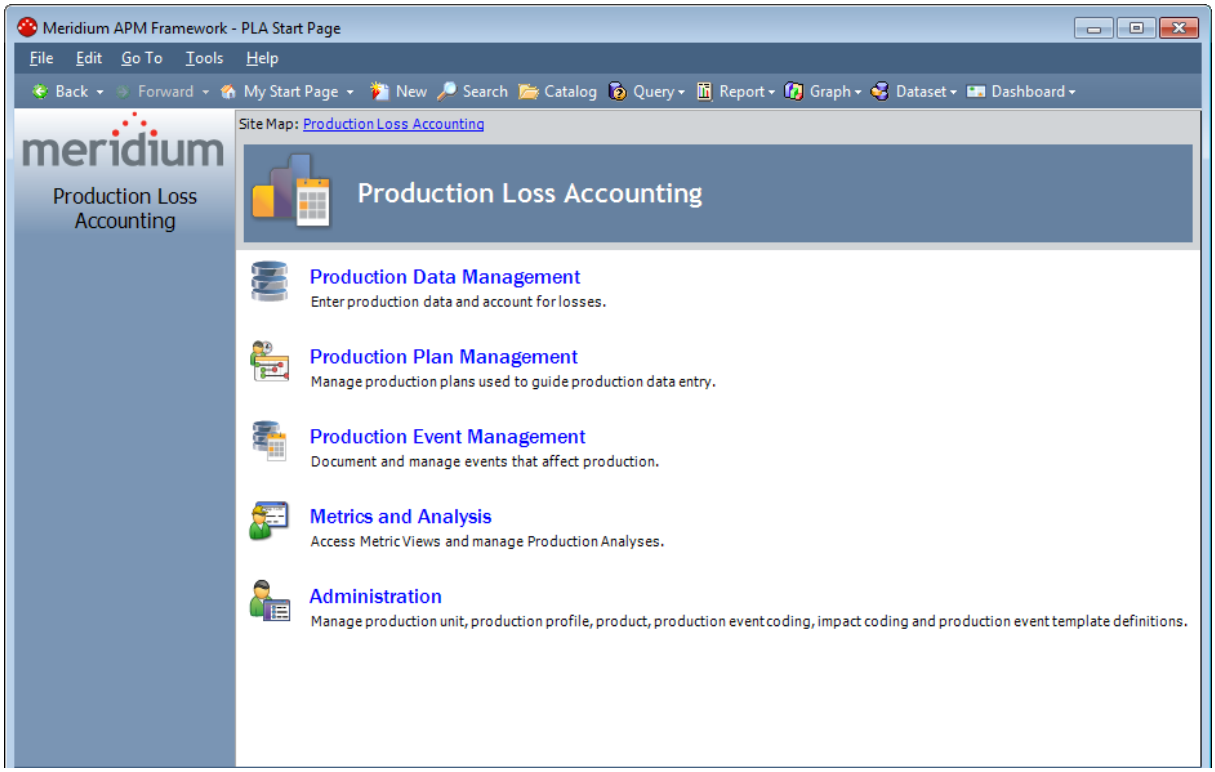
- On the Meridium APM Framework menu bar, click **Go To**, point to **Failure Elimination**, and then click **Production Loss Accounting**.

  The **PLA Start Page** appears.



Aspects of the PLA Start Page

The **PLA Start Page** serves as the starting point for the tasks that you can perform in Production Loss Accounting (PLA). You can access each task via a link on this page. Note that the links on this page do not suggest a recommended workflow but rather allow you to access certain features that you will need to use as part of managing production data. The **PLA Start Page** is shown in the following image.



The following links are available:

- **Production Data Management:** Displays the **Find Production Plan** window, where you can search for the Production Plan record that you want to open on the Production Data Entry page.
- **Production Plan Management:** Displays the **Find Production Unit** window, where you can search for the Production Unit record that you want to open on the Manage Production Plans page.
- **Production Event Management:** Displays the Production Event Management page, where you can manage Production Event records.
- **Metrics and Analysis:** Displays the Metric & Analyses page, where you can create and open Production Analyses and open Metric Views that display data about a specific production unit.

  Note: The **Metrics and Analysis** link appears on the **PLA Start** page only if the Metrics and Scorecards and/or Reliability Analytics module is active. If neither is

active, the link does not appear and you will not be able to access the **Metric Views and Production Analyses** page.

- **Administration:** Displays the **Products** page, where you can add, modify, and delete Product records. From this page, you can access other pages that allow you to perform administrative tasks.

Note: The **Administration** link appears on the**PLA Start** page only if you are a member of the MI Production Loss Accounting Administrator Security Group.

First-Time Deployment Workflow

Deploying and configuring the Production Loss Accounting (PLA) module the first time includes completing multiple steps, which are outlined in the table in this topic. The steps in this section of the documentation provide all the information that you need to deploy and configure PLA on top of the basic Meridium APM system architecture.

Whether a step is required or optional is indicated in the **Required/Optional** cell. Steps are marked as *Required* if you must perform the step to take advantage of PLA functionality.

The person responsible for completing each task may vary within your organization. We recommend, however, that the steps be performed in relatively the same order in which they are listed in the table.

Step	Task	Required/Optional	Notes
1	Deploy the Metrics and Scorecard module.	Required	This step is required if you want to view Metric Views that are provided as baseline PLA content.
2	Review the PLA data model to determine which relationship definitions you will need to modify to include your custom equipment and location families. Modify any relationship definitions as needed via Configuration Manager.	Optional	This step is necessary only if you store equipment and location information in families other than the baseline Equipment and Functional Location families.
3	Assign the desired Security Users to one or more PLA Security Groups in Configuration Manager.	Required	User must have permissions to the PLA families in order to use the PLA functionality.
4	Assign users to states and operations, as applicable.	Required	Refer to the documentation topics in the *Production Loss Accounting State Configuration* section for details.

Step	Task	Required/Optional	Notes
5	Change the default currency symbol.	Optional	The currency symbol is set by default to *$* and displayed in the following places: • Default Margin field on the Production Profile datasheet. • **Production Summary** tab of the **Production Data Entry** page.
6	Set the Precision of Calculated Values	Optional	The default precision value, or number of decimal places that will be displayed, by default, is *two*. The precision value is used to display the following calculated values: • Cost of Losses • Unaccounted Loss • Acceptable Loss
7	Specify the Acceptable Loss	Optional	The Acceptable Loss is set by default to *0*. The Acceptable Loss is displayed on the **Production Data** section on each production data tab.
8	Define all products.	Required	You will need to define all products whose production you plan to track using PLA. Each product is stored in a*Product* record.

Step	Task	Required/Optional	Notes
9	Define production units.	Required	You will need to identify the production units that produce the products you defined in the previous task. Note that a single product can be produced by more than one production unit. A single production unit can also produce more than one product. Each production unit is stored in a *Production Unit* record, which can be linked to an existing Functional Location record that contains more detailed information about the production unit.

Step	Task	Required/Optional	Notes
10	Define production profiles.	Required	For each production unit that you defined in the previous task, you will need to identify all the products they produce and information about those products, such as the maximum demonstrated rate of production and the amount of profit one of those products yields. The combination of data about a product and the corresponding production unit is the *production profile* for that production unit. A production unit will have one production profile for each product it produces. Each production profile is stored in a *Production Profile* record, which is linked to the corresponding Product record and Production Unit record.

Step	Task	Required/Optional	Notes
11	Define production event codes.	Required	You will need to use production event codes to categorize the types of events that can cause you to produce less than the maximum sustained capacity amount. Production event codes define the cause of lost production and answer the question: *Why are we losing production?* You can also group the types of events by structuring them in a hierarchy. For example, you might group event types into *planned* and *unplanned*, where planned events are events such as maintenance down days or employee holidays, and unplanned events are events such as equipment failures or natural disasters (e.g., floods or hurricanes). Each event type will be stored in a separate *Production Event Code* record.
12	Define impact codes.	Optional	The baseline Meridium APM database contains Impact Code records that define a set of basic impact codes. Therefore, this step is required only if you do not want to use the baseline impact codes or if you want to use codes in addition to those that are provided.

Step	Task	Required/Optional	Notes
13	Define OEE codes.	Optional	The baseline Meridium APM database contains OEE Code records that define a set of basic OEE codes. Therefore, this step is required only if you do not want to use the baseline OEE codes or if you want to use codes in addition to those that are provided. For non-baseline codes to be included in the OEE Metric View, however, they must be children of the baseline parent codes.
14	Define values that will be mapped to a Production Analysis.	Optional	By default, certain PLA values are mapped to the production data in a Production Analysis. If you want to map different or additional PLA values, you can do so by modifying the *All Production Data* query.
15	Deploy the Production Data cube and Equipment Costs Data cube on the SQL Server Analysis Server.	Optional	You will need to deploy the cubes so that users can access Metric Views that display a graphical representation of production data.
16	Configure PLA for PDI Integration: • Define production event templates. • Link Production Profile records to Xi Tag records.	Optional	This step is required only if you want to use the integration between PLA and the Process Data Integration feature where Production Event records are created automatically.

Step	Task	Required/Optional	Notes
17	Define Profile margin for a Production Profile.	Optional	You can define Profile Margin in addition to the Default Margin. Defining additional Profile Margin will allow you to account for Production Losses more accurately when the losses are related to quality.
18	Associate Event Codes with Production Units.	Optional	You can associate the Production Event Codes with the Production Units to limit the Production Event Codes that can be associated with a Production Event.
19	Specify the Acceptable Loss for each product.	Optional	You can specify the Acceptable Loss if you want to specify the threshold value for the loss that can be ignored when calculating the overall loss for a Production Plan.

Upgrade or Production Loss Accounting to 3.6.1.2.0

The following tables list the steps that are required to update or upgrade PLA to 3.6.1.2.0. These steps assume that you have completed the steps for upgrading the components in the basic Meridium APM system architecture.

Update from any version V3.6.1.0.0 through V3.6.1.1.0

This module will be updated to 3.6.1.2.0 automatically when you update the components in the basic Meridium APM system architecture. No additional steps are required.

Upgrade from any version V3.6.0.0.0 through V3.6.0.12.4

Step	Task	Required/Optional	Notes
1	Deploy the Production Data cube and Equipment Costs Data cube on the SQL Server Analysis Server.	Optional	If you deployed the Production Data cube and Equipment Costs Data cube on the SQL Server Analysis Server in V3.5.1, you do not need to configure these again.
2	Assign users to states and operations, as applicable.	Required	Refer to the documentation topics in the *Production Loss Accounting State Configuration* section for details.
3	Define Profile margin for a Production Profile.	Optional	You can define Profile Margin in addition to the Default Margin. Defining additional Profile Margin will allow you to account for Production Losses more accurately when the losses are related to quality.
4	Associate Event Codes with Production Units.	Optional	You can associate the Production Event Codes with the Production Units to limit the Production Event Codes that can be associated with a Production Event.

Step	Task	Required/Optional	Notes
5	Specify the Acceptable Loss for each product.	Optional	You can specify the Acceptable Loss if you want to specify the threshold value for the loss that can be ignored when calculating the overall loss for a Production Plan.

Upgrade from any version V3.5.1.0.0 through V3.5.1.12.0

Step	Task	Required/Optional	Notes
1	Deploy the Production Data cube and Equipment Costs Data cube on the SQL Server Analysis Server.	Optional	If you deployed the Production Data cube and Equipment Costs Data cube on the SQL Server Analysis Server in V3.5.1, you do not need to configure these again.
2	Assign users to states and operations, as applicable.	Required	Refer to the documentation topics in the *Production Loss Accounting State Configuration* section for details.
3	Define Profile margin for a Production Profile.	Optional	You can define Profile Margin in addition to the Default Margin. Defining additional Profile Margin will allow you to account for Production Losses more accurately when the losses are related to quality.
4	Associate Event Codes with Production Units.	Optional	You can associate the Production Event Codes with the Production Units to limit the Production Event Codes that can be associated with a Production Event.
5	Specify the Acceptable Loss for each product.	Optional	You can specify the Acceptable Loss if you want to specify the threshold value for the loss that can be ignored when calculating the overall loss for a Production Plan.

Upgrade from any version V3.5.0 SP1 LP through V3.5.0.1.9.0

Step	Task	Required/Optional	Notes
1	Deploy the Production Data cube and Equipment Costs Data cube on the SQL Server Analysis Server.	Optional	If you deployed the Production Data cube and Equipment Costs Data cube on the SQL Server Analysis Server in V3.5.0 SP1 LP, you do not need to configure these again.
2	Assign users to states and operations, as applicable.	Required	Refer to the documentation topics in the *Production Loss Accounting State Configuration* section for details.
3	Define Profile margin for a Production Profile.	Optional	You can define Profile Margin in addition to the Default Margin. Defining additional Profile Margin will allow you to account for Production Losses more accurately when the losses are related to quality.
4	Associate Event Codes with Production Units.	Optional	You can associate the Production Event Codes with the Production Units to limit the Production Event Codes that can be associated with a Production Event.
5	Specify the Acceptable Loss for each product.	Optional	You can specify the Acceptable Loss if you want to specify the threshold value for the loss that can be ignored when calculating the overall loss for a Production Plan.

Upgrade from any version V3.5.0 through V3.5.0.0.7.1

Step	Task	Required/Optional	Notes
1	Deploy the Production Data cube and Equipment Costs Data cube on the SQL Server Analysis Server.	Optional	If you deployed the Production Data cube and Equipment Costs Data cube on the SQL Server Analysis Server in the V3.5.0, you do not need to configure these again.
2	Assign users to states and operations, as applicable.	Required	Refer to the documentation topics in the *Production Loss Accounting State Configuration* section for details.
3	Define Profile margin for a Production Profile.	Optional	You can define Profile Margin in addition to the Default Margin. Defining additional Profile Margin will allow you to account for Production Losses more accurately when the losses are related to quality.
4	Associate Event Codes with Production Units.	Optional	You can associate the Production Event Codes with the Production Units to limit the Production Event Codes that can be associated with a Production Event.
5	Specify the Acceptable Loss for each product.	Optional	You can specify the Acceptable Loss if you want to specify the threshold value for the loss that can be ignored when calculating the overall loss for a Production Plan.

Upgrade from any version V3.4.5 through V3.4.5.0.1.4

Step	Task	Required/Optional	Notes
1	Define OEE codes.	Optional	You can use the baseline OEE Code records that are provided in the Meridium APM database. If you do not want to use the OEE Code records that are provided, you will need to create custom OEE codes to identify the types of losses you can incur. Each OEE code will be stored in an *OEE Code* record.
2	Define values that will be mapped to a Production Analysis.	Optional	By default, certain PLA values are mapped to the production data in a Production Analysis. If you want to map different or additional PLA values, you can do so by modifying the *All Production Data* query.
3	Deploy the Production Data cube and Equipment Costs Data cube on the SQL Server Analysis Server.	Optional	If you deployed the Production Data cube and Equipment Costs Data cube on the SQL Server Analysis Server in the V3.4.5, you do not need to configure these again.
4	Assign users to states and operations, as applicable.	Required	Refer to the documentation topics in the *Production Loss Accounting State Configuration* section for details.
5	Define Profile margin for a Production Profile.	Optional	You can define Profile Margin in addition to the Default Margin. Defining additional Profile Margin will allow you to account for Production Losses more accurately when the losses are related to quality.

Step	Task	Required/Optional	Notes
6	Associate Event Codes with Production Units.	Optional	You can associate the Production Event Codes with the Production Units to limit the Production Event Codes that can be associated with a Production Event.
7	Specify the Acceptable Loss for each product.	Optional	You can specify the Acceptable Loss if you want to specify the threshold value for the loss that can be ignored when calculating the overall loss for a Production Plan.

PLA Security Groups

The baseline Production Loss Accounting (PLA) module contains the following Security Groups:

- MI Production Loss Accounting Administrator
- MI Production Loss Accounting Manager
- MI Production Loss Accounting Service
- MI Production Loss Accounting User

The following table lists the default privileges that members of each group have to the PLA entity and relationship families.

Family	MI Production Loss Accounting Administrator	MI Production Loss Accounting Manager	MI Production Loss Accounting Service	MI Production Loss Accounting User
Entity Families				
Equipment	View, Update, Insert, Delete	View	View	None
Functional Location	View	View	View	None
Impact Code	View, Update, Insert, Delete	View	View	View
Interface Log	View, Update, Insert, Delete	View	View	View
OEE Code	View, Update, Insert, Delete	View	View	View
Product	View, Update, Insert, Delete	View	View	View
Production Analysis	View, Update, Insert, Delete	None	View	View, Update, Insert, Delete
Production Data	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Production Event	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Production Event Code	View, Update, Insert, Delete	View	View	View

Family	MI Production Loss Accounting Administrator	MI Pro-duction Loss Accounting Manager	MI Production Loss Account-ing Service	MI Production Loss Account-ing User
Production Event Tem-plate	View, Update, Insert, Delete	View	View	View, Update, Insert, Delete
Production Long Range Plan	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Production Loss	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Production Losses	View, Update, Insert, Delete	None	View, Update, Insert, Delete	View, Update, Insert, Delete
Production Plan	View, Update, Insert, Delete	View	View	View, Update, Insert, Delete
Production Target	View, Update, Insert, Delete	View	View	View, Update, Insert, Delete
SSAS Server	View	View	None	View
Xi Reading	None	None	View	None
Xi Tag	View	None	View	None
Relationship Families				
Analysis Link	View, Update, Insert, Delete	None	View	View, Update, Insert, Delete
Caused by Pro-duction Event	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has Base Pro-duction Event Code	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has Child Pro-duction Event Code	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View
Has Impact Code	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete

Family	MI Production Loss Accounting Administrator	MI Production Loss Accounting Manager	MI Production Loss Accounting Service	MI Production Loss Accounting User
Has Losses	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has OEE Code	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has Product	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View
Has Production Data	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has Production Event	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has Production Event Code	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has Production Event Template	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has Production Long Range Plan	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has Production Plan	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has Production Profile	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has Production Target	View, Update, Insert, Delete	View	View	View, Update, Insert, Delete
Has Production Unit	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Has Reference Documents	View, Update, Insert, Delete	View	View	View, Update, Insert, Delete
Has Reliability	View, Update, Insert, Delete	None	View	View, Update, Insert, Delete

Family	MI Production Loss Accounting Administrator	MI Production Loss Accounting Manager	MI Production Loss Accounting Service	MI Production Loss Accounting User
Has Unit Profile	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View
Has Work History	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Production Event Has RCA Analysis	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete
Is Production Unit	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View
Xi Tag Has Production Event Template	View, Update, Insert, Delete	View	View, Update, Insert, Delete	View, Update, Insert, Delete

Changing the Currency Symbol

When you define a production profile for a product, you specify the default margin, or the profit associated with a single unit of that product. When you enter production losses, the total cost of those losses is displayed on the **Production Summary** tab. In each case, the cost is displayed using the currency symbol that is defined in the **Currency** dialog box.

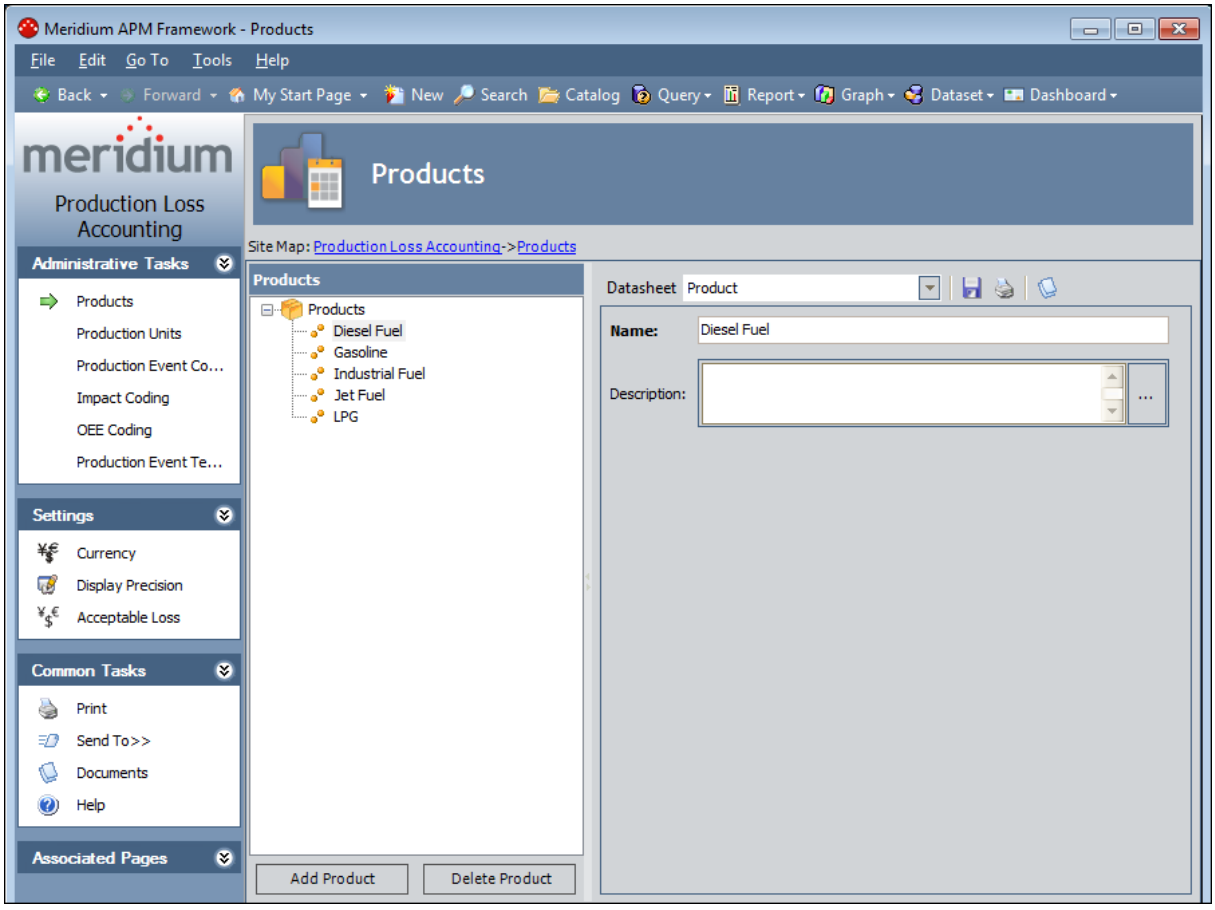
The default currency symbol is *$*. If desired, you can change the currency symbol using these instructions.

Note: You can change the currency on any page that is accessible via the **Administration** link. The following instructions show how to change the currency using the **Administration** link on the **Products** page. If you want to change the currency from a different page, you can skip step 1 and start with step 2 of these instructions.

To change the currency:

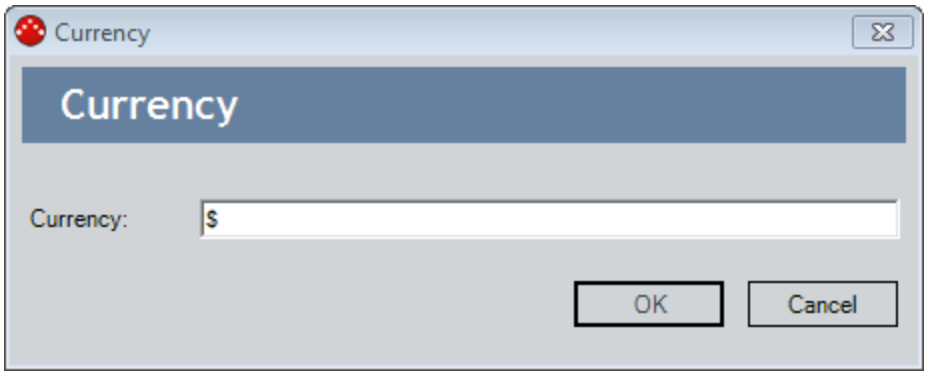
1. In the Meridium APM Framework application, on the **PLA Start Page**, click the **Administration** link.

   The Products page appears.



2. On the **Settings** menu, click the **Currency** link.

   The **Currency** dialog box appears.



3. In the **Currency** text box, type the desired currency symbol.
4. Click **OK**.

   The currency symbol is saved and will be displayed anywhere that a cost value appears in PLA.

Setting the Precision of Calculated Values

On the **Production Data Entry** page, the following values are calculated in the Meridium APM system:

- Cost of Losses
- Unaccounted Loss
- Acceptable Loss

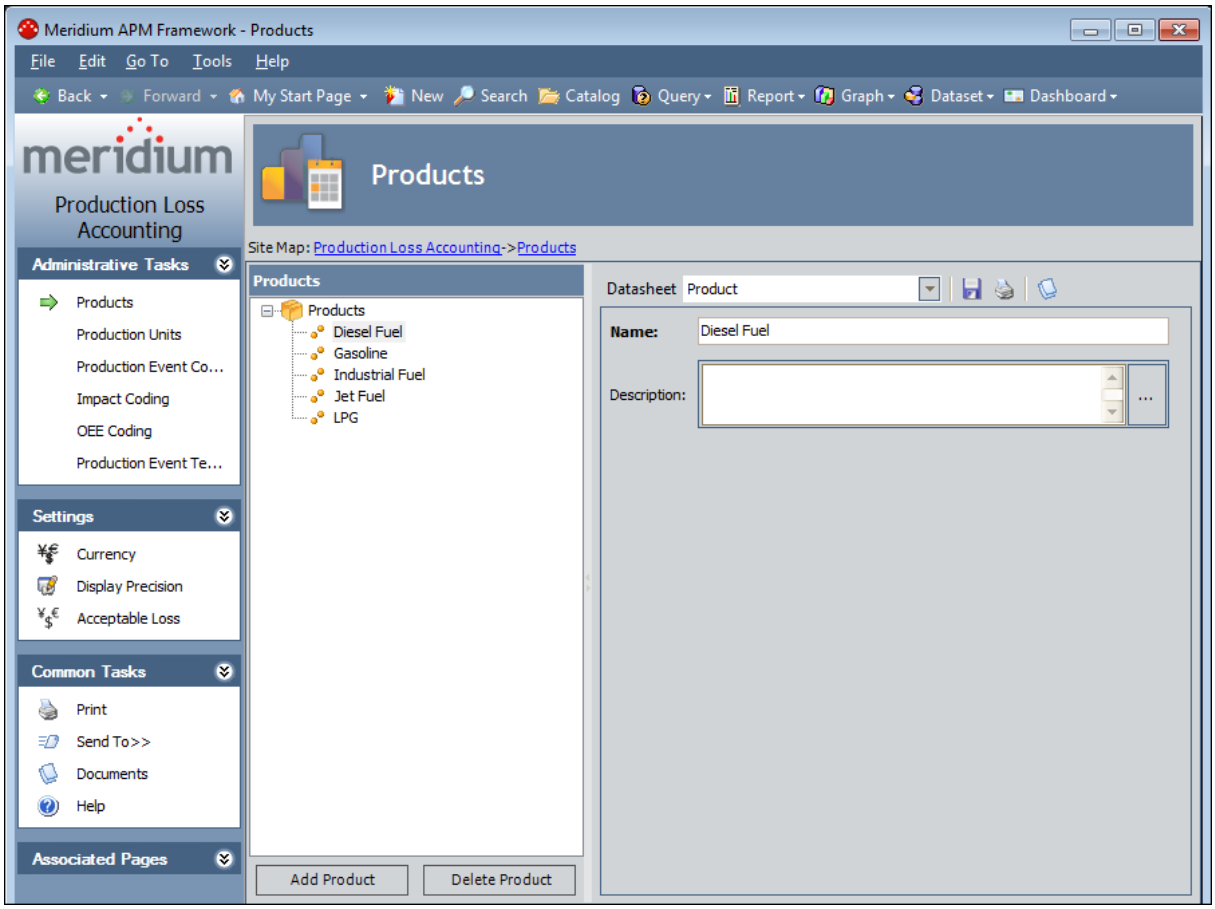
In each case, the resulting calculated value will be displayed using the number of decimals defined by the Display Precision setting. The default precision value, or number of decimal places that will be displayed, is *two*. If desired, you can change the number of decimal places that appear for the *Cost of Losses* and *Unaccounted Loss* values using the following instructions.

Note: You can change this setting from any page where the **Display Precision** link appears. The following instructions show how to change the precision using the **Display Precision** link on the **Products** page. If you want to change the precision from a different page, you can skip step 1 and start with step 2 of these instructions.

To set the precision of calculated values:

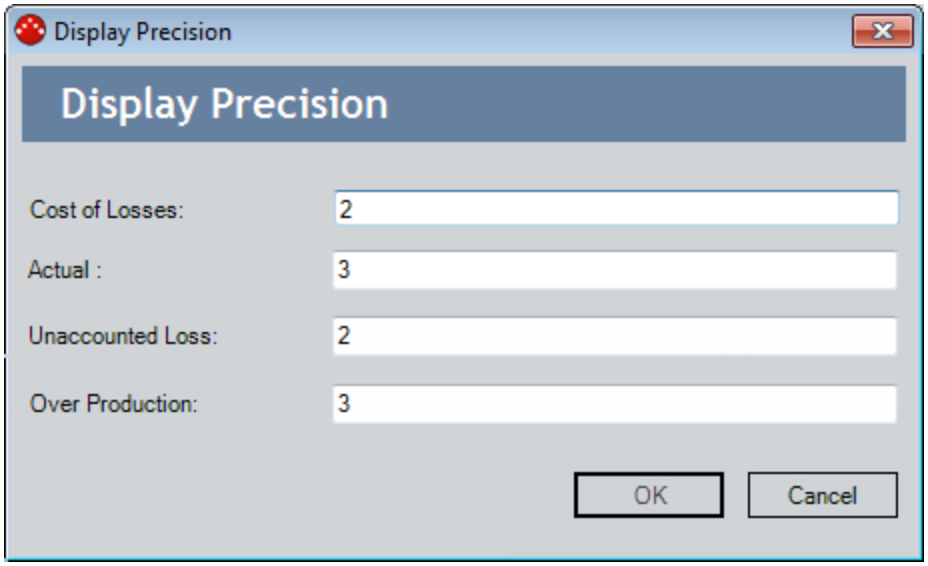
1. In the Meridium APM Framework application, on the **PLA Start Page**, click the **Administration** link.

   The **Products** page appears.



2. On the **Settings** menu, click the **Display Precision** link.

   The **Display Precision** dialog box appears.



3. In the **Cost of Losses** text box, type the desired number of decimal places for the Cost of Losses value on the Production Summary tab. This value must be greater than or equal to *0* (zero) and less than or equal to *9.*
4. In the **Actual** text box, type the desired number of decimal places for the values in the **Actual** column in the grid on the Production Data tab.
5. In the **Unaccounted Loss** text box, type the desired number of decimal places for the values in the **Unaccounted Loss** column in the grid on the Production Data tab. This value must be greater than or equal to *0* (zero) and less than or equal to *9.*
6. In the **Over Production** text box, type the desired number of decimal places for the values in the **Over Production** column in the grid on the Production Data tab.
7. Click **OK**.

   The precision values are saved.

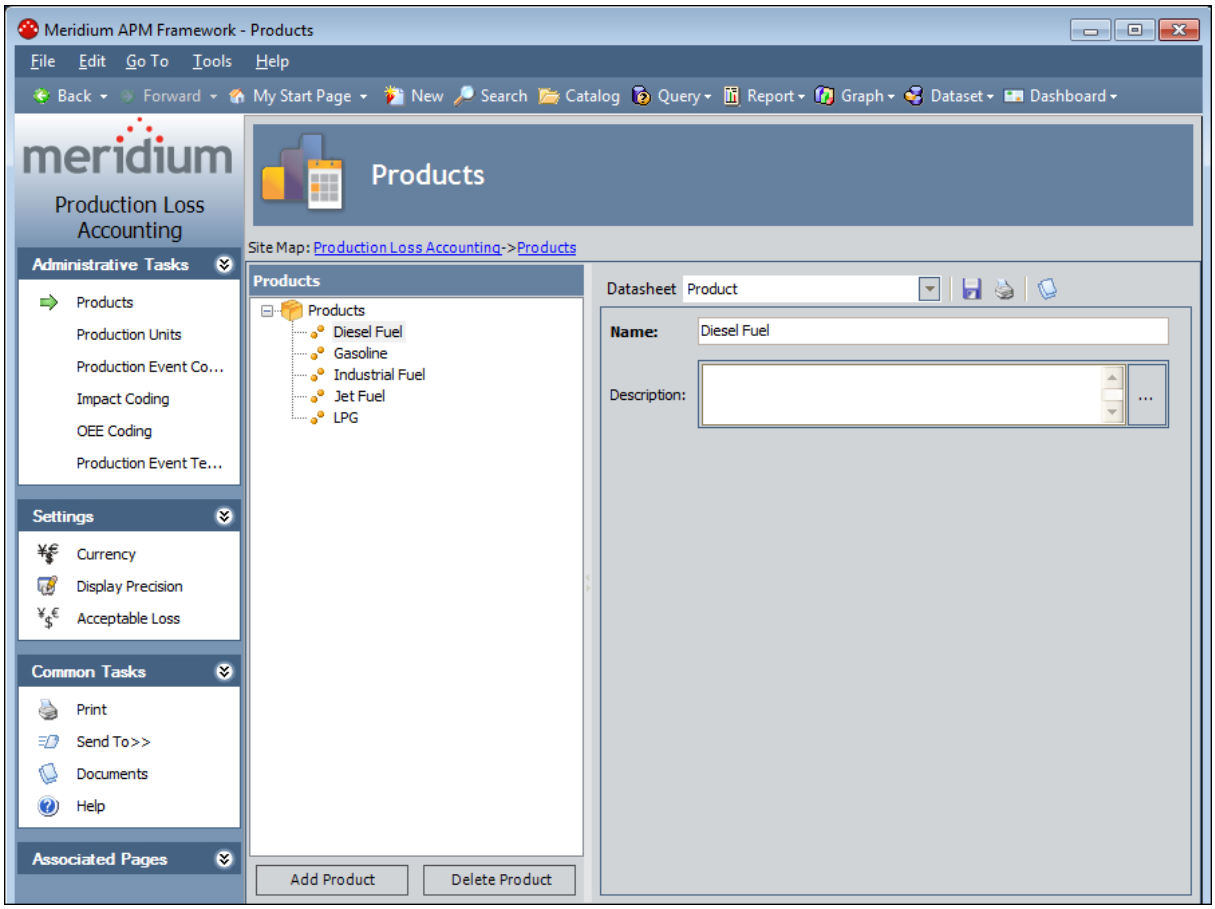
Specifying the Acceptable Loss

By default, the value of Acceptable Loss is 0. You can define the Acceptable Loss to specify the threshold value for the loss that can be ignored when calculating the overall loss for a Production Plan. The Acceptable Loss is displayed on the **Production Data** section on each production data tab.

To change the Acceptable Loss:

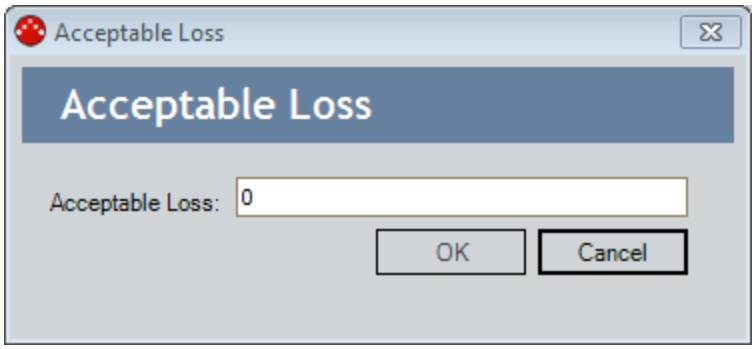
1. In the Meridium APM Framework application, on the **PLA Start Page**, click the **Administration** link.

   The Products page appears.



2. On the **Settings** menu, click the **Acceptable Loss** link.

   The **Acceptable Loss** dialog box appears.



3. In the **Acceptable Loss** text box, type the desired Acceptable Loss.
4. Click **OK**.

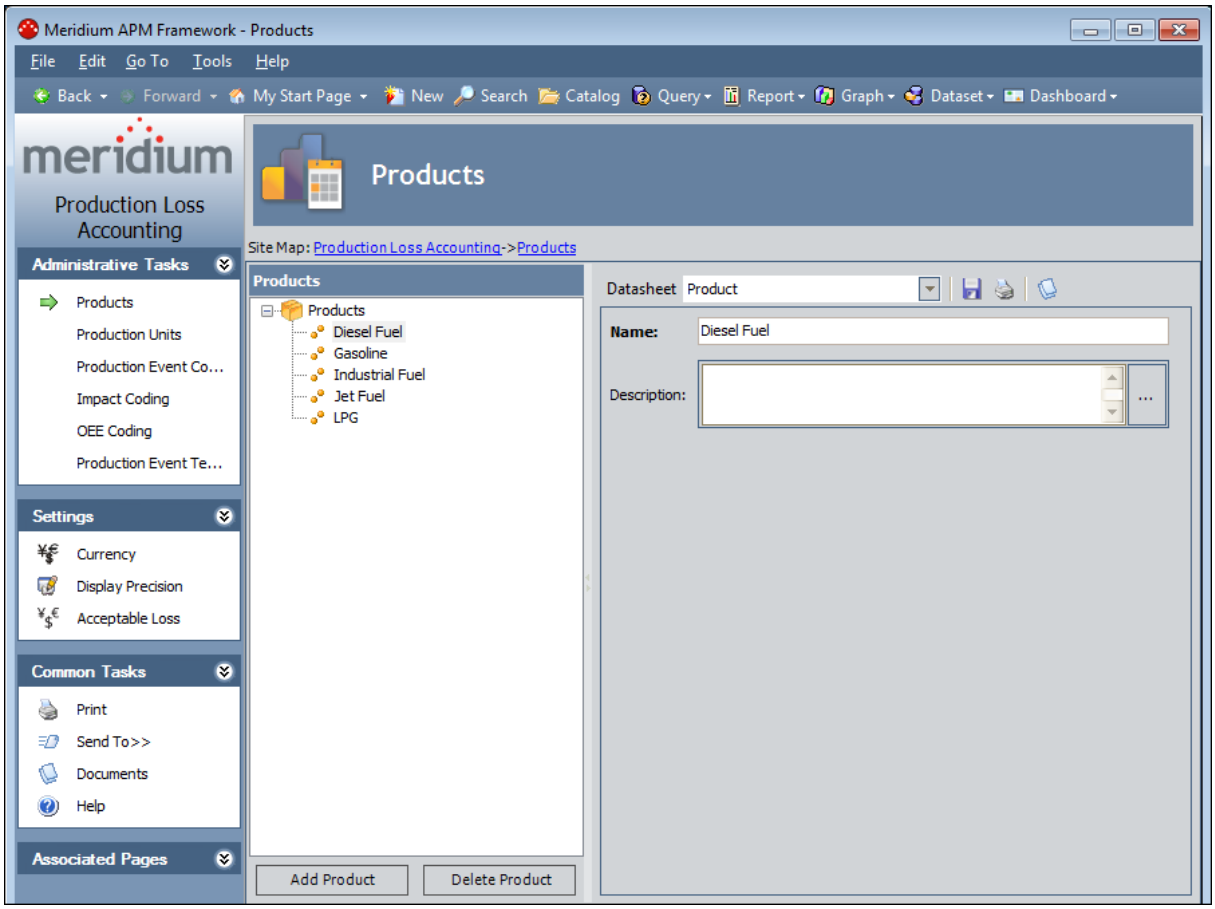
   The Acceptable Loss is saved and will be displayed on the Production Data Entry page and the Production Data Summary Graph as Unaccounted Loss.

Accessing the Products Page

To access the Products page:

- In the Meridium APM Framework application, on the **PLA Start Page**, click the **Administration** link.

  The Products page appears.

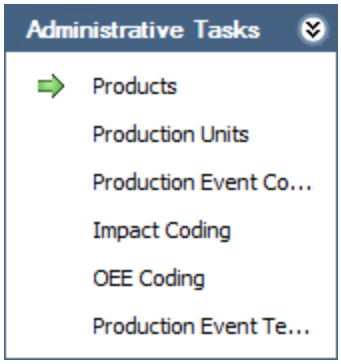


Aspects of the Products Page

The **Products** page contains the following items:

- **Task menu pane:** Contains the following task menus:
  - **Administrative Tasks** menu
  - **Settings** menu
  - **Common Tasks** menu
  - **Associated Pages** menu
- **Products pane:** Contains the following items:
  - A tree that displays all the Product records that exist in the database.
  - The **Add Products** button.
  - The **Delete Products** button.
- **Datasheet area:** Displays the datasheet for the Product record that is selected in the tree in the **Products** pane.

Administrative Tasks Menu



The **Administrative Tasks** menu on the **Products** page contains the following links:

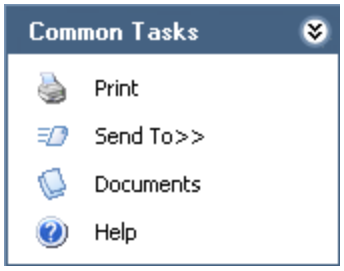
- **Products:** Displays the **Products** page. A green arrow appears to the left of this link when you are viewing this page.
- **Production Units:** Displays the **Production Units and Profiles** page.
- **Production Event Coding:** Displays the **Production Event Coding** page.
- **Impact Coding:** Displays the **Impact Coding** page.
- **OEE Coding:** Displays the **OEE Coding** page.
- **Production Event Templates:** Displays the **Event Templates** page.

Settings Menu

The **Settings** menu on the **Products** page contains the following link:

- **Currency:** Displays the **Currency** dialog box, where you can specify the currency symbol that will be used throughout PLA.
- **Display Precision:** Displays the **Display Precision** dialog box, where you can specify the number of decimal places that will be used for displaying calculated values on the **Production Data Entry** page.
- **Acceptable Loss:** Displays the **Acceptable Loss** dialog box, where you can specify the acceptable loss that will be used for displaying Acceptable Loss values on the **Production Data Entry** page.

Common Tasks Menu



The **Common Tasks** menu on the **Products** page contains the following links:

- **Print:** Displays the **Preview** window, which shows a preview of how the datasheet that appears in the datasheet area will be printed. From the **Preview** window, you can select print options and print the record. This link is enabled only when a record is selected in the tree.
- **Send To:** Displays a submenu with options that let you provide a link to the current page on your desktop (create shortcut), in an email message, or on a Home Page. This link is enabled only when a record is selected in the tree.
- **Documents:** Displays the **Reference Documents** window, where you can manage Reference Document records for the Product record that is currently selected in the **Products** pane. This link is enabled only when a record is selected in the tree.
- **Help:** Displays the context-sensitive Help topic for the **Products** page.

Associated Pages Menu

The **Associated Pages** menu on the **Products** page displays links only if Associated Pages have been configured for the Product family. If no Associated Pages have been configured for the Product family, the **Associated Pages** menu will be empty.

Products Pane

The **Products** pane on the **Products** page contains a tree that displays all Product records that exist in the database. The root level of the tree displays the family grouping *Products*, which is represented by the icon. Directly below the family node are nodes representing Product records. Each record is represented by the icon. To the right of each icon is the Record ID.

For example, suppose the following Product records exist in the database: *Bottles*, *Caps*, and *Labels*. In this case, the tree would look like this:

Below the tree are the following buttons:

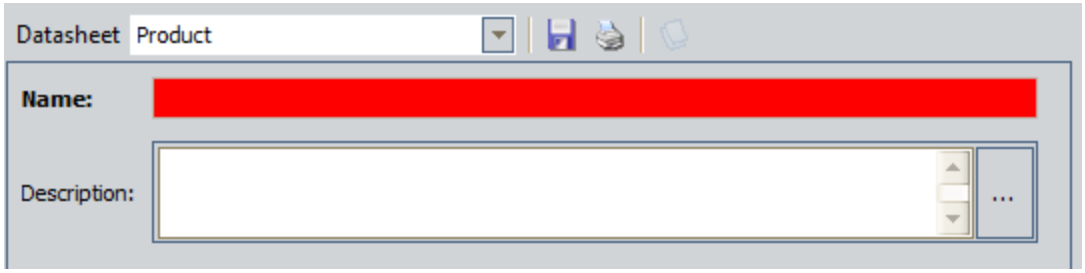
- **Add Product:** Displays a blank Product datasheet in the datasheet area, where you can create a new Product record.
- **Delete Product:** After asking for confirmation, deletes the selected Product record.

Creating a Product Record

To create a Product record:

1. In the Meridium APM Framework application, on the **Products** page, below the tree, click the **Add Product** button.

   A new blank datasheet appears to the right of the **Products** pane.



2. Enter data into the fields as desired.
3. When you are finished completing the fields, on the datasheet toolbar, click the **Save current record** button.

   The Product record is saved.

Deleting a Product Record

To delete a Product record:

1. In the Meridium APM Framework application, on the **Products** page, in the tree, select the Product record that you want to delete.
2. Below the tree, click the **Delete Product** button.

   A message appears, asking if you are sure you want to delete the record.
3. Click the **Yes** button.

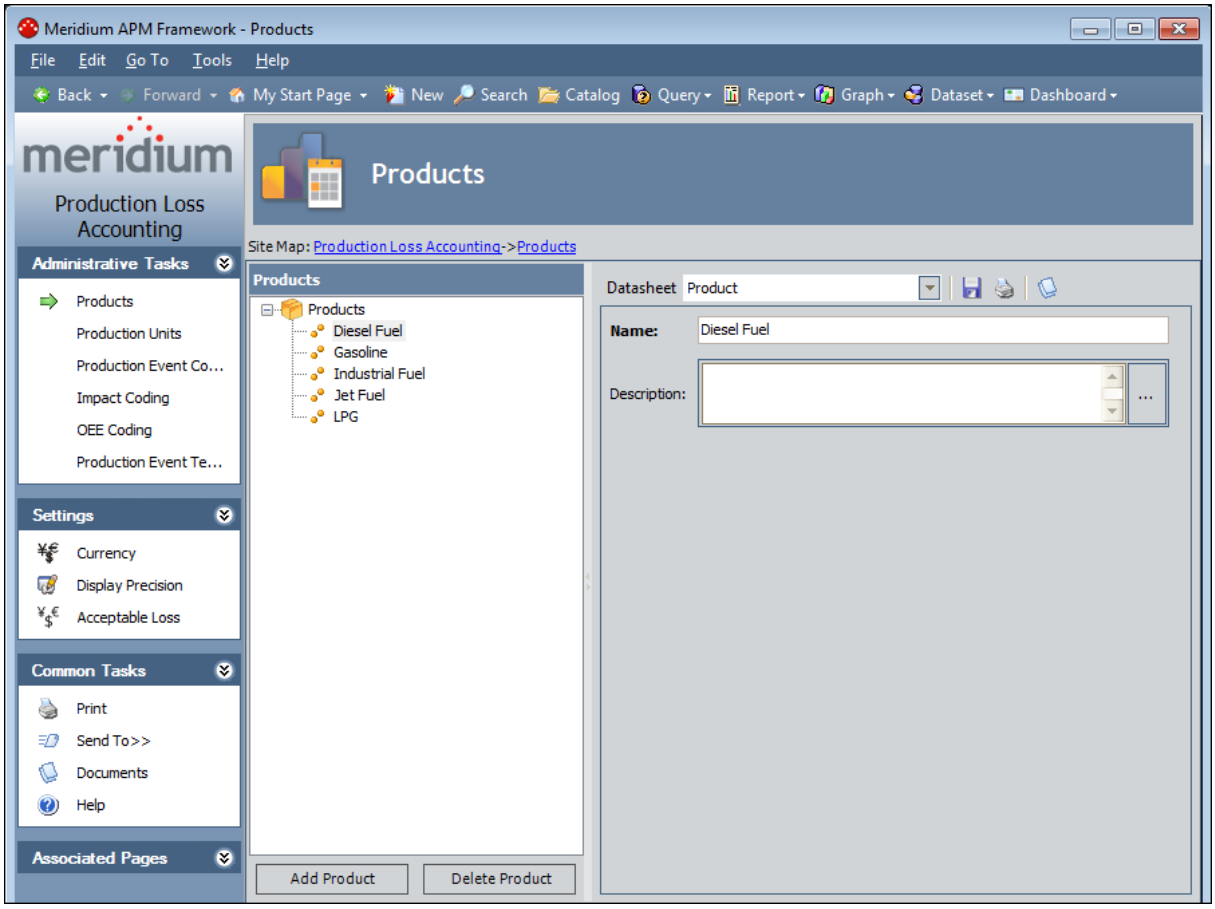
   The Product record is deleted.

Accessing the Production Units and Profiles Page

To access the Production Units and Profiles page:

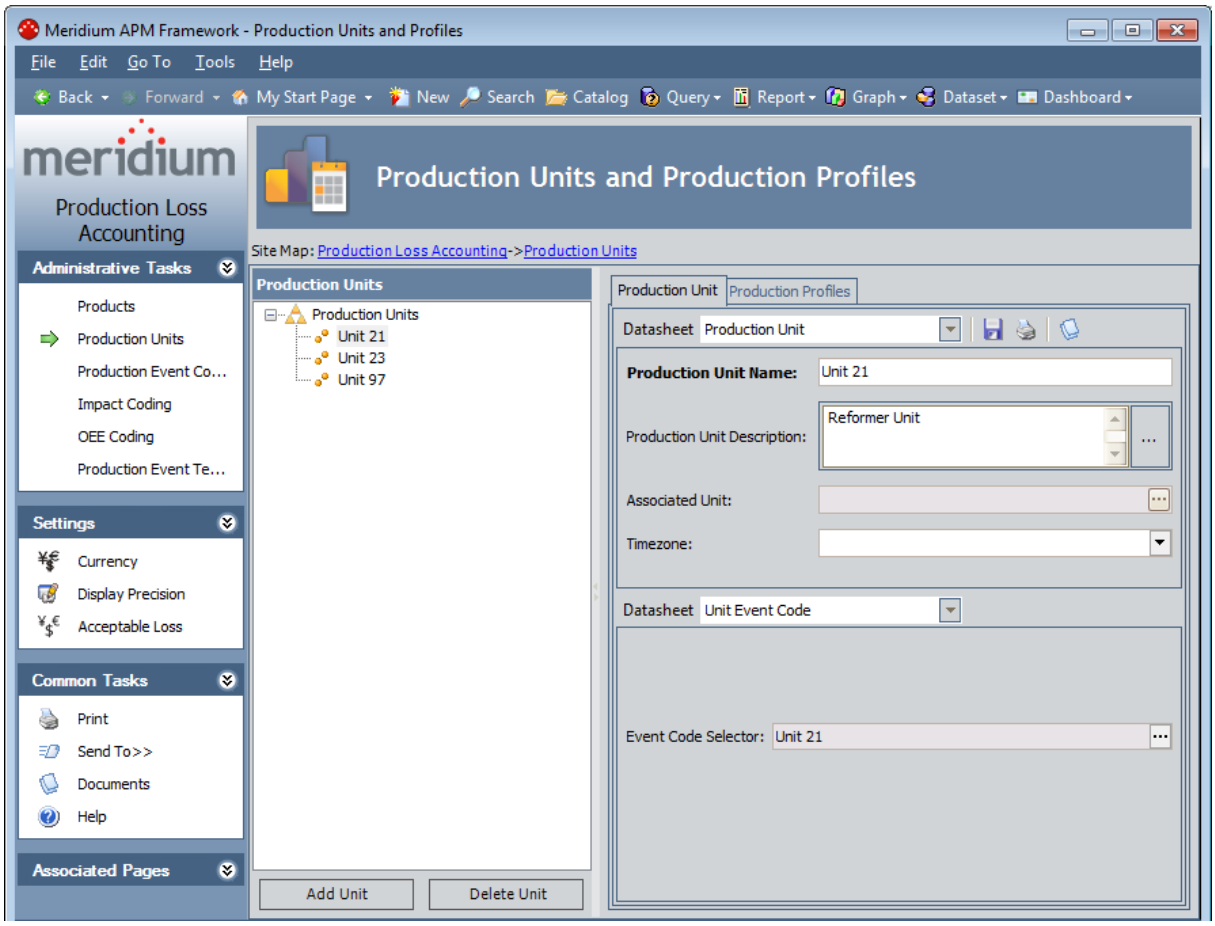
1. In the Meridium APM Framework application, on the **PLA Start Page**, click the **Administration** link.

   The **Products** page appears.



2. On the **Administrative Tasks** menu, click the **Production Units** link.

   The Production Units and Profiles page appears.


Meridium APM Framework - Production Units and Profiles
File Edit Go To Tools Help
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Datasheet Unit Event Code
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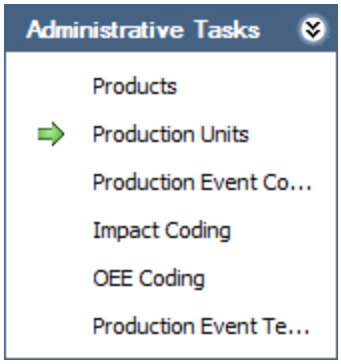
Aspects of the Production Units and Profiles Page

The **Production Units and Profiles** page contains the following items:

- **Task menu pane:** Contains the following task menus:
  - **Administrative Tasks** menu
  - **Settings** Menu
  - **Common Tasks** menu
  - **Associated Pages** menu
- **Production Units pane:** Contains the following items:
  - A tree that displays all the Production Unit records that exist in the database.
  - The **Add Units** button.
  - The **Delete Units** button.
- **Datasheet area:** Displays the following items:
  - The **Production Unit** tab, which displays the datasheet for the Production Unit record that is selected in the tree in the **Units** pane.
  - The **Production Profiles** tab, which lets you:
    - Create Production Profile records for the Production Unit record that is selected in the tree.
    - Delete Production Profile records for the Production Unit record that is selected in the tree.
    - Add Profile Margin records for your profile.
    - Change the state that is currently assigned to the Production Profile record.

Administrative Tasks Menu



The **Administrative Tasks** menu on the **Production Units and Profiles** page contains the following links:

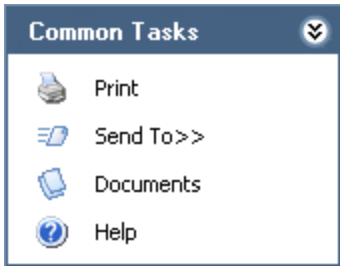
- **Products:** Displays the **Products** page.
- **Production Units:** Displays the **Production Units and Profiles** page. A green arrow appears to the left of this link when you are viewing this page.
- **Production Event Coding:** Displays the **Production Event Coding** page.
- **Impact Coding:** Displays the **Impact Coding** page.
- **OEE Coding:** Displays the **OEE Coding** page.
- **Production Event Templates:** Displays the **Event Templates** page.

Settings Menu

The **Settings** menu on the **Production Units and Profiles** page contains the following links:

- **Currency:** Displays the **Currency** dialog box, where you can specify the currency symbol that will be used throughout PLA.
- **Display Precision:** Displays the **Display Precision** dialog box, where you can specify the number of decimal places that will be used for displaying calculated values on the **Production Data Entry** page.
- **Acceptable Loss:** Displays the **Acceptable Loss** dialog box, where you can specify the acceptable loss percentage that will be used for displaying Acceptable Loss values on the **Production Data Entry** page.

Common Tasks Menu



The **Common Tasks** menu on the **Production Units and Profiles** page contains the following links:

- **Print:** Displays the **Preview** window, which shows a preview of how the datasheet that appears in the datasheet area will be printed. From the **Preview** window, you can select print options and print the record. This link is enabled only when a record is selected in the tree.
- **Send To:** Displays a submenu with options that let you provide a link to the current page on your desktop (create shortcut), in an email message, or on a Home Page. This link is enabled only when a record is selected in the tree.
- **Documents:** Displays the **Reference Documents** window, where you can manage Reference Document records for the Production Unit record that is currently selected in the **Units** pane. This link is enabled only when a record is selected in the tree.
- **Help:** Displays the context-sensitive Help topic for the **Production Units and Profiles** page.

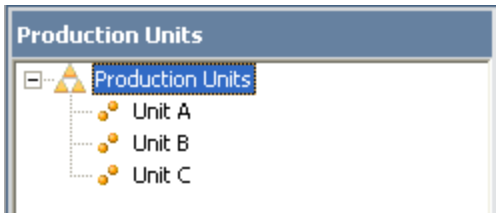
Associated Pages Menu

The **Associated Pages** menu on the **Production Units and Profiles** page displays links only if Associated Pages have been configured for the Production Unit family. If no Associated Pages have been configured for the Production Unit family, the **Associated Pages** menu will be empty.

Production Units Pane

The **Production Units** pane on the **Production Units and Profiles** page contains a tree that displays all Production Unit records that exist in the database. The root level of the tree displays the family grouping *Production Units*, which is represented by the icon. Directly below the family node are nodes representing the Production Unit records. Each record is represented by the icon. To the right of each icon is the Record ID.

For example, suppose the following Production Unit records exist in the database: *Unit A*, *Unit B*, and *Unit C*. In this case, the tree would look like this:



Below the tree are the following buttons:

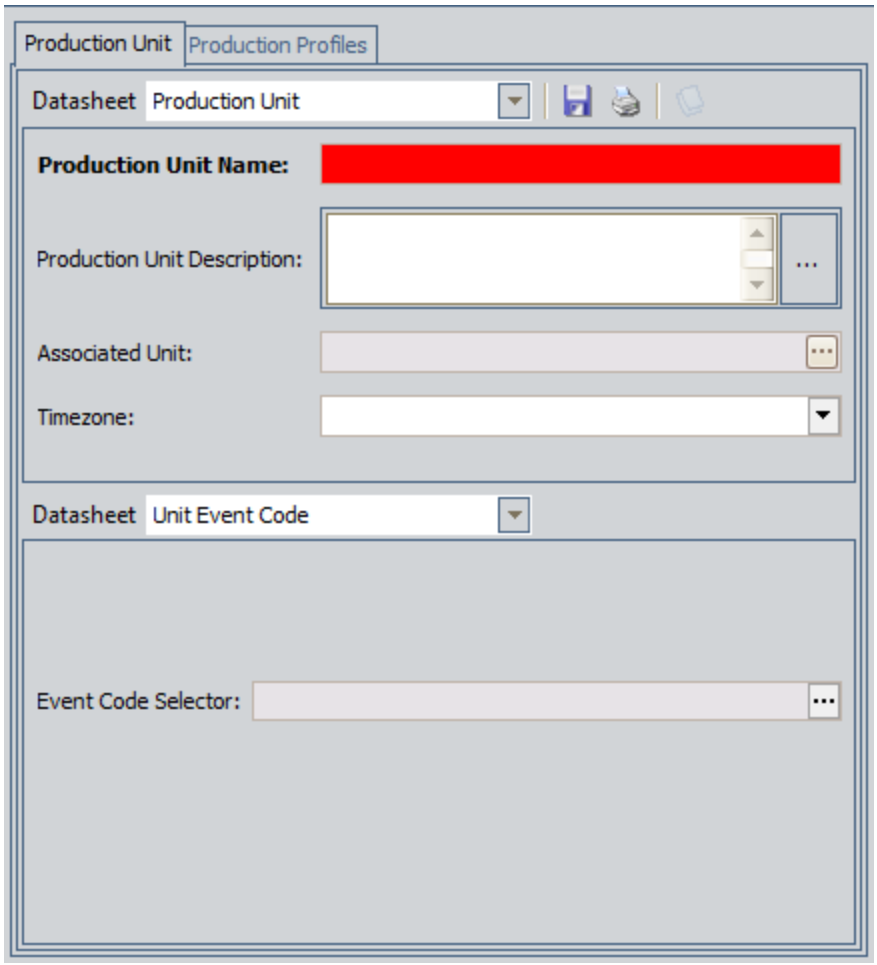
- **Add Unit:** Displays a blank Production Unit datasheet in the datasheet area, where you can create a new Production Unit record.
- **Delete Unit:** After asking for confirmation, deletes the selected Production Unit record.

Creating Production Unit Records

To create a Production Unit record:

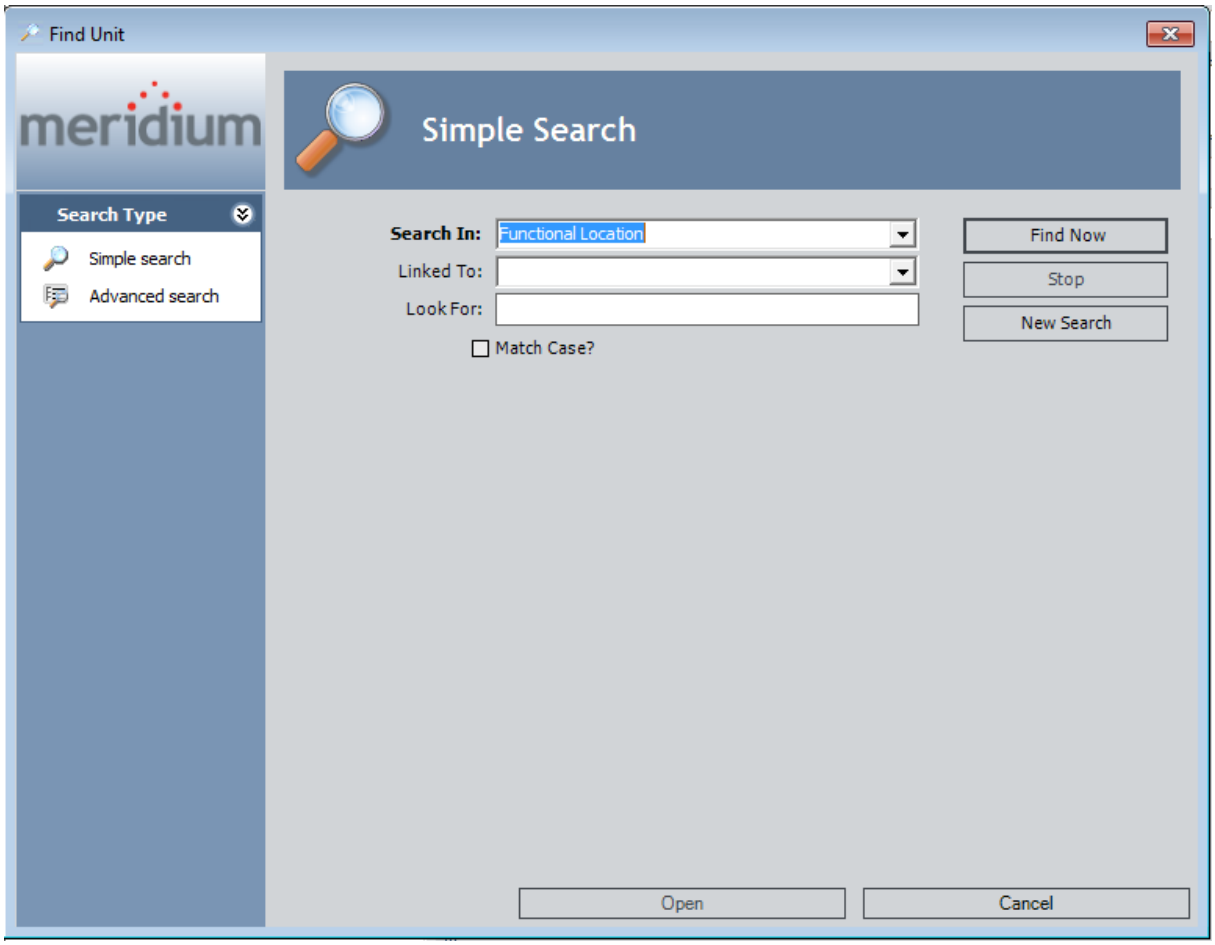
1. In the Meridium APM Framework application, on the Production Units and Profiles page, below the tree, click the **Add Unit** button.

   A new blank datasheet appears to the right of the **Units** pane.



2. Enter data into the fields as desired.
3. If you want to link the Production Unit record to a Functional Location record containing more information about the production unit, in the **Associated Unit** cell, click the ... button.

   The **Find Unit** window appears, displaying the **Simple Search** workspace. The value in the **Search In** list is set by default to *Functional Location*.



4. If desired,refine the search criteria.
5. When you are finished defining the search criteria, click the **Find Now** button.
6. In the search results list, select the record to which you want to link to the Production Unit record, and click the **Open** button.

   The selected record is linked to the Production Unit record. The Record ID of the selected record appears in the **Associated Unit** cell as a hyperlink, which you can click to open the datasheet for the record.
7. When you are finished completing the fields, on the datasheet toolbar, click the button.

   The Production Unit record is saved.

Linking Production Unit Records to Functional Location Records

A *production unit* is a collection of equipment and locations that are used to facilitate a process. PLA uses Production Unit records to store the name and description of your production units.

If you have implemented the Meridium APM product according to the Meridium APM Standard Practice, your database will also contain Functional Location records that store additional information about production units. If desired, using the Associated Unit field in Production Unit records, you can link a PLA Production Unit record to a Functional Location record that contains more information about that production unit. Combined, the two records contain all the information about the production unit.

Deleting Production Unit Records

Note: You can delete a Production Unit record only if it is not linked to any Production Profile records.

To delete a Production Unit record:

1. In the Meridium APM Framework application, on the **Production Units and Profiles** page, in the tree, select the Production Unit record that you want to delete.
2. Below the tree, click the **Delete Unit** button.

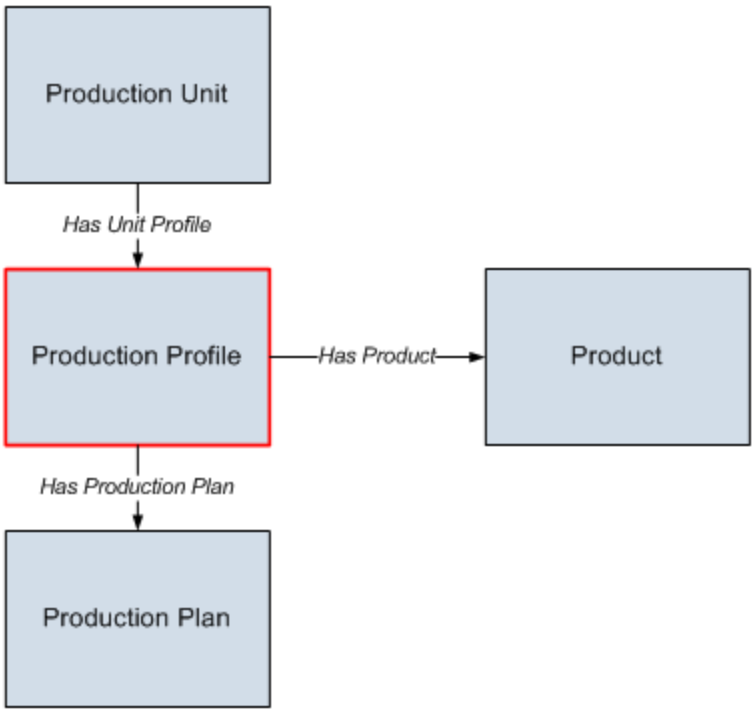
   A message appears, asking if you are sure you want to delete the record.
3. Click the **Yes** button.

   The Production Unit record is deleted.

About Production Profiles

For each production unit for which you have created a Production Unit record, you will need to identify all the products it produces and information about those products, such as the maximum sustained rate of production and the amount of profit one of those products yields. The combination of data about a product and the corresponding production unit is the *production profile* for that production unit.

In terms of the PLA data model, one Production Unit record will be linked to one or more Production Profile records, as shown in the following image. Each Production Profile record is linked to a single Product record representing the product that the production unit produces. In addition, each Production Profile record is linked to one or more Production Plan records representing the planned production for that production unit and product combination. The image shows these relationships. The arrows represent relationship families, and the boxes represent entity families. The Production Profile family is outlined in red.



Each production unit can produce more than one product. For example, in a water-bottling facility, a single production unit might be responsible for producing both bottles and labels. A production unit will have one production profile for *each* product it produces. In other words, if a production unit produces two products, that production unit will have two production profiles.

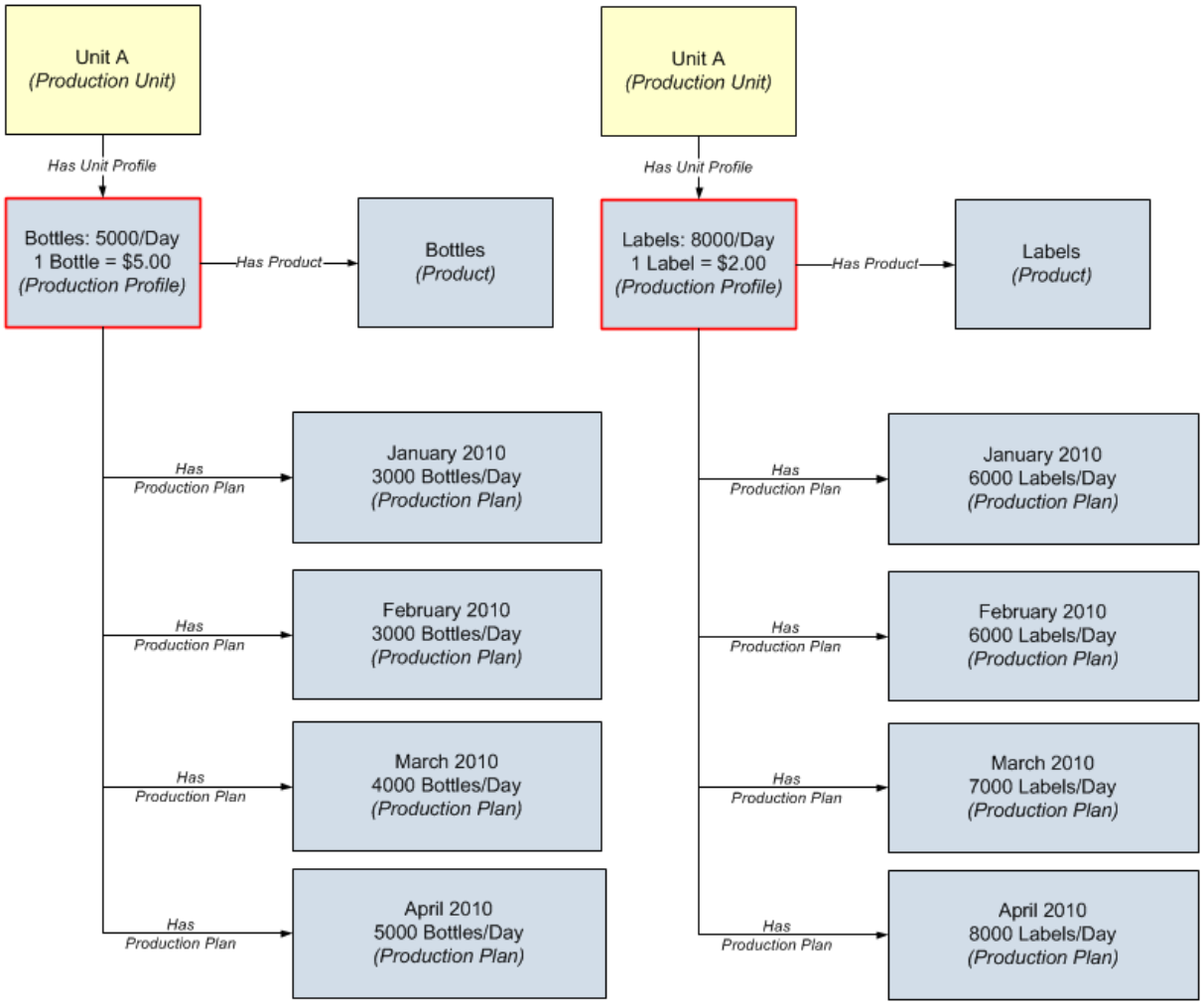
Alternatively, multiple production units can produce the same product. For example, in a facility that produces water bottles, bottle labels, and bottle caps, the water bottles might be produced by multiple production units. This ensures that if one production unit fails, some water bottles will continue to be produced by the other production unit.

Example of One Unit Producing Multiple Products

Consider the following image, where a single production unit, *Unit A*, produces multiple products: *Bottles* and *Labels*. You can see that each production unit and product combination has its own *production profile* (outlined in red).

- For Unit A's bottle production, the production profile indicates that Unit A is capable of producing 5000 bottles per day, where each bottle yields a $5.00 profit.
- For Unit A's label production, the production profile indicates that Unit A is capable of producing 8000 labels per day, where each label yields a $2.00 profit.

You can also see that for each combination of a production unit, production profile, and product, multiple production plans exist.

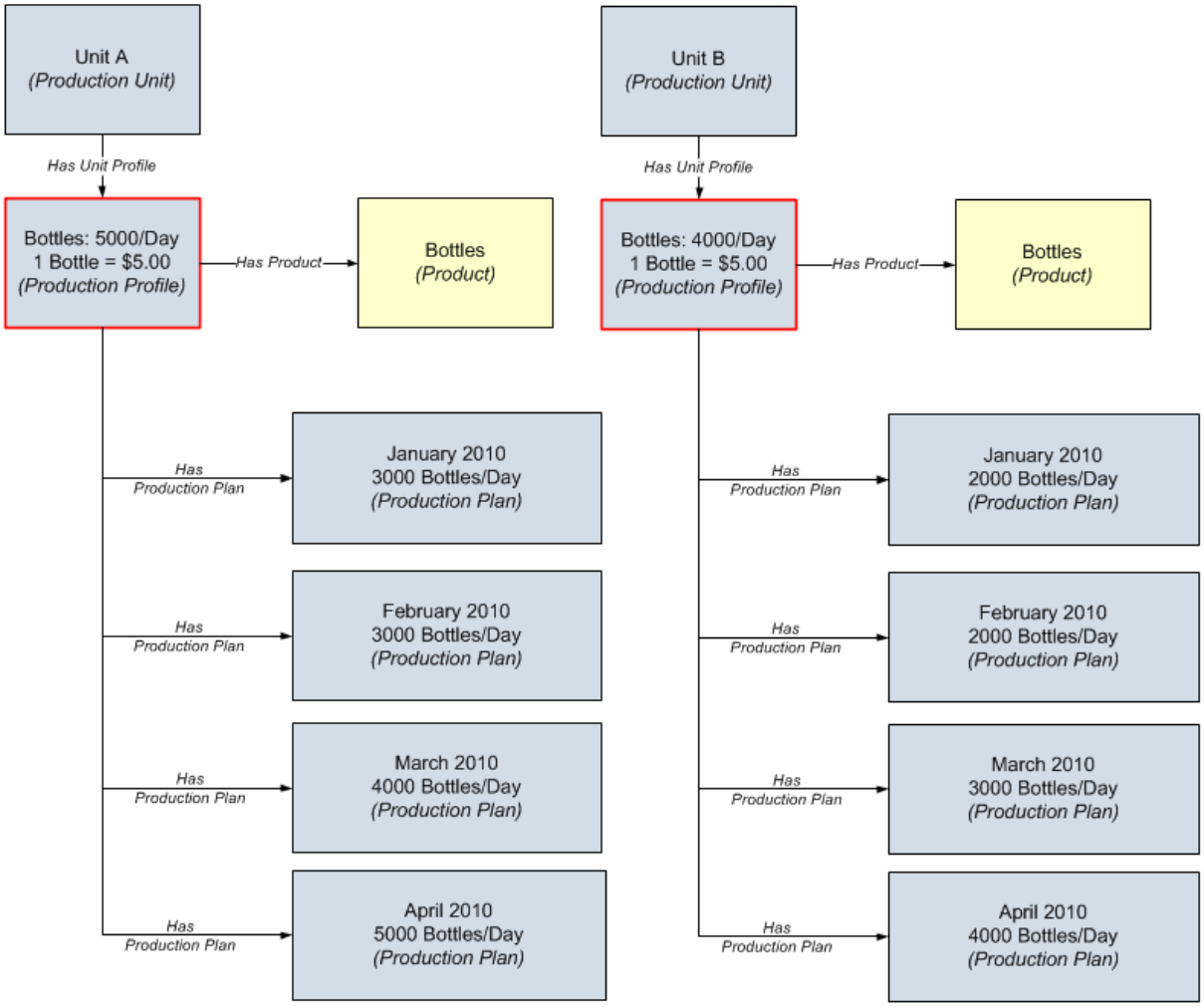


Example of Multiple Units Producing the Same Product

A single product can be produced by more than one production unit. Consider the following image, which shows the product *Bottles* being produced by two production units, *Unit A* and *Unit B*. You can see that each production unit and product combination has its own *production profile* (outlined in red).

- For Unit A, the production profile indicates that Unit A is capable of producing 5000 bottles per day, where each bottle yields a $5.00 profit.
- For Unit B, the production profile indicates that Unit B is capable of producing 4000 bottles per day, where each bottle yields a $5.00 profit.

You can also see that for each combination of a production unit, production profile, and product, multiple production plans exist.

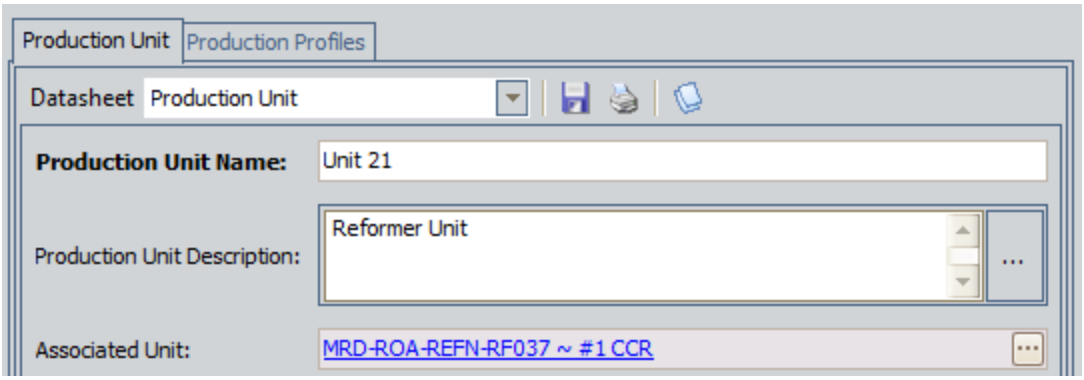


Creating Production Profile Records

To create a Production Profile record:

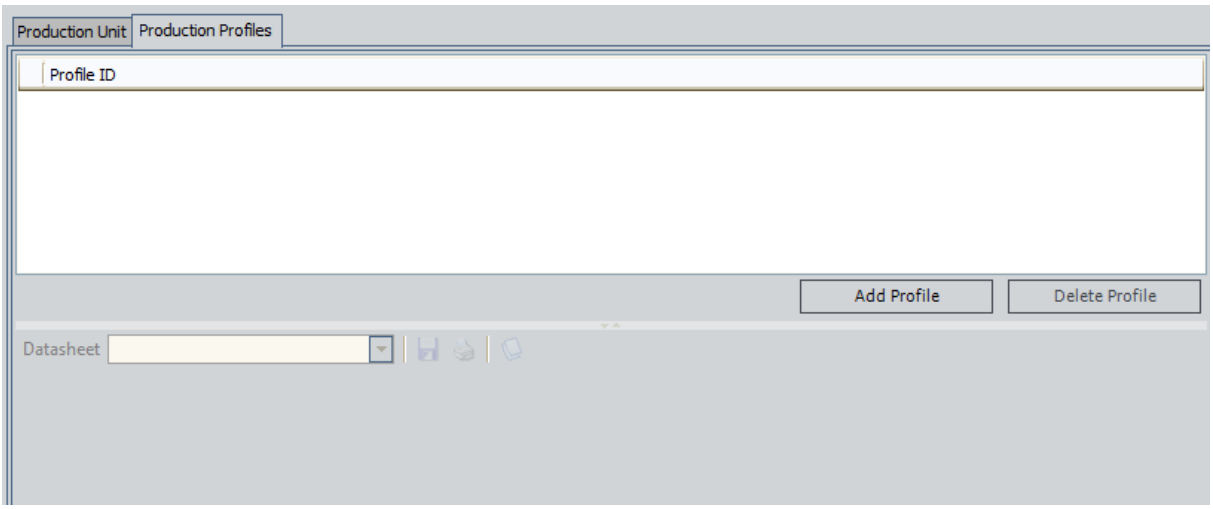
1. In the Meridium APM Framework application, on the Production Units and Profiles page, in the tree, select the Production Unit record to which you want to link a new Production Profile record.

   The datasheet for the selected Production Unit record appears on the **Production Unit** tab to the right of the **ProductionUnits** pane.



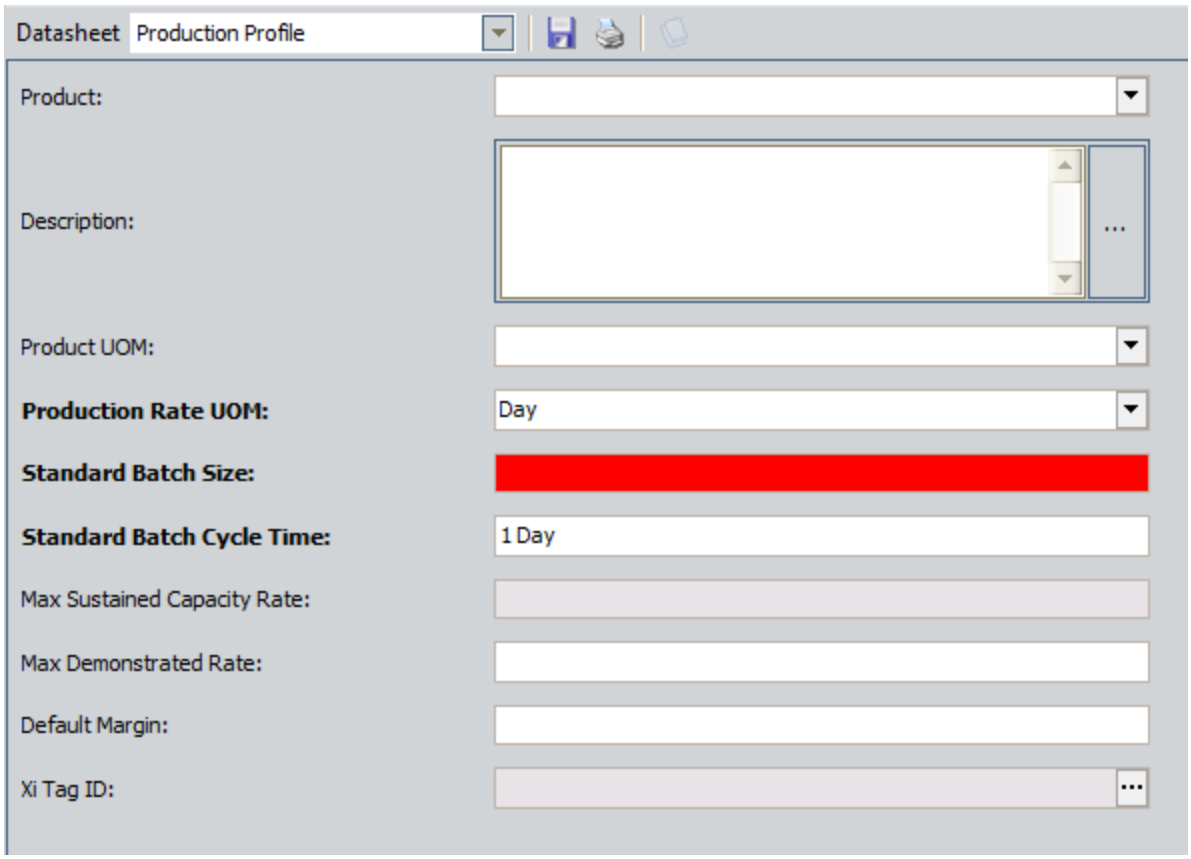
2. Click the **Production Profiles** tab.

   The **Production Profiles** tab appears.



3. Above the Production Profile datasheet, click the **Add Profile** button.

   A new blank Production Profile datasheet appears.



4. In the datasheet, enter data into the fields as desired. The *Standard Batch Size* field is required.
5. When you are finished completing the fields, on the datasheet toolbar, click the button.

   The Production Profile record is saved and linked to the:

- *Production Unit* record that is selected in the tree.
- *Product* record that is represented by the product that you selected in the Product field.
- *Xi Tag* record that is represented by the tag that you selected in the Xi Tag ID field.

In addition, a row is added to the grid above the datasheet, displaying the Record ID of the new Production Profile record.

What If the Margin Changes Over Time?

In some cases, the product *margin*, or the amount of profit that one unit of that particular product yields, changes over time. For example, consider a company that produces water bottles. If consumers start buying more bottled water versus carbonated soft drinks, the profit that a single bottle yields might increase.

In this case, in any Production Profile record that defines water bottle production from a particular unit, you would want to change the value in the Default Margin field to represent the *current* margin at that time.

The value in the Default Margin field in the Production Profile record is copied to the Margin field in all new Production Data records. For instance, if on July 1 the value in the Default Margin field is *5.00*, new Production Data records that are created *on or after* July 1 will contain the value *5* in the Margin field. If, however, on July 16 you change the value in the Default Margin field to *6.00*, any new Production Data records that are created *on or after* July 16 will contain the value *6* in their Margin field.

Keep in mind that Production Data records are created *automatically* when you access the **Production Data Entry** page. The number of records that are created depends upon the day on which you access the page and the planning period of the Production Plan record that you selected when you accessed the page.

For example, suppose the planning period in a Production Plan record is July 1 through July 31. If you were to access the **Production Data Entry** page for that Production Plan record for the first time on July 15, fifteen Production Data records would be created (one for each day between July 1 and July 15). Each of those records would contain the *same* value in the Margin field because they were all created at the same time.

If you were to increase the value in the Default Margin field on July 16 and access the **Production Data Entry** page again on July 16, one new Production Data record would be created to represent July 16, and the value in its Margin field would be the updated value in the Default Margin field in the Production Profile record.

Adding Profile Margin Records

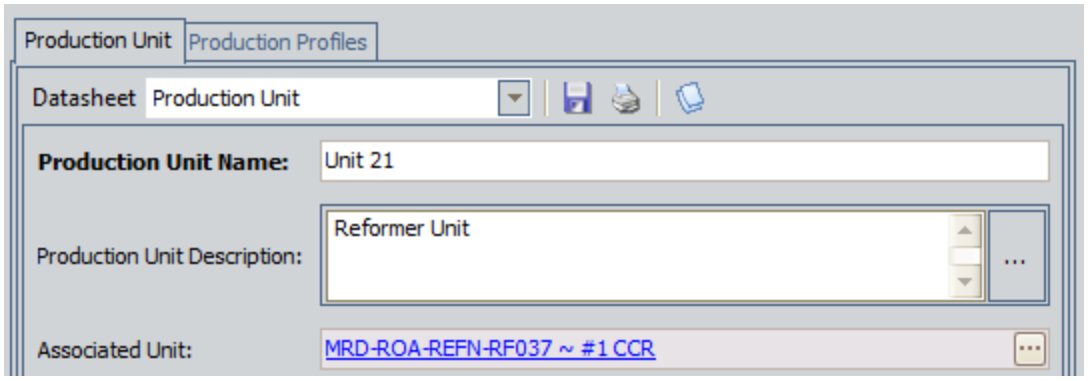
If desired, you can define a profile margin other than the Default Margin. You might want to do so when a quality loss takes place and the amount that was produced has some value other than zero. For example, suppose that the product is clothing that is sold as "factory-seconds." There are minor quality defects with the product due to which it cannot be sold for 100% value of the actual price. It may, however, be a good bargain when the same product is sold for 50% to 75% of the actual price. In this case the loss is equal to the difference between the value the product is sold for versus the value the product could have been sold for.

Note: You can add a Profile Margin record only if a Production Profile record exists for a Production Unit.

To add a Profile Margin record:

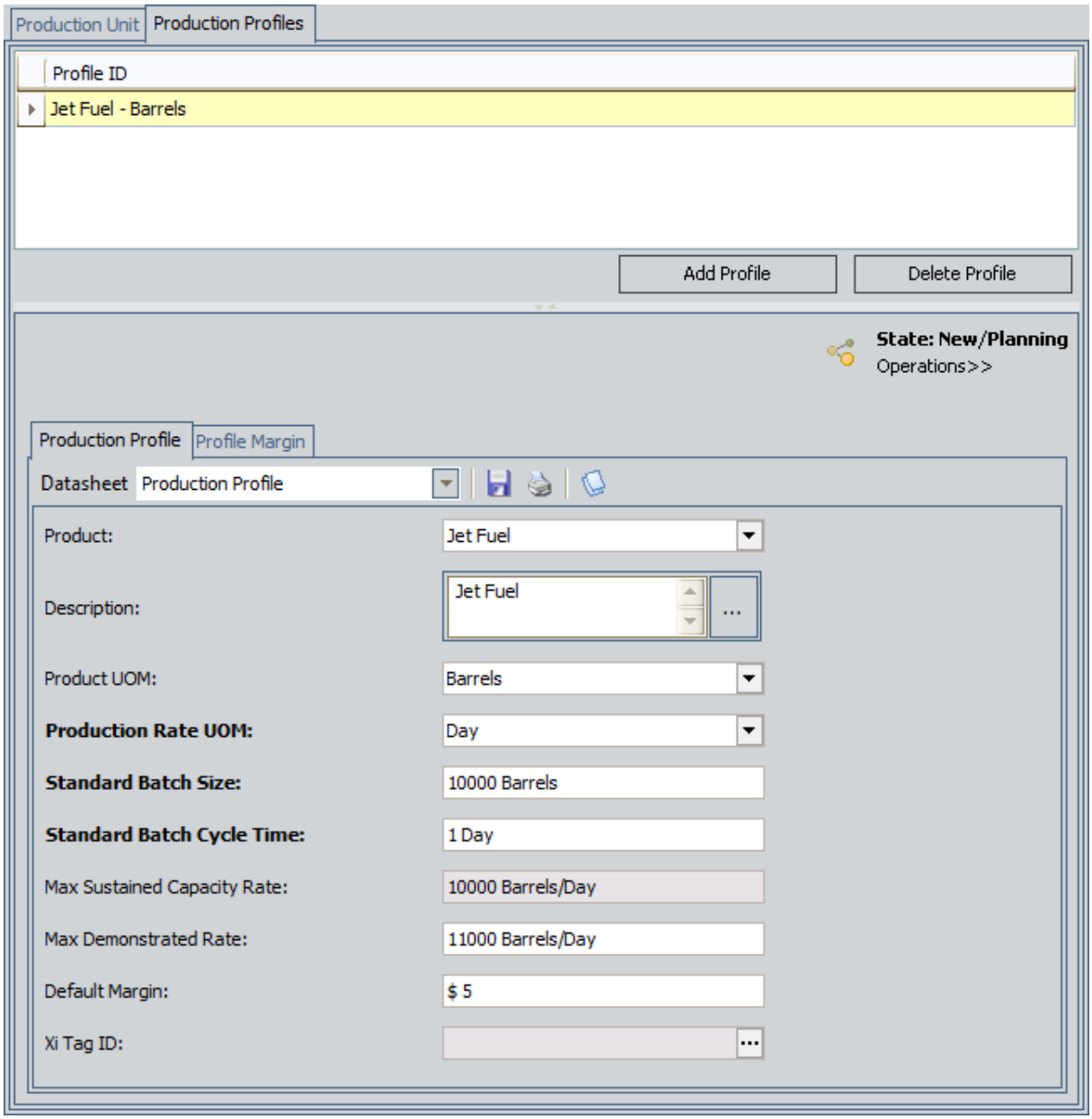
1. In the Meridium APM Framework application, on the Production Units and Profiles page, in the tree, select the Production Unit record that is linked to the Production Profile record for which you want to add your own Profile Margin record.

   The datasheet for the selected Production Unit record appears on the **Production Unit** tab to the right of the **Production Units** pane.



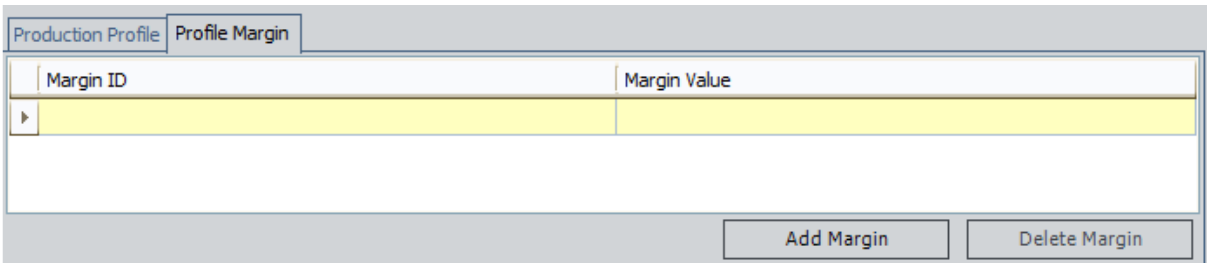
2. Click the **Production Profiles** tab.

   The **Production Profiles** tab appears.



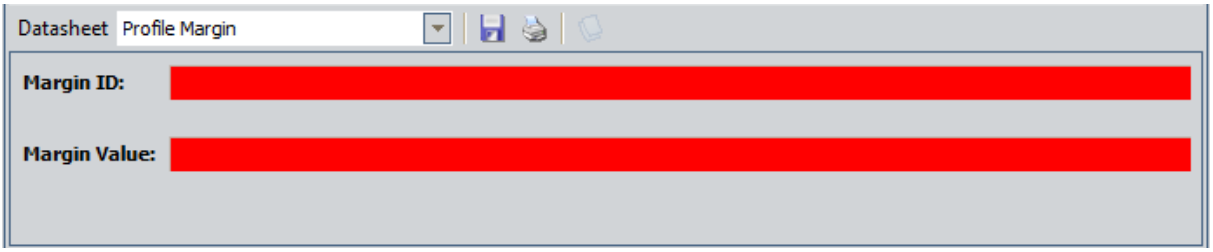
3. Click the Production Profile for which you want to add Profile Margin record.
4. Click the **Profile Margin** tab.

   A grid appears, displaying a row for each Profile Margin record that exists in the database.



5. Below the grid, click the **Add Margin** button.

   A new blank Profile Margin datasheet appears.



6. In the datasheet, enter data into the fields as desired. The *Margin ID and Margin Value* fields are required.

   Note: The value in the *Margin Value* field on the Profile Margin datasheet *must* be less than or equal to the value in the *Default Margin* field on the Production Profile datasheet.

7. When you are finished completing the fields, on the datasheet toolbar, click the button.

   The Profile Margin record is saved and linked to the *Production Profile* record that is selected in the **Production Profiles** tab.

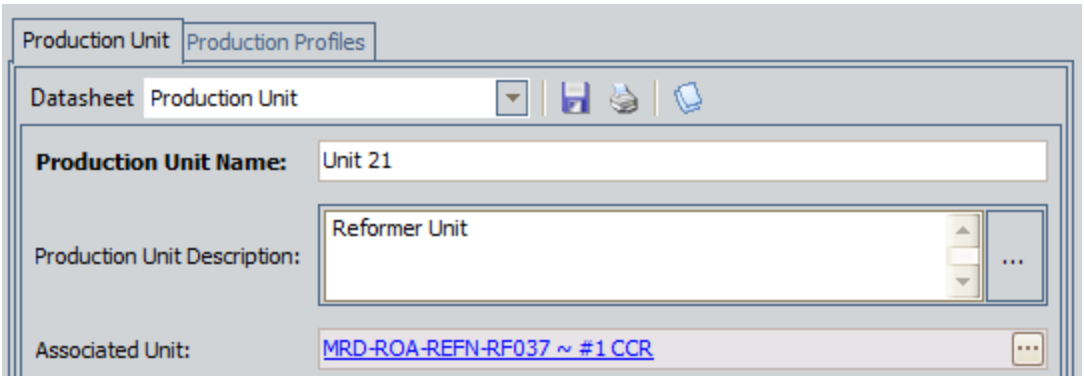
   In addition, a row is added to the grid above the datasheet, displaying the Record ID of the new Profile Margin record.

Deleting Profile Margin Records

To delete a Profile Margin record:

1. In the Meridium APM Framework application, on the Production Units and Profiles page, in the tree, select the Production Unit record that is linked to the Production Profile record for which you want to delete a Profile Margin record.

   The datasheet for the selected Production Unit record appears on the **Production Unit** tab to the right of the **Production Units** pane.



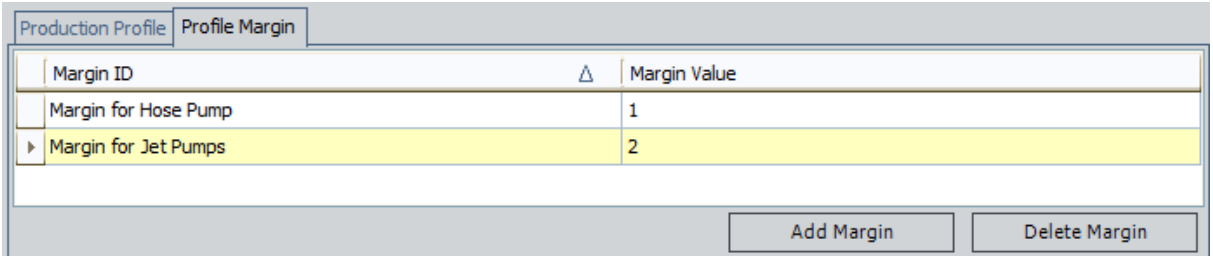
2. Click the **Production Profiles** tab.

   The **Production Profiles** tab appears.

3. Click the Production Profile for which you want to delete a Profile Margin record.

4. Click the **Profile Margin** tab.

   A grid appears, displaying a row for each Profile Margin record that exists in the database.



5. In the grid, select the Profile Margin record that you want to delete.

6. Below the grid, click the **Delete Margin** button.

   A message appears, asking if you are sure that you want to delete the Profile Margin record.

7. Click the **Yes** button.

   The Profile Margin record is deleted and removed from the grid.

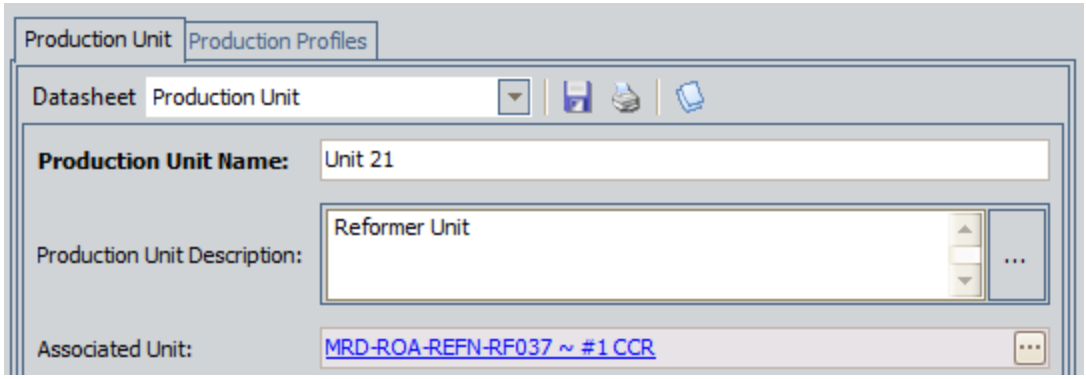
Deleting Production Profile Records

Note: You can delete a Production Profile record only if it is not linked to any Production Plan records.

To delete a Production Profile record:

1. In the Meridium APM Framework application, on the Production Units and Profiles page, in the tree, select the Production Unit record that is linked to the Production Profile record that you want to delete.

   The datasheet for the selected Production Unit record appears on the **Production Unit** tab to the right of the **Units** pane.



2. Click the **Production Profiles** tab.
3. In the grid, select the Production Profile record that you want to delete.
4. Below the grid, click the **Delete Profile** button.

   A message appears, asking if you are sure that you want to delete the Production Profile record.

   Note: If you are attempting to delete a Production Profile record that is linked to one or more Production Plan records, the message asks you to delete the Production Plan records before deleting the Production Profile record.

5. Click the **Yes** button.

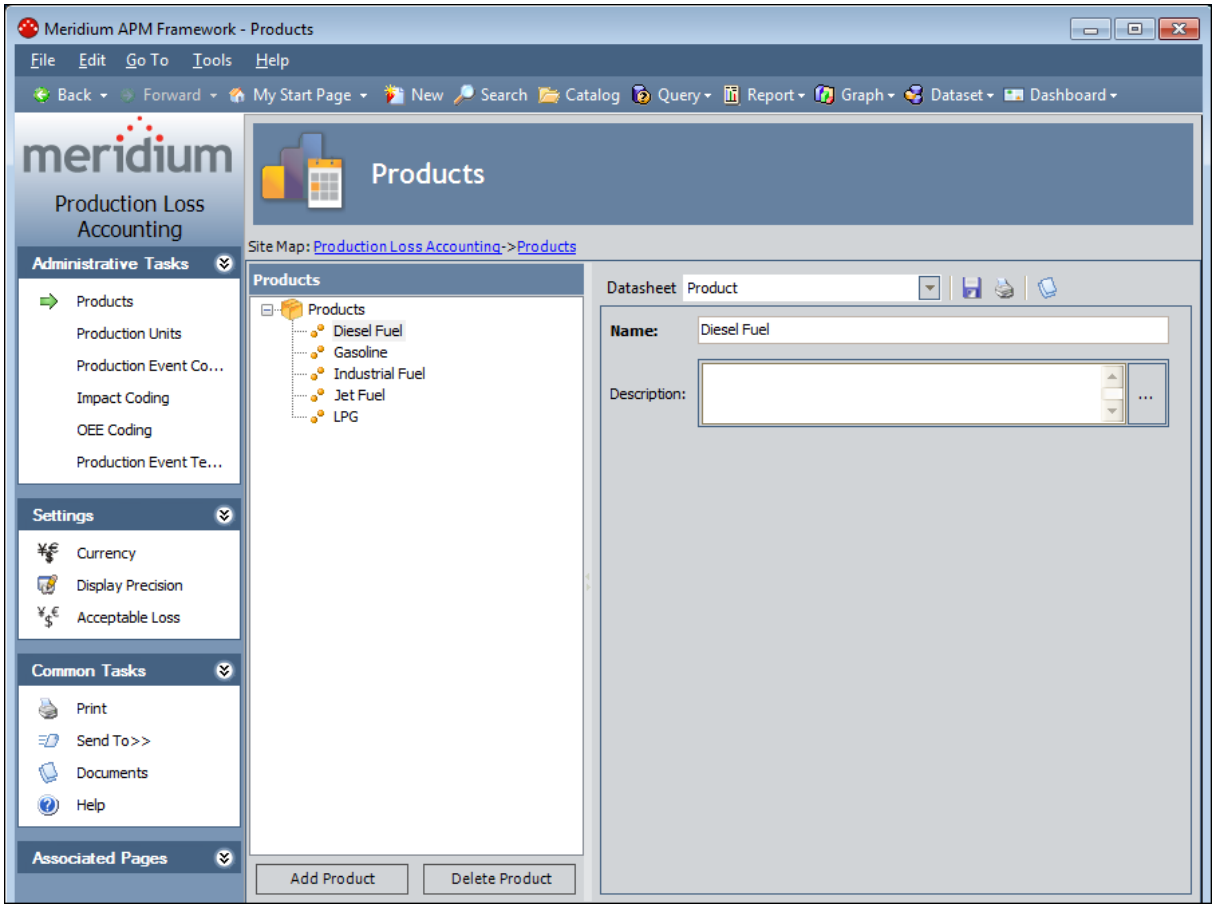
   The Production Profile record is deleted and removed from the grid.

Accessing the Production Event Coding Page

To access the Production Event Coding page:

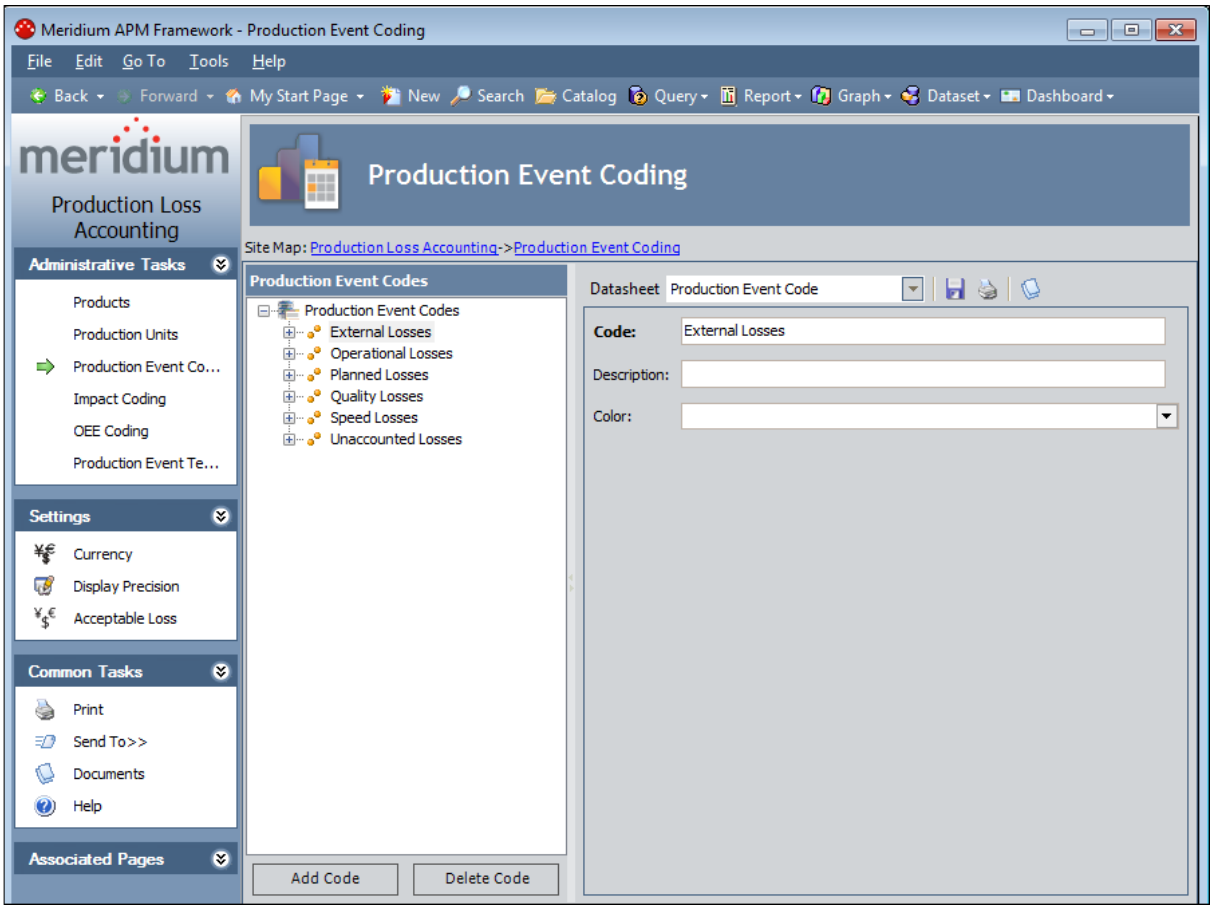
1. In the Meridium APM Framework application, on the **PLA Start Page**, click the **Administration** link.

   The **Products** page appears.



2. On the **Administrative Tasks** menu, click the **Production Event Coding** link.

   The Production Event Coding page appears.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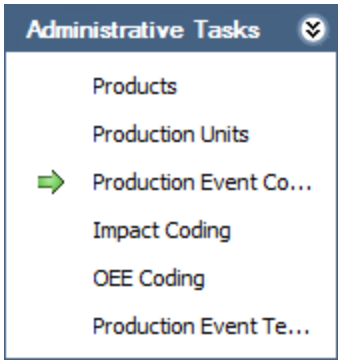
Operational Losses
Planned Losses
Quality Losses
Speed Losses
Unaccounted Losses
Add Code
Delete Code
Datasheet Production Event Code
Code: External Losses
Description:
Color:

Aspects of the Production Event Coding Page

The **Production Event Coding** page contains the following items:

- **Task menu pane:** Contains the following task menus:
  - **Administrative Tasks** menu
  - **Settings** menu
  - **Common Tasks** menu
  - **Associated Pages** menu
- **Production Event Codes** pane: Contains the following items:
  - A tree that displays all the Production Event Code records that exist in the database.
  - The **Add Code** button.
  - The **Delete Code** button.
- **Datasheet area:** Displays the datasheet for the Production Event Code record that is selected in the tree in the **Production Event Codes** pane.

Administrative Tasks Menu



The **Administrative Tasks** menu on the **Production Event Coding** page contains the following links:

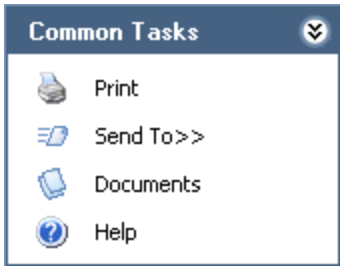
- **Products:** Displays the Products page.
- **Production Units:** Displays the Production Units and Profiles page.
- **Production Event Coding:** Displays the **Production Event Coding** page. A green arrow appears to the left of this link when you are viewing this page.
- **Impact Coding:** Displays the Impact Coding page.
- **OEE Coding:** Displays the OEE Coding page.
- **Production Event Templates:** Displays the Event Templates page.

Settings Menu

The **Settings** menu on the **Production Event Coding** page contains the following link:

- **Currency:** Displays the **Currency** dialog box, where you can specify the currency symbol that will be used throughout PLA.
- **Display Precision:** Displays the **Display Precision** dialog box, where you can specify the number of decimal places that will be used for displaying calculated values on the **Production Data Entry** page.
- **Acceptable Loss:** Displays the **Acceptable Loss** dialog box, where you can specify the acceptable loss that will be used for displaying Acceptable Loss values on the **Production Data Entry** page.

Common Tasks Menu



The **Common Tasks** menu on the **Production Event Coding** page contains the following links:

- **Print:** Displays the **Preview** window, which shows a preview of how the datasheet that appears in the datasheet area will be printed. From the **Preview** window, you can select print options and print the record. This link is enabled only when a record is selected in the tree.
- **Send To:** Displays a submenu with options that let you provide a link to the current page on your desktop (create shortcut), in an email message, or on a Home Page. This link is enabled only when a record is selected in the tree.
- **Documents:** Displays the **Reference Documents** window, where you can manage Reference Document records for the Production Event Code record that is currently selected in the **Production Event Codes** pane. This link is enabled only when a record is selected in the tree.
- **Help:** Displays the context-sensitive Help topic for the **Production Event Coding** page.

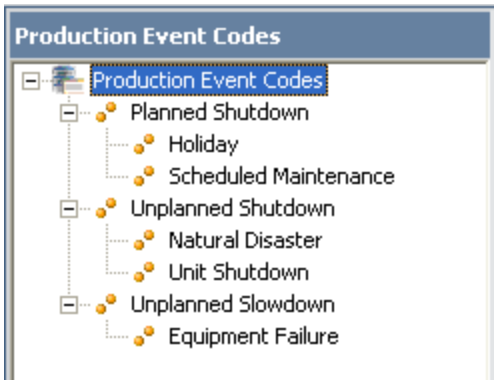
Associated Pages Menu

The **Associated Pages** menu on the **Production Event Coding** page displays links only if Associated Pages have been configured for the Production Event Code family. If no Associated Pages have been configured for the Production Event Code family, the **Associated Pages** menu will be empty.

Production Event Codes Pane

The **Production Event Codes** pane on the **Production Event Coding** page contains a tree that displays all Production Event Code records that exist in the database. The root level of the tree displays the family grouping *Production Event Codes*, which is represented by the icon. Directly below the family node are nodes representing the Production Event Code records. Each record is represented by the icon. To the right of each icon is the Record ID.

Note that you can group Production Event Code records into categories, where each category is also represented by its own Production Event Code record. For example, suppose the following Production Event Code records exist in the database to categorize types of events: *Planned Shutdown*, *Unplanned Shutdown*, and *Unplanned Slowdown*. In each category, more specific types of events exist. In this case, the tree might look like this:



Below the tree are the following buttons:

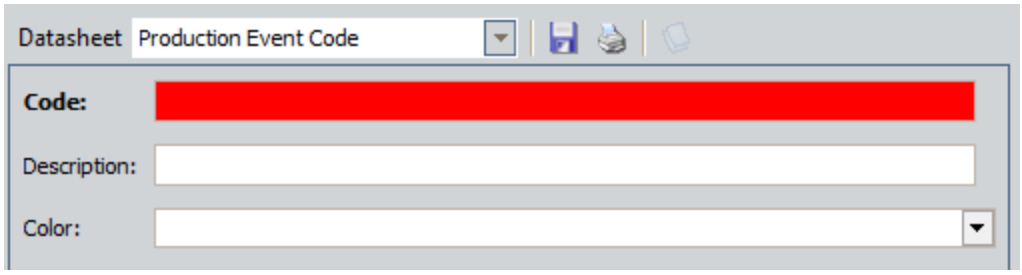
- **Add Code:** Displays a blank Production Event Code datasheet in the datasheet area, where you can create a new Production Event Code record.
- **Delete Code:** After asking for confirmation, deletes the selected Production Event Code record.

Creating a Production Event Code Record

To create a Production Event Code record:

1. In the Meridium APM Framework application, on the Production Event Coding page, in the tree, select the node below which you want the new Production Event Code record to appear.
2. Click the **Add Code** button.

   A new blank datasheet appears to the right of the **Production Event Codes** pane.



3. Complete the fields as desired.
4. When you are finished completing the fields, on the datasheet toolbar, click the **Save current record** button.

   The Production Event Code record is saved.

Deleting a Production Event Code Record

To delete a Production Event Code record:

1. In the Meridium APM Framework application, on the Production Event Coding page, in the tree, select the Production Event Code record that you want to delete.
2. Below the tree, click the **Delete Code** button.

   A message appears, asking if you are sure you want to delete the record.
3. Click the **Yes** button.

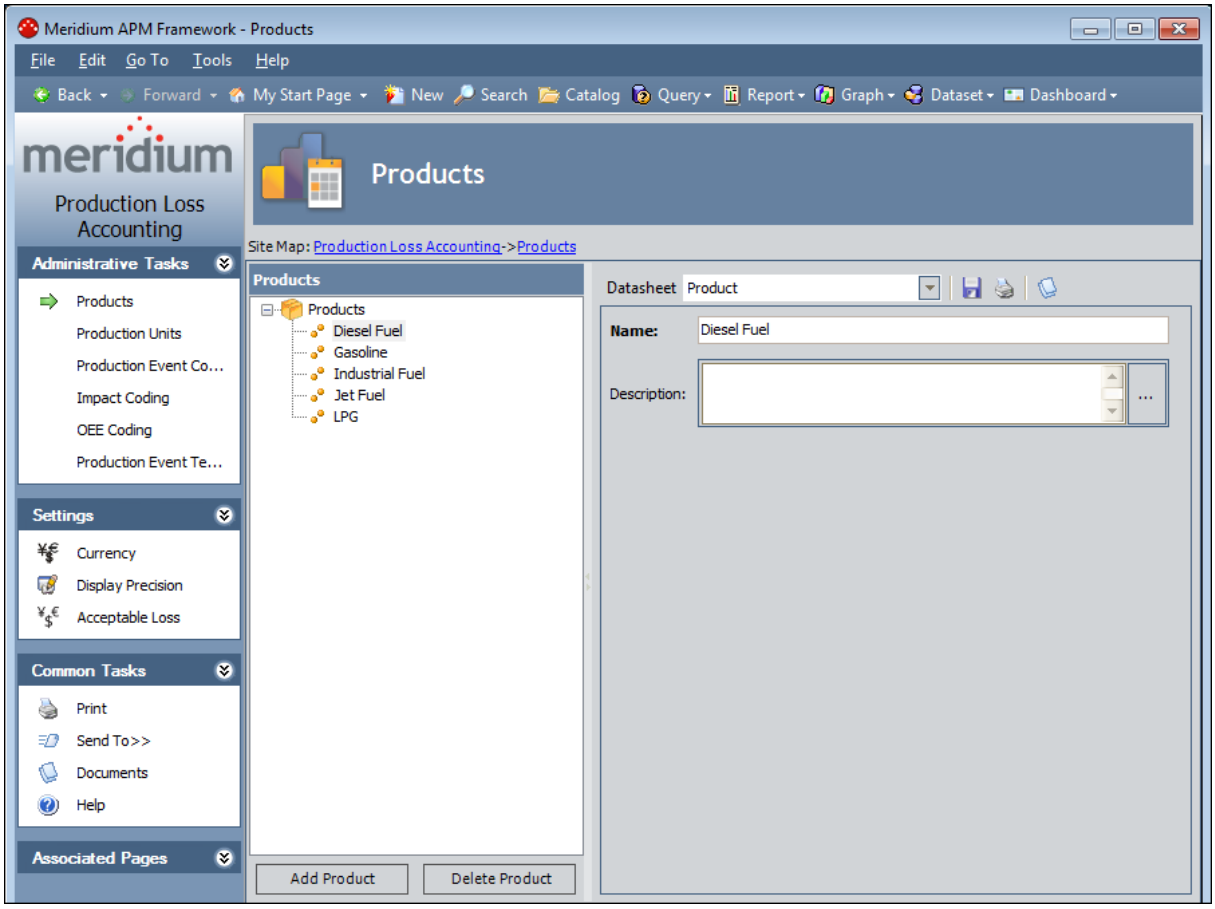
   The Production Event Code record is deleted.

Accessing the Impact Coding Page

To access the Impact Coding page:

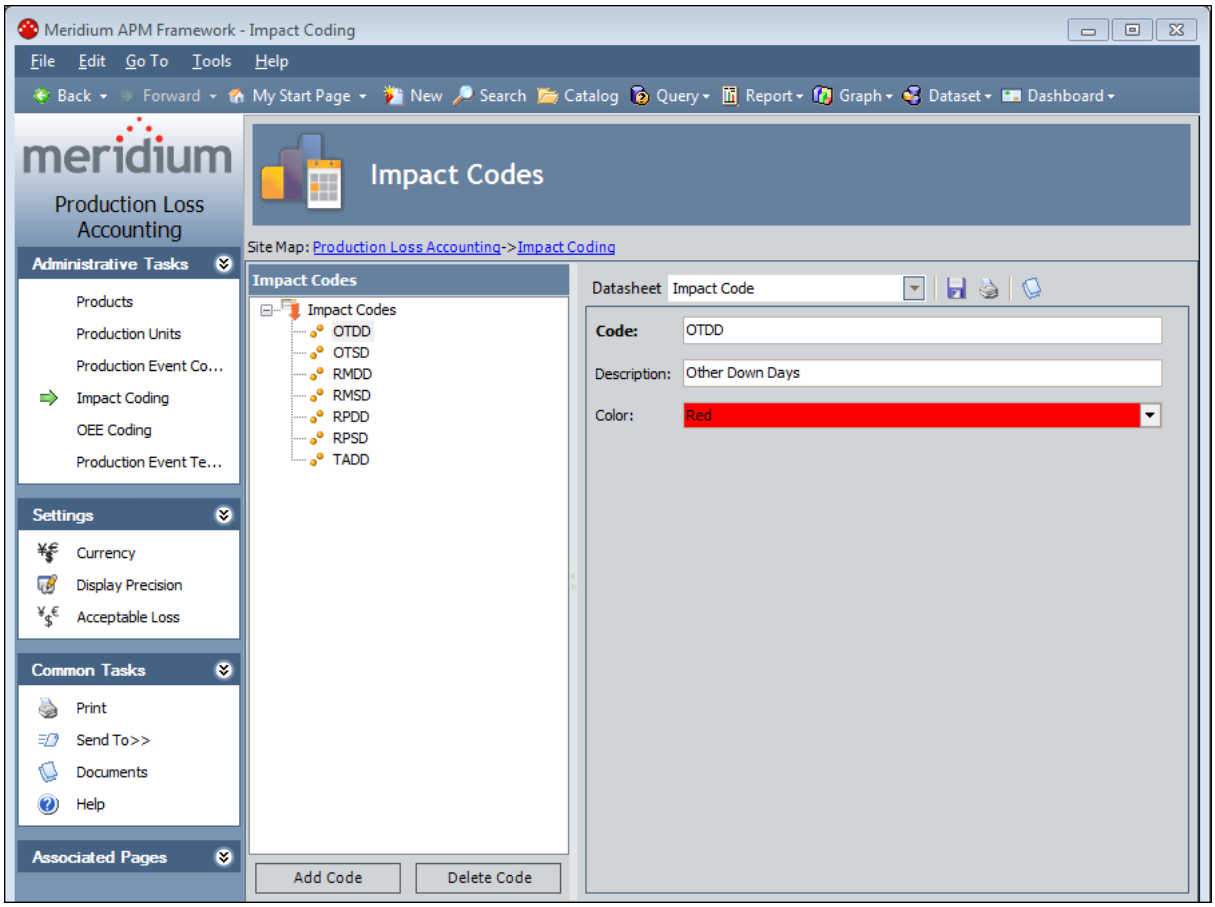
1. In the Meridium APM Framework application, on the **PLA Start Page**, click the **Administration** link.

   The **Products** page appears.



2. On the **Administrative Tasks** menu in PLA, click the **Impact Coding** link.

   The Impact Coding page appears.


Meridium APM Framework - Impact Coding
File Edit Go To Tools Help
Back Forward My Start Page New Search Catalog Query Report Graph Dataset Dashboard
meridium
Production Loss Accounting
Administrative Tasks
Products
Production Units
Production Event Co...
Impact Coding
OEE Coding
Production Event Te...
Settings
Currency
Display Precision
Acceptable Loss
Common Tasks
Print
Send To>>
Documents
Help
Associated Pages
Impact Codes
Site Map: Production Loss Accounting->Impact Coding
Impact Codes
Impact Codes
OTDD
OTSD
RMDD
RMSD
RPDD
RPSD
TADD
Add Code
Delete Code
Datasheet Impact Code
Code: OTDD
Description: Other Down Days
Color: Red

Aspects of the Impact Coding Page

The **Impact Coding** page contains the following items:

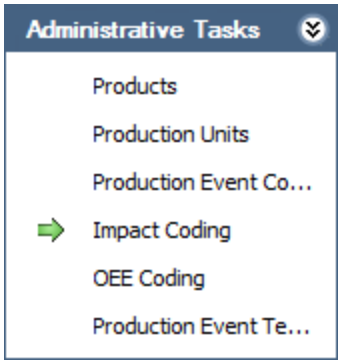
- **Task menu pane:** Contains the following task menus:
  - **Administrative Tasks** menu
  - **Settings** menu
  - **Common Tasks** menu
  - **Associated Pages** menu
- **Impact Codes pane:** Contains the following items:
  - A tree that displays all the Impact Code records that exist in the database.
  - The **Add Code** button.
  - The **Delete Code** button.
- **Datasheet area:** Displays the datasheet for the Impact Code record that is selected in the tree in the **Impact Codes** pane.

Baseline Impact Code Records

The following Impact Code records are provided in the baseline Meridium APM database:

Code	Description
TADD	Turnaround Down Days
RMDD	Routine Maintenance Down Days
RMSD	Routine Maintenance Slowdown Days
RPDD	Regulatory-Process Down Days
RPSD	Regulatory-Process Slowdown Days
OTDD	Other Down Days
OTSD	Other Slowdown Days

Administrative Tasks Menu



The **Administrative Tasks** menu on the **Impact Coding** page contains the following links:

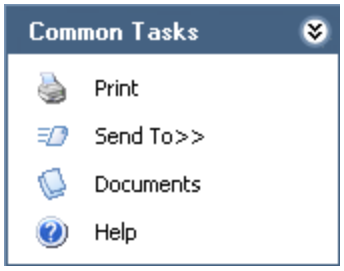
- **Products:** Displays the Products page.
- **Production Units:** Displays the Production Units and Profiles page.
- **Production Event Coding:** Displays the Production Event Coding page.
- **Impact Coding:** Displays the **Impact Coding** page. A green arrow appears to the left of this link when you are viewing this page.
- **OEE Coding:** Displays the OEE Coding page.
- **Production Event Templates:** Displays the Event Templates page.

Settings Menu

The **Settings** menu on the **Impact Coding** page contains the following link:

- **Currency:** Displays the **Currency** dialog box, where you can specify the currency symbol that will be used throughout PLA.
- **Display Precision:** Displays the **Display Precision** dialog box, where you can specify the number of decimal places that will be used for displaying calculated values on the **Production Data Entry** page.
- **Acceptable Loss:** Displays the **Acceptable Loss** dialog box, where you can specify the acceptable loss that will be used for displaying Acceptable Loss values on the **Production Data Entry** page.

Common Tasks Menu



The **Common Tasks** menu on the **Impact Coding** page contains the following links:

- **Print:** Displays the **Preview** window, which shows a preview of how the datasheet that appears in the datasheet area will be printed. From the **Preview** window, you can select print options and print the record. This link is enabled only when a record is selected in the tree.
- **Send To:** Displays a submenu with options that let you provide a link to the current page on your desktop (create shortcut), in an email message, or on a Home Page. This link is enabled only when a record is selected in the tree.
- **Documents:** Displays the **Reference Documents** window, where you can manage Reference Document records for the Impact Code record that is currently selected in the **Impact Codes** pane. This link is enabled only when a record is selected in the tree.
- **Help:** Displays the context-sensitive Help topic for the **Impact Coding** page.

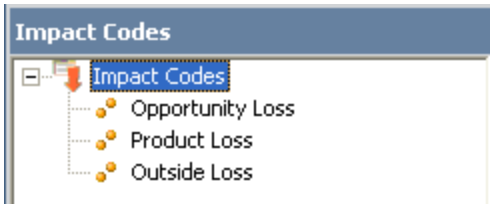
Associated Pages Menu

The **Associated Pages** menu on the **Impact Coding** page displays links only if Associated Pages have been configured for the Impact Code family. If no Associated Pages have been configured for the Impact Code family, the **Associated Pages** menu will be empty.

Impact Codes Pane

The **Impact Codes** pane on the **Impact Coding** page contains a tree that displays all Impact Code records that exist in the database. The root level of the tree displays the family grouping *Impact Codes*, which is represented by the icon. Directly below the family node are nodes representing the Impact Code records. Each record is represented by the icon. To the right of each icon is the Record ID.

For example, suppose the following Impact Code records exist in the database: *Opportunity Loss*, *Product Loss*, and *Outside Loss*. In this case, the tree would look like this:



Below the tree are the following buttons:

- **Add Code:** Displays a blank Impact Code datasheet in the datasheet area, where you can create a new Impact Code record.
- **Delete Code:** After asking for confirmation, deletes the selected Impact Code record.

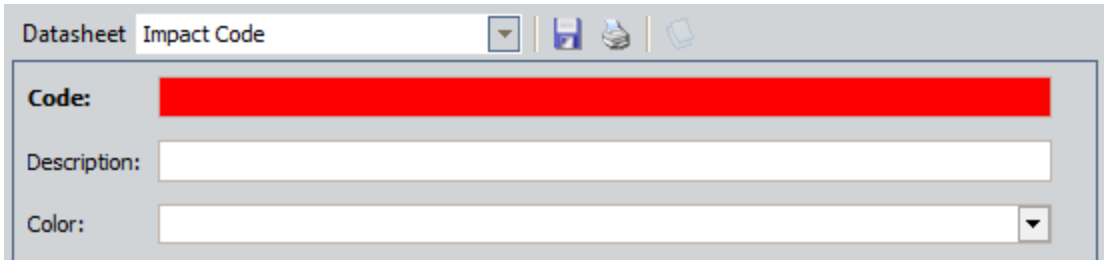
Creating an Impact Code Record

Note: If you create new impact codes and would like to use those impact codes instead of the baseline codes in the Mechanical Availability, On-Stream Factor, or Operational Availability Metric Views, you will need to modify the corresponding Metric View calculations for the Production Data cube in SQL Server Analysis Services. Instructions for completing this task are not provided in the Meridium APM Documentation. For more information, consult your Microsoft documentation.

To create an Impact Code record:

1. In the Meridium APM Framework application, on the **Impact Coding** page, below the tree, click the **Add Code** button.

   A new blank datasheet appears to the right of the **Impact Codes** pane.



2. Enter data into the fields as desired.
3. When you are finished completing the fields, on the datasheet toolbar, click the **Save current record** button.

   The Impact Code record is saved.

Deleting an Impact Code Record

To delete an Impact Code record:

1. In the Meridium APM Framework application, on the **Impact Coding** page, in the tree, select the Impact Code record that you want to delete.
2. Below the tree, click the **Delete Code** button.

   A message appears, asking if you are sure you want to delete the record.
3. Click the **Yes** button.

   The Impact Code record is deleted.

About OEE Codes

Many companies report how well a manufacturing operation is running overall using *Overall Equipment Effectiveness* codes, or OEE codes. These codes categorize production losses using three specific areas: equipment availability, performance, and product quality. The losses associated with these categories are then used to calculate an overall OEE percentage, which indicates the effectiveness of the production process.

The goal is to reach a 100% OEE level, or 100% efficiency. In order to achieve this, each category must operate at 100% (i.e., *0* losses are assigned to each category). The OEE level is a standard way to measure efficiency that can be compared across industries (e.g., electric and refining).

In the Meridium APM system, you can categorize losses according to OEE codes via the OEE Code field in Production Loss records. After production losses are categorized using OEE codes, for each production unit, you can view the overall OEE percentage that is calculated by the Meridium APM system via the *OEE* Metric View. To simply view the production loss amount attributed to each OEE code, you can view the *Losses by OEE Code* Metric View.

Baseline OEE Code Records

The baseline Meridium APM database contains a set of baseline OEE code records that define basic OEE Codes. Each OEE code is either a *parent* code or a *child* code. In general, parent codes are used to categorize high-level losses, and child codes further divide those categories into more specific areas. Both parent codes and child codes are stored in OEE Code records.

You can also create custom OEE codes. Only the baseline codes and their children, however, will be used to calculate the OEE percentage in the OEE Metric View. Therefore, in order for custom OEE codes to be included in the OEE percentage calculation, they must be children of the baseline parent OEE codes.

The following OEE Code records are provided in the baseline Meridium APM database.

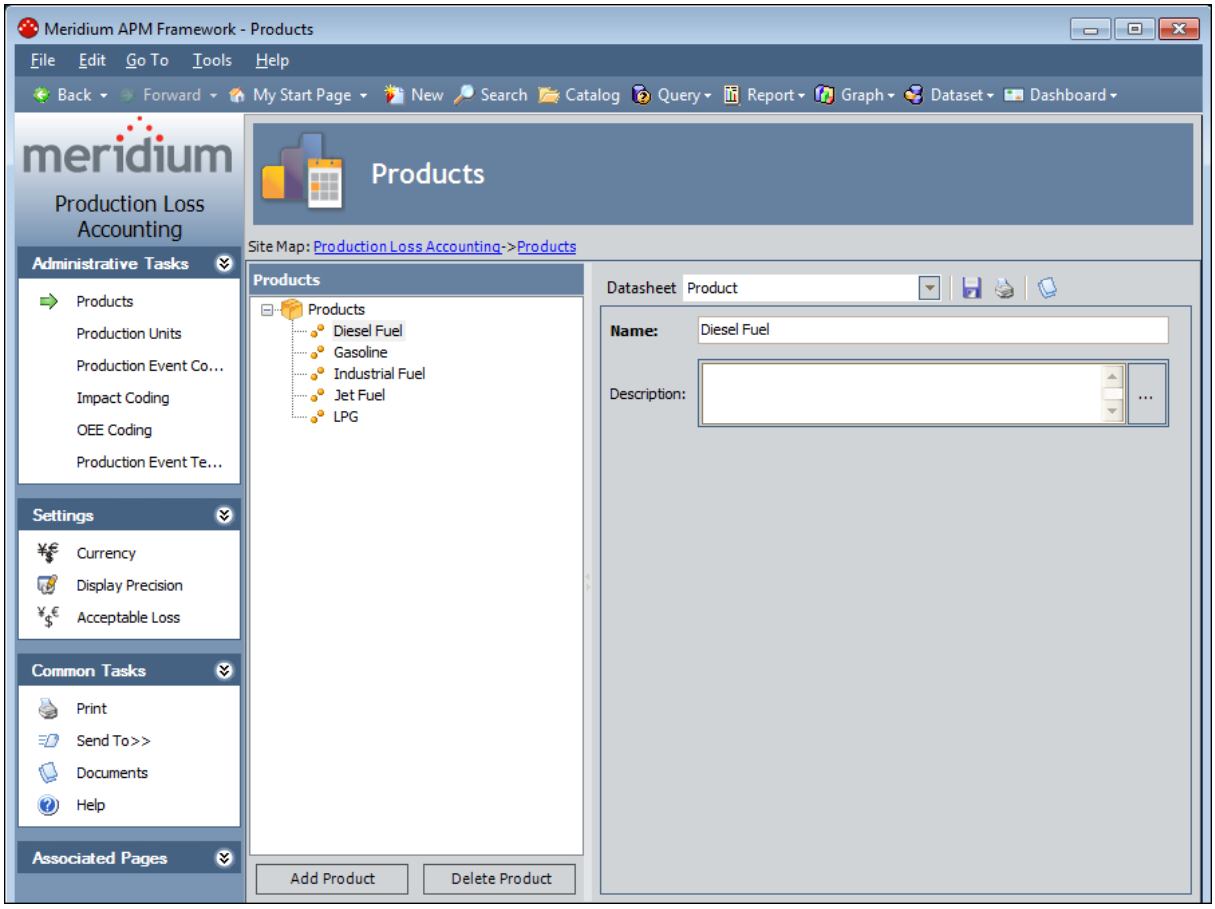
Parent Code	Child Codes	Description
Availability	Scheduled Downtime Setup/Clean Up Unscheduled Downtime	Indicates that a production loss is due to resources that are unavailable for use (e.g., scheduled maintenance).
Idle Time	No Demand No Feedstock or Raw Material Not scheduled for production	Indicates that a production loss is due to available resources that are currently not in use (e.g., a piece of equipment is available for use, but there are not enough employees to operate it). Losses associated with the Idle Time OEE code are included in the calculations for other categories (availability, performance, and quality). Idle Time does not represent its own OEE category.
Performance	Minor Stops Reduced Rate	Indicates that a production loss is due to resources that are not performing at 100% capacity.
Quality	Startup Rejects Production Rejects	Indicates that a production loss is due to poor quality product that could not be used.

Accessing the OEE Coding Page

To access the OEE Coding page:

1. In the Meridium APM Framework application, on the **PLA Start Page**, click the **Administration** link.

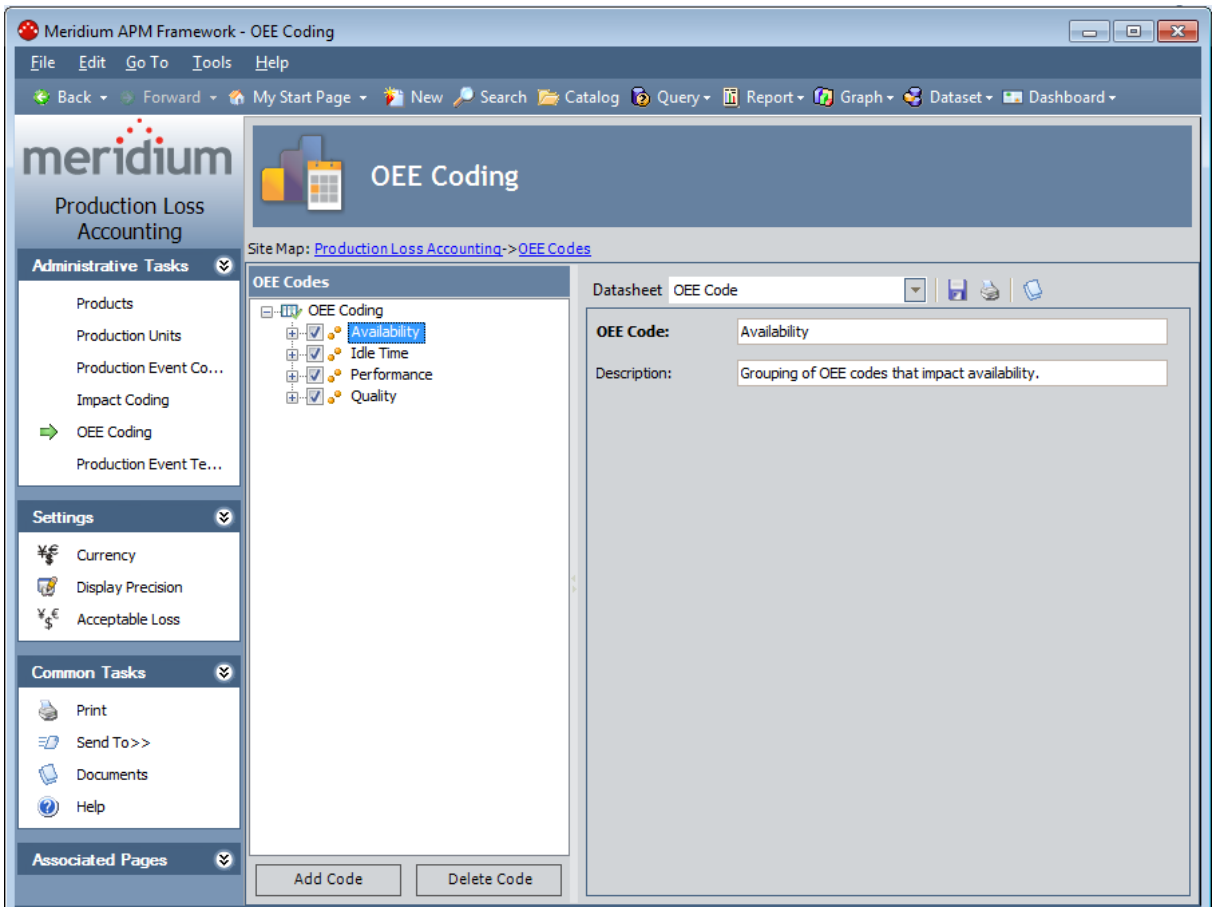
   The **Products** page appears.



2. On the **Administrative Tasks** menu in PLA, click the **OEE Coding** link.

   The OEE Coding page appears.

Accessing the OEE Coding Page

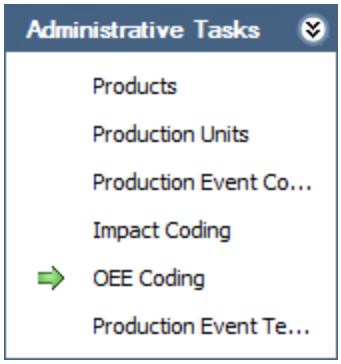


Overview of the OEE Coding Page

The **OEE Coding** page contains the following items:

- **Task menu pane:** Contains the following task menus:
  - **Administrative Tasks** menu
  - **Settings** menu
  - **Common Tasks** menu
  - **Associated Pages** menu
- **OEE Codes pane:** Contains the following items:
  - A tree that displays all the OEE Code records that exist in the database.
  - The **Add Code** button.
  - The **Delete Code** button.
- **Datasheet area:** Displays the datasheet for the OEE Code record that is selected in the tree in the **OEE Codes** pane.

Administrative Tasks Menu



The **Administrative Tasks** menu on the **OEE Coding** page contains the following links:

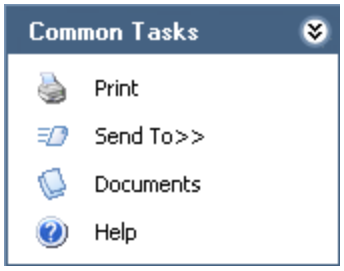
- **Products:** Displays the Products page.
- **Production Units:** Displays the Production Units and Profiles page.
- **Production Event Coding:** Displays the Production Event Coding page.
- **Impact Coding:** Displays the Impact Coding page.
- **OEE Coding:** Displays the **OEE Coding** page. A green arrow appears to the left of this link when you are viewing this page.
- **Production Event Templates:** Displays the Event Templates page.

Settings Menu

The **Settings** menu on the **OEE Coding** page contains the following link:

- **Currency:** Displays the **Currency** dialog box, where you can specify the currency symbol that will be used throughout PLA.
- **Display Precision:** Displays the **Display Precision** dialog box, where you can specify the number of decimal places that will be used for displaying calculated values on the **Production Data Entry** page.
- **Acceptable Loss:** Displays the **Acceptable Loss** dialog box, where you can specify the acceptable loss that will be used for displaying Acceptable Loss values on the **Production Data Entry** page.

Common Tasks Menu



The **Common Tasks** menu on the **OEE Coding** page contains the following links:

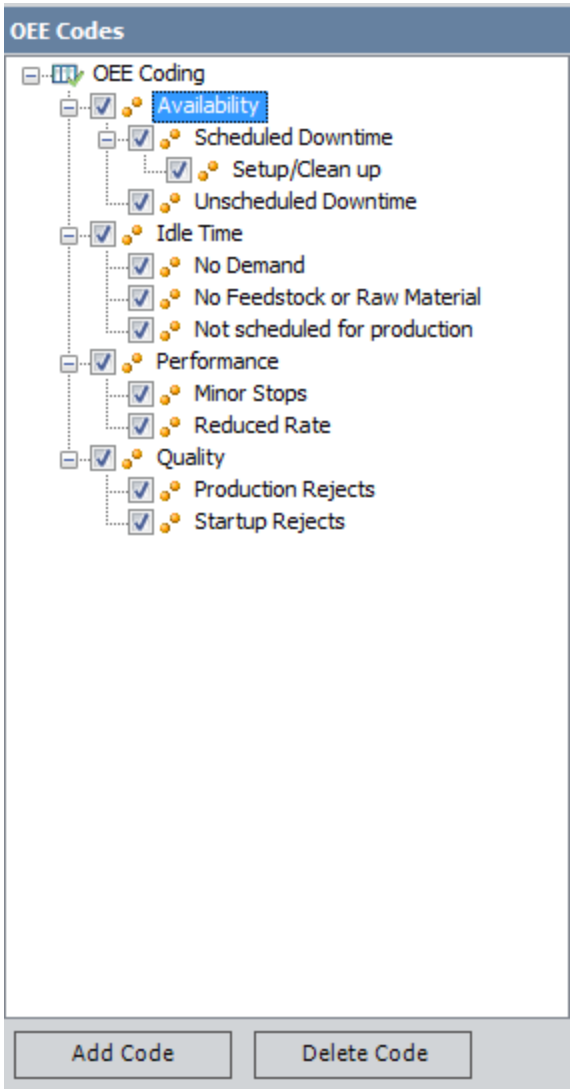
- **Print:** Displays the **Preview** window, which shows a preview of how the datasheet that appears in the datasheet area will be printed. From the **Preview** window, you can select print options and print the record. This link is enabled only when a record is selected in the tree.
- **Send To:** Displays a submenu with options that let you provide a link to the current page on your desktop (create shortcut), in an email message, or on a Home Page. This link is enabled only when a record is selected in the tree.
- **Documents:** Displays the **Reference Documents** window, where you can manage Reference Document records for the OEE Code record that is currently selected in the **OEE Codes** pane. This link is enabled only when a record is selected in the tree.
- **Help:** Displays the context-sensitive Help topic for the **OEE Coding** page.

Associated Pages Menu

The **Associated Pages** menu on the **OEE Coding** page displays links only if Associated Pages have been configured for the OEE Code family. If no Associated Pages have been configured for the OEE Code family, the **Associated Pages** menu will be empty.

OEE Codes Pane

The **OEE Codes** pane on the **OEE Coding** page contains a tree that displays all OEE Code records that exist in the database.



The root level of the tree displays the text *OEE Coding*, which is represented by the icon. Directly below the OEE Coding node are nodes representing OEE Code records. Each record is identified by the icon and the Record ID. Parent OEE codes exist on the first level of the hierarchy. To see the child codes of each parent OEE code, you can expand each parent node to view the second level of the hierarchy.

To the left of each node is a check box, which indicates whether or not the code is enabled. You can clear the check box to disable the code or select the check box to enable the code. Only enabled codes can be assigned to production losses. Disabling codes allows you to restrict them from being used without deleting them from the system. For example, if you wanted to use the code *Startup Rejects* only during certain

times of the year, you could disable the *Startup Rejects* code when you are not using it, and enable it again later.

The following buttons appear below the tree:

- **Add Code:** Displays a blank OEE Code datasheet in the datasheet area, where you can create a new OEE Code record.
- **Delete Code:** After asking for confirmation, deletes the selected OEE Code record.

Creating an OEE Code Record

You can create either a parent OEE code or an OEE code that is the child of another OEE code.

Note: New child OEE Code records can be added to enabled parent OEE Code records only.

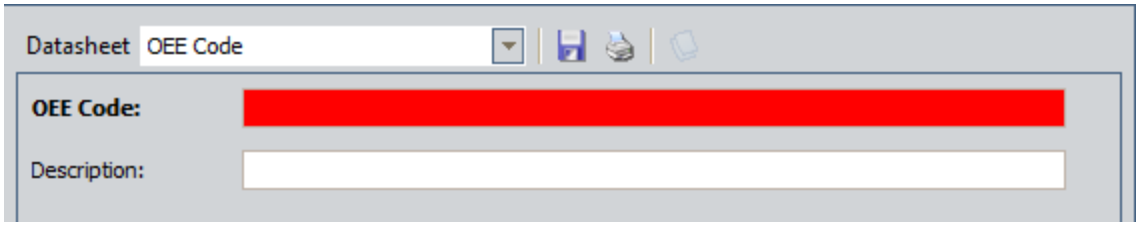
To create an OEE Code record:

1. In the Meridium APM Framework application, access the **OEE Coding** page.
2. If you want to create a parent code, select the root OEE Coding node, and click the **Add Code** button.

   -or-

   If you want to create a child node, in the OEE Codes pane, select the code that you want to serve as the parent code, and click the **Add Code** button.

   A new blank datasheet appears to the right of the **OEE Codes** pane.

3. In the **OEE Code** text box, type a short name for the OEE code.
4. In the **Description** text box, type a description of the OEE code.
5. Click the button.

   The OEE Code record is saved.

Disabling OEE Codes

If you are a member of the MI Production Loss Accounting Administrator Security Group or a Super User, you can disable OEE codes on the **OEE Coding** page. Disabling an OEE code prevents users from assigning that code to a Production Loss record without deleting the record. On the **Production Data Entry** page, when you are assigning an OEE code to a loss in the **Losses** section, disabled OEE codes will be gray in the **Select OEE Code** window and you will not be able to select them.

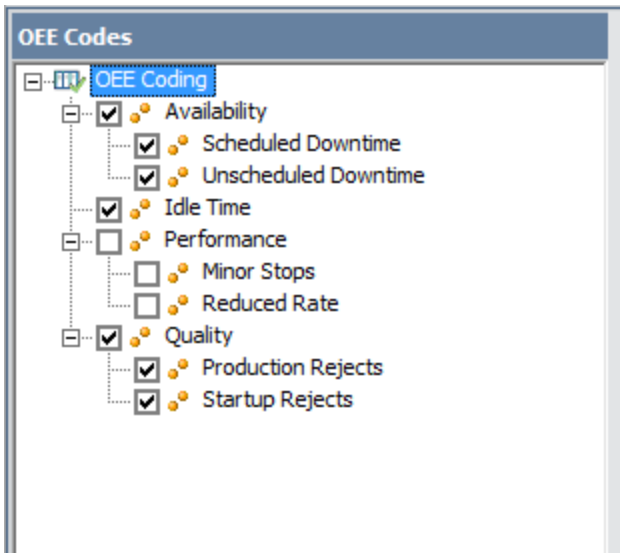
If you disable a *parent* OEE Code record, its child OEE Code records will be disabled automatically. Likewise, if you enable a parent OEE Code record, its child OEE Code records will be enabled automatically. You can enable or disable child nodes, however, without affecting the state of the parent node. You cannot add a child OEE Code record to a disabled OEE Code record.

To disable an OEE code:

- In the Meridium APM Framework application, in the tree on the **OEE Coding** page, clear the check box next to the OEE code that you want to disable.

  Note: If the check box is already cleared, you can select it to enable the code.

  The OEE code is disabled, and the value in the Is Inactive field is set automatically to *True*. In the following image, the parent node *Performance* and its child nodes are disabled.



Deleting an OEE Code Record

To delete an OEE Code record:

1. In the Meridium APM Framework application, on the **OEE Coding** page, in the tree, select the OEE Code record that you want to delete.
2. Below the tree, click the **Delete Code** button.

   A message appears, asking if you are sure you want to delete the record.

   Note: When you delete an OEE code record that has children, the message will warn you that its children will also be deleted.

3. Click the **Yes** button.

   The OEE Code record is deleted.

Deploying the Production Data and Equipment Costs Data Cubes

The Production Data cube is used to build the Metric Views that are provided in the Catalog folder \\Public\Meridium\Modules\PLA\Metrics, with one exception, the *Total Cost of Unreliability Metric View*, which is built using the Equipment Costs Data cube. The following instructions explain how to deploy the Production Data cube and Equipment Costs Data cube. These instructions are intended to be used only by users who are familiar with Microsoft SQL Server Analysis Services and Microsoft SQL Server Business Intelligence Development Studio and the help systems that exist within each application. These instructions assume that you have already installed both of these components.

To deploy the Equipment Costs Data cube and the Production Data cube:

1. In Microsoft SQL Server Business Intelligence Development Studio, open the file **Production Loss Analysis.dwproj**. This file is located on the Meridium APM Framework and Server Setup DVD in one of the following folders. You will need to use the file in the folder that corresponds to the type of database you are using.

- **For an Oracle database:** \\Meridium APM Framework and Server Setup\Configuration\PLA Analysis Services Project\Oracle
- **For an SQL Server database:**\\Meridium APM Framework and Server Setup\Configuration\PLA Analysis Services Project\SQL

> **Note:** If you are opening the Production Loss Analysis.dwproj file for the first time, the first time you try to save changes to the project, you will be prompted to save the project to your local machine.

2. In Microsoft SQL Server Business Intelligence Development Studio, in the properties for the Production Loss Analysis project, identify the Analysis Services Server that you want to use to deploy the cubes.

> **Note:**You must have permission to access the selected Analysis Services Server in order for the cubes to deploy correctly.

3. In Microsoft SQL Server Business Intelligence Development Studio, in the properties for the Production Loss Analysis project, check that the Analysis Services database is set to *Production Loss Analysis*. This is the database to which the project will be deployed. The value *Production Loss Analysis*is populated automatically and must not be modified in order for the cubes to deploy correctly.
4. In Microsoft SQL Server Business Intelligence Development Studio, open the data source Meridium.ds, and identify the connection information for the Meridium data source to which you want to deploy the cubes.
5. In Microsoft SQL Server Business Intelligence Development Studio, process the cubes. You can process each cube individually or process both cubes at once by processing the entire Production Loss Analysis project.

6. In the Meridium APM Framework application, using the Record Manager, open the Analysis Services Cube record **Production Data**. In the**Analysis Services Server**text box, type the name of the Analysis Services Server.
7. In the Meridium APM Framework application, using the Record Manager, open the Analysis Services Cube record **Equipment Costs Data**. In the **Analysis Services Server** text box, type the name of the Analysis Services Server.
8. In the Meridium APM Framework application, using the Metrics and Scorecards module, grant permission to the Production Data cube record and the Equipment Data Costs cube record to all Security Users and Security Groups whose members should be allowed to view the PLA Metric Views. Note that all baseline PLA Security Groups have permission to the Production Data cube and the Equipment Data Costs cube. If you are using Security Groups outside of this Security Group, you will need to determine if they will also need permissions to these records.

About Configuring the All Production Data Query

The *All Production Data* query, which is located in the Catalog folder **\\Public\Meridium\Modules\Reliability Manager\Analyses**, determines which values from records in the Production Loss Accounting module are mapped to the Production Data field in Production Analysis records. The Production Data field stores code, which represents the production data that, along with the mapping supplied through this query, is used to create the Production Analysis plot. If you want to map values from custom fields to the Production Data field, you will need to modify the All Production Data query.

The baseline All Production Data query returns values from fields in Production Data and Production Loss records, which are then mapped to the Production Data field in a Production Analysis record. You can map values from a custom field in any record in the Production Loss Accounting module by adding the field to the All Production Data query.

The baseline All Production Data query returns the following fields from the Production Data family:

- Period
- Actual
- MSCR

In a Production Analysis:

- Values that are mapped from the Period field represent dates.
- Values that are mapped from the Actual field represent production data.
- Values that are mapped from the MSCR field represent the values against which the Actual value is compared to determine if a loss occurred.

These values represent the underlying production data for the Production Analysis, which you can view on the **Edit Production Data** window in the Production Analysis module.

If you are using fields other than the baseline fields to represent these values, you should replace the baseline fields with your custom fields accordingly in the All Production Data query. If you are using fields that contain values other than the values defined in the baseline fields, you can add the custom fields to the All Production Data query in addition to the baseline fields.

The baseline All Production Data query also returns the results of the *Combined Production Data Codes* query, which returns the following fields from the Production Loss family:

- Impact Code
- Event Code
- OEE Code

You do not need to modify the Combined Production Data Codes query in order to map values from custom fields to the Production Data field in a Production Analysis record. You only need to add your custom field to the All Production Data query.

About Process Data Integration

If the Process Data Integration feature has been configured correctly and an administrative user has completed the necessary system administration steps for PLA, the following PLA records will be created *automatically* as a result of the integration:

- **Production Data records.** To enable this integration, you will need to link Production Profile records to Xi Tag records. As a result, any readings that are recorded in the associated Xi Reading records will be used to create Production Data records automatically.
- **Production Event records.** To enable this integration, you will need to create Production Event Template records and link them to Xi Tag records. As a result, any readings that are recorded in the associated Xi Reading records will be used to create or update Production Event records automatically. You can also create a Production Event record via a Policy Diagram in the Policy Manager module.

An Example of Creating Production Data Records Automatically

Note: The following example assumes that you are using a *daily* production plan (i.e., one Production Data record exists per day during the planning period). The same concept applies to production plans on other schedules (e.g., weekly, per shift, and so on). In all cases, dates and times in Xi Reading records are compared to the production planning schedule to determine if a Production Data record should be created automatically (and what its start and end dates should be).

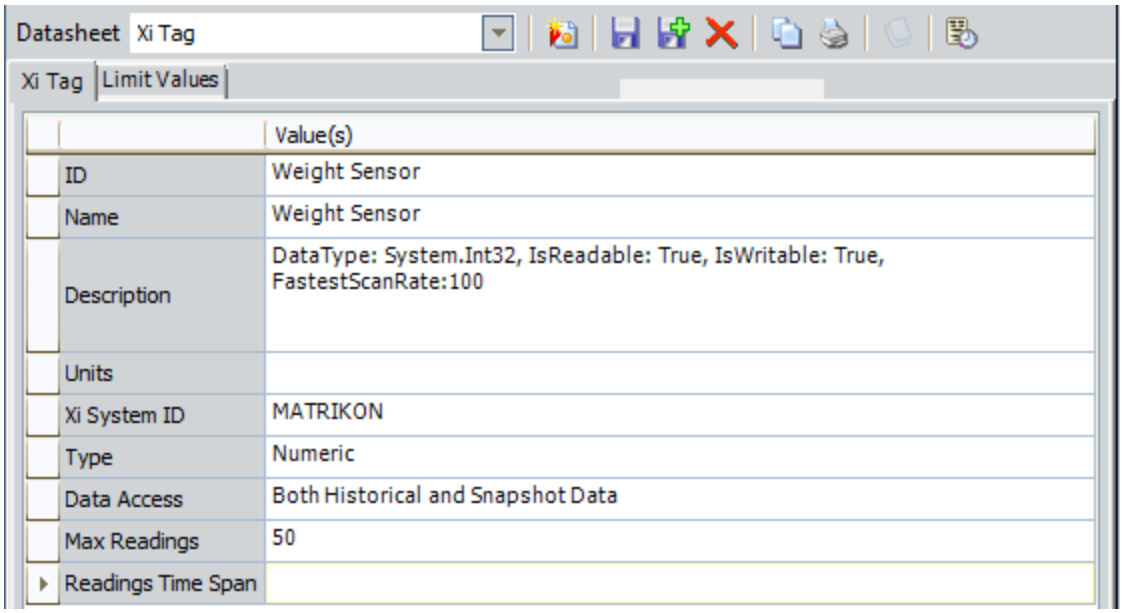
Suppose that when your production process finishes filling, labeling, and capping a bottle of water, the bottle is placed on a pallet. Each filled bottle weighs 40 pounds, and a single pallet can hold up to 20 water bottles (800 pounds). Also, in a given day, the maximum amount of product that you can produce is 5,000 bottles. In other words, at the end of the day, you can fully stock 250 pallets, where the weight on each pallet is 800 pounds, and the total weight on *all* pallets is 200,000 pounds.

These numbers are illustrated in the following image.

Given this scenario, you might want to track the amount of product that you produced each day by measuring the weight on *all* pallets at the end of the day. To do so, you

might stack each pallet and then use a weight sensor to measure the total weight of the stack. If the weight sensor records a value of 200,000 pounds, you know that you have met your maximum production for the day.

In this case, you could use the Process Data Integration feature to create an Xi Tag record for the weight sensor. The Xi Tag datasheet might look like this:

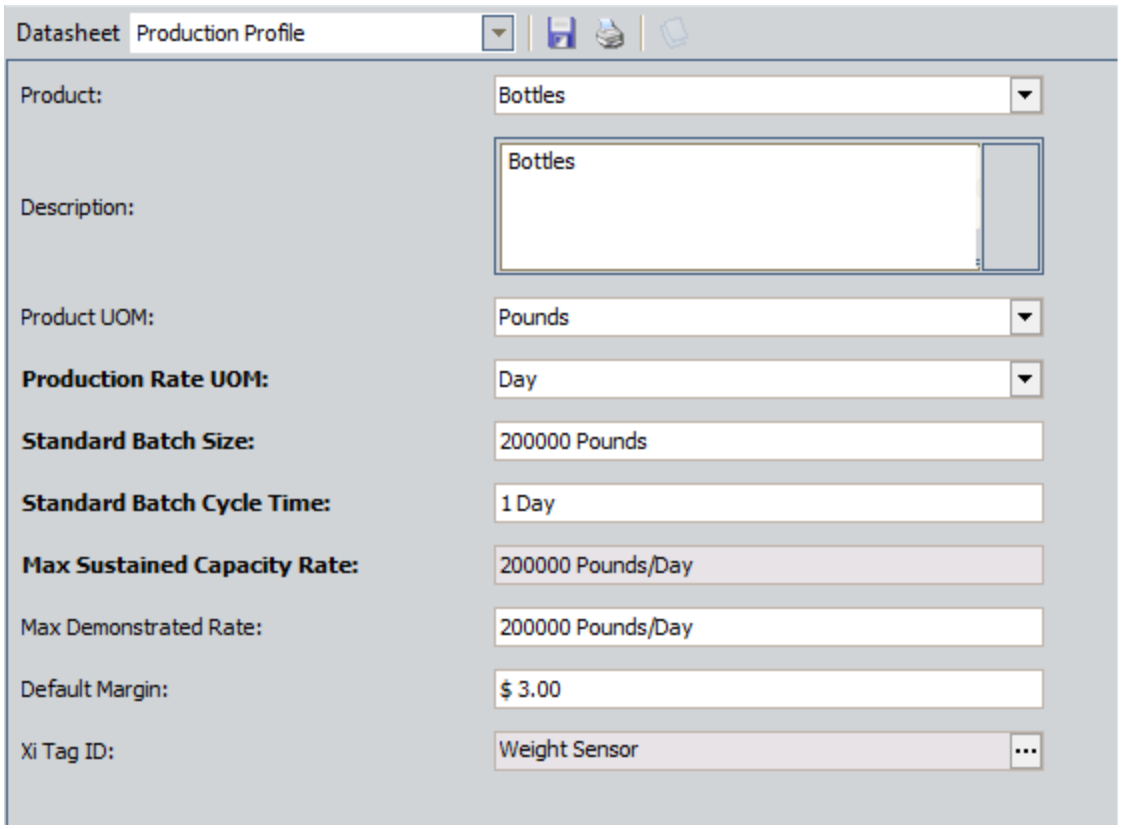


At the end of the day, the sensor would record the total weight on all pallets in the stack that day, and the value would be transferred to an Xi Reading record. If the total weight on 10/1/2011 and 10/2/2011 were *200,000* and *195,000*, respectively, at the end of the day on 10/2/2011, the database would contain Xi Reading records with the following values.

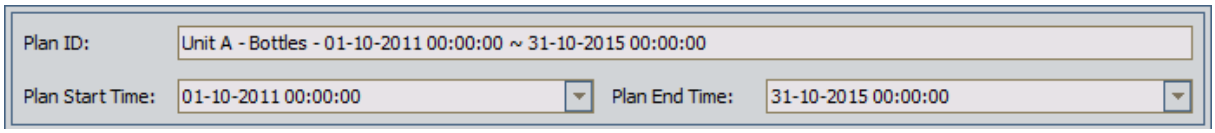
XiReading ID	Time Stamp	Value
Weight Sensor	2011-10-01 00:00:00	200000
Weight Sensor	2011-10-02 00:00:00	195000

If you have associated a Production Profile record with this Xi Tag record and that Production Profile record is linked to a Production Plan record whose date range contains the days on which the Xi Reading records were created (10/1/2011 and 10/2/2011), a Production Data record would be created automatically for each reading. The value in the Actual field in each Production Data record would identify the total weight on all pallets for that day, where the total weight was originally recorded in the Xi Reading record.

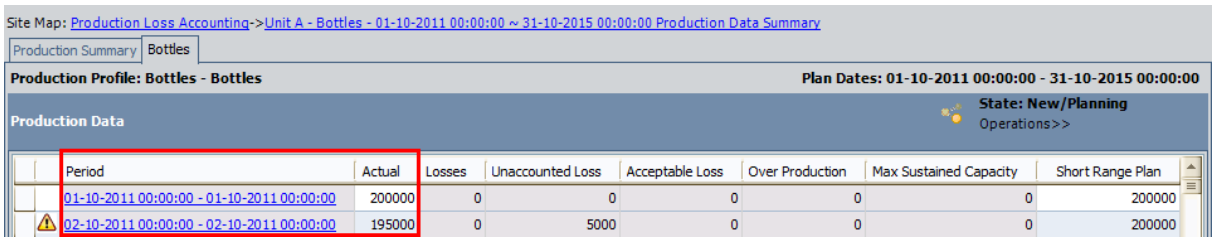
The following image shows the datasheet for the Production Profile record that is linked to this Xi Tag record. You can see the value *Weight Sensor* in the Xi Tag ID field.



In addition, the following image shows the production plan details for the Production Plan record to which this Production Profile record is linked. You can see that the planning period starts on 10/1/2011 (in the Plan Start Time field) and ends on 10/31/2011 (in the Plan End Time field).



Because these records and values exist, at the end of the day on 10/2/2011, two Production Data records will have been created automatically to store the values that were recorded by the weight sensor on those days. The following image shows what those two Production Data records would look like on the **Production Data Entry** page. The dates and actual values have been outlined in red.



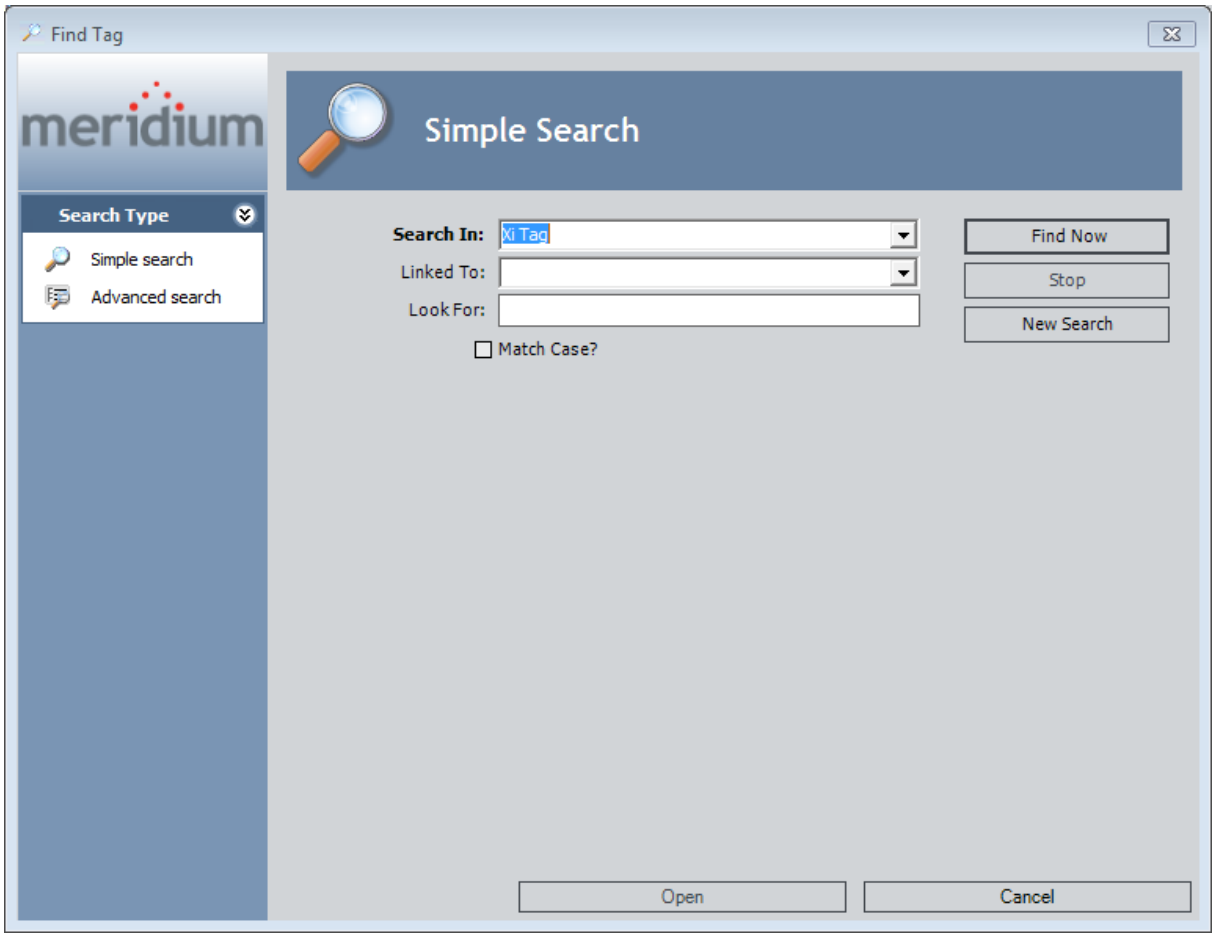
Linking a Production Profile Record to an Xi Tag Record

To link a Production Profile record to an Xi Tag record:

1. On the Production Units and Profiles page, in the tree, select the Production Unit record that is linked to the Production Profile record to which you want to link an Xi Tag record.
2. In the datasheet area, click the **Production Profiles** tab.
3. In the grid at the top of the tab, select the row representing the Production Profile record that you want to link to an Xi Tag record.

   The datasheet for the selected Production Profile record appears below the grid.
4. On the datasheet, in the **Xi Tag ID** cell, click the ··· button.

   The **Find Tag** window appears, displaying the **Simple Search** workspace. The value in the **Search In** list is set by default to *Xi Tag*. You cannot select a different value.



5. If desired,refine the search criteria.
6. When you are finished defining the search criteria, click the **Find Now** button.

   The search results appear below the search criteria.
7. In the search results list, select the Xi Tag record to which you want to link the Production Profile record, and click the **Open** button.

   The selected Xi Tag record is linked to the Production Profile record. The Record ID of the selected Xi Tag record appears in the **Xi Tag ID** cell.
8. On the datasheet toolbar, click the button.

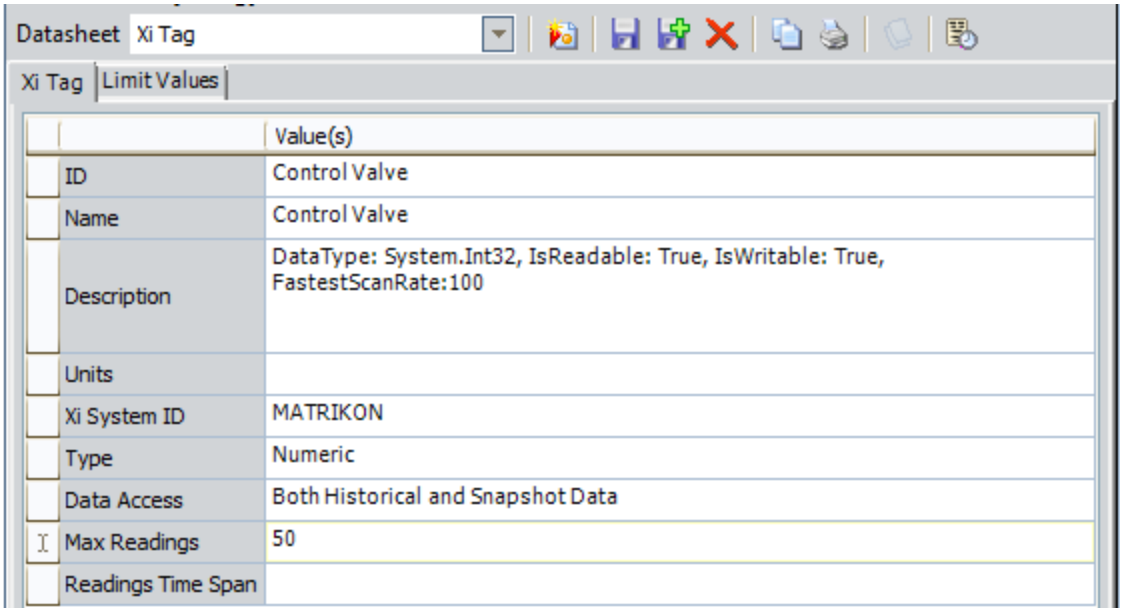
   The Production Profile record is saved.

An Example of Creating Production Event Records Automatically

Suppose that as part of your company's water bottling process, you are required to remove 97% of all chemicals from the water during the purification process. In this case, you might use a monitoring system that checks the percentage of remaining chemicals in the purified water before it flows into the filling machine.

If the system detects that less than 97% of chemicals have been removed from the water, a control valve closes to stop the water from entering the filling machine. In other words, when the control valve is open, you know that at least 97% of chemicals have been removed from the water, and it is safe to continue filling bottles with it. Likewise, when the control valve is closed, less than 97% of chemicals have been removed, and no bottles should be filled with that water until the problem is repaired. Throughout the day, the control value would either be open or closed. If the valve were to close, it would indicate the *start* of a production event, and when the valve reopened, it would indicate the *end* of that production event.

In this case, you could use the Process Data Integration feature to create an Xi Tag record for the control valve. The Xi Tag datasheet might look like this:

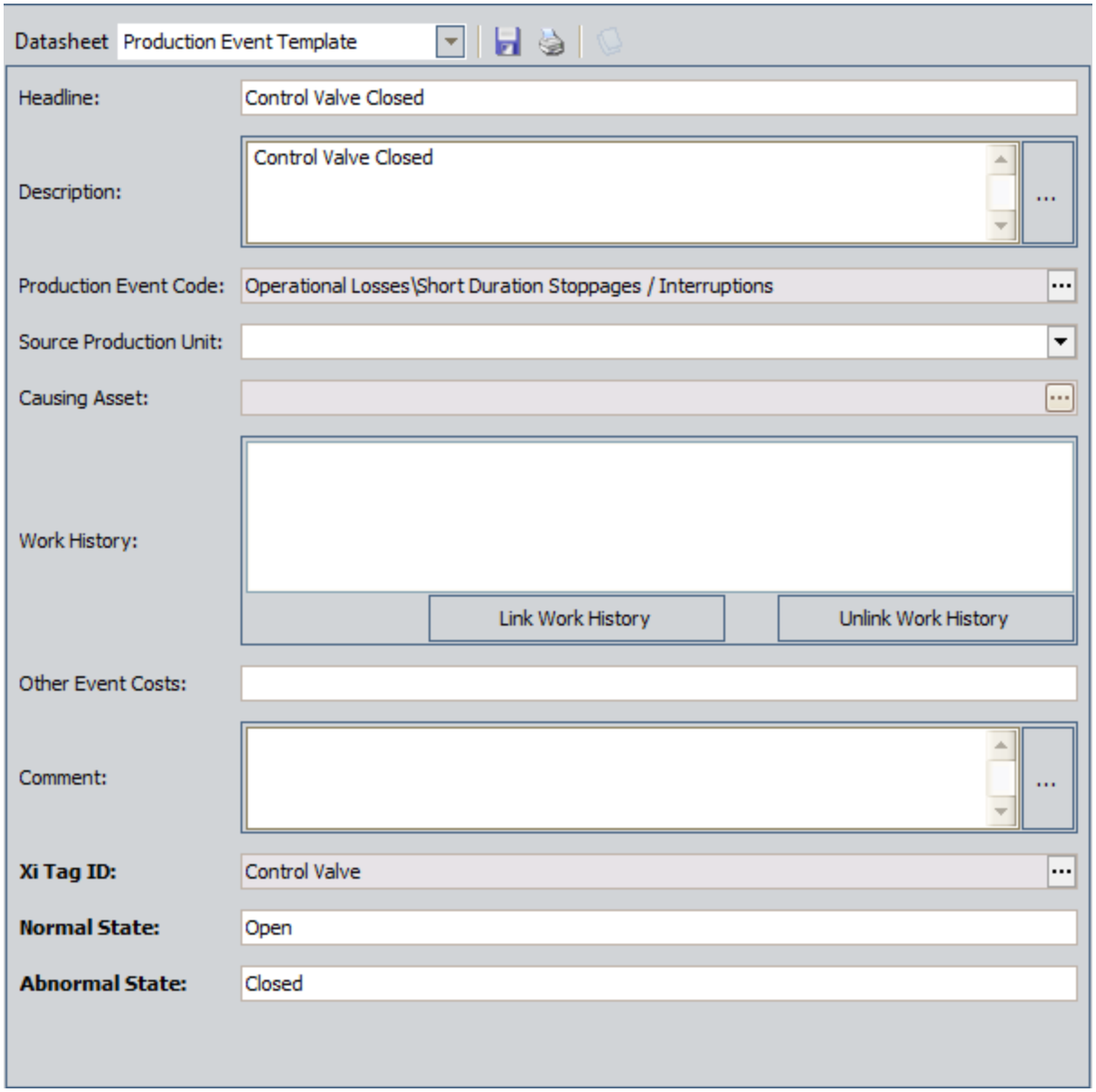


If the control valve were to close on 10/1/2011 at 10:53:00 A.M. and reopen on 10/1/2011 at 11:25:00 A.M., the database would contain Xi Reading records with the following values.

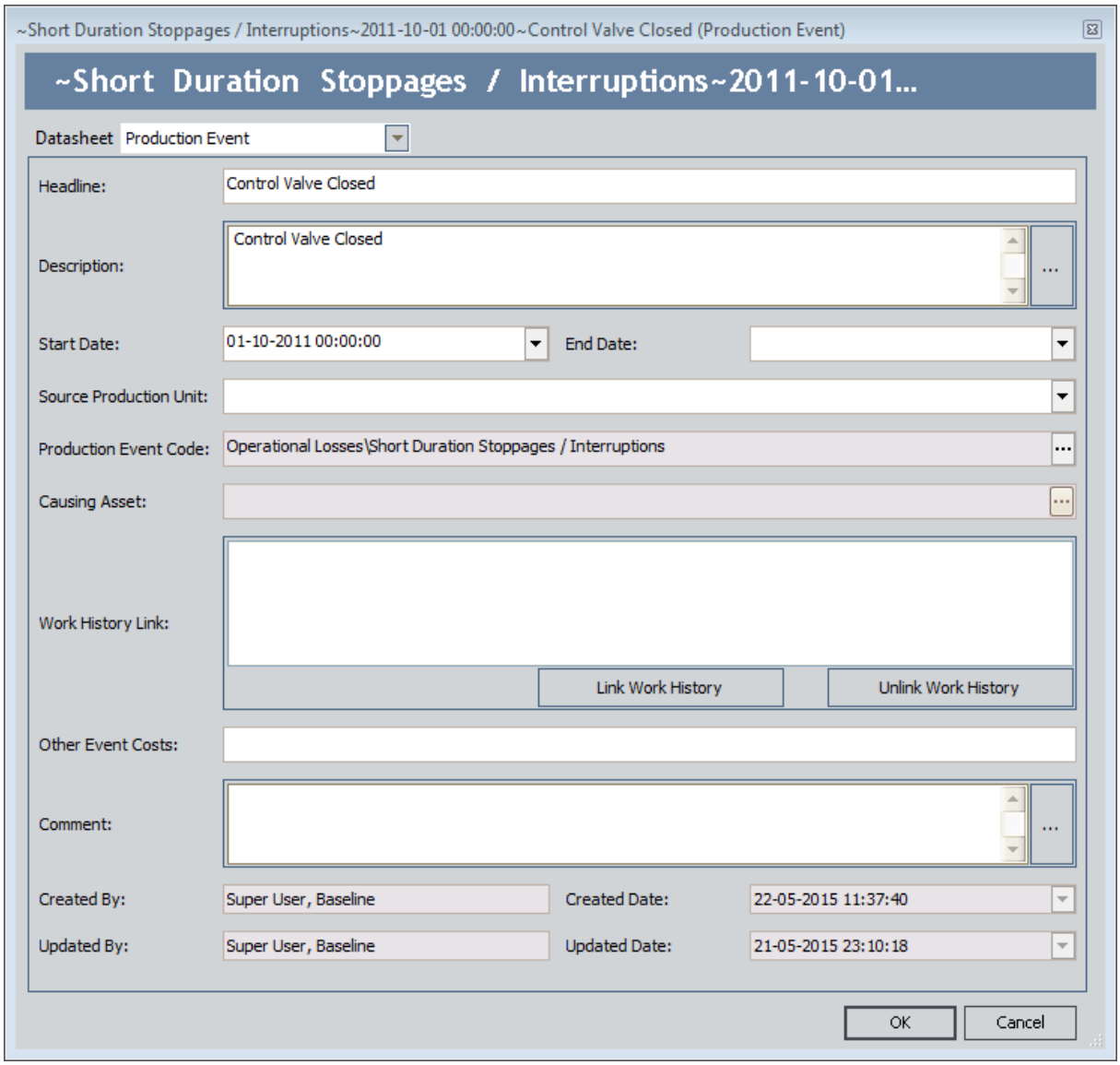
XiReading ID	Time Stamp	Value CHR
Control Valve	2011-10-01 10:53:00	Closed
Control Valve	2011-10-01 11:25:00	Open

If you have created a Production Event Template record that is linked to this Xi Tag record and contains the values *Open* and *Closed* in the Normal State and Abnormal State fields, respectively, one Production Event record would be created automatically when the first reading is recorded (start of production event), and that same record would be updated automatically when the second reading is recorded (end of production event).

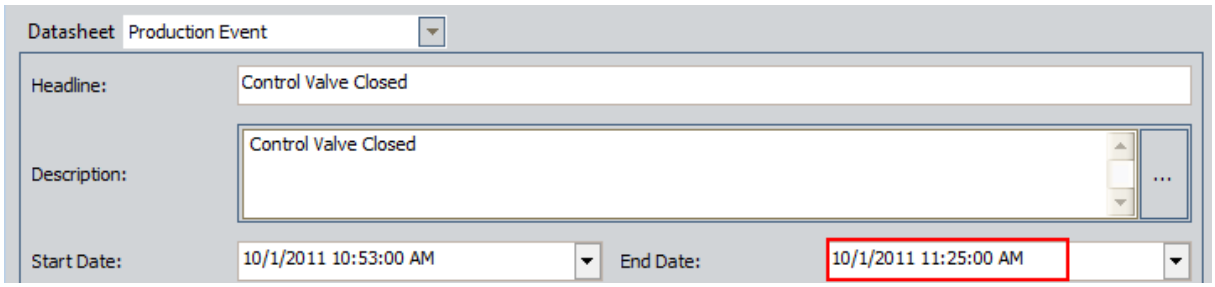
The following image shows the datasheet for the Production Event Template record that is linked to this Xi Tag record. You can see the value *Control Valve* in the Xi Tag ID field. You can also see the value *Open* in the Normal State field and the value *Closed* in the Abnormal State field.



Because this record and its values exist, at 10:53:00 A.M. on 10/1/2011, a Production Event record would be created automatically to track the beginning of the production event (i.e., the time at which the control valve closed). As shown in the following image, the value in the Start Date field would be set to *10/1/2011 10:53:00 A.M.* All other values in the Production Event Template record would also be used to populate the corresponding fields in the Production Event record.



At 11:25:00 A.M. on 10/1/2011, that same Production Event record would be updated with the end date of *10/1/2011 11:25:00 A.M.*, as shown with the red outline in the following image.

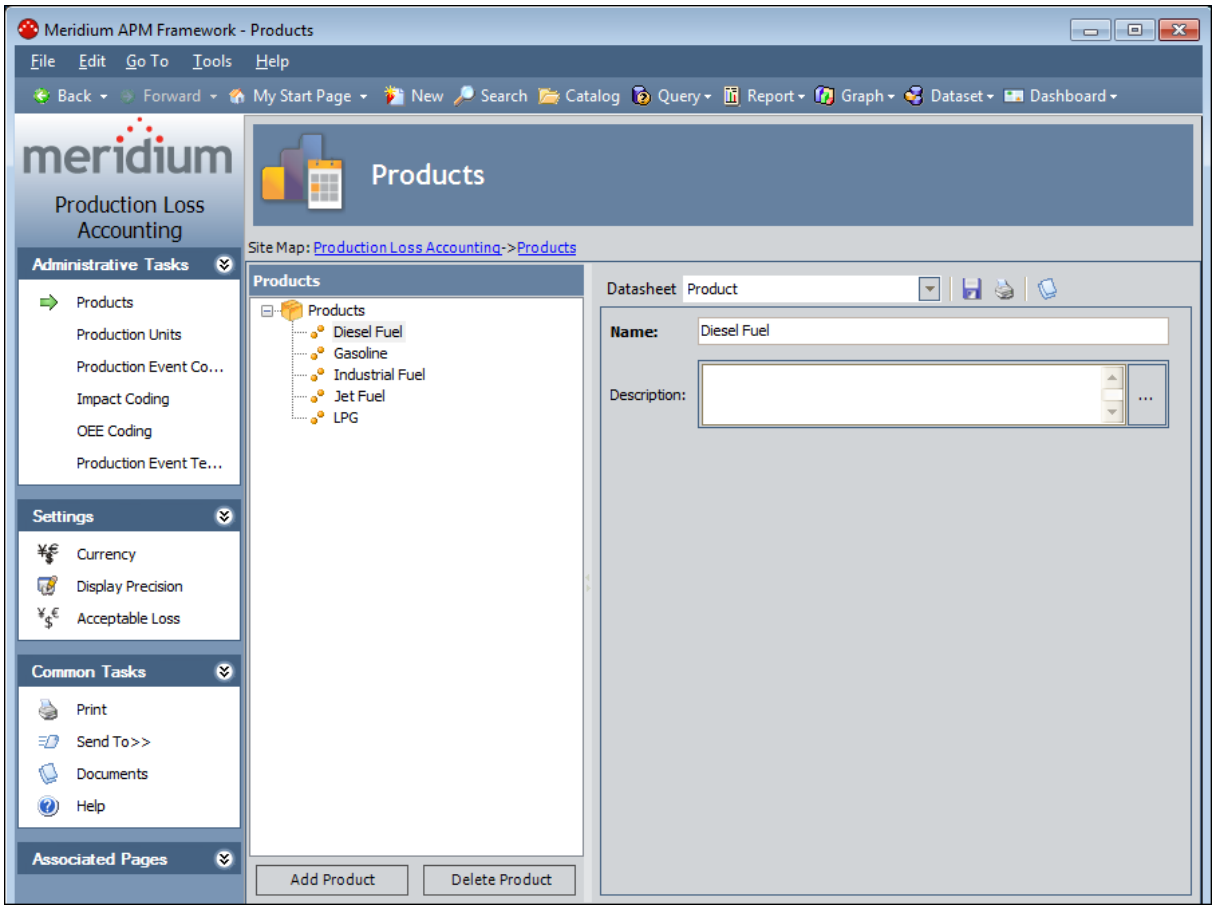

Datasheet
Production Event
Headline:
Control Valve Closed
Description:
Control Valve Closed
...
Start Date:
10/1/2011 10:53:00 AM
End Date:
10/1/2011 11:25:00 AM

Accessing the Event Templates Page

To access the Event Templates page:

1. On the **PLA Start Page**, click the **Administration** link.

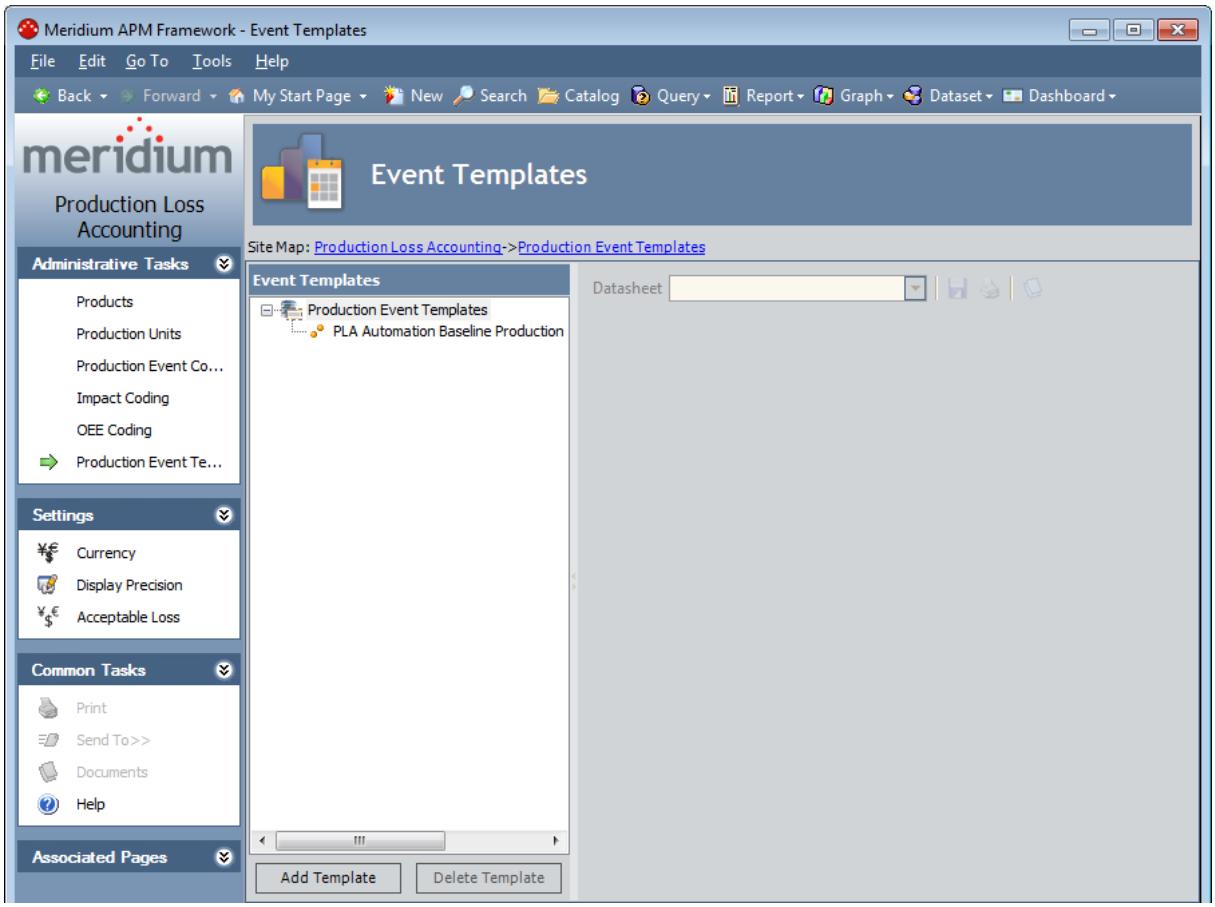
   The **Products** page appears.



2. On the **Administrative Tasks** menu in PLA, click the **Production Event Templates** link.

   The **Event Templates** page appears.

Accessing the Event Templates Page

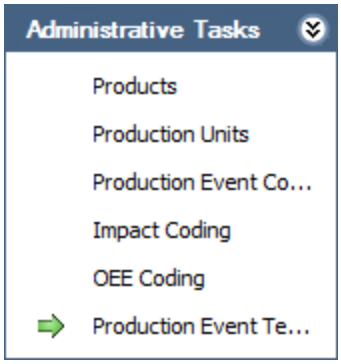


Aspects of the Event Templates Page

The **Event Templates** page contains the following items:

- **Task menu pane:** Contains the following task menus:
  - **Administrative Tasks** menu
  - **Settings** menu
  - **Common Tasks** menu
  - **Associated Pages** menu
- **Event Templates pane:** Contains the following items:
  - A tree that displays all the Production Event Template records that exist in the database.
  - The **Add Template** button.
  - The **Delete Template** button.
- **Datasheet area:** Displays the datasheet for the Production Event Template record that is selected in the tree in the **Event Templates** pane.

Administrative Tasks Menu



The **Administrative Tasks** menu on the **Event Templates** page contains the following links:

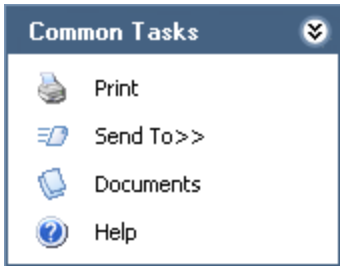
- **Products:** Displays the **Products** page.
- **Production Units:** Displays the **Production Units and Profiles** page.
- **Production Event Coding:** Displays the **Production Event Coding** page.
- **Impact Coding:** Displays the **Impact Coding** page.
- **OEE Coding:** Displays the **OEE Coding** page.
- **Production Event Templates:** Displays the **Event Templates** page. A green arrow appears to the left of this link when you are viewing this page.

Settings Menu

The **Settings** menu on the **Event Templates** page contains the following link:

- **Currency:** Displays the **Currency** dialog box, where you can specify the currency symbol that will be used throughout PLA.
- **Display Precision:** Displays the **Display Precision** dialog box, where you can specify the number of decimal places that will be used for displaying calculated values on the **Production Data Entry** page.

Common Tasks Menu



The **Common Tasks** menu on the **Event Templates** page contains the following links:

- **Print:** Displays the**Preview** window, which shows a preview of how the datasheet that appears in the datasheet area will be printed. From the **Preview** window, you can select print options and print the record. This link is enabled only when a record is selected in the tree.
- **Send To:** Displays a submenu with options that let you provide a link to the current page on your desktop (create shortcut), in an email message, or on a Home Page. This link is enabled only when a record is selected in the tree.
- **Documents:** This link is always disabled.
- **Help:** Displays the context-sensitive Help topic for the **Event Templates** page.

Associated Pages Menu

The **Associated Pages** menu on the **Event Templates** page displays links only if Associated Pages have been configured for the Production Event Template family. If no Associated Pages have been configured for the Production Event Template family, the **Associated Pages** menu will be empty.

Event Templates Pane

The **Event Templates** pane on the **Event Templates** page contains a tree that displays all Production Event Template records that exist in the database. The root level of the tree displays the family grouping *Production Event Templates*, which is represented by the icon. Directly below the family node are nodes representing the Production Event Templates records. Each record is represented by the icon. To the right of each icon is the Record ID.

For example, suppose a Production Event Template record with the Record ID *Unit 21~ Control Valve* exists in the database. In this case, the tree would look like this:

Below the tree are the following buttons:

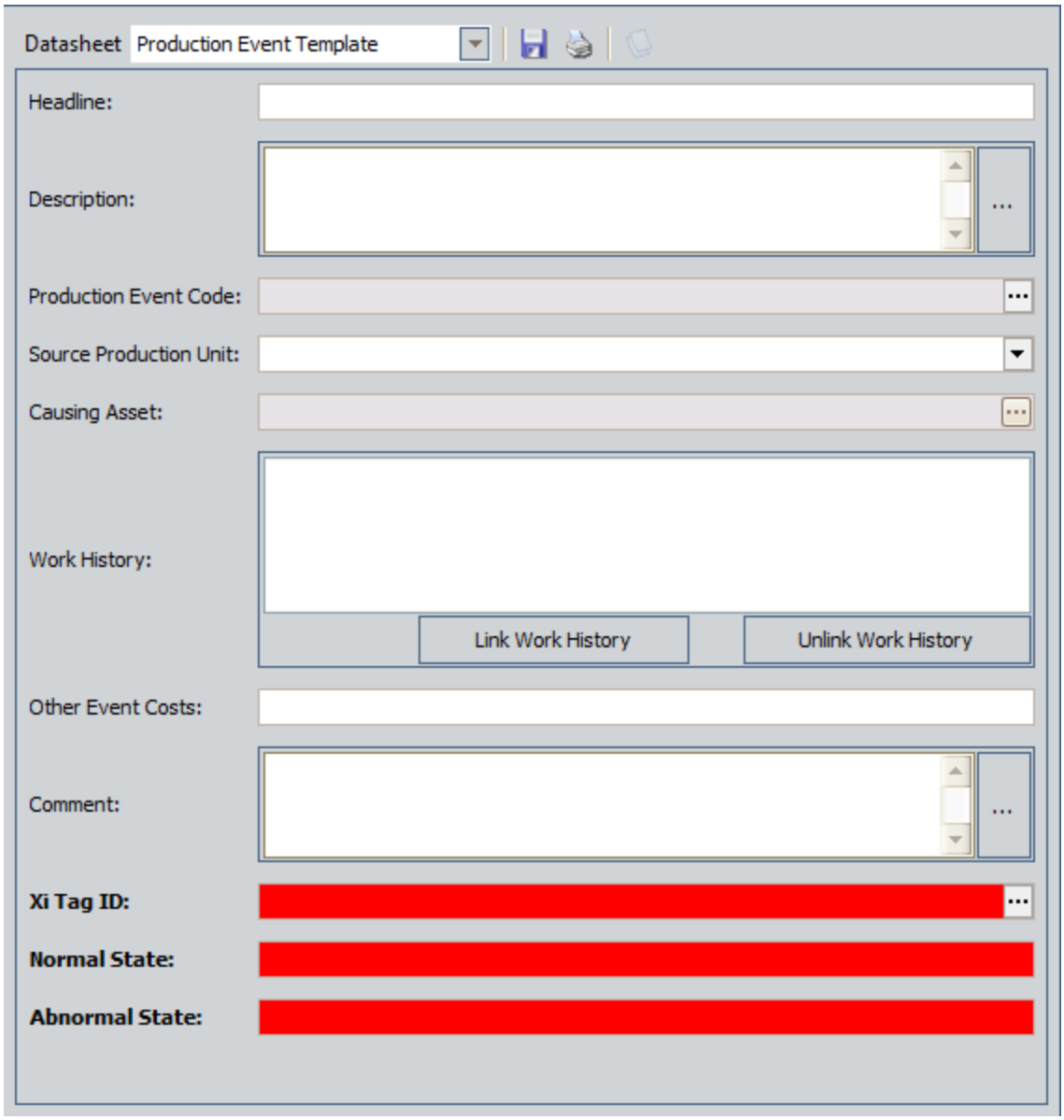
- **Add Template:** Displays a blank Production Event Template datasheet in the datasheet area, where you can create a new Production Event Template record.
- **Delete Template:** After asking for confirmation, deletes the selected Production Event Template record.

Creating a Production Event Template Record

To create a Production Event Template record:

1. On the Event Templates page, below the tree, click the **Add Template** button.

   A new blank datasheet appears to the right of the **Event Templates** pane.



2. Complete the fields as desired.
3. When you are finished completing the fields, on the datasheet toolbar, click the button.

   The Production Event Template record is saved.

Deleting a Production Event Template Record

To delete a Production Event Template record:

1. On the **Event Templates** page, in the tree, select the Production Event Template record that you want to delete.
2. Below the tree, click the **Delete Template** button.

   A message appears, asking if you are sure you want to delete the record.
3. Click the **Yes** button.

   The Production Event Template record is deleted.

About Navigating the PLA Module

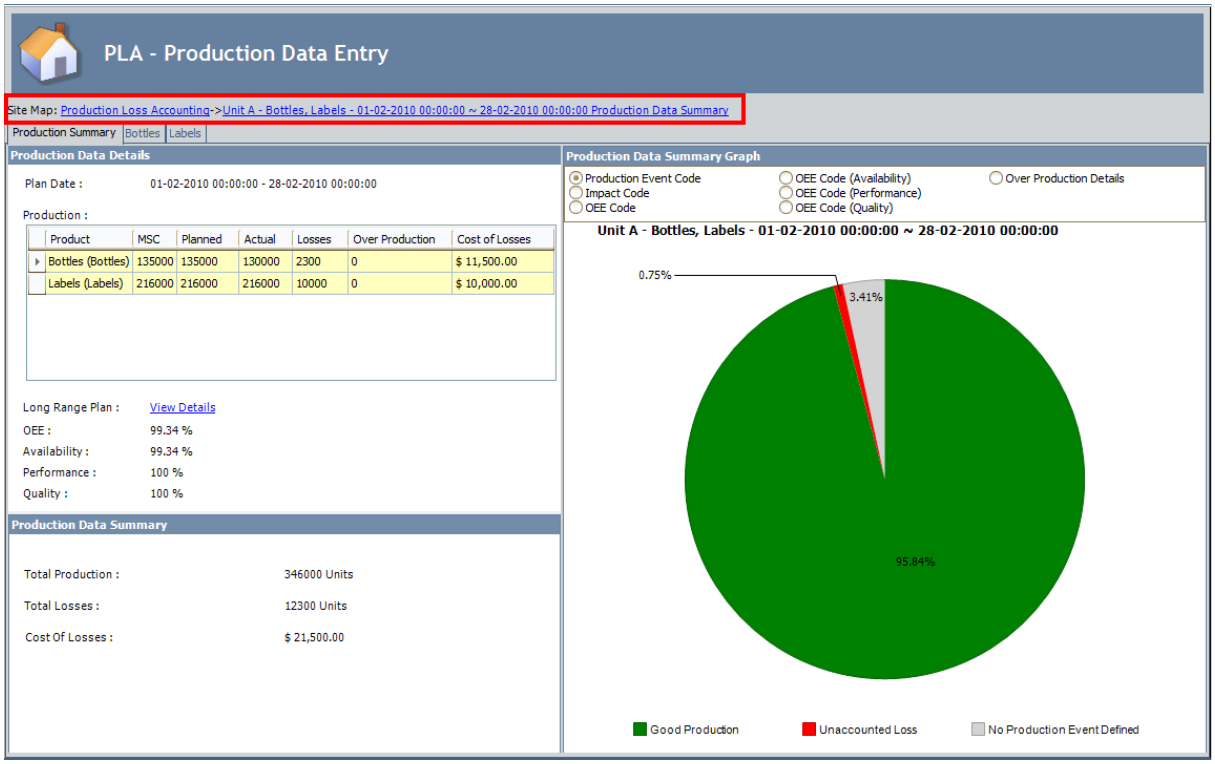
With the Meridium APM Framework application, the PLA module provides the following navigational tools:

- A start page with links that provide access to the main features of PLA. You can use these links to complete the PLA workflow.
- A Site Map that you can use to navigate within the PLA module. The Site Map indicates your current location and shows the typical path for arriving there. To access a previous page, you can click its hyperlinked name in the Site Map.

Using the PLA Site Map

The Site Map in PLA allows you to navigate from the current page to other pages in PLA. The **Production Loss Accounting** link, which provides access to the **PLA Start Page**, will always be available. Links to other pages may also be available, depending upon your location in the application. You can click any link that is available to access the corresponding page.

The following image shows an example of what the Site Map looks like on the **Production Data Entry** page. A red outline has been added to the image to highlight the Site Map.



PLA Workflow

The following workflow describes the basic tasks that you will perform in PLA:

1. For each production unit, create a production plan to specify the amount of product you plan to produce during a set time period. You can create the plan on any schedule, such as yearly, quarterly, monthly, and so on.
2. If an event such as an equipment failure or a planned shutdown occurs and causes you to incur a production loss, document the event.
3. Enter production data on a daily basis. This includes entering the amount of product you produced and accounting for any losses that you incurred each day.

About Production Plans

Each production unit can generate one or more products. For each product that it generates, a production profile will exist to identify information about that product, such as the maximum demonstrated rate of production and the amount of profit one of those products yields.

For each production unit, a *production plan* will also exist to define several criteria, as outlined in the following table.

Plan Details	Description	Example
What	The products that you plan to produce. Each plan can include one or more products.	You plan to produce water bottles and labels.
When -or- How Much	**When:** The *time period* for which you want to track the production. In this case, you will provide the start and end dates, and the planned product quantity will be determined automatically based upon the production profile. This option is called a *time-based* plan. -or- **How Much:** The *amount of each product* that you plan to produce. In this case, you will provide the start time and the planned product quantity, and the end time will be determined automatically. This option is called a *quantity-based* plan.	**When:** You plan to produce bottles and labels from January 1, 2010 through April 30, 2010. -or- **How Much:** You plan to produce 50,000 bottles and 100,000 labels, starting January 1, 2010.

Plan Details	Description	Example
During Which Hours	The hours each day that you produce the specified products.	You have one shift running 8:00 A.M. to 5:00 P.M. -or- You have two shifts: • 8:00 A.M. to 8:00 P.M. • 8:00 P.M. to 8:00 A.M.
How Often You Enter Data	The frequency by which you enter production data and production losses.	You enter production data daily. -or- You enter production data once per shift.

Each production plan is represented by a Production Plan record.

Simple Time-Based Plan

Plan Summary

The following example of a time-based plan assumes that your production plan meets the following criteria:

Criteria	Data Used in This Example
How Much	One product (bottles)
When	January 1, 2010 through April 30, 2010
During Which Hours	Monday through Friday, 24 hours per day (8:00 A.M. to 8:00 A.M.)
How Often You Enter Data	Daily

Plan Details

In this example, Production Unit A produces bottles in a water-bottling facility. Unit A's *production profile* indicates that:

- Unit A can generate 5,000 bottles per day.
- One bottle yields a $5.00 profit.

For Unit A, you want to track production for four months, from January 2010 through April 2010. For each month, you plan to produce the following number of bottles per day.

Month	Planned Production (per day)
January	3,000 bottles
February	3,000 bottles
March	4,000 bottles
April	5,000 bottles

You can see that within each individual month, the company plans to produce the same number of bottles each day of that month. The company does not, however, plan to produce the same number of bottles per day *across* months.

In other words:

- In the first two months, they plan to produce 3,000 bottles per day, every day.
- In the third month, they plan to produce 4,000 bottles per day, every day.

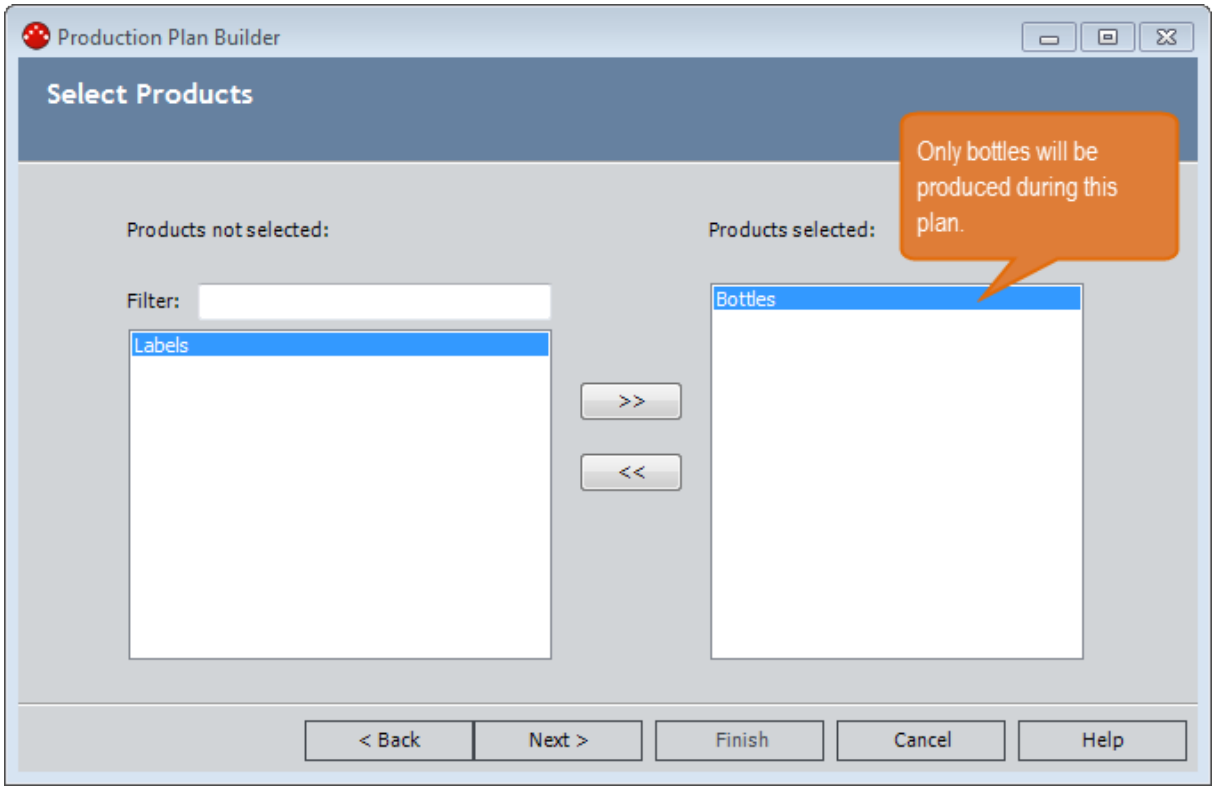
- In the fourth month, they plan to produce the maximum amount of bottles per day, every day: 5,000.

This variation in planned production might be a result of increased demand for water bottles as the months pass. For example, if the water bottle consumers are in a location that experiences cold weather in January and February and an increased warming trend starting in March, there is probably less demand for water bottles in January. Likewise, starting in March and continuing in April, when the temperature is gradually getting warmer, demand for water bottles increases, which causes the planned production for those months to reach the maximum amount that the production unit can produce.

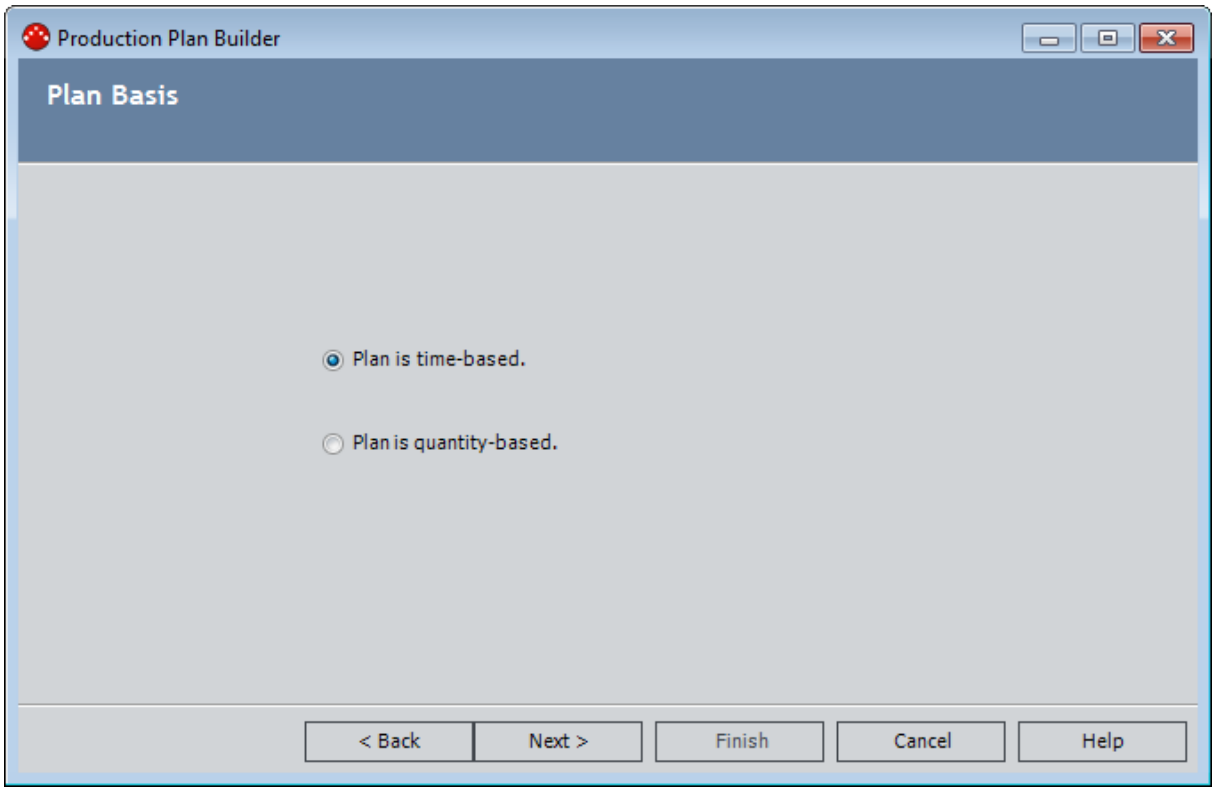
Production Plan Builder Selections

To produce this plan, you would select the following options in the **Production Plan Builder**:

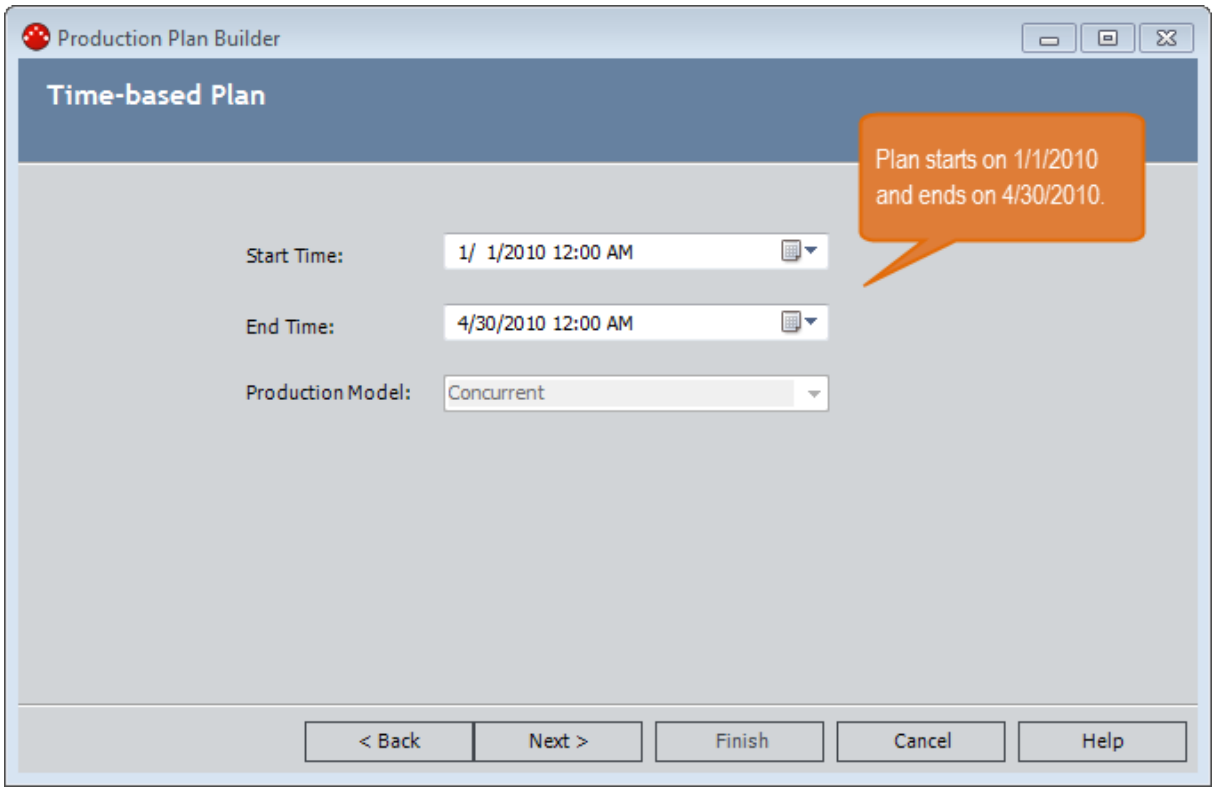
Select Products screen:



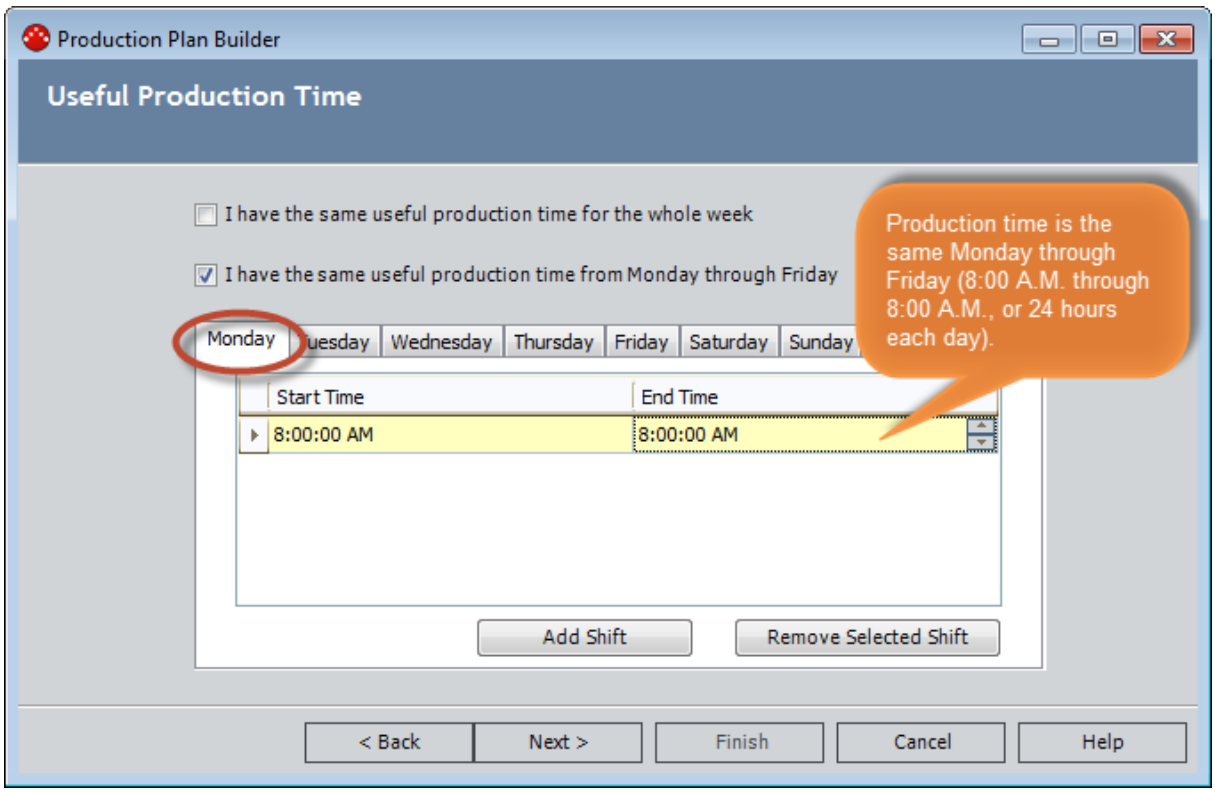
Plan Basis screen:

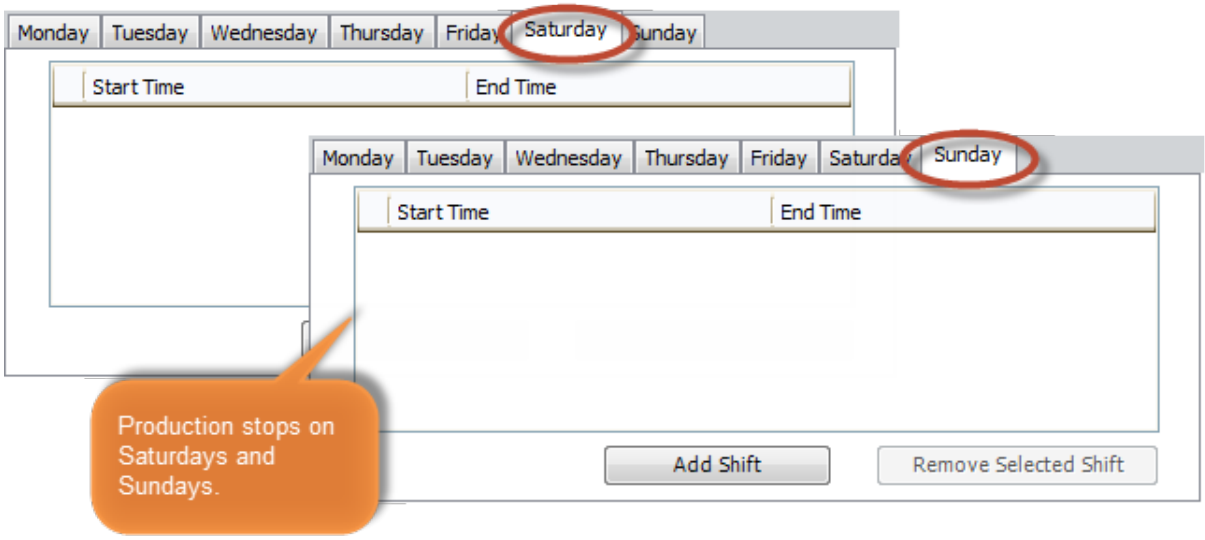


Time-Based Plan screen:

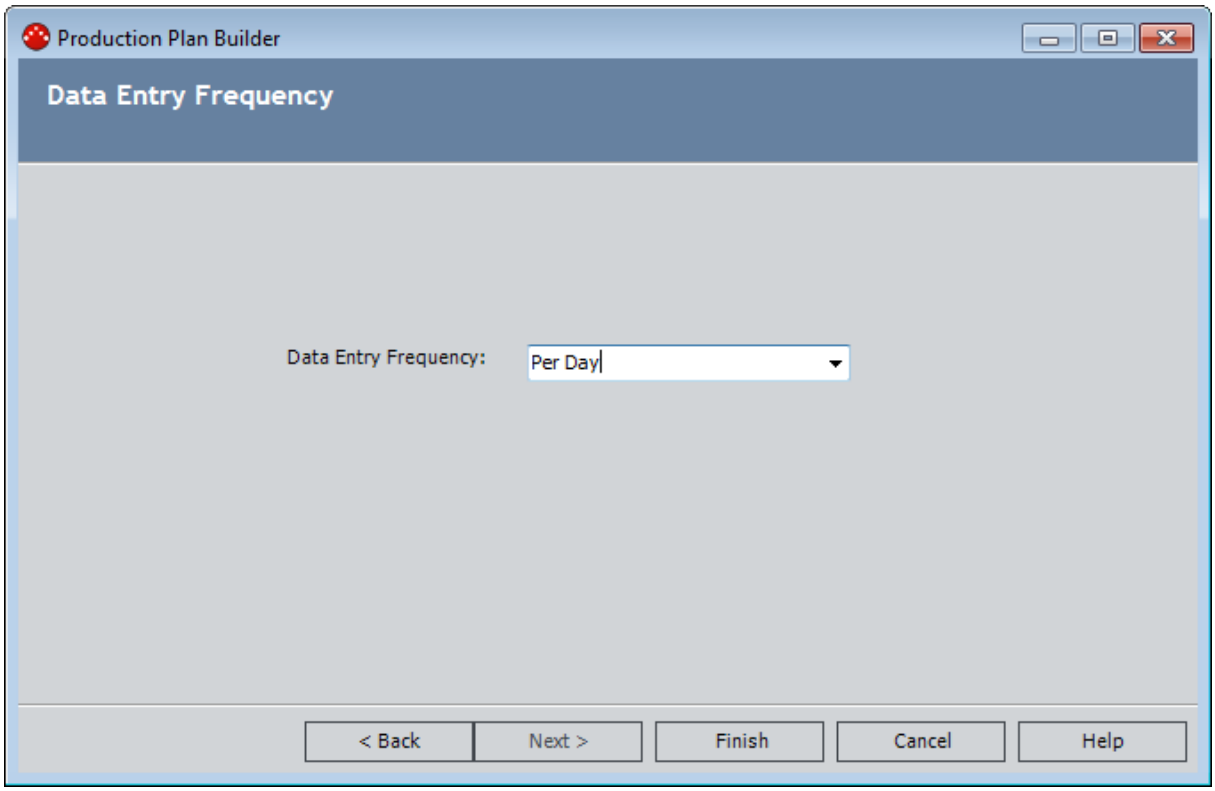


Useful Production Time screen:

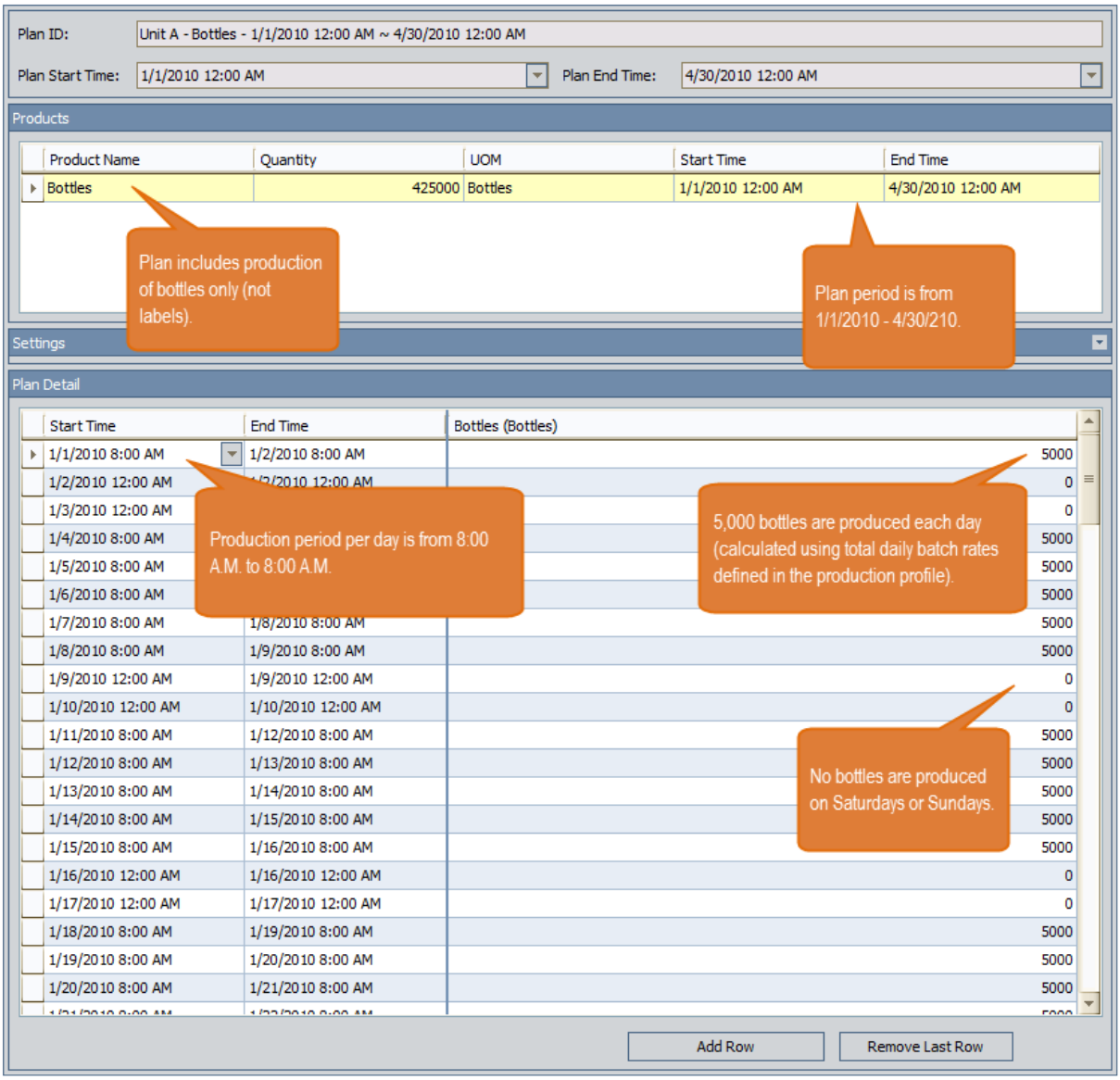




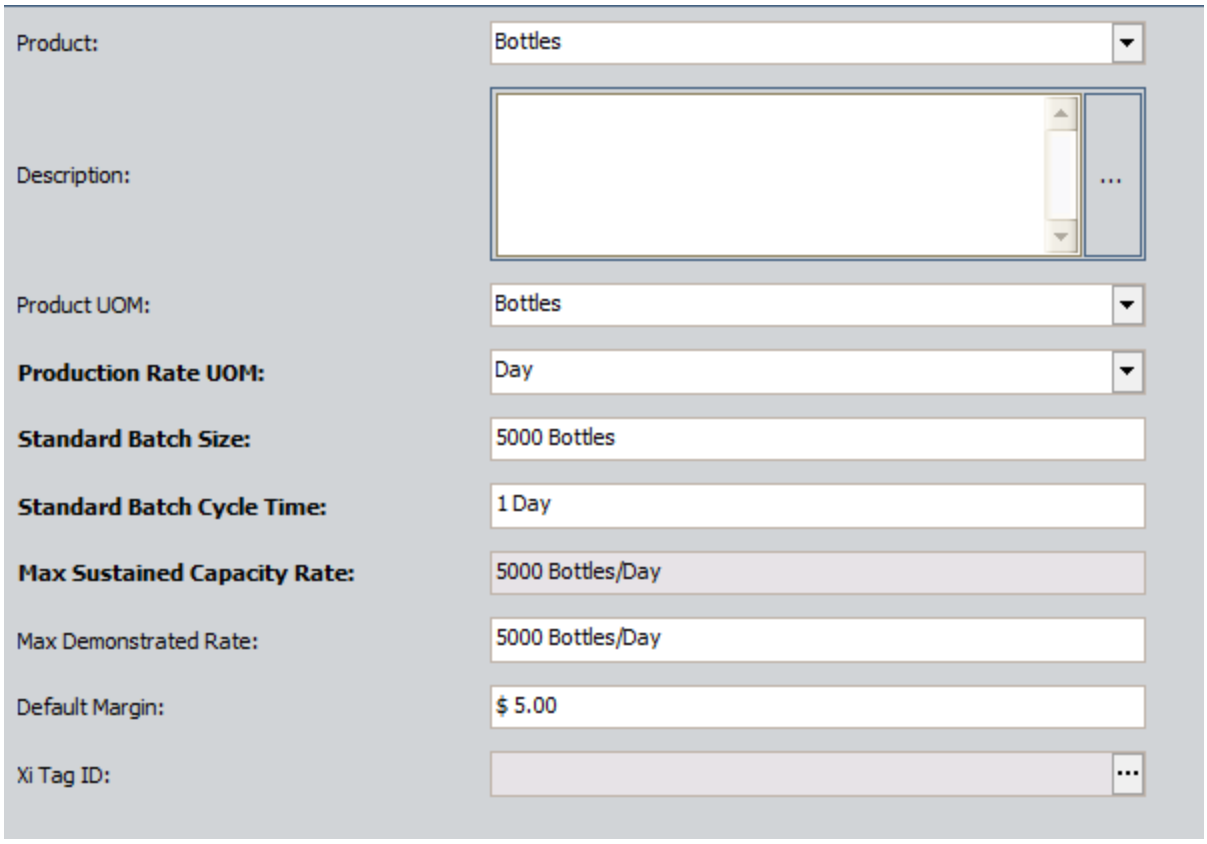
Data Entry Frequency screen:



Plan Results



You can see that the calculated planned production each day (except Saturdays and Sundays) is *5,000 bottles per day*. This value is calculated automatically using the standard batch size (5,000 bottles) and cycle time (1 day) in the associated production profile for Unit A.



If you remember from the plan details explained earlier in this topic, you do not actually plan to produce 5,000 bottles from January through April. Instead:

- In January and February, you plan to produce 3,000 bottles per day.
- In March, you plan to produce 4,000 bottles per day.
- In April, you plan to produce the maximum amount of bottles per day, every day: 5,000.

To represent this plan in PLA, you would need to modify the plan details manually, so the final result would look like this:

Plan Detail

Start Time	End Time	Bottles (Bottles)
3/20/2010 12:00 AM	3/20/2010 12:00 AM	0
3/21/2010 12:00 AM	3/21/2010 12:00 AM	0
3/22/2010 8:00 AM	3/23/2010 8:00 AM	4000
3/23/2010 8:00 AM	3/24/2010 8:00 AM	4000
3/24/2010 8:00 AM	3/25/2010 8:00 AM	4000
3/25/2010 8:00 AM	3/26/2010 8:00 AM	4000
3/26/2010 8:00 AM	3/27/2010 8:00 AM	4000
3/27/2010 12:00 AM	3/27/2010 12:00 AM	0
3/28/2010 12:00 AM	3/28/2010 12:00 AM	0
3/29/2010 8:00 AM	3/30/2010 8:00 AM	4000
3/30/2010 8:00 AM	3/31/2010 8:00 AM	4000
3/31/2010 8:00 AM	4/1/2010 8:00 AM	5000
4/1/2010 8:00 AM	4/2/2010 8:00 AM	5000
4/2/2010 8:00 AM	4/3/2010 8:00 AM	5000
4/3/2010 12:00 AM	4/3/2010 12:00 AM	0
4/4/2010 12:00 AM	4/4/2010 12:00 AM	0
4/5/2010 8:00 AM	4/6/2010 8:00 AM	5000
4/6/2010 8:00 AM	4/7/2010 8:00 AM	5000
4/7/2010 8:00 AM	4/8/2010 8:00 AM	5000
4/8/2010 8:00 AM	4/9/2010 8:00 AM	5000

As you change the plan details, the total quantity, which is calculated automatically, would be updated accordingly:

Products

Product Name	Quantity	UOM	Start Time	End Time
Bottles	321000	Bottles	1/1/2010 12:00 AM	4/30/2010 12:00 AM

Complex Time-Based Plan

Plan Summary

The following example of a time-based plan assumes that your production plan meets the following criteria:

Criteria	Data Used in This Example
How Much	Two products (bottles and labels)
When	January 1, 2010 through April 30, 2010
During Which Hours	Monday through Friday, 24 hours per day, two shifts: • 8:00 A.M. to 8:00 P.M. • 8:00 P.M. to 8:00 A.M.
How Often You Enter Data	Per Shift (i.e., twice a day)

Plan Details

In this example, Production Unit A produces bottles and labels in a water-bottling facility. Unit A's *production profiles* indicate that:

- Unit A can generate 5,000 bottles per day and 8,000 labels per day.
- One bottle yields a $5.00 profit.
- One label yields a $1.00 profit.

For Unit A, you want to track production for four months, from January 2010 through April 2010. For each month, you plan to produce the following number of bottles and labels per day.

Month	Planned Bottle Production (per day)	Planned Label Production (per day)
January	3,000 bottles	6,000 labels
February	3,000 bottles	6,000 labels
March	4,000 bottles	7,000 labels
April	5,000 bottles	8,000 labels

You can see that within each individual month, the company plans to produce the same number of bottles and labels each day of that month. The company does not, however, plan to produce the same number of bottles and labels per day *across* months.

In other words:

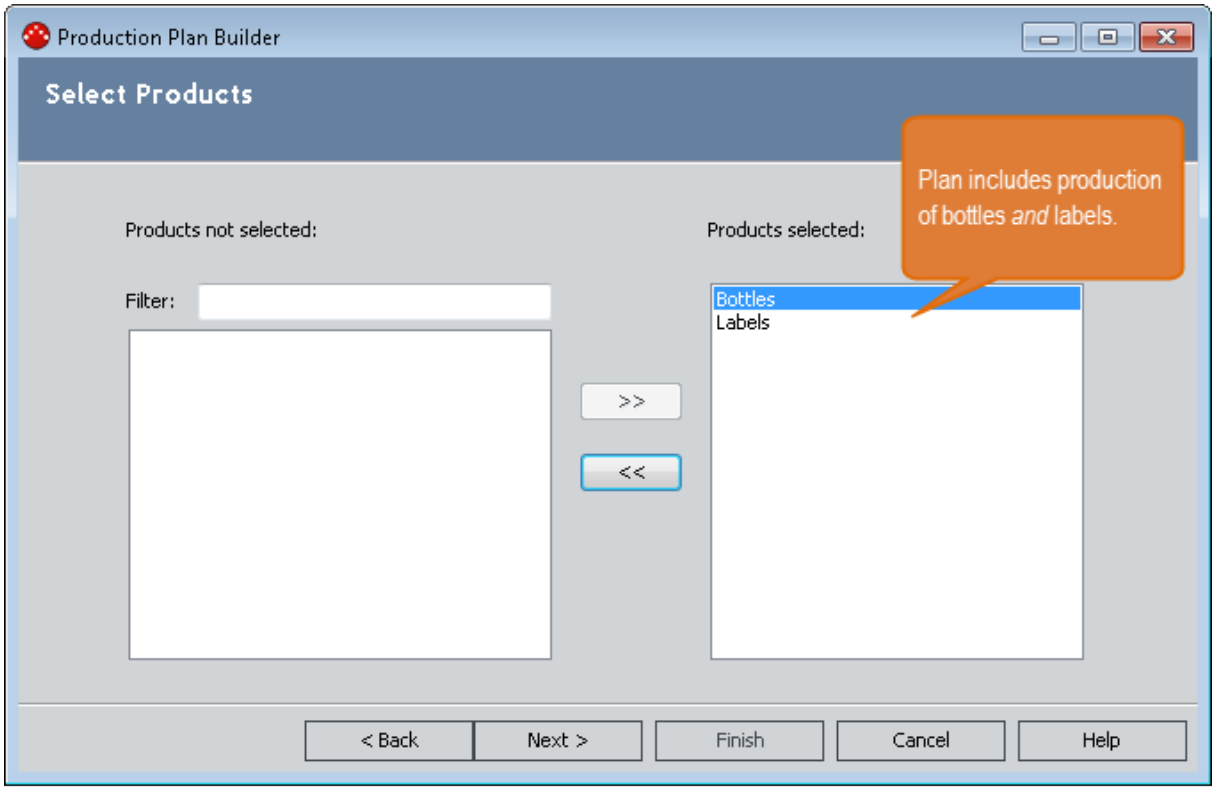
- In the first two months, they plan to produce 3,000 bottles and 6,000 labels per day, every day.
- In the third month, they plan to produce 4,000 bottles and 7,000 labels per day, every day.
- In the fourth month, they plan to produce the maximum amount of bottles and labels per day, every day: 5,000 bottle and 8,000 labels.

This variation in planned production might be a result of increased demand for water bottles as the months pass. For example, if the water bottle consumers are in a location that experiences cold weather in January and February and an increased warming trend starting in March, there is probably less demand for water bottles in January. Likewise, starting in March and continuing in April, when the temperature is gradually getting warmer, demand for water bottles increases, which causes the planned production for those months to reach the maximum amount that the production unit can produce.

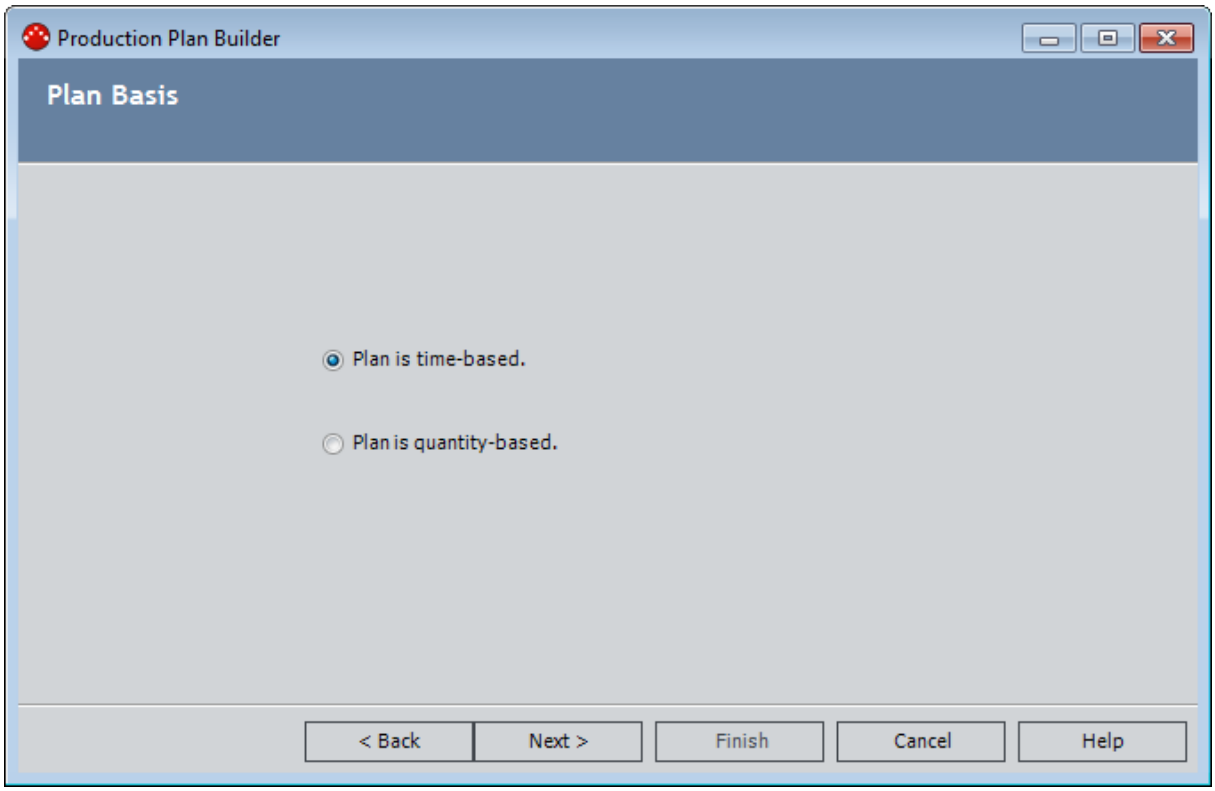
Production Plan Builder Selections

To produce this plan, you would select the following options in the **Production Plan Builder**:

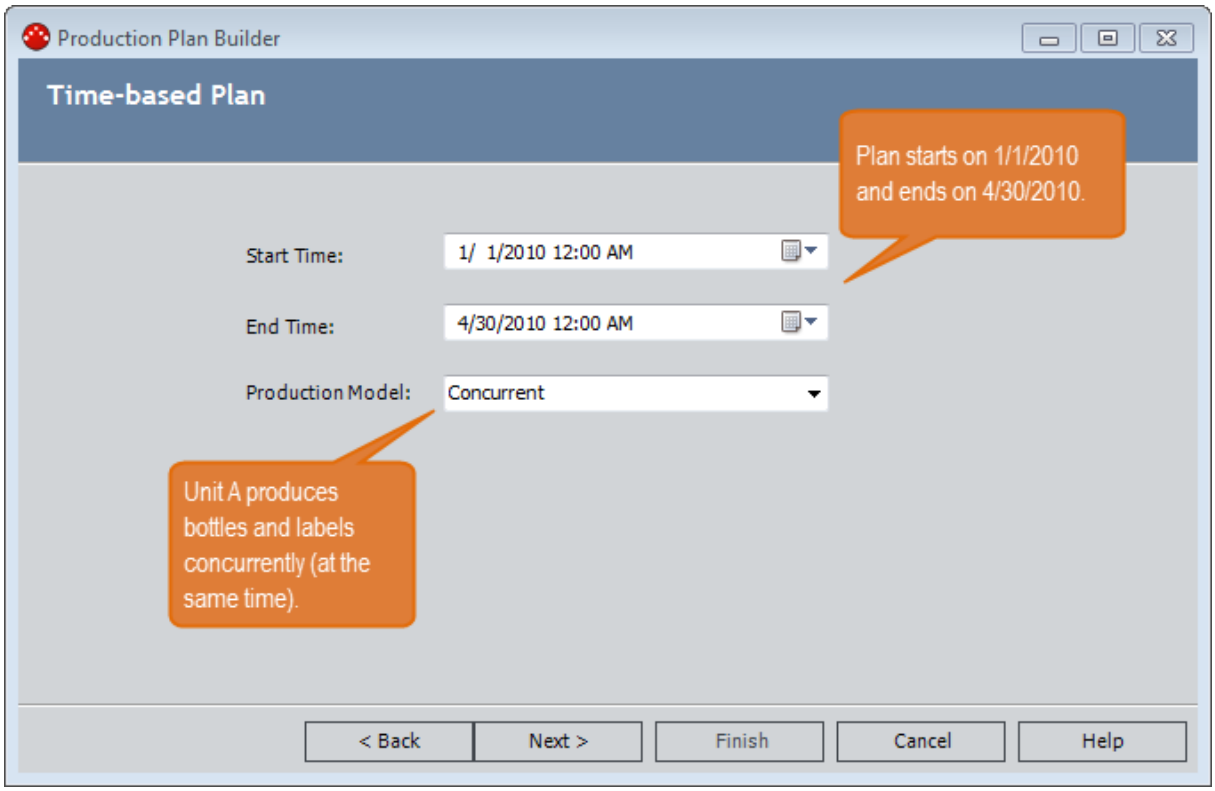
Select Products screen:



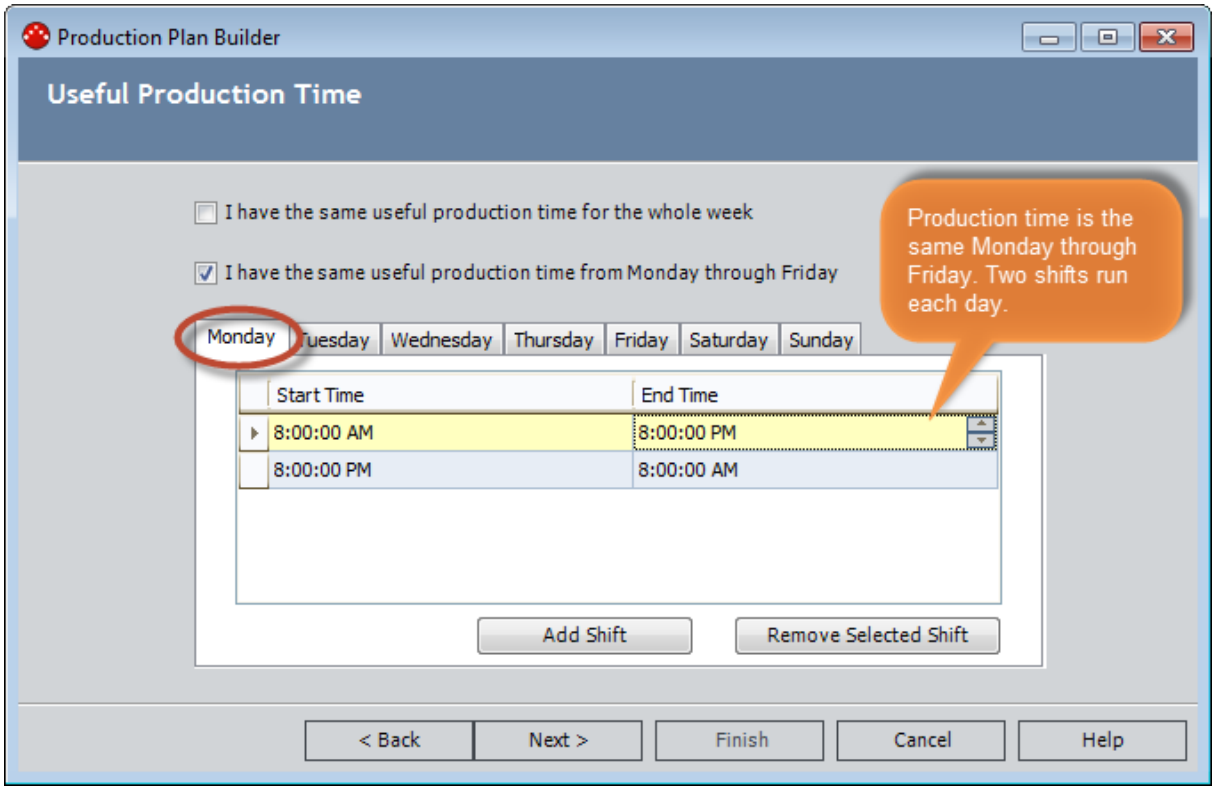
Plan Basis screen:

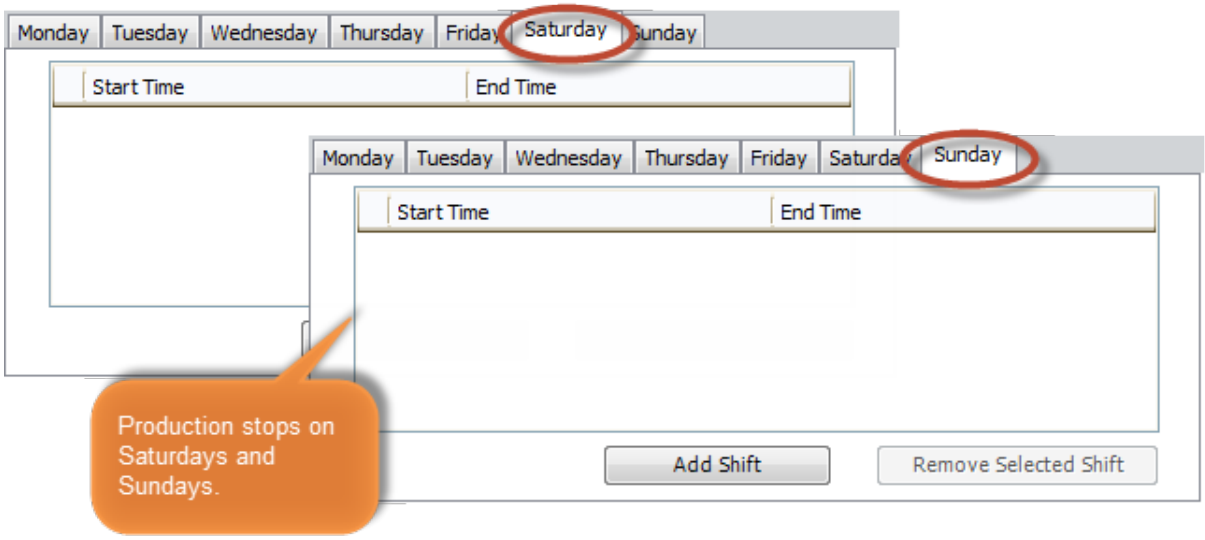


Time-Based Plan screen:

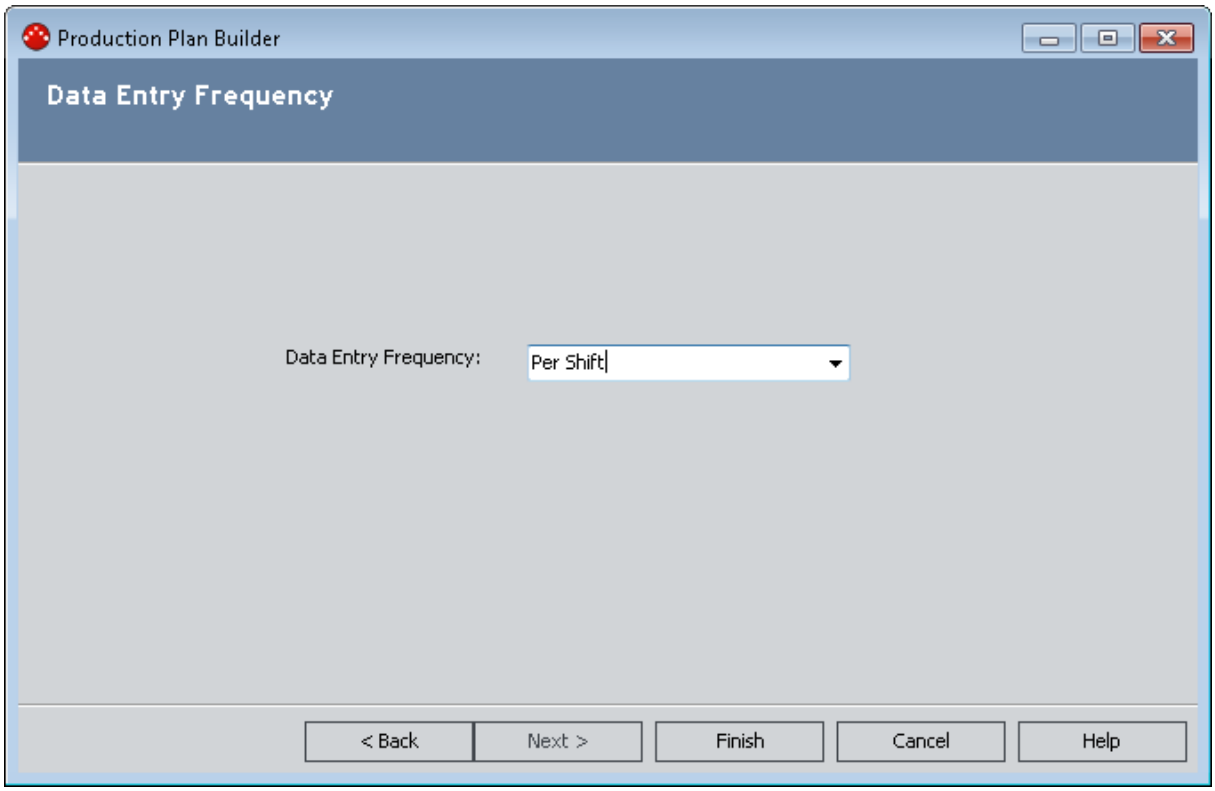


Useful Production Time screen:

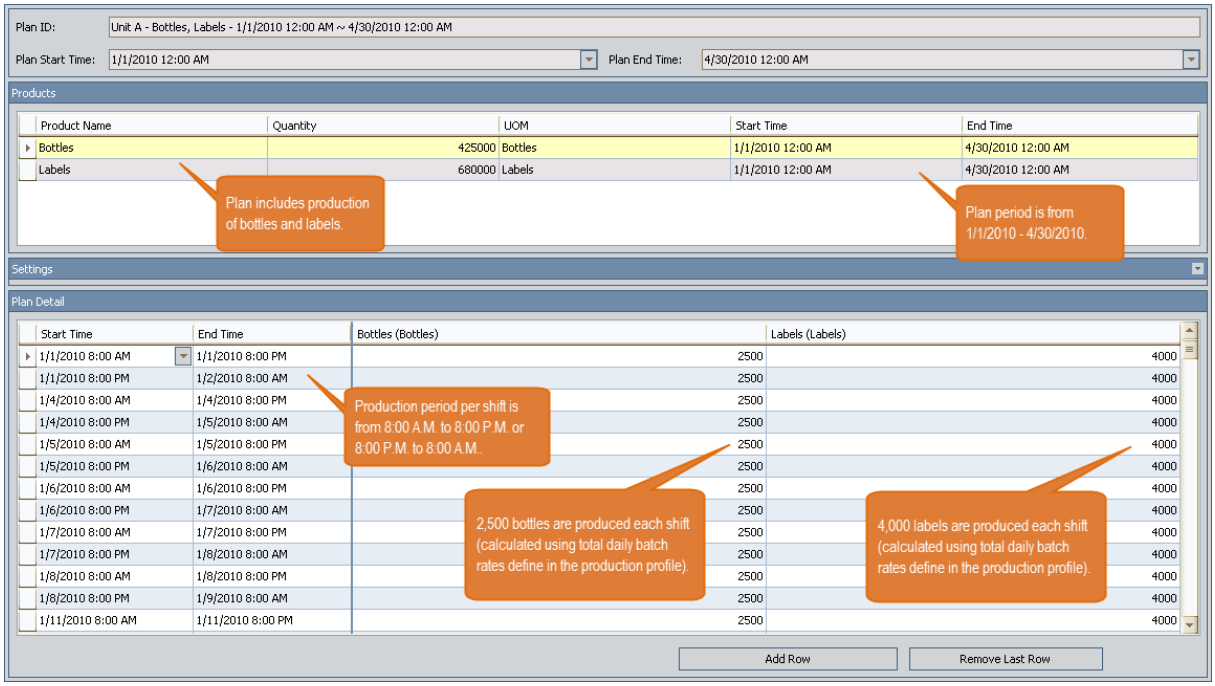




Data Entry Frequency screen:



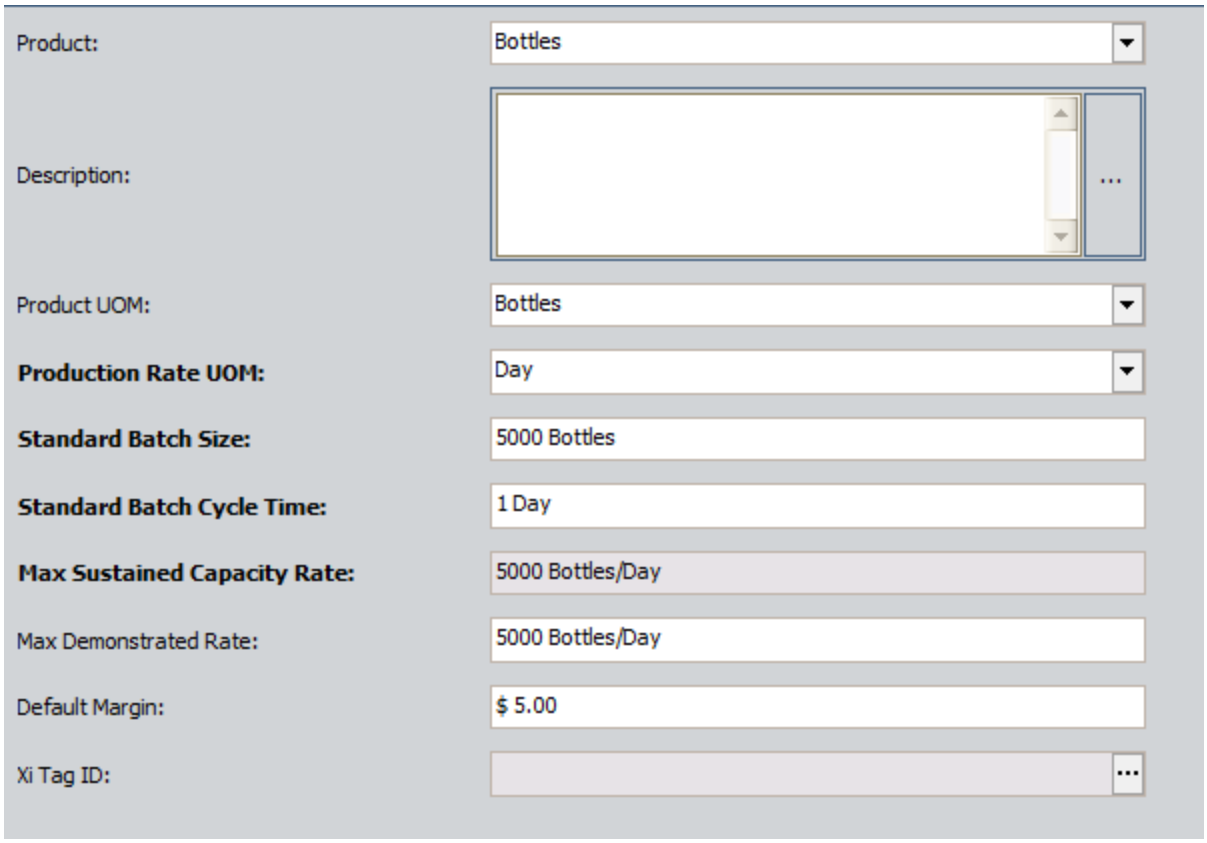
Plan Results



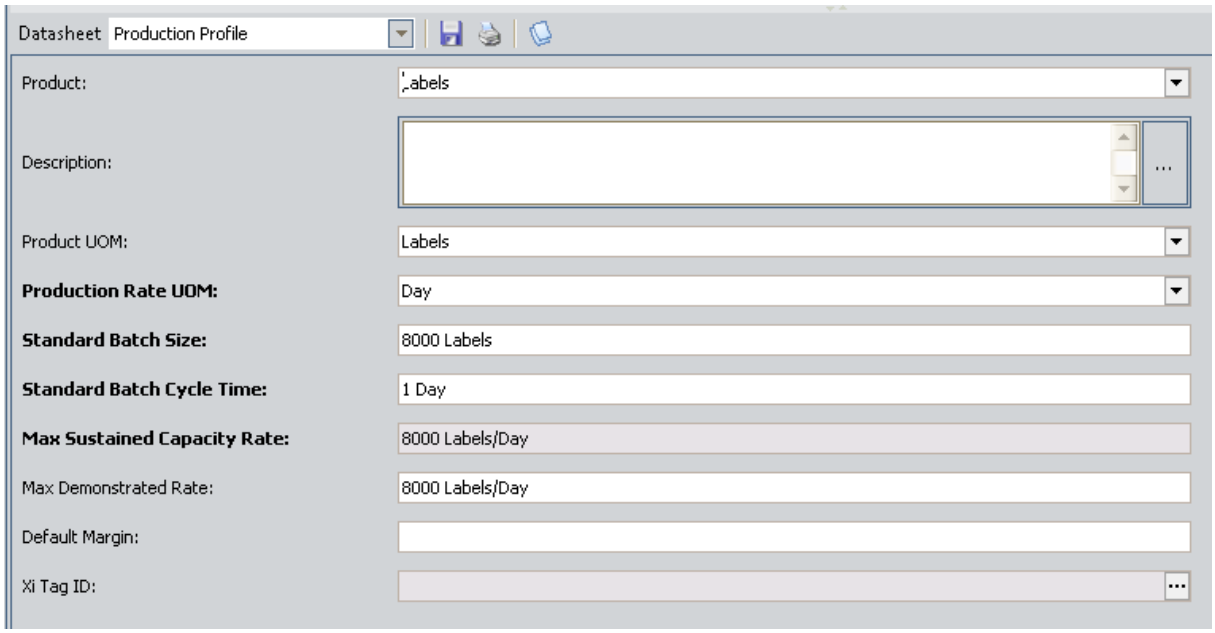
You can see that the calculated planned production each day (except Saturdays and Sundays) is *2,500 bottles and 4,000 labels per shift*. This value is calculated automatically

using the standard batch size (5,000 bottles and 8,000 labels) and cycle time (1 day) in the associated production profiles for Unit A.

Bottles - Production Profile



Labels - Production Profile



If you remember from the plan details explained earlier in this topic, you do not actually plan to produce 5,000 bottles and 8,000 labels from January through April. Instead:

- In January and February, you plan to produce 3,000 bottles and 6,000 labels per day.
- In March, you plan to produce 4,000 bottles and 7,000 labels per day.
- In April, you plan to produce the maximum amount of bottles and labels per day, every day: 5,000 bottles and 8,000 labels.

To represent this plan in PLA, you would need to modify the plan details manually, so the final result would look like this (remember that each row represents a *shift* and not an entire *day*):

Plan Detail

Start Time	End Time	Bottles (Bottles)	Labels (Labels)
3/26/2010 8:00 AM	3/26/2010 8:00 PM	2000	3500
3/26/2010 8:00 PM	3/27/2010 8:00 AM	2000	3500
3/29/2010 8:00 AM	3/29/2010 8:00 PM	2000	3500
3/29/2010 8:00 PM	3/30/2010 8:00 AM	2000	3500
3/30/2010 8:00 AM	3/30/2010 8:00 PM	2000	3500
3/30/2010 8:00 PM	3/31/2010 8:00 AM	2000	3500
3/31/2010 8:00 AM	3/31/2010 8:00 PM	2000	3500
3/31/2010 8:00 PM	4/1/2010 8:00 AM	2000	3500
4/1/2010 8:00 AM	4/1/2010 8:00 PM	2500	4000
4/1/2010 8:00 PM	4/2/2010 8:00 AM	2500	4000
4/2/2010 8:00 AM	4/2/2010 8:00 PM	2500	4000
4/2/2010 8:00 PM	4/3/2010 8:00 AM	2500	4000
4/5/2010 8:00 AM	4/5/2010 8:00 PM	2500	4000
4/5/2010 8:00 PM	4/6/2010 8:00 AM	2500	4000
4/6/2010 8:00 AM	4/6/2010 8:00 PM	2500	4000
4/6/2010 8:00 PM	4/7/2010 8:00 AM	2500	4000
4/7/2010 8:00 AM	4/7/2010 8:00 PM	2500	4000
4/7/2010 8:00 PM	4/8/2010 8:00 AM	2500	4000
4/8/2010 8:00 AM	4/8/2010 8:00 PM	2500	4000
4/8/2010 8:00 PM	4/9/2010 8:00 AM	2500	4000

As you change the plan details, the total quantity, which is calculated automatically, would be updated accordingly:

Products

Product Name	Quantity	UOM	Start Time	End Time
Bottles	320000	Bottles	1/1/2010 8:00 AM	4/30/2010 8:00 AM
Labels	575000	Labels	1/1/2010 8:00 AM	4/30/2010 8:00 AM

Simple Quantity-Based Plan

Plan Summary

The following example of a quantity-based plan assumes that your production plan meets the following criteria:

Criteria	Data Used in This Example
What	One product (bottles)
How Much	50,000 bottles, starting January 1, 2010
During Which Hours	Monday through Friday, 24 hours per day (8:00 A.M. to 8:00 A.M.)
How Often You Enter Data	Daily

Plan Details

In this example, Production Unit A produces bottles in a water-bottling facility. Unit A's *production profile* indicates that:

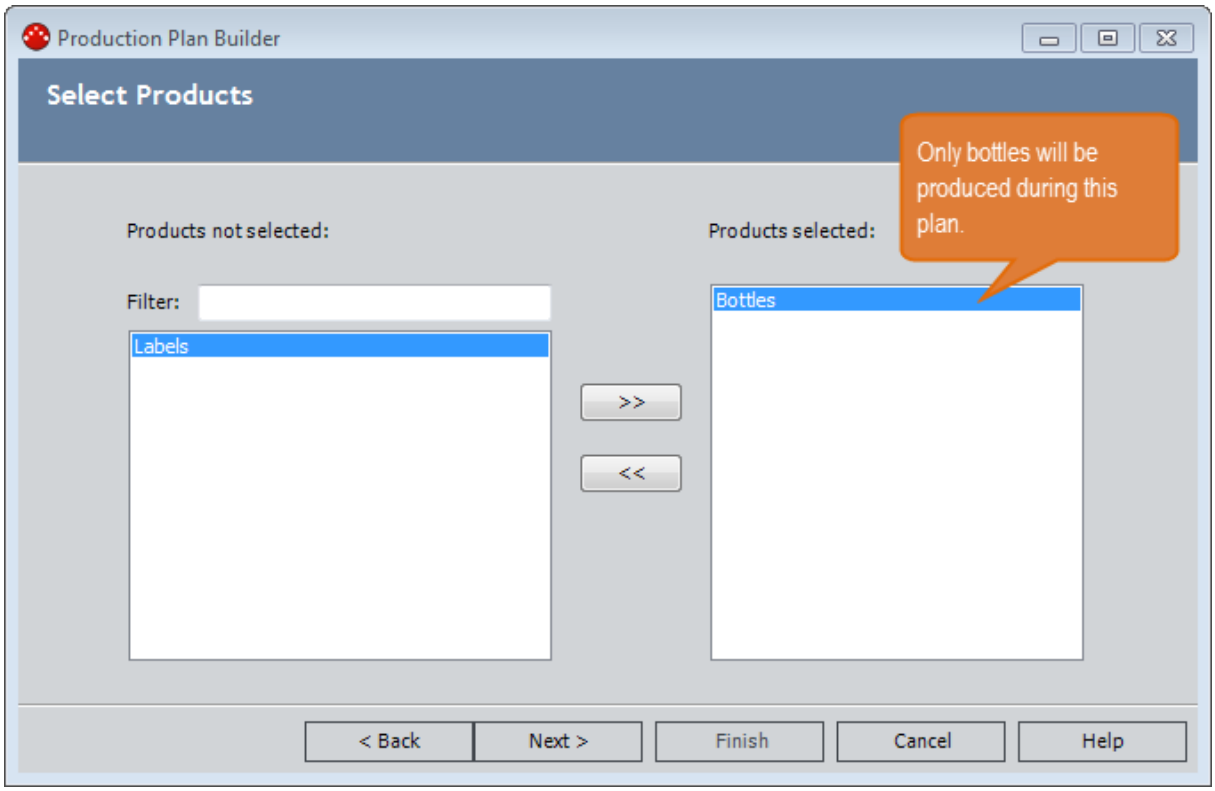
- Unit A can generate 5,000 bottles per day.
- One bottle yields a $5.00 profit.

For Unit A, you want to track production for 50,000 bottles, starting January 1, 2010. You do not have a determined end date. Instead, you want the production plan to determine the end date automatically based upon how long it takes to produce 50,000 bottles.

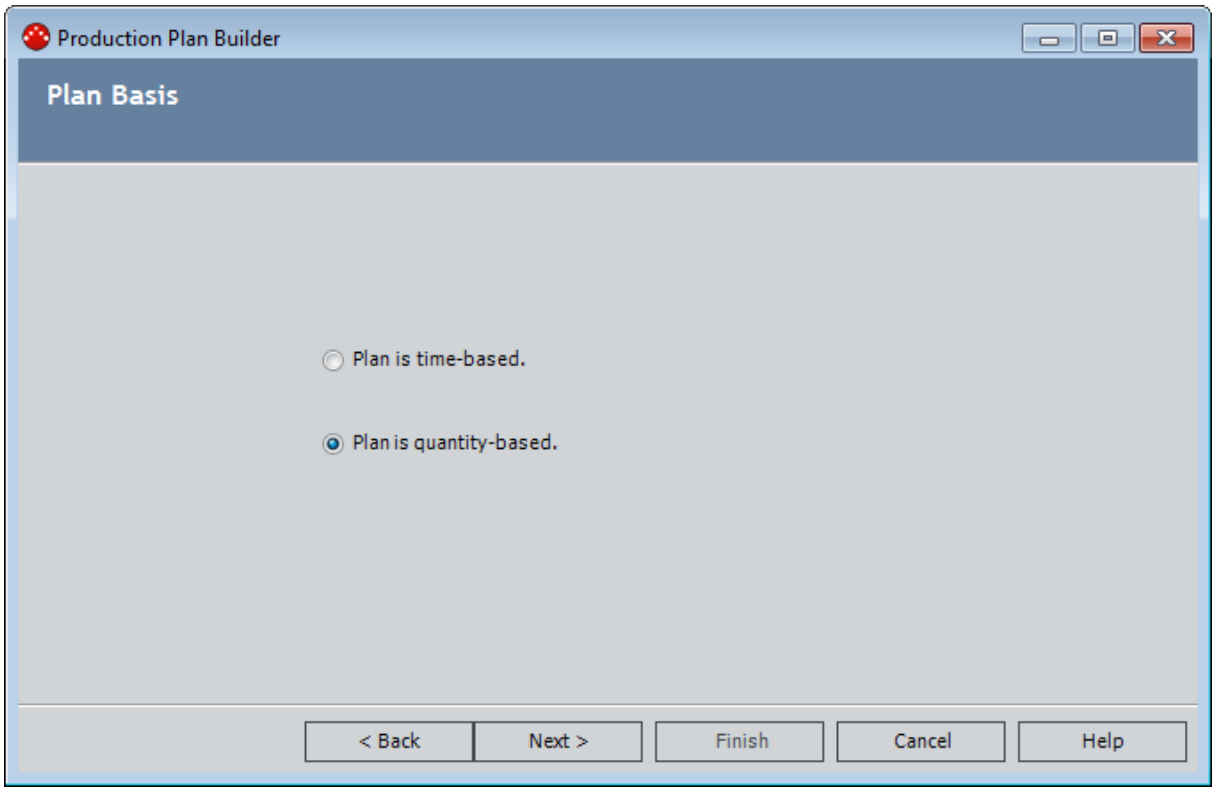
Production Plan Builder Selections

To produce this plan, you would select the following options in the **Production Plan Builder**:

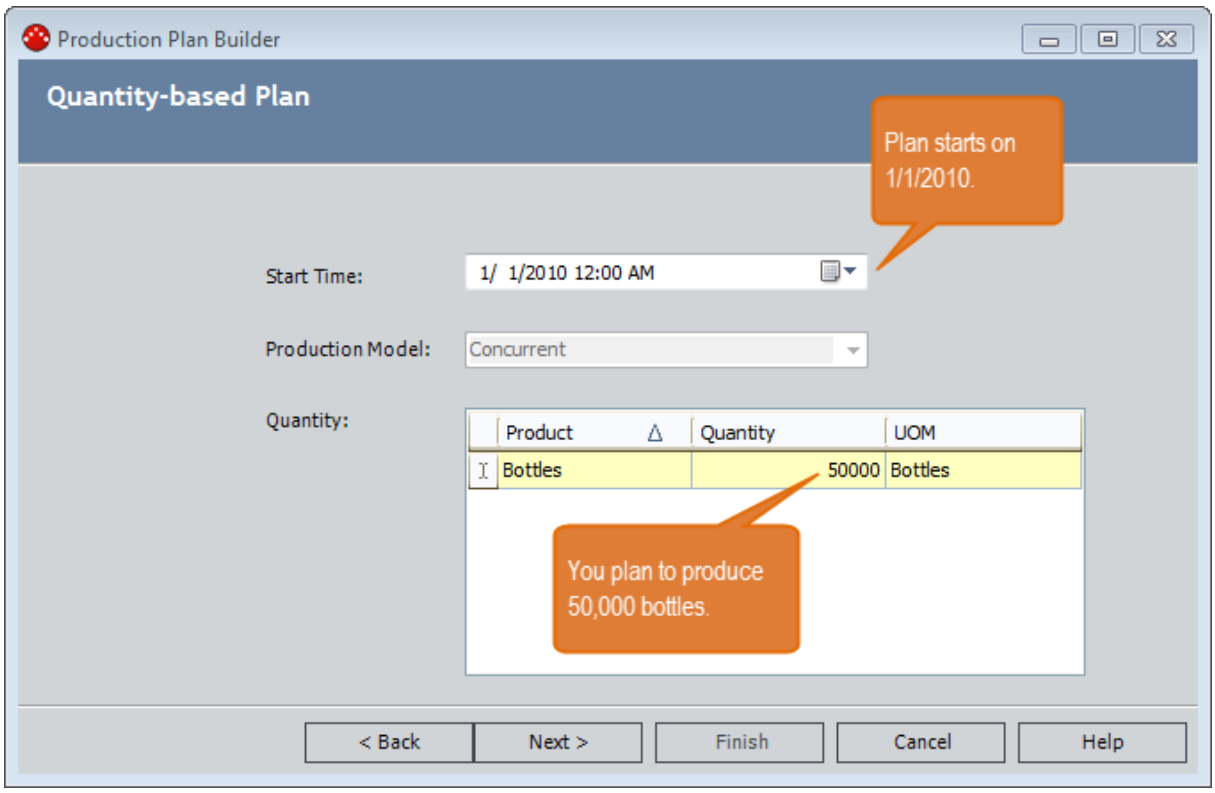
Select Products screen:



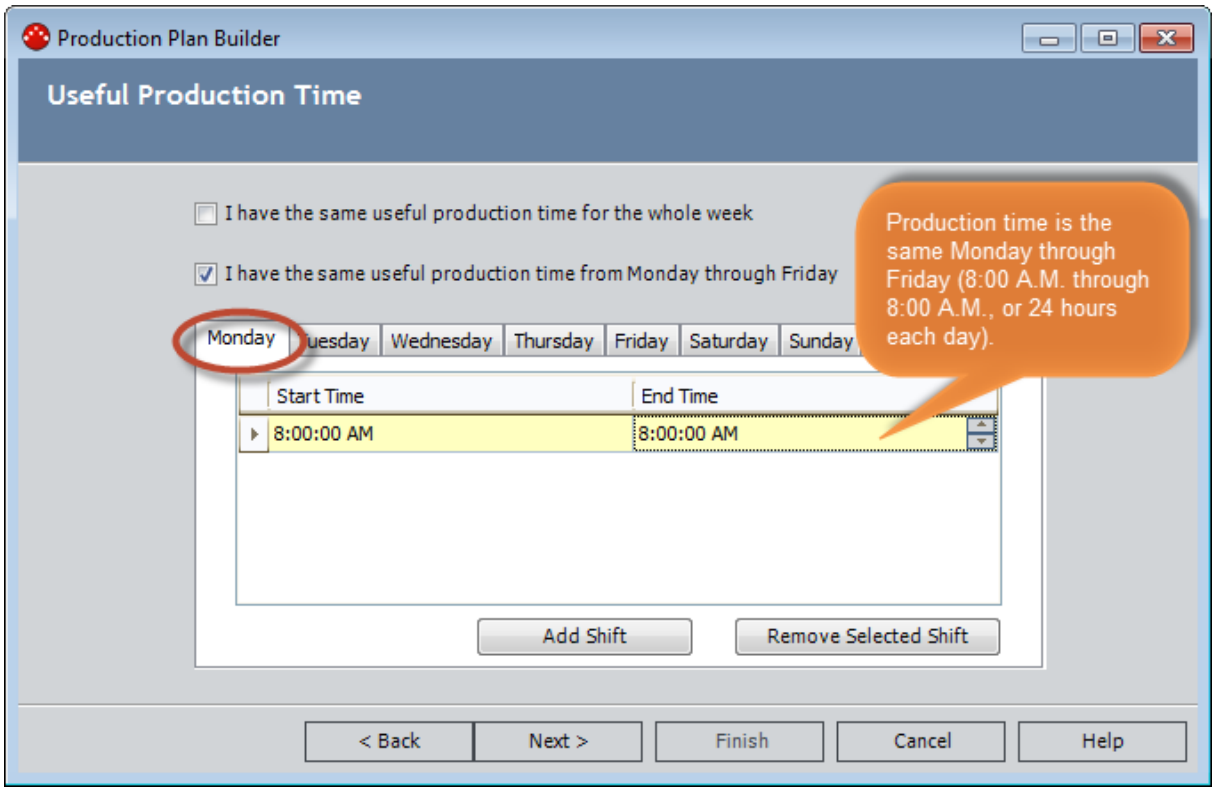
Plan Basis screen:

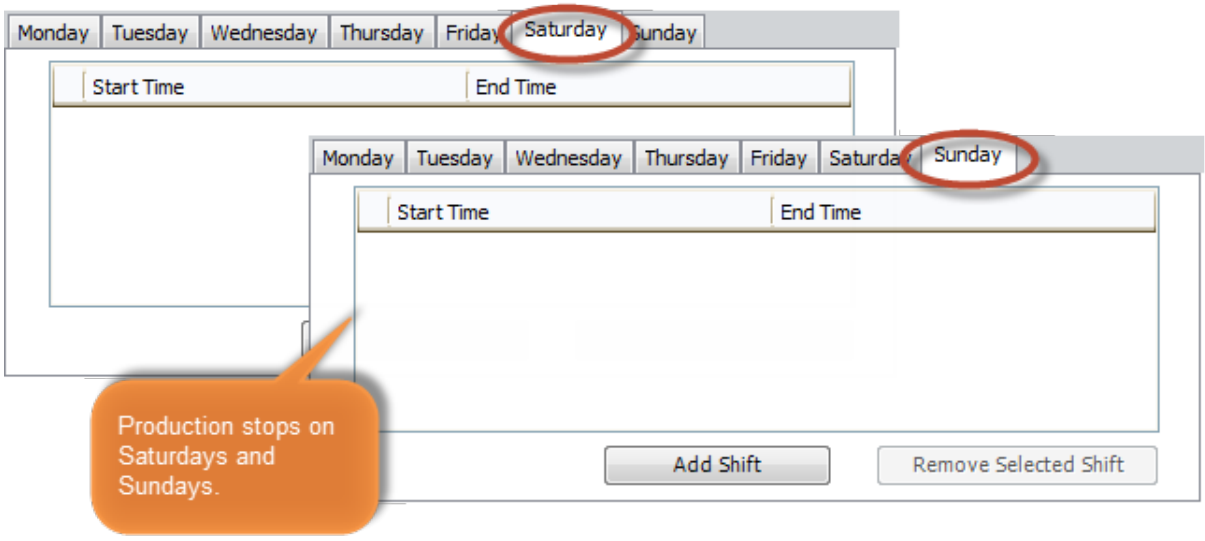


Quantity-Based Plan screen:

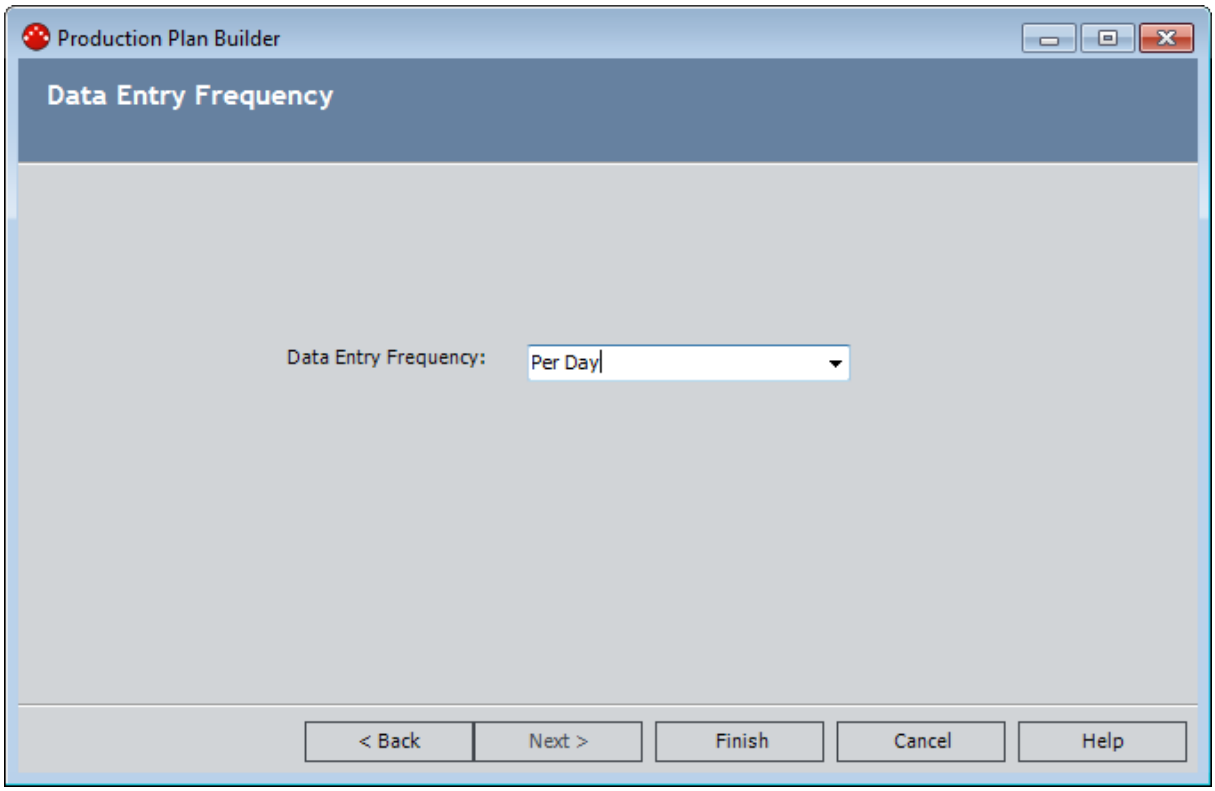


Useful Production Time screen:

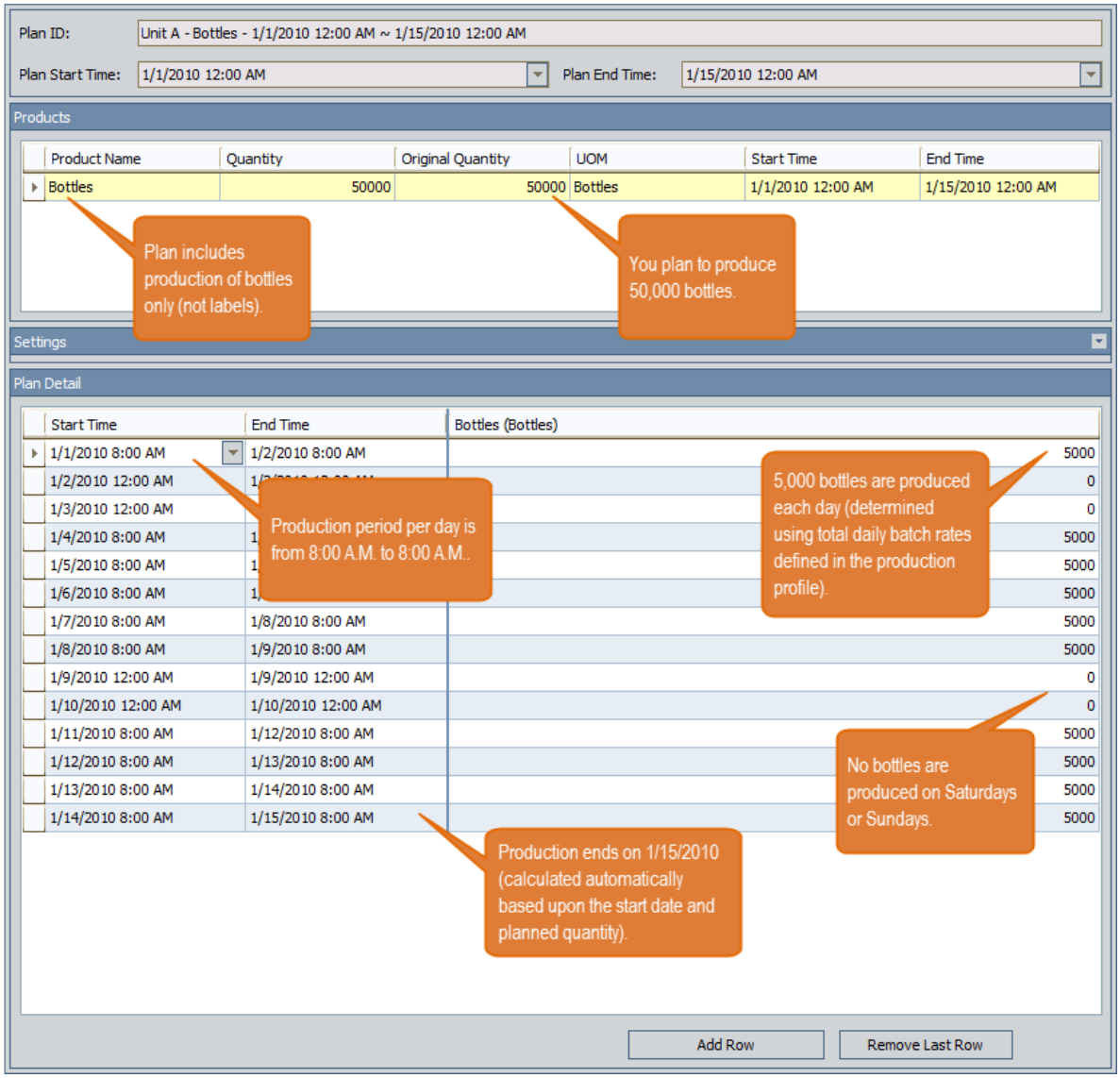




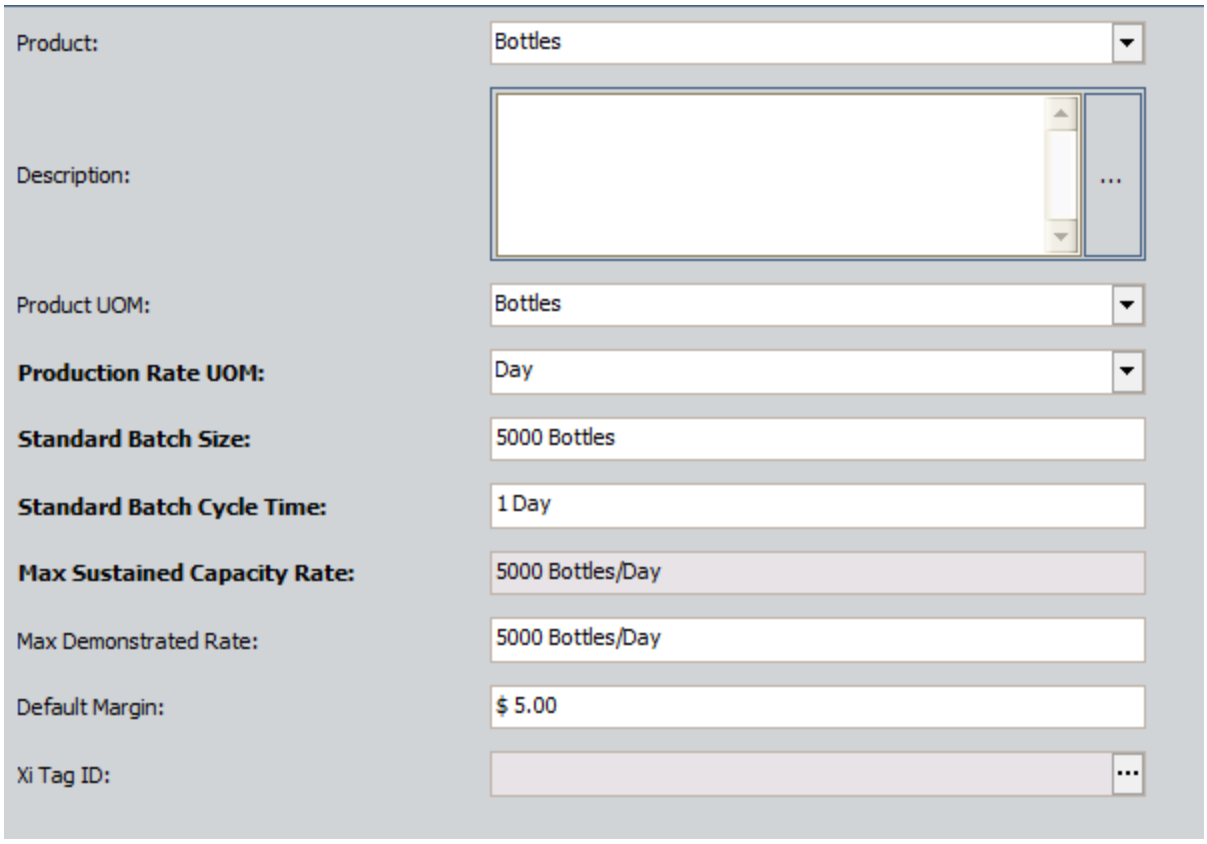
Data Entry Frequency screen:



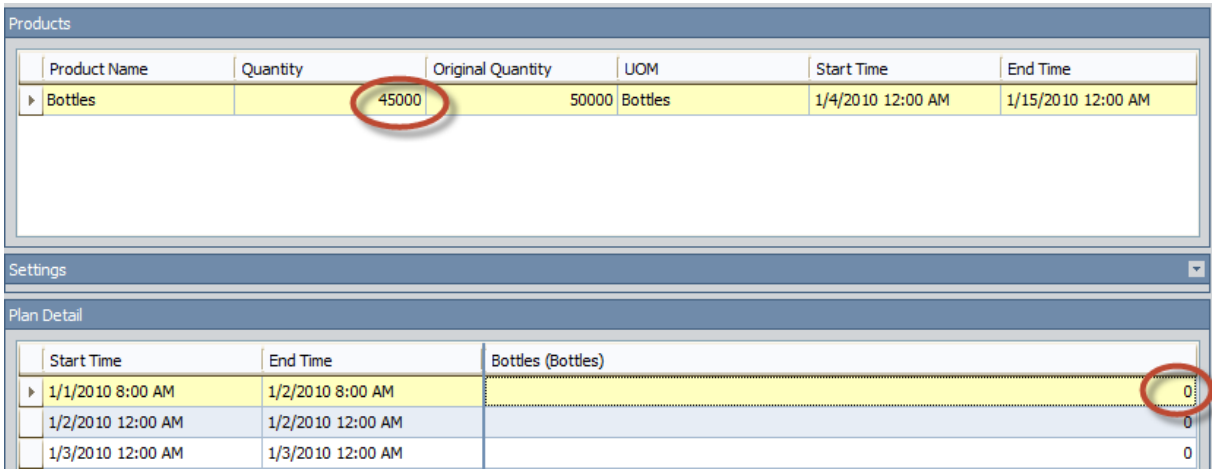
Plan Results



You can see that the planned production each day (except Saturdays and Sundays) is *5,000 bottles per day*. This value is determined automatically using the standard batch size (5,000 bottles) and cycle time (1 day) in the associated production profile for Unit A.



If the plan changes and you need to adjust the planned production per day for any reason, you can change the details accordingly. As you do so, the quantity will be updated automatically. For example, if you decide to close the plant on January 1 to account for a holiday, you could change the planned production for that day to *0*. Doing so would cause the quantity to be recalculated and updated automatically.



Complex Quantity-Based Plan

Plan Summary

The following example of a quantity-based plan assumes that your production plan meets the following criteria:

Criteria	Data Used in This Example
What	Two products (bottles and labels)
How Much	50,000 bottles and 100,000 labels, starting January 1, 2010
During Which Hours	Monday through Friday, 24 hours per day, two shifts: • 8:00 A.M. to 8:00 P.M. • 8:00 P.M. to 8:00 A.M.
How Often You Enter Data	Per Shift (i.e., twice a day)

Plan Details

In this example, Production Unit A produces bottles and labels in a water-bottling facility. Unit A's *production profiles* indicate that:

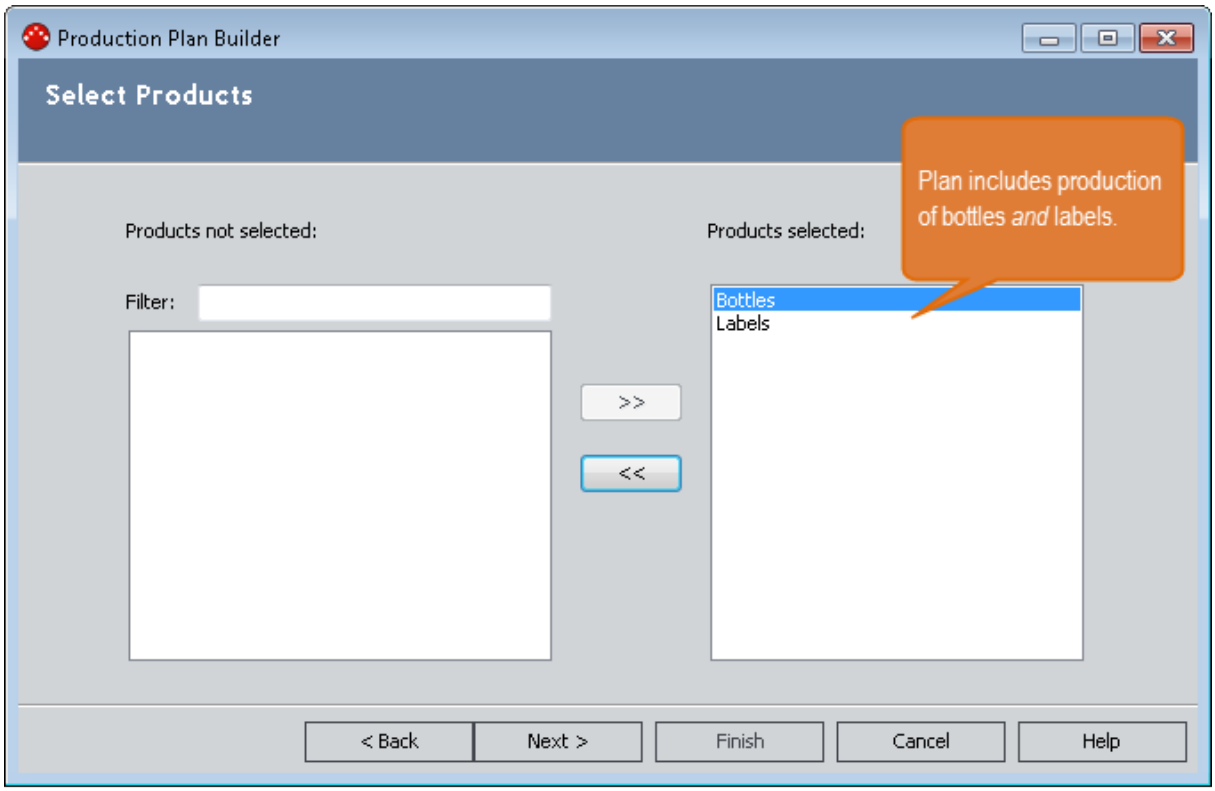
- Unit A can generate 5,000 bottles per day and 8,000 labels per day.
- One bottle yields a $5.00 profit.
- One label yields a $1.00 profit.

For Unit A, you want to track production for 50,000 bottles and 80,000 labels, starting January 1, 2010. You do not have a determined end date. Instead, you want the production plan to determine the end date automatically based upon how long it takes to produce 50,000 bottles and 80,000 labels.

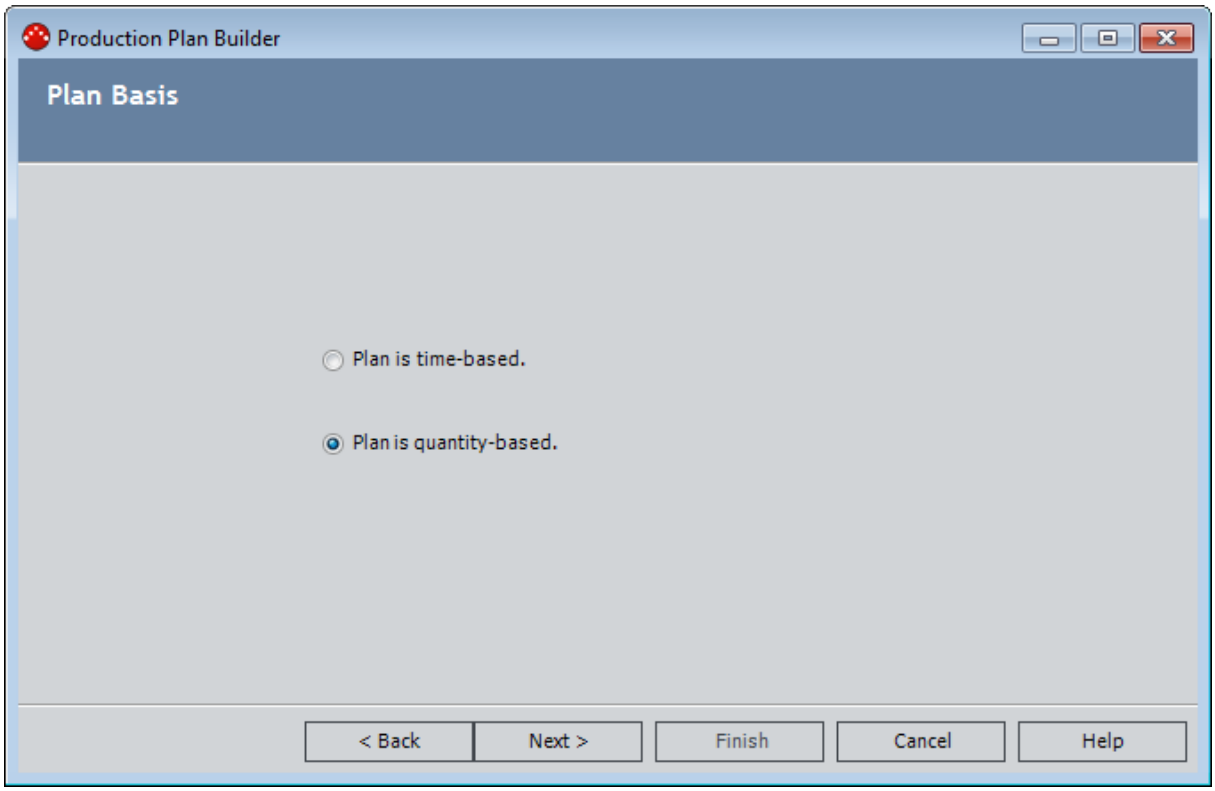
Production Plan Builder Selections

To produce this plan, you would select the following options in the **Production Plan Builder**:

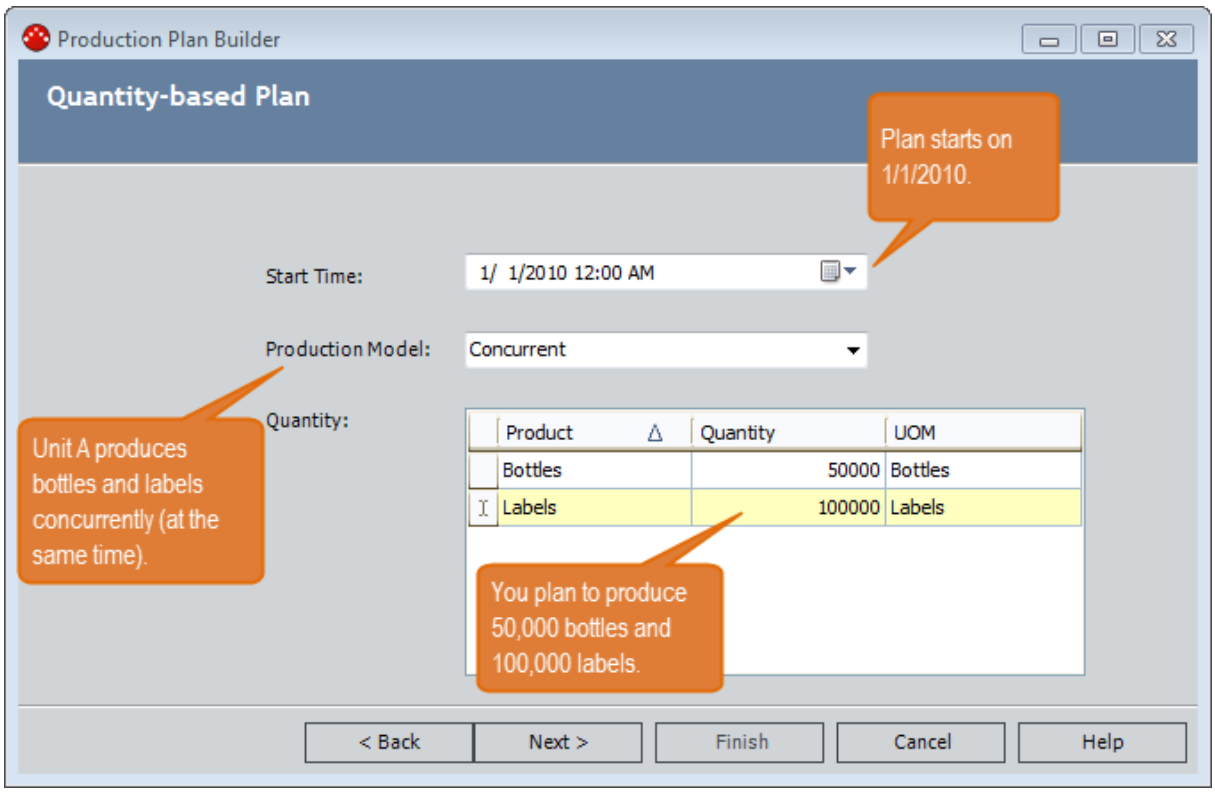
Select Products screen:



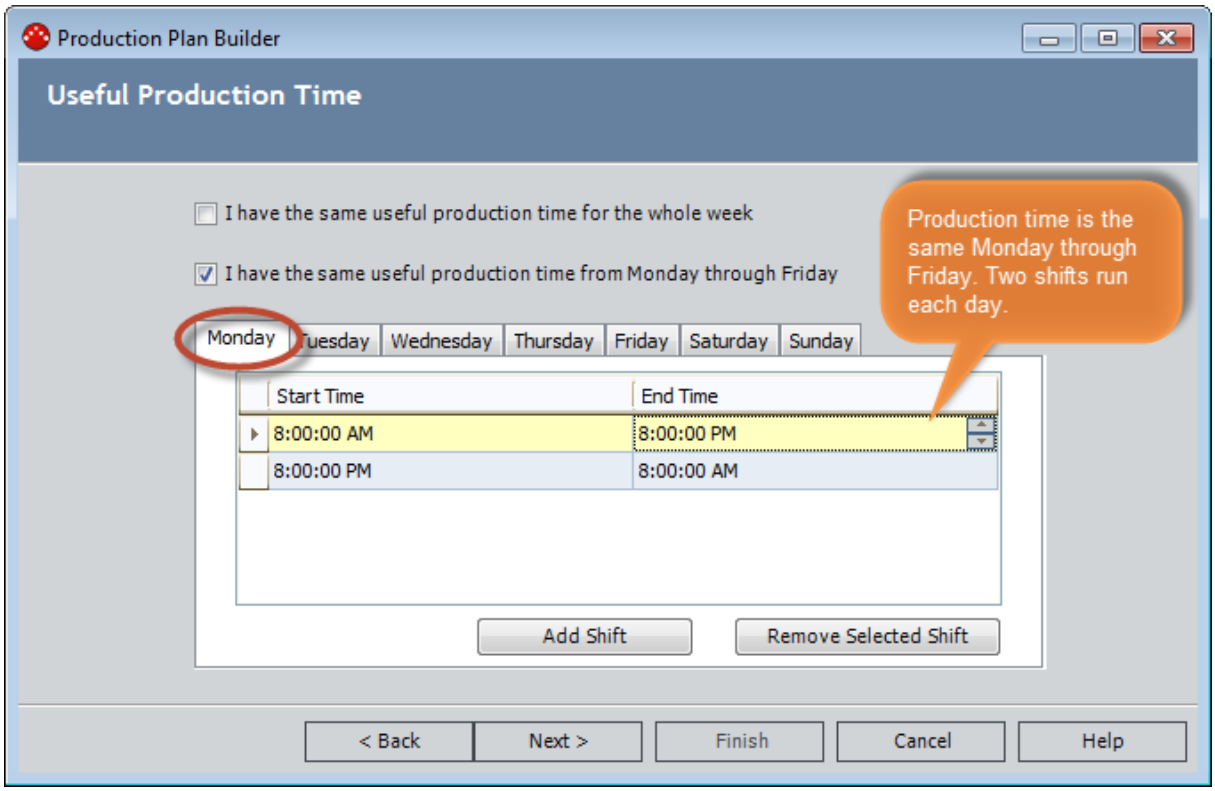
Plan Basis screen:

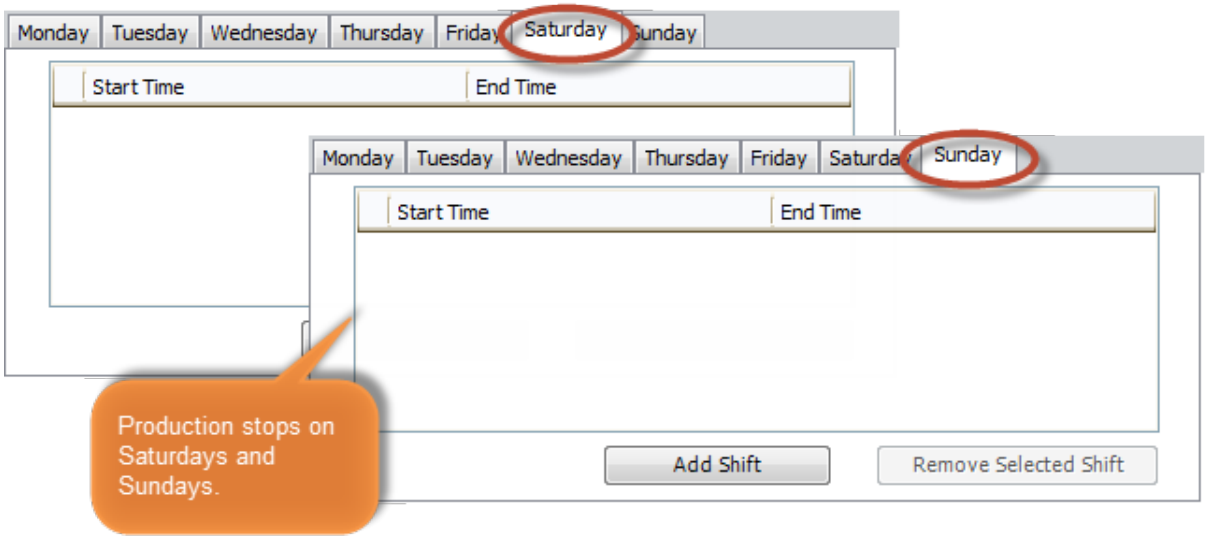


Quantity-Based Plan screen:

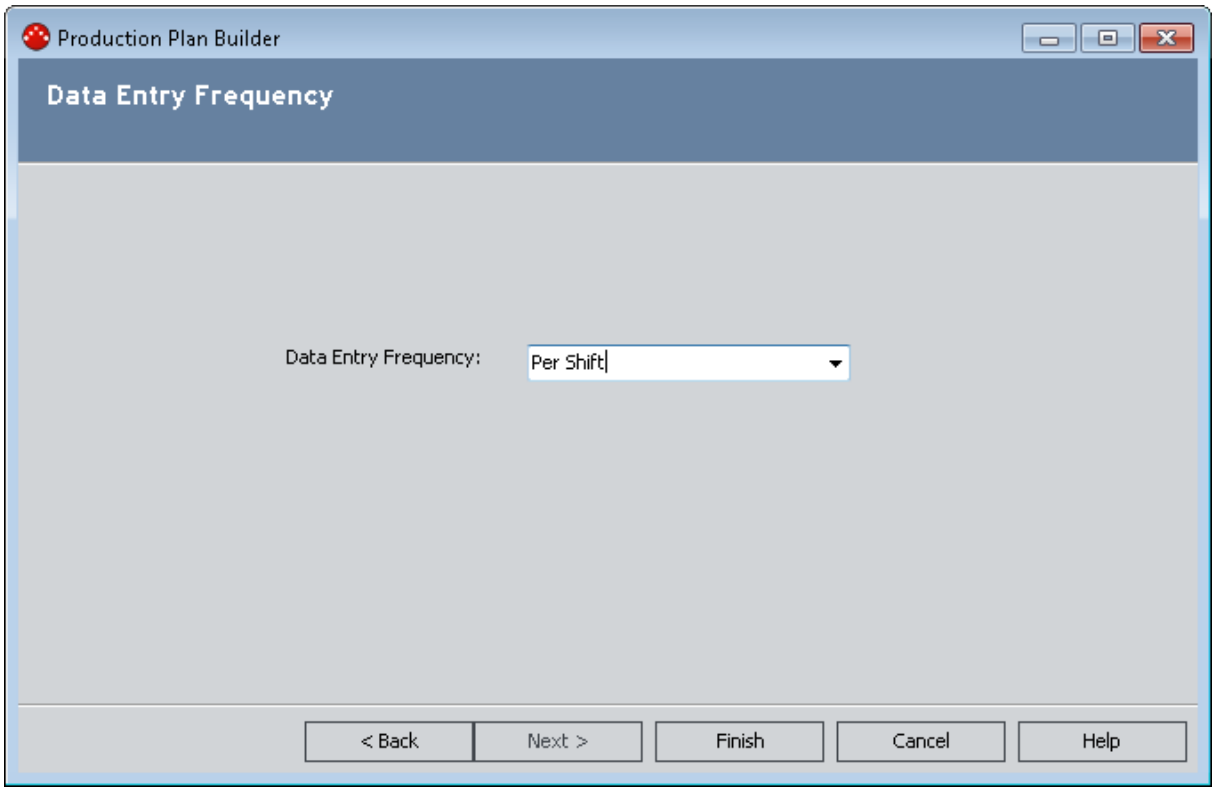


Useful Production Time screen:

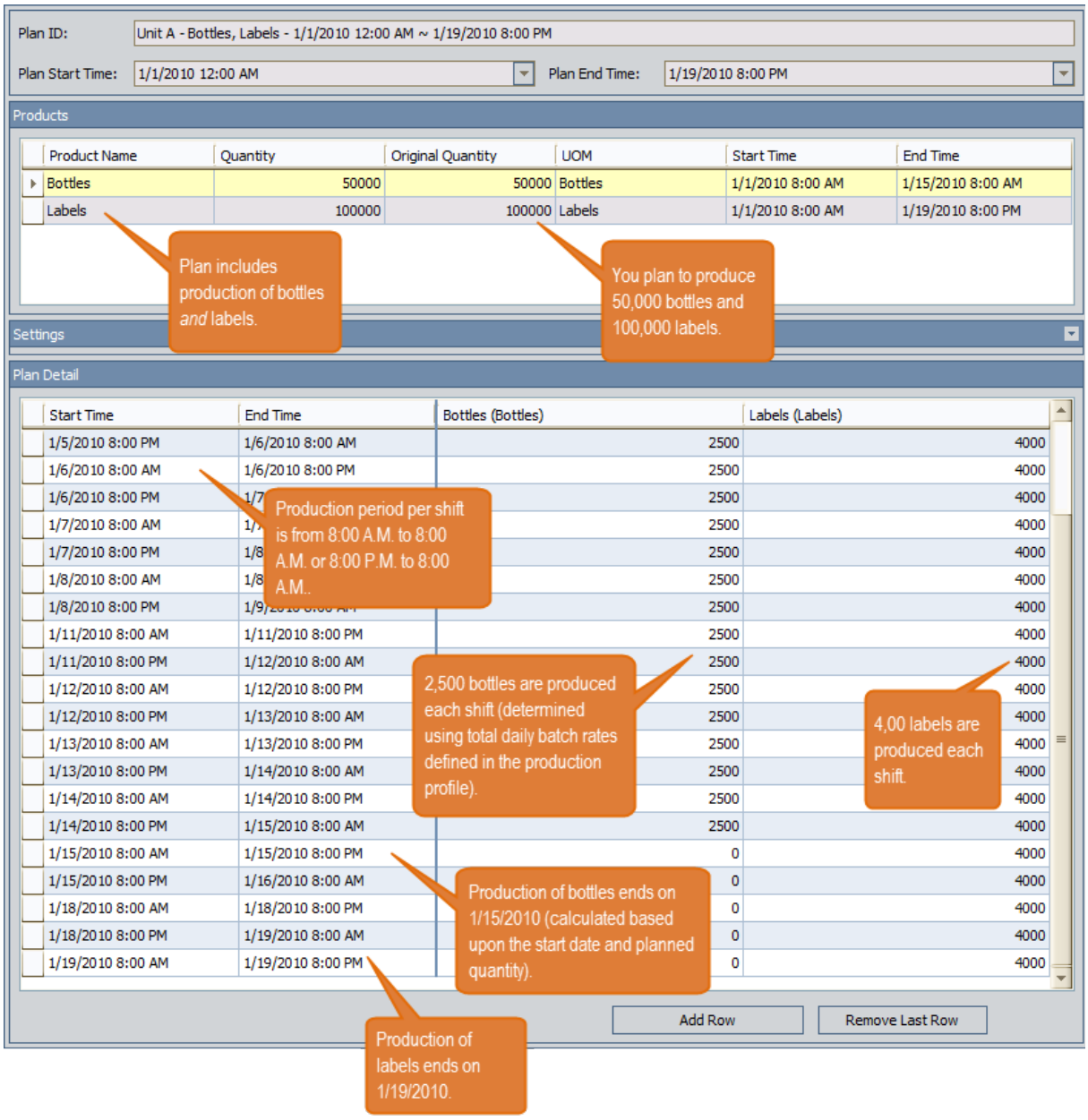




Data Entry Frequency screen:

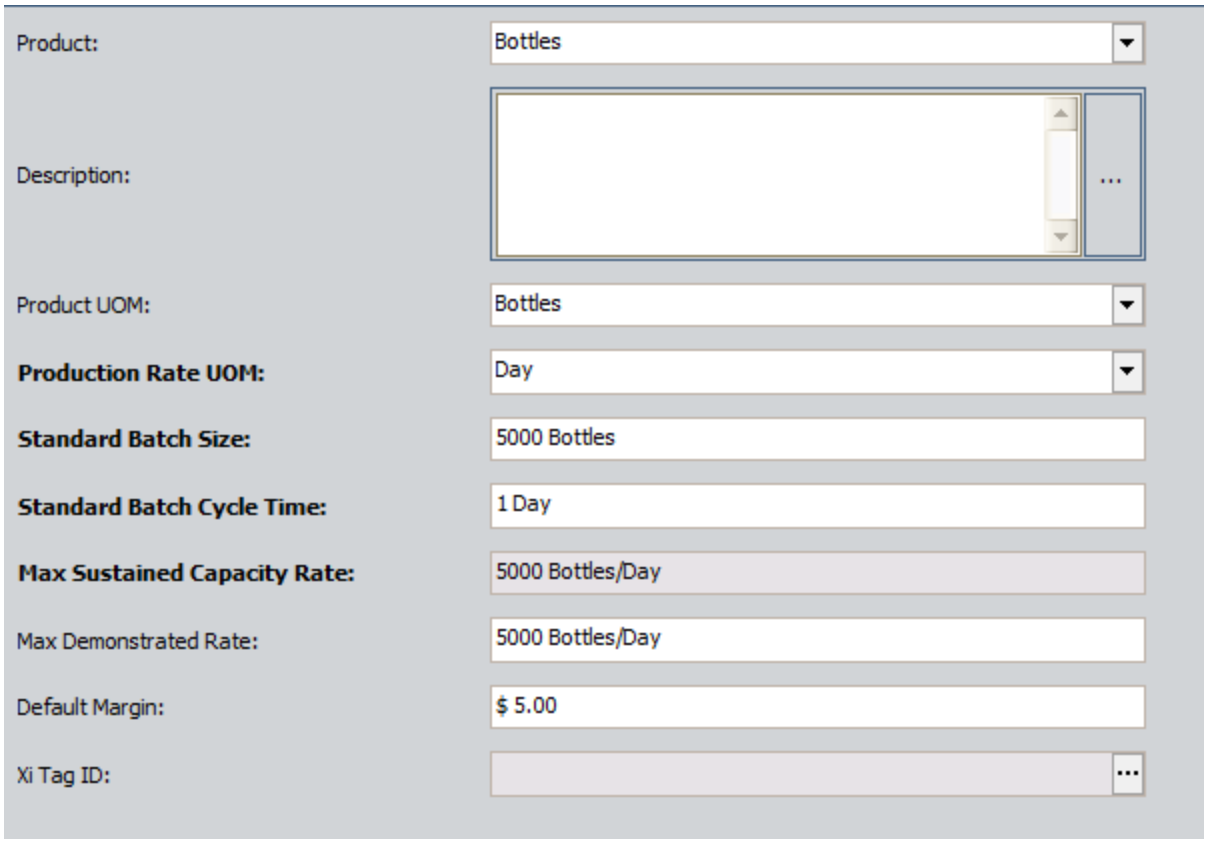


Plan Results

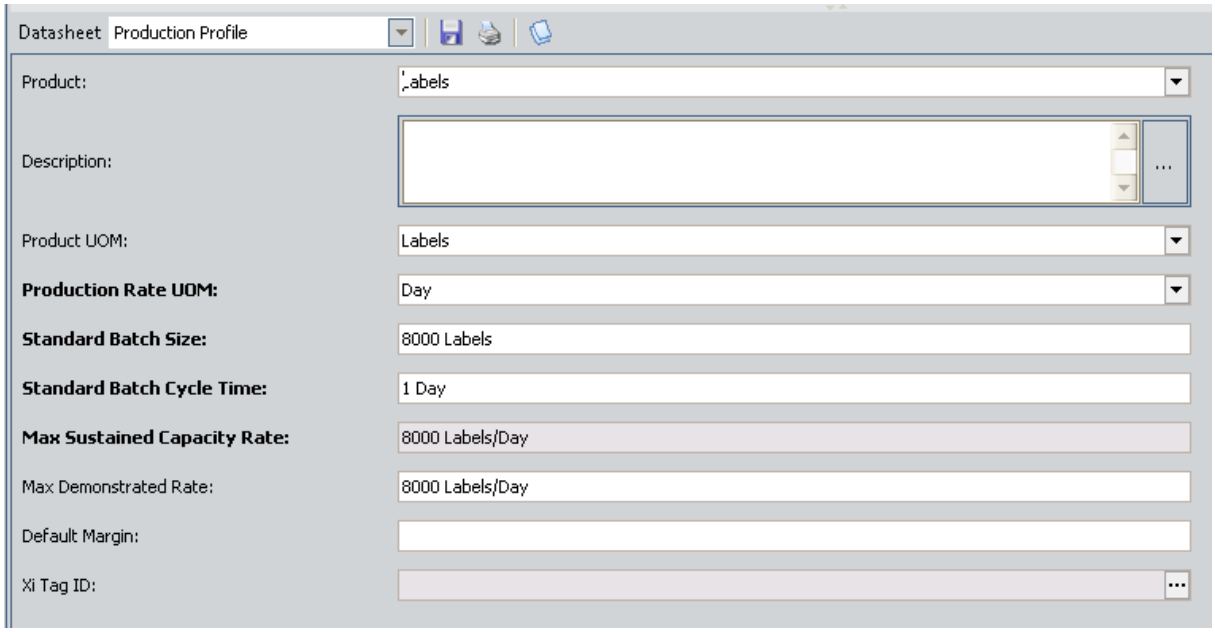


You can see that the calculated planned production each day (except Saturdays and Sundays) is *2,500 bottles and 4,000 labels per shift*. This value is calculated automatically using the standard batch size (5,000 bottles and 80,000 labels) and cycle time (1 day) in the associated production profiles for Unit A.

Bottles - Production Profile

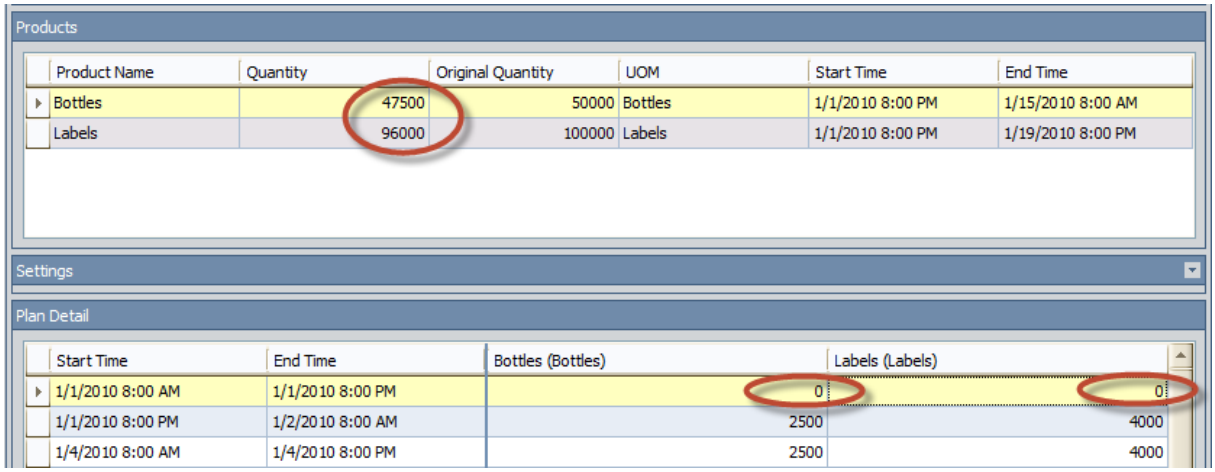


Labels - Production Profile



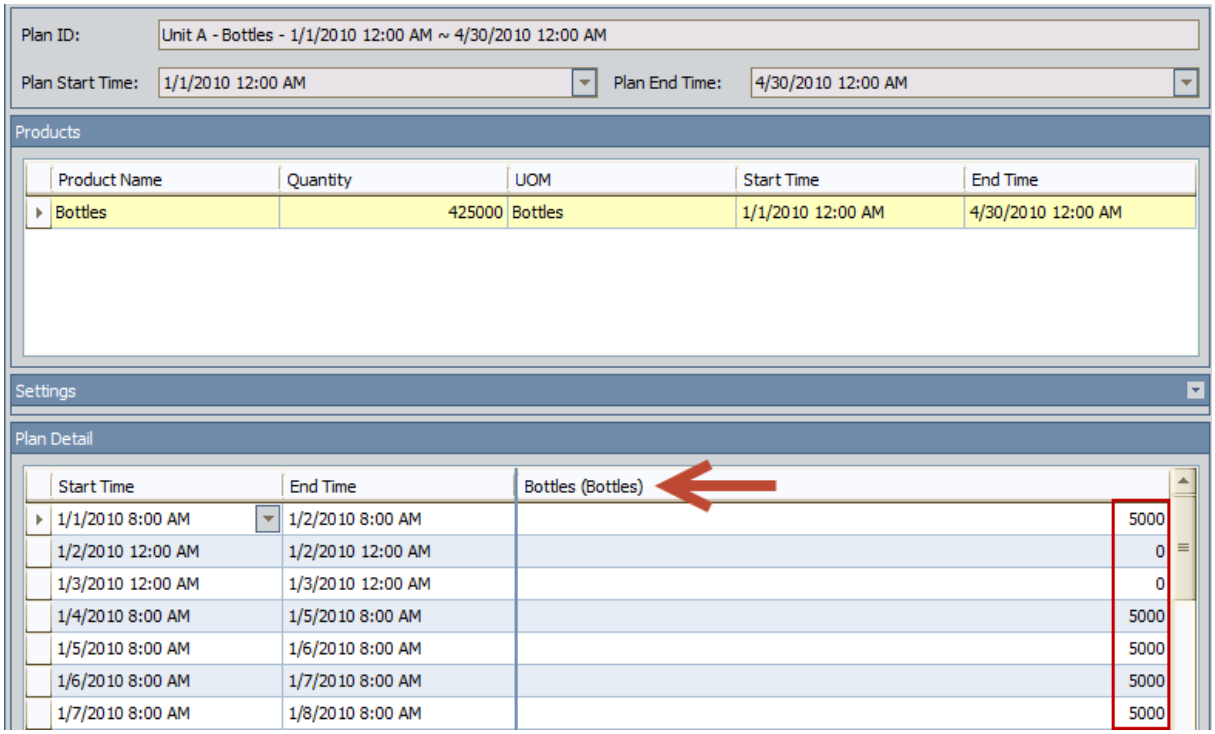
If the plan changes and you need to adjust the planned production per day for any reason, you can change the details accordingly. As you do so, the quantity will be

updated automatically. For example, if you decide to close the plant on January 1 to account for a holiday, you could change the planned production for that day to *0*. Doing so would cause the quantity to be recalculated and updated automatically.

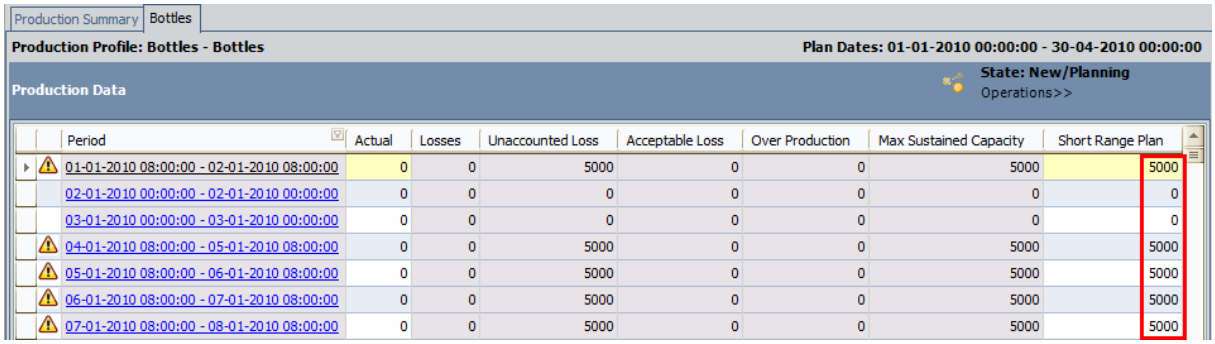


How are the Planned Production Values Used?

After you create a production plan, the plan will contain a row for each period for which you plan to produce a given product (e.g., an entire day or a specific shift within a day). Each row will contain a planned production value, where the product associated with those values is specified in the column header. The following image illustrates planned production values for *bottles*.

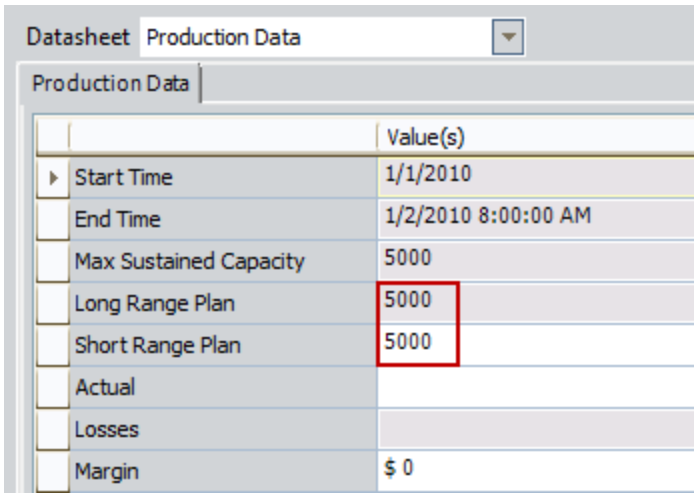


When you access the **Production Data Entry** page for a production plan, on each production tab, you will see a similar row for each period in the plan. Each row on the tab represents a separate Production Data record. In each row, the value in the **Short Range Plan** column is a copy of the planned production value.

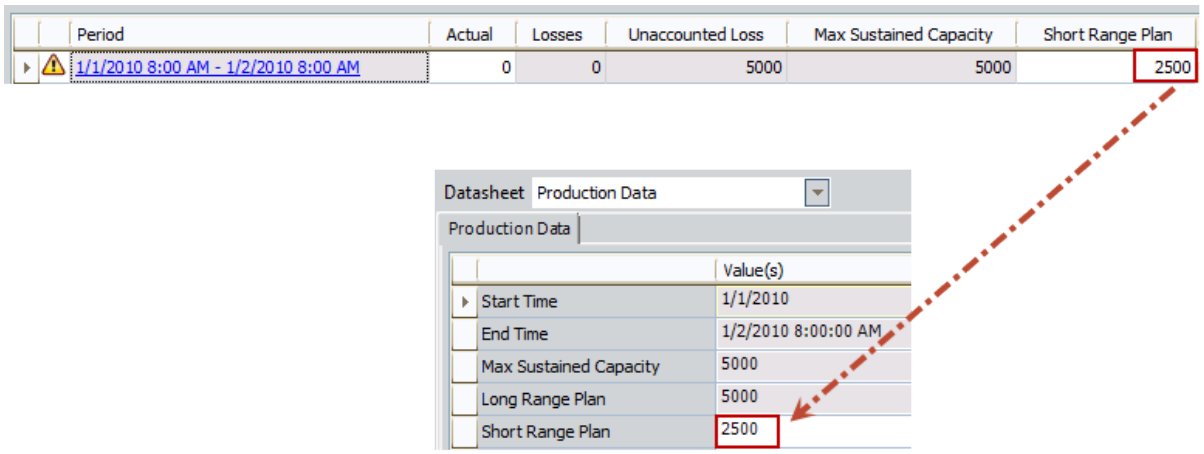


Note: On the **Production Data** tab, the short range value can be changed manually if needed.

In addition, if you click the hyperlink in the **Period** cell in any row, you will see the Production Data datasheet, which also displays the Long Range Plan field that belongs to the Production Data family. The value in the Long Range Plan field is derived the same way that the Short Range Plan value is derived. Consider the following image, which shows the value *15610* in the **Long Range Plan** and **Short Range Plan** cells on the Production Data datasheet. A red outline has been added to the image to highlight these values.



If you were to change the Short Range Plan value on the production tab, the value in the Short Range Plan field in the Production Data record would be updated accordingly.



Accessing the Manage Production Plans Page

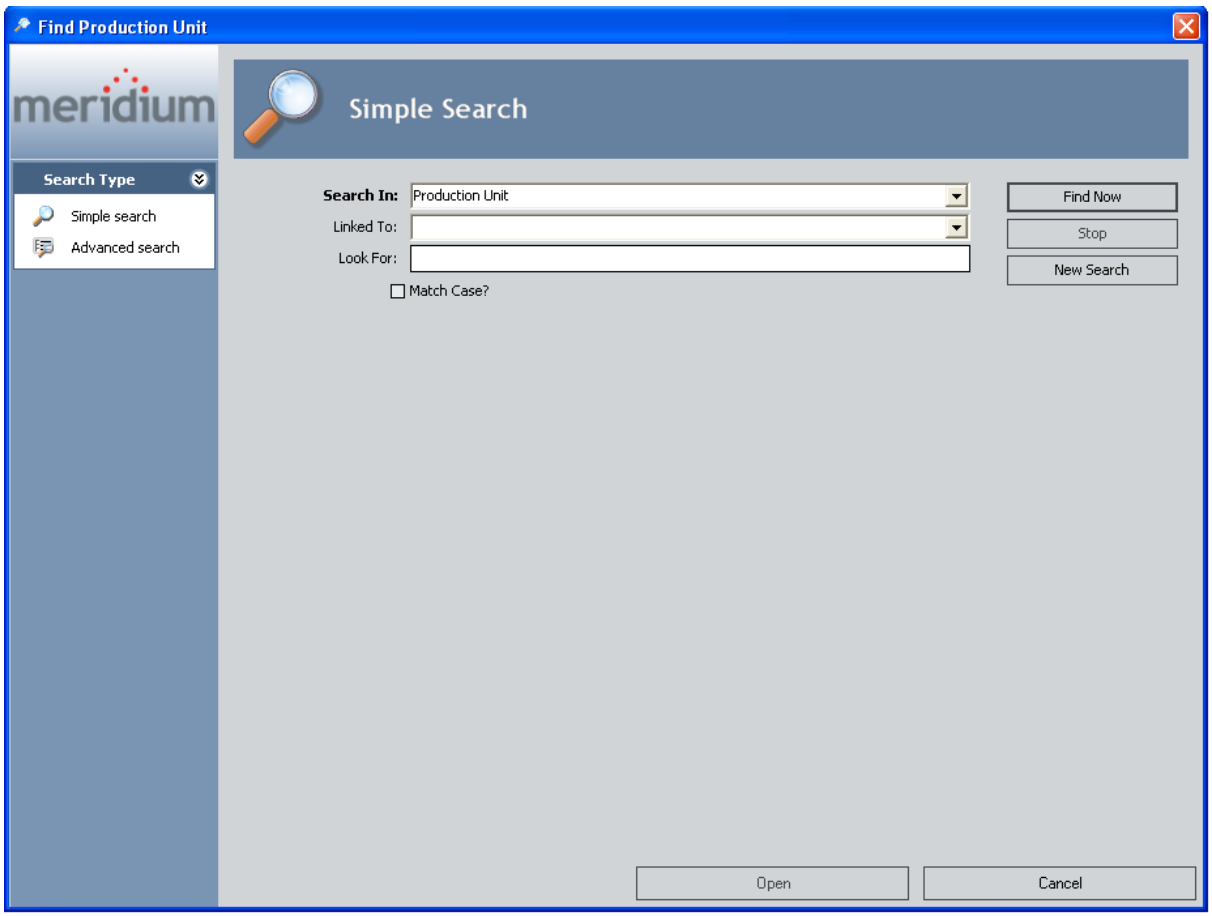
To access the Manage Production Plans page:

1. On the **PLA Start Page**, click the **Production Plan Management** link.

   -or-

   On any **Tools** menu, click the **Manage Plans** link.

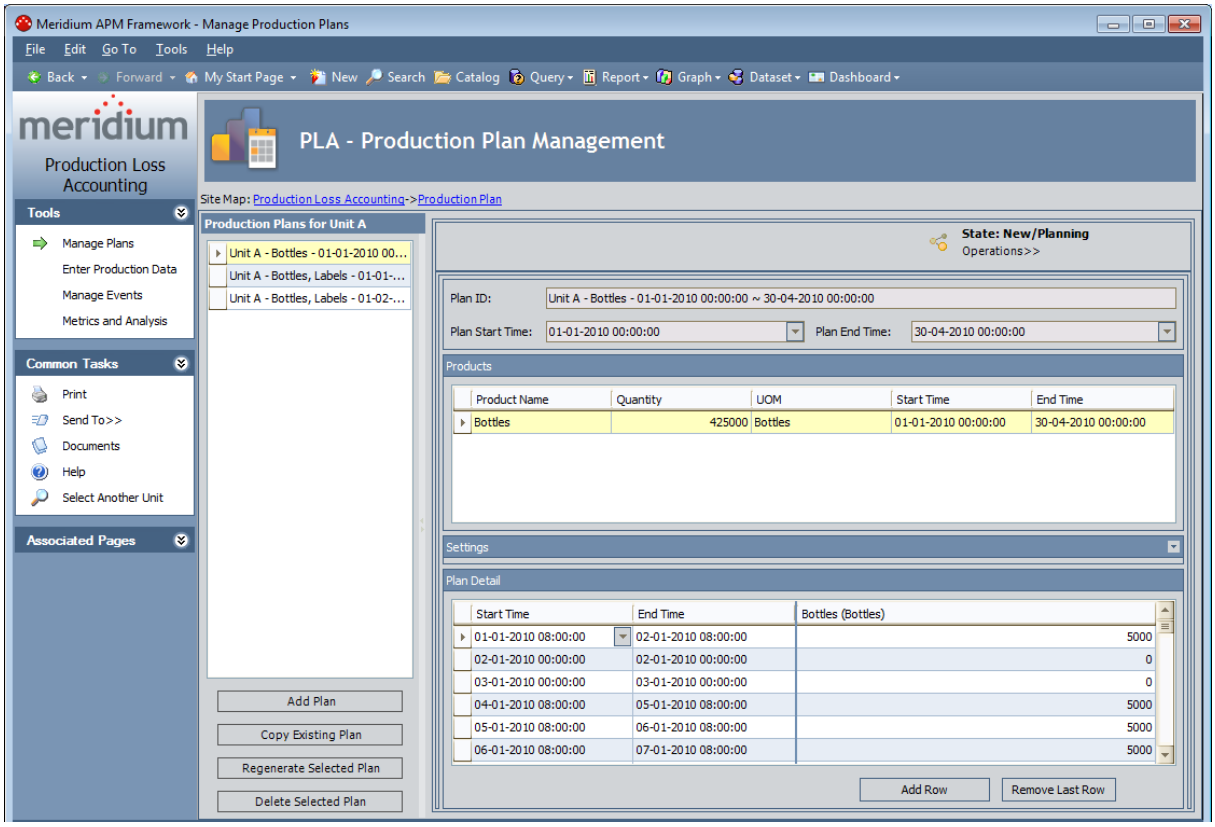
   The **Find Production Unit** window appears, displaying the **Simple Search** work-space. The value in the **Search In** list is set to *Production Unit*. You cannot select a different value.



2. If desired, refine the search criteria.
3. When you are finished defining the search criteria, click the **Find Now** button.
4. In the search results list, select the Production Unit record for which you want to build a production plan, and click the **Open** button.

Note: The Production Unit record must be linked to at least one Production Profile record.

The Manage Production Plans page appears.



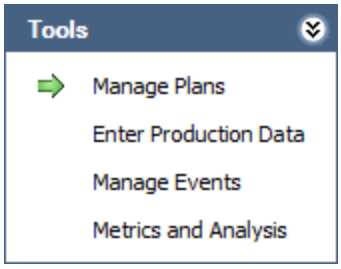
Aspects of the Manage Production Plans Page

The **Manage Production Plans** page contains the following items:

- **Task menu pane:** Contains the following task menus:
  - **Tools** menu
  - **Common Tasks** menu
  - **Associated Pages** menu
- **Production Plans for <Unit Name>** pane, where **<Unit Name>** is the value in the Name field in the Production Unit record for which you accessed the page. The pane contains the following items:
  - A list that displays production plans for the current production unit.
  - The **Add Plan** button.
  - The **Copy Existing Plan** button.
  - The **Regenerate Selected Plan** button.
  - The **Delete Selected Plan** button.

  Throughout the documentation, this pane is referred to simply as the ***Production Plans*** *pane*.
- **Production plan details area:** Displays the details of the production plan that is selected in the **Production Plans** pane.

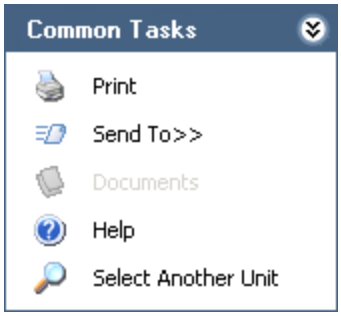
Tools Menu



The **Tools** menu on the **Manage Productions Plans** page contains the following links:

- **Manage Plans:** Displays the **Find Production Unit** window, where you can search for the Production Unit record whose production plans you want to manage on the current page. A green arrow appears to the left of this link when you are viewing this page.
- **Enter Production Data:** Displays the **Find Production Plan** window, where you can search for the Production Plan record that you want to use to build the data that will appear on the **Production Data Entry** page.
- **Manage Events:** Displays the Production Event Management page.
- **Metrics and Analyses:** Displays the **Production Analysis** page.

Common Tasks Menu



The **Common Tasks** menu on the **Manage Production Plans** page contains the following links:

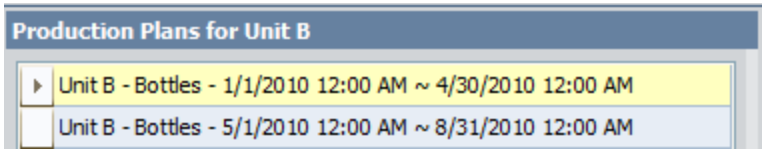
- **Print:** Displays the **Preview** window, which shows a preview of how the grid will be printed. From the **Preview** window, you can select print options and print the record.
- **Send To:** Displays a submenu with options that let you provide a link to the current page on your desktop (create shortcut), in an email message, or on a Home Page.
- **Documents:** Displays the **Reference Documents** window, where you can manage Reference Document records for the Production Plan record that is selected in the tree. This link is enabled only when a Production Plan record is selected in the tree.
- **Help:** Displays the context-sensitive Help topic for the **Manage Production Plans** page.
- **Select Another Unit:** Displays the **Find Production Unit** window, where you can search for the Production Unit record whose production plans you want to manage on the current page.

Associated Pages Menu

The **Associated Pages** menu on the **Manage Production Plans** page displays links only if Associated Pages have been configured for the Production Plan family. If no Associated Pages have been configured for the Production Plan family, the **Associated Pages** menu will be empty.

Production Plans Pane

The **Production Plans** pane on the **Manage Production Plans** page contains a list that displays all Production Plans that exist for the Production Unit for which you accessed the page.

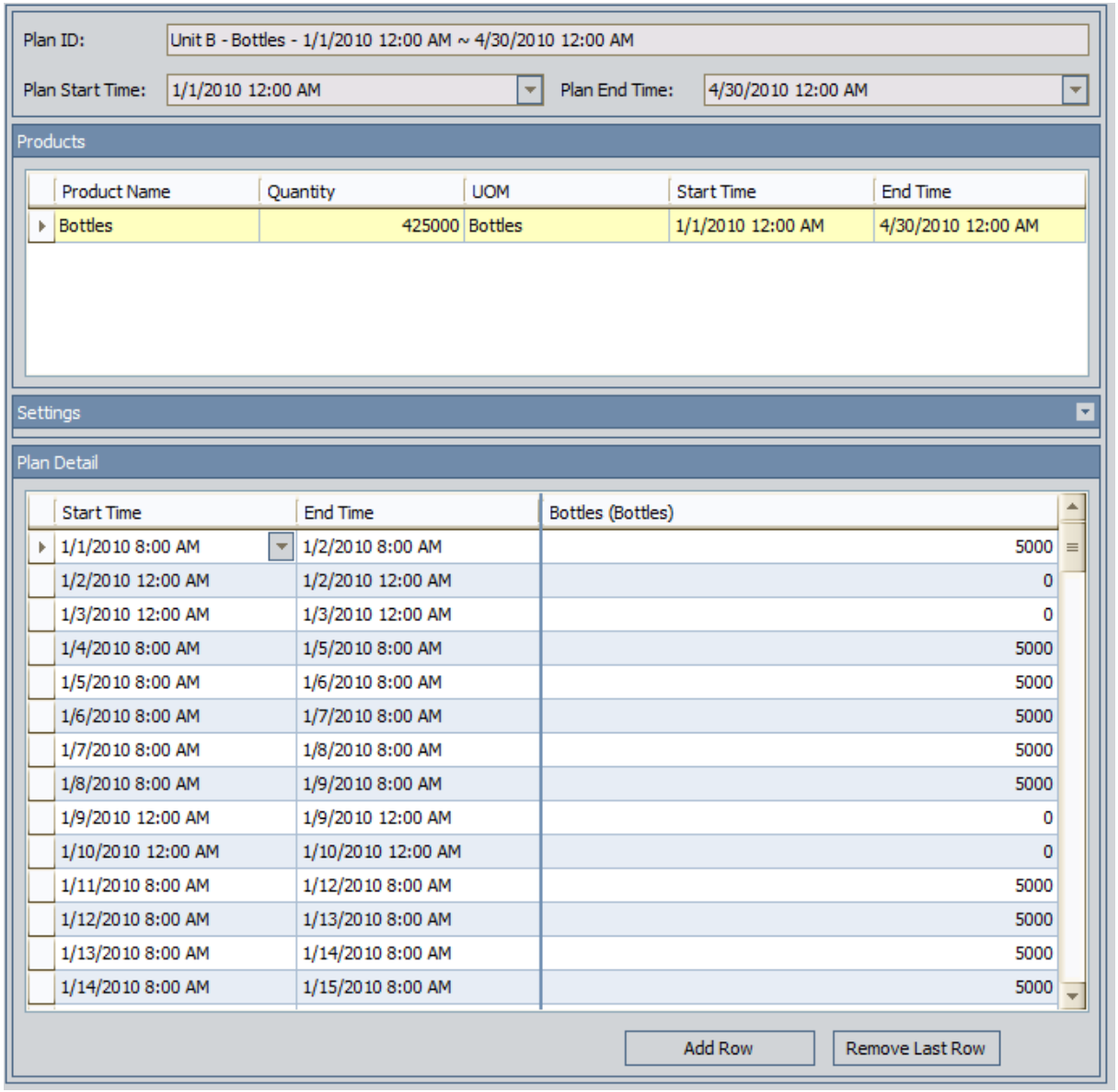


Below the pane are the following buttons:

- **Add Plan:** Displays the **Production Plan Builder**, where you can create a new production plan.
- **Copy Existing Plan:** Displays the **Find Production Plan** window, where you can select the production plan that you want to copy to create a new production plan.
- **Regenerate Selected Plan:** After displaying a confirmation message confirming that you want to delete the current production plan and create a new one, displays the **Production Plan Builder**, where you can modify the details of the selected production plan.
- **Delete Selected Plan:** After asking for confirmation, deletes the selected production plan.

Production Plan Details Area

The production plan details area displays the details of the production plan and the planned production values per period.



The production plan details area contains the following items:

- **State: <Current State>:** The state that is currently assigned to the Production Plan record. You can follow the standard procedure for managing record states.
- **Plan ID:** The record ID of the Production Plan record. This value is read-only.
- **Plan Start Time:** The start date and time of the production plan. This value is read-only.

- **Plan End Time:** The end date and time of the production plan. If this is a *time-based* plan, you specified this value manually in the **Production Plan Builder**. Alternatively, if this is a *quantity-based* plan, this value is determined automatically based upon the product quantity and start date that you specified. This value is read-only.
- **Products section:** Contains a grid, where each row in the grid represents a separate product that is being produced during the plan. All values in the grid are read-only. The grid contains the following columns:
  - **Product Name:** The name of the product.
  - **Quantity:** How much of the product will be produced during the *entire* plan. If this is a *time-based* plan, this value is determined automatically based upon the start and end dates that you specified in the **Production Plan Builder** and the batch production values that you specified in the associated Production Profile record. Alternatively, if this is a *quantity-based* plan, you specified this value manually in the **Production Plan Builder**. As you modify individual production values in the **Plan Detail** section, this value is updated automatically.
  - **Original Quantity:** How much of the product you originally planned to produce during the entire plan (before you made changes to individual production values in the **Plan Detail** section). This column is shown only for *quantity-based* plans.
  - **UOM:** The unit of measure that is associated with the product.
  - **Start Time:** The date and time at which that product will start being produced. If multiple products are being produced, the start time for each product is determined based upon your production model selection in the **Production Plan Builder**. For example, if multiple products are being produced sequentially, for each product after the first one, production will start after production ends for the previous product.
  - **End Time:** The date and time at which that product will stop being produced.
- **Settings section:** Displays the following read-only information:
  - **Plan Basis:** The type of plan: *Time-based* or *Quantity-based*.
  - **Production Model:** The order in which the products will be produced (at the same time or one after the other).
  - **Data Entry Type:** How often you plan to enter production data and losses.

Note: The **Settings** section is collapsed by default.

- **Plan Detail section:** Contains a grid, where each row in the grid represents a separate period in the plan (e.g., a separate day or a separate shift within the same day). The grid contains the following columns:
  - **Start Time:** The start date and time of the period. In each row, you can modify the start *time* (within certain limits) but not the start *date*. If you attempt to modify the start time in a way that is prohibited, a message will appear to identify the range within which the time must fall.

- **End Time:** The end date and time of the period. In each row, you can modify the end *time* (within certain limits) but not the end *date*. If you attempt to modify the end time in a way that is prohibited, a message will appear to identify the range within which the time must fall.
- **<Product Name (<UOM>)>:** The planned production amount for that period. You can modify the value as long as it does not exceed the maximum demonstrated capacity that is defined in the associated production profile.

Below the grid, the following buttons are available:

- **Add Row:** Adds a new row to the end of the grid. The start time, end time, and planned production value for the new row will be determined automatically.
- **Remove Last Row:** Removes the last row from the grid.

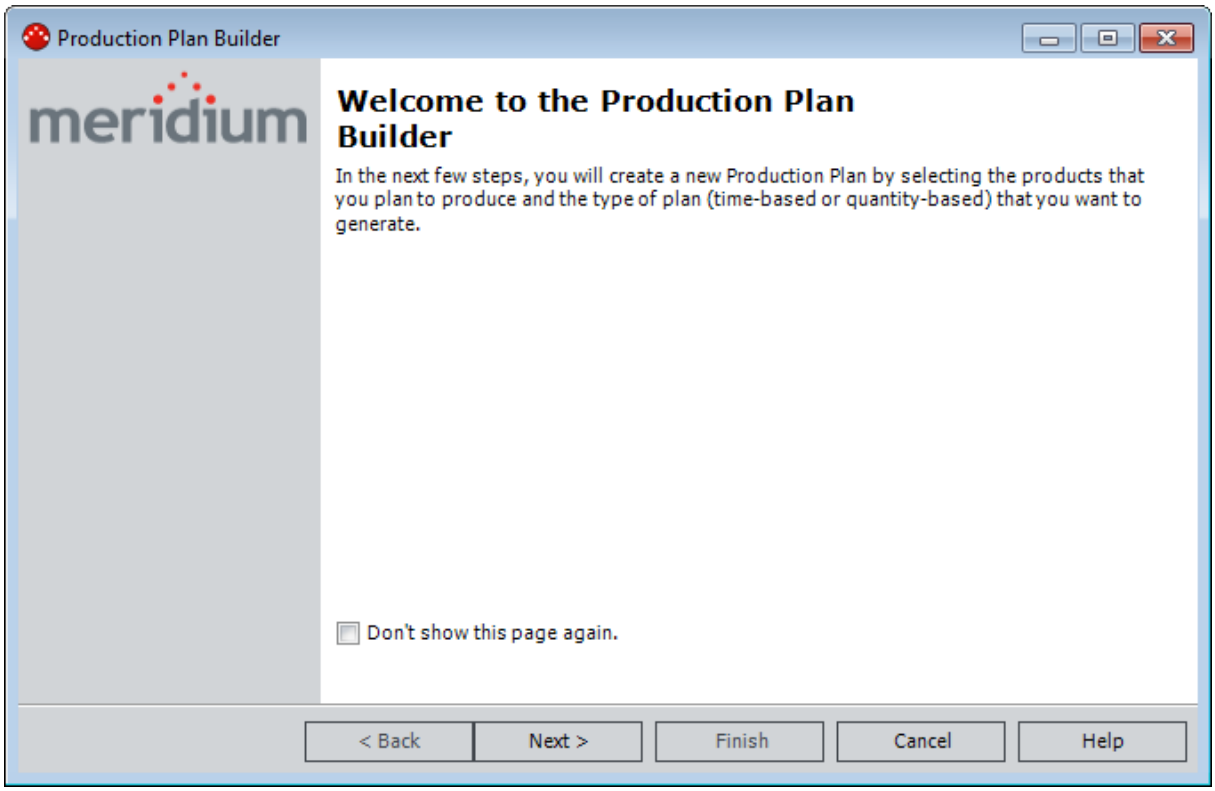
You can modify values in the **Plan Detail** section. Doing so will update the value in the **Quantity** column in the **Products** section and the plan start and end time above the **Products** section.

Creating Production Plans

To create a Production Plan:

1. On the Manage Production Plans page, below the tree, click the **Add Plan** button.

   The **Production Plan Builder** appears, displaying the Welcome screen.



2. Proceed through the **Production Plan Builder** to define the details of the production plan.

   The production plan is created, and the details are displayed on the **Manage Production Plans** page.

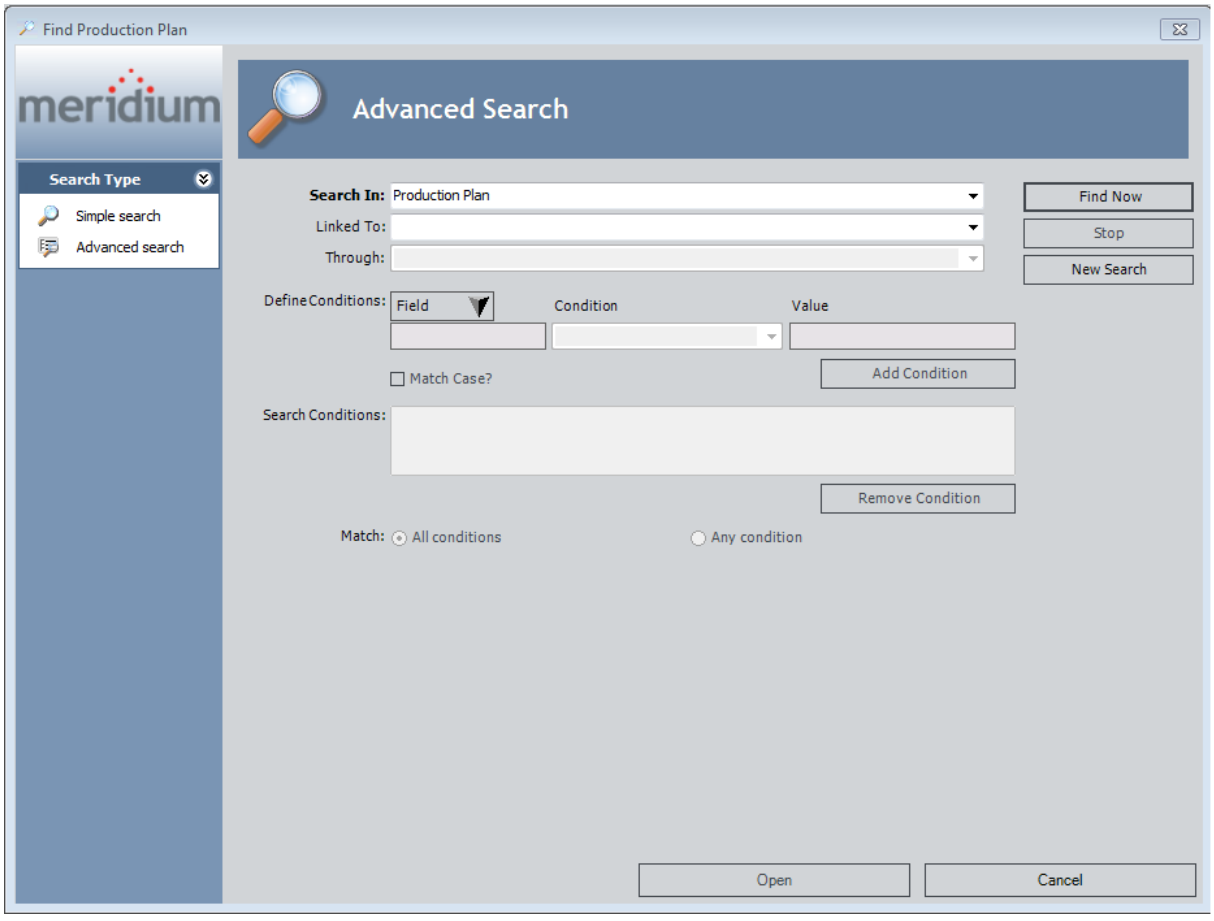
Copying Existing Production Plans

When you create a copy of an existing production plan, a new production plan is created. You can copy an existing production plan to create a production plan for the same production unit for which the source plan was created or for a different production unit. For example, suppose Unit A and Unit B can both produce bottles. If a production plan already exists for Unit A, you can copy it to create a new production plan for Unit A, or you can copy it to create a new production plan for Unit B. The Production Unit that you are currently viewing on the **Manage Production Plans** page is the *target* Production Unit for which the new plan will be created.

To copy an existing Production Plan:

1. On the Manage Production Plans page, below the tree, click the **Copy Existing Plan** button.

   The **Find Production Plan** window appears, displaying the **Advanced Search** workspace. The value in the **Search In** list is set to *Production Plan*. You cannot select a different value.



2. If desired, refine the search criteria.
3. When you are finished defining the search criteria, click the **Find Now** button.
4. In the search results list, select the production plan that you want to copy to create a new production plan, and click the **Open** button.

   Note: You must select a production plan that includes products that can be produced by the production unit to which you are copying it. For example, if you are copying a production plan to a unit that can produce only bottles, you cannot copy a production plan that includes labels.

   A new production plan is created based upon the selected production plan, and the new production plan appears in the **Production Plans** pane.

Regenerating Existing Production Plans

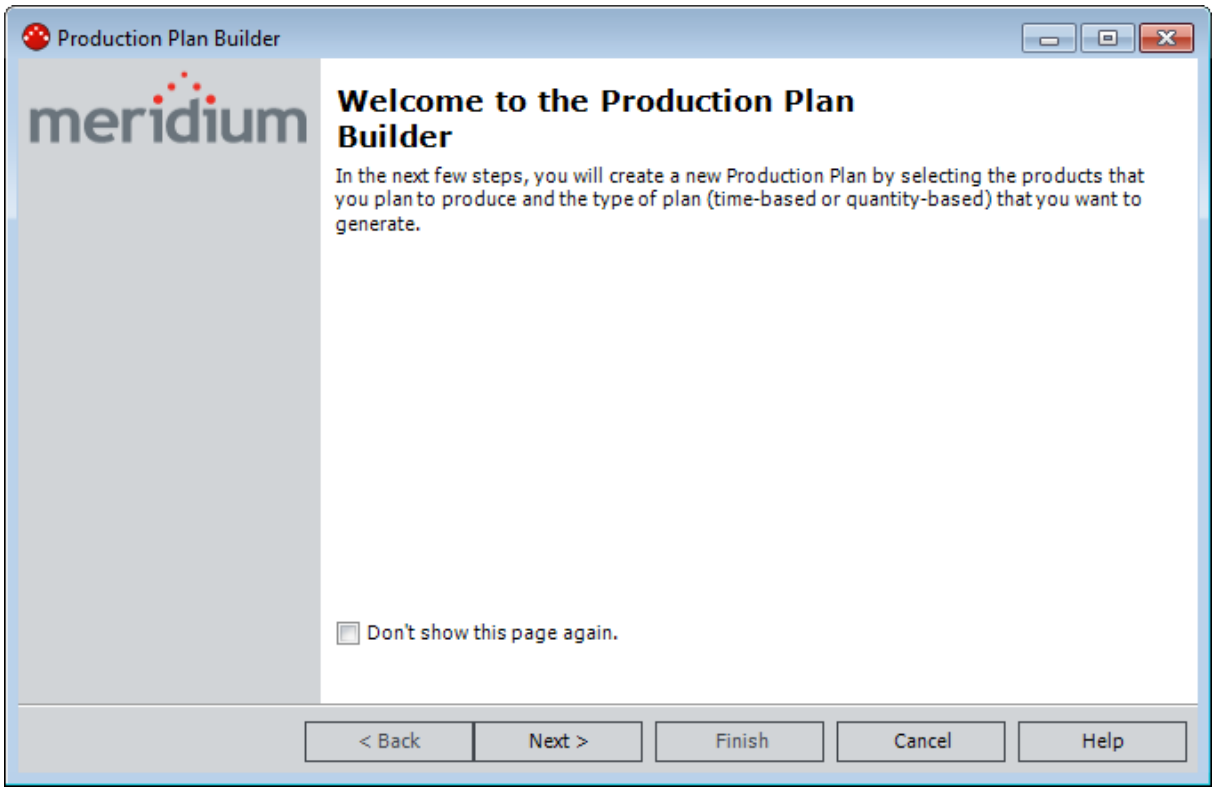
After a production plan is created (either as a copy of an existing production plan or from scratch), you can change only the planned production values. You cannot change production plan details such as start date, end date, and products. Instead, if you want to modify the details of a production plan, you will need to regenerate the production plan. Doing so will delete the current production plan and create a new one. You will use the **Production Plan Builder** to regenerate the plan, but instead of entering all details from scratch, the details of the previous plan will be retained in the builder. You can keep the details that you want to keep and modify the details that are no longer valid.

You can also copy a production plan and then regenerate the copied plan to create similar plans for various months. For example, you have created a production plan for producing bottles in January. To create a production plan for producing bottles in February, you can copy the January production plan and then regenerate the copied production plan to change the start time and end time.

To regenerate an existing production plan:

1. On the Manage Production Plans page, in the **Production Plans** pane, select the production plan that you want to regenerate.
2. Below the pane, click the **Regenerate Existing Plan** button.

   The **Production Plan Builder** appears, displaying the Welcome screen.



3. Proceed through the **Production Plan Builder** to define the details of the production plan.

   The previous production plan is deleted, the new production plan is created, and the details are displayed on the **Manage Production Plans** page.

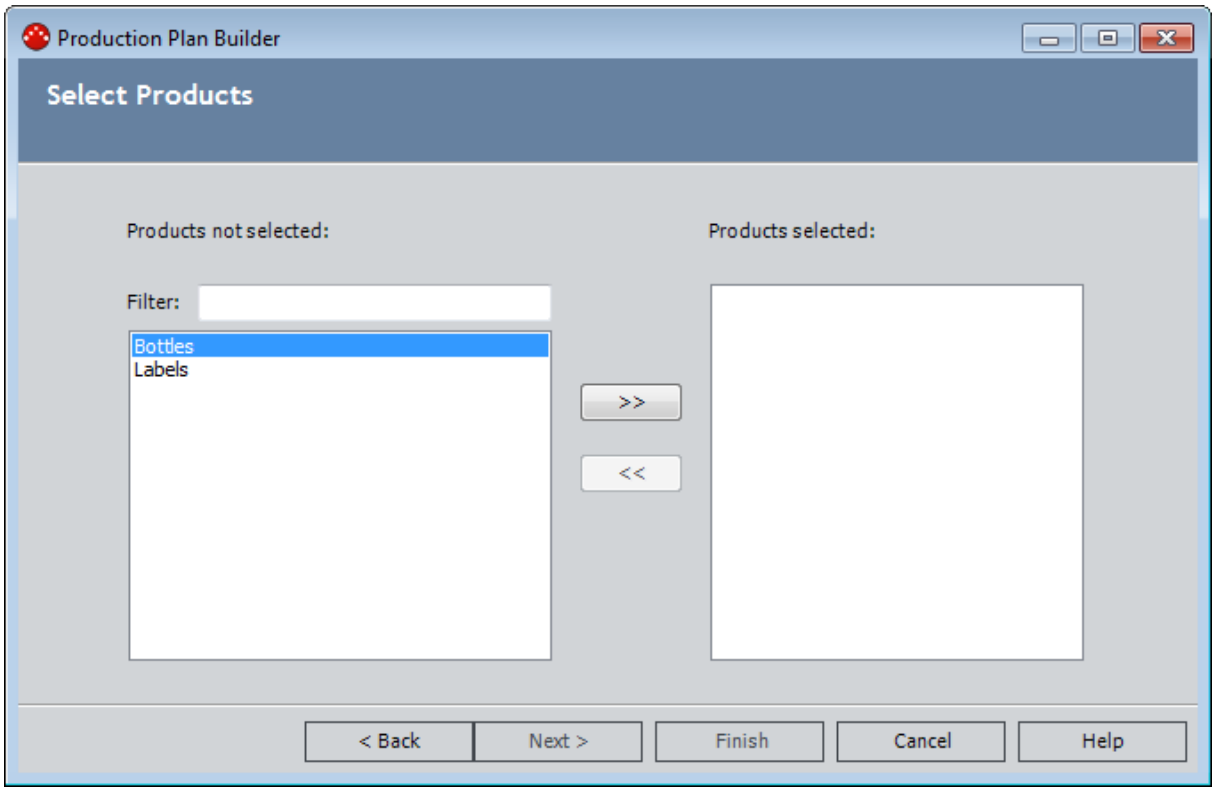
Using the Production Plan Builder

The **Production Plan Builder** appears when you click the **Add Plan** button or **Regenerate Selected Plan** button on the Manage Production Plans page. You can use this builder to create a new Production Plan or modify the details of an existing production plan.

To use the Production Plan Builder to create or modify a Production Plan:

1. On the Welcome screen, click the **Next** button. If you do not want to view this screen in the future, click the **Don't show this page again** check box.

   The **Select Products** screen appears.



   You can use this screen to define the products that you plan to produce. Each plan can include one or more products.

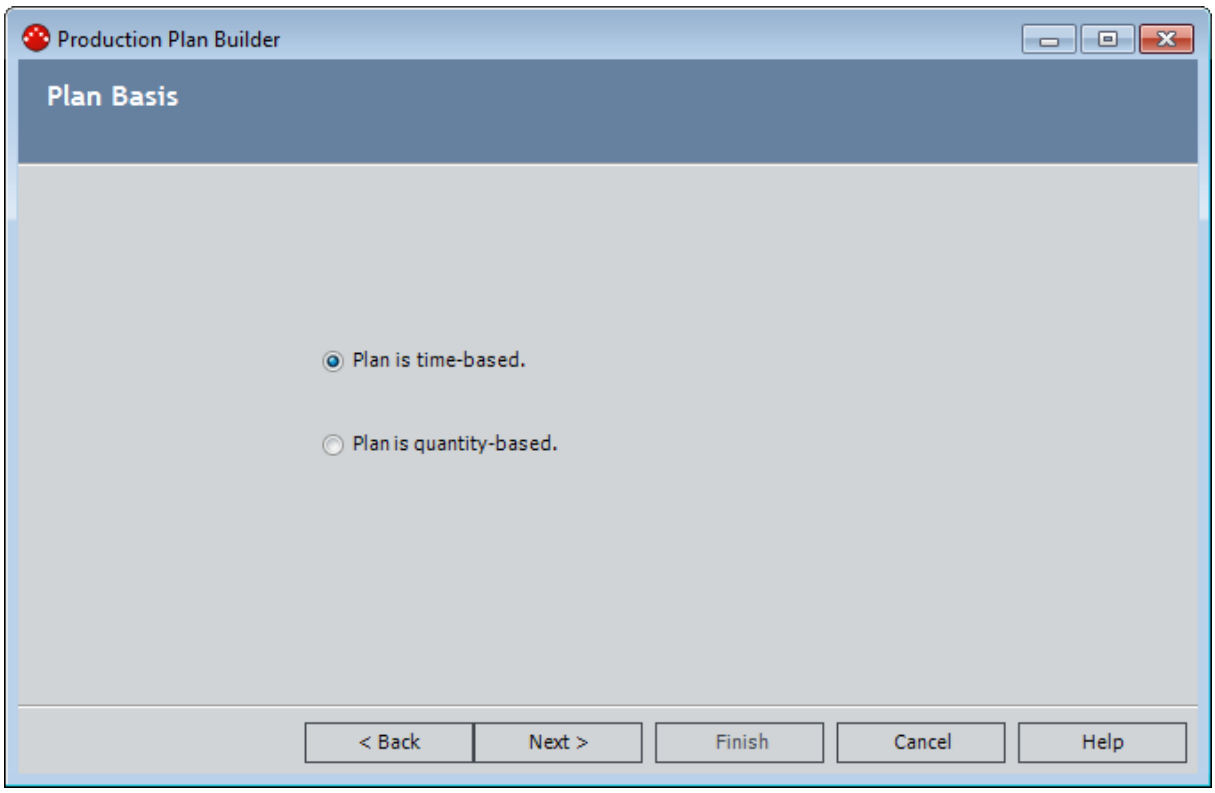
   Note: The Products associated with a Production Profile record appear in the **Select Products** screen *only* after the state of the Production Profile record is changed to *Approved*.

2. To add a product to the plan, in the left pane, select the product, and then click the >> button. If the list of products that you can add is long and you are having trouble finding the product that you want to add, you can search for a

specific product using the **Filter** text box.

3. When you are finished adding products to the plan, click the **Next** button.

   The **Plan Basis** screen appears.



   You can use this screen to determine whether the plan will be *time-based* (i.e., you will define the *time period* for which you want to track production) or *quantity-based* (i.e., you will define the *amount of each product* that you plan to produce).

4. If you want to generate a *time-based* plan, accept the default selection.

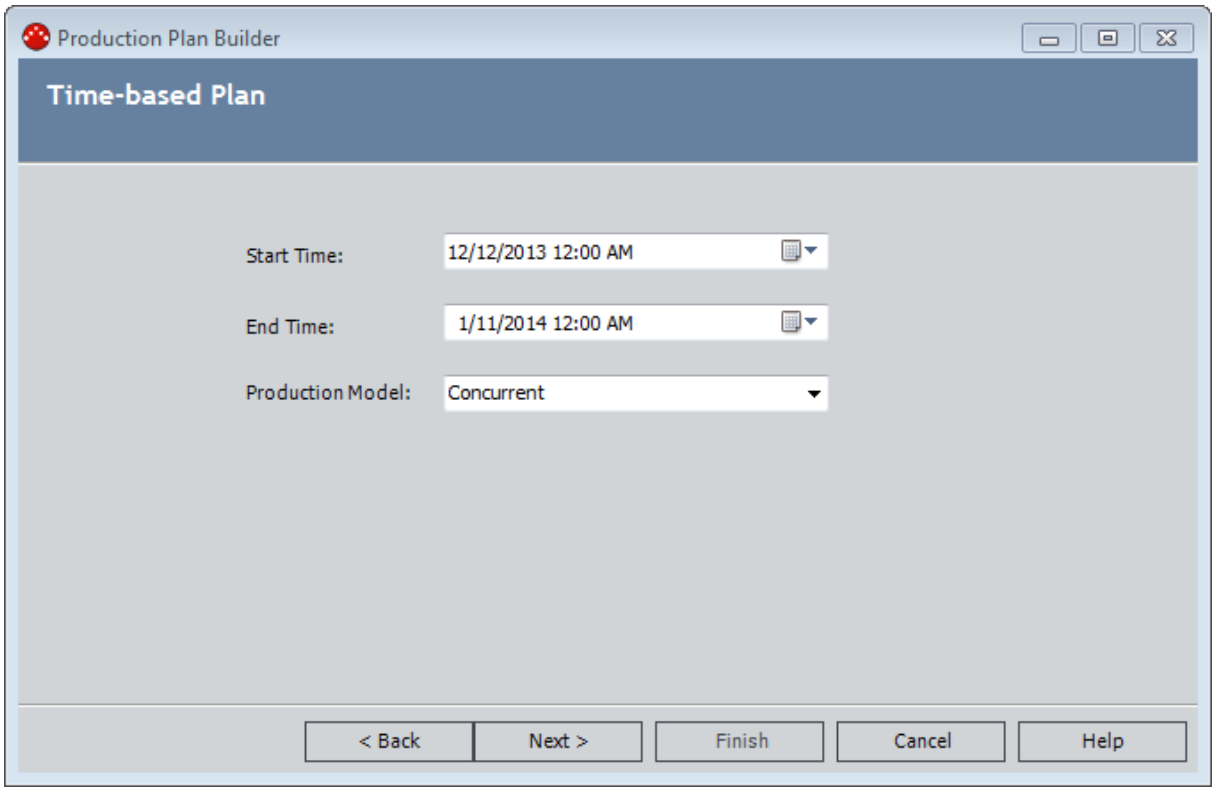
   -or-

   If you want to generate a *quantity-based* plan, select the **Plan is quantity-based** option.

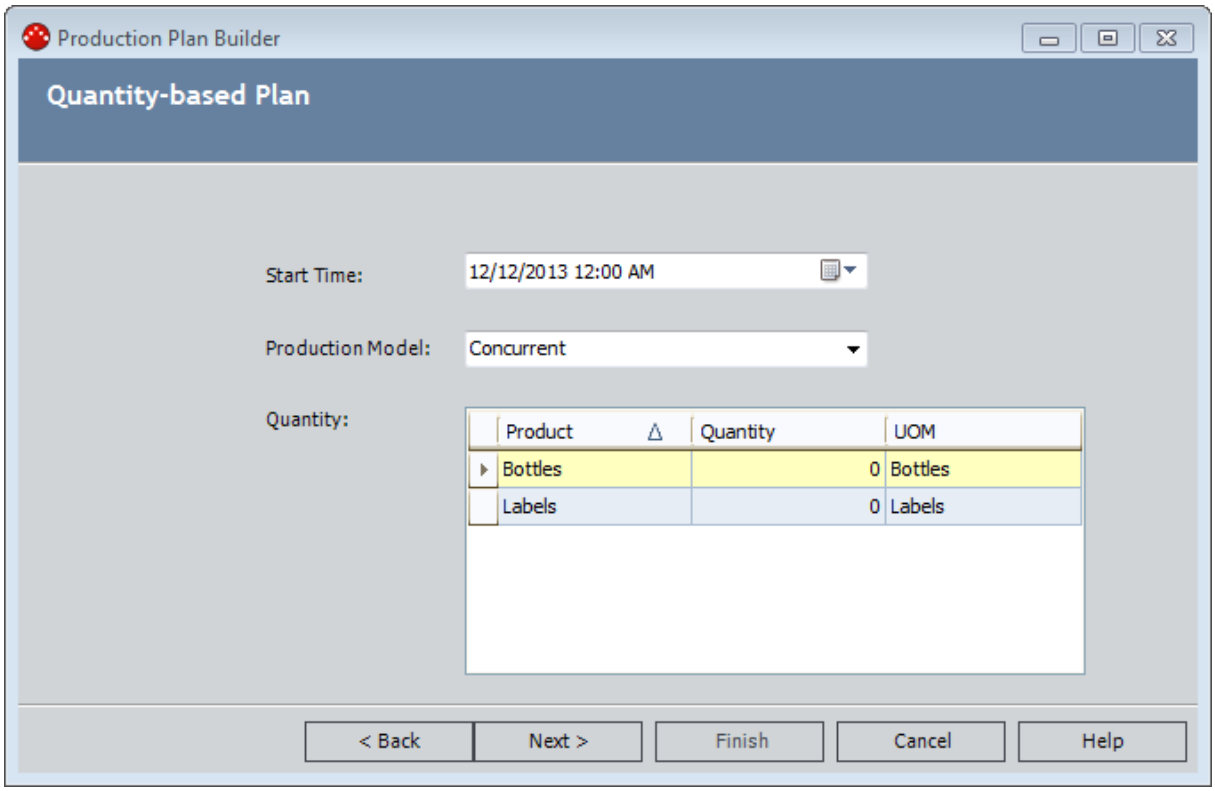
5. Click the **Next** button.

   The **Time-based Plan** screen or **Quantity-based Plan** screen appears, depending upon your selection in step 4.

   Time-Based Plan screen:



Quantity-Based Plan screen:



6. If you are creating a *time-based plan*:
    a. In the **Start Time** cell, type or select the date on which the plan begins.
    b. In the **End Time** cell, type or select the date on which the plan ends.
    c. In the **Production Model** list, select the option that describes how the unit produces the products that you selected on the **Select Products** screen. You can select either of the following options:
        - **Concurrent:** The unit produces the products at the same time.
        - **Sequential:** The unit produces the first product first, and it begins producing the second product after production of the first product is complete.

    Note: The **Production Model** list is disabled if you are producing only one product during this plan.

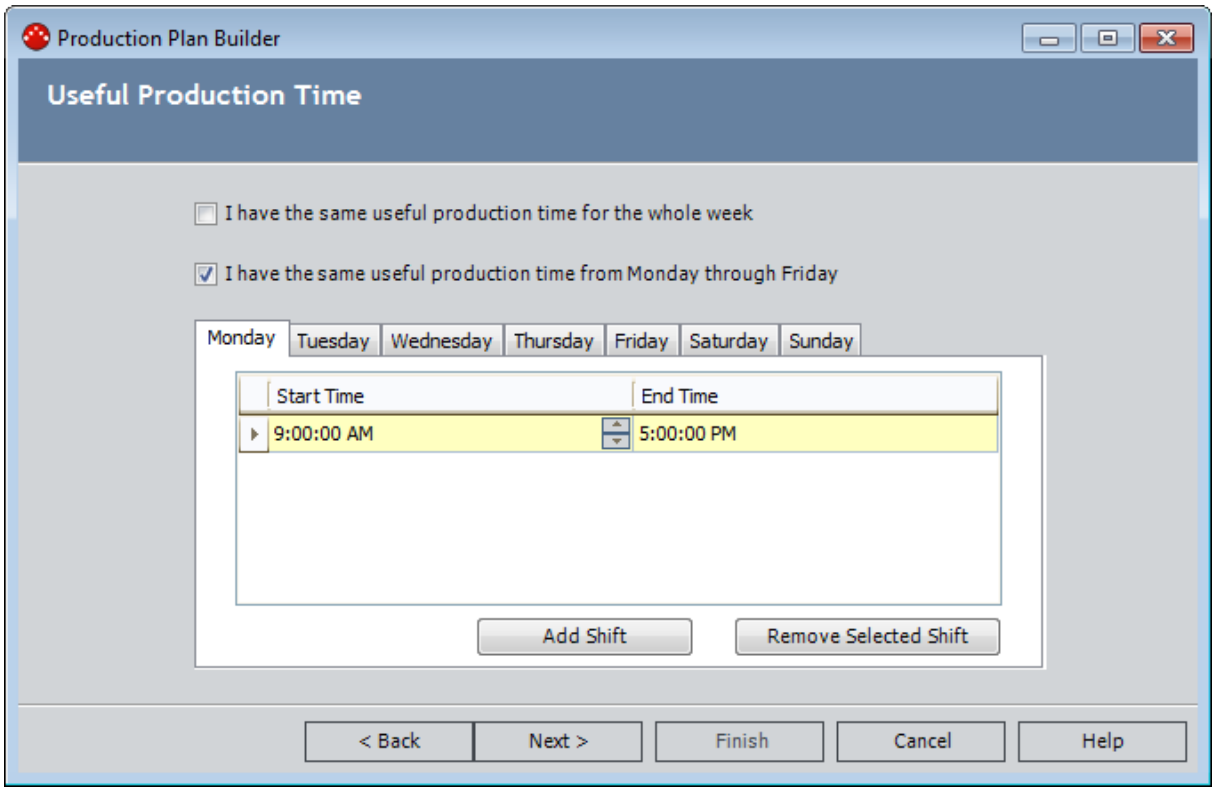
    -or-

    If you are creating a *quantity-based plan*:
    a. In the **Start Time** cell, type or select the date on which the plan begins.
    b. In the **Production Model** list, select the option that describes how the unit produces the products that you selected on the **Select Products** screen. You can select either of the following options:
        - **Concurrent:** The unit produces the products at the same time.
        - **Sequential:** The unit produces the first product first, and it begins producing the second product after production of the first product is complete.

    Note: The **Production Model** list is disabled if you are producing only one product during this plan.

    c. In the **Quantity** grid, in the **Quantity** cell for each row, type the amount of that product that you plan to produce. If the unit produces multiple products, you can also sort them using the **Product** column to change the order in which each product will be produced.
7. When you are finished defining the plan details, click the **Next** button.

    The **Useful Production Time** screen appears.

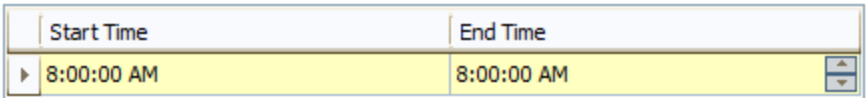


You can use this screen to define the hours each day that you produce the specified products. By default, the builder assumes that Monday through Friday, your production hours are the same (9:00:00 A.M. to 5:00:00 P.M.). It also assumes that you do not produce anything on Saturdays or Sundays.

8. To refine the hours each day that you produce the specified products, on each tab, define your shifts as appropriate. If your shifts are the same Monday through Friday, you can leave the default check box selected and define the shift only for *Monday*. It will then be copied to Tuesday through Friday automatically. If, however, your shifts are the same every day of the week (including weekends), you can select the **I have the same useful production time for the whole week** check box. You can then define the shift only for *Monday*, and it will be copied to Tuesday through Sunday automatically.

   When defining shifts, note that:

   - If you run only one shift all day (24 hours a day), make the start time and end time the same, like this:

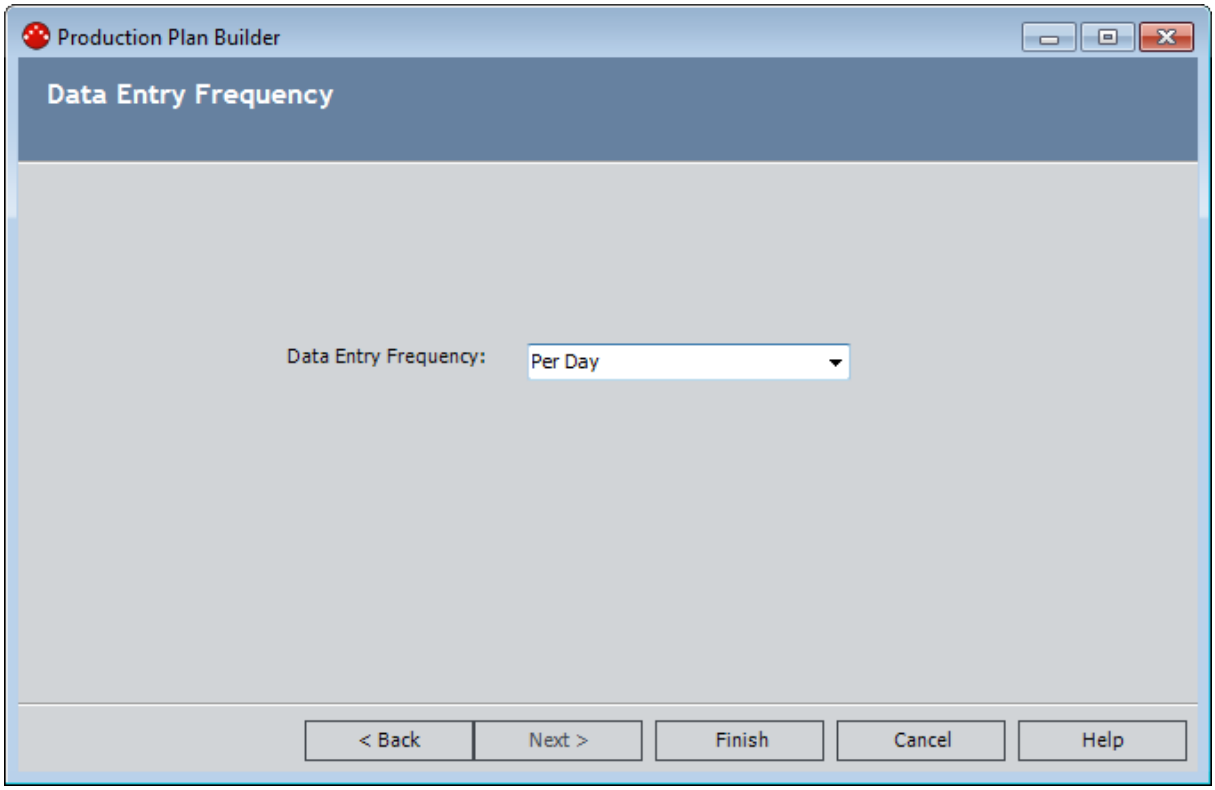


   - If you run multiple shifts per day, back to back, make the start date and time of the second shift match the end date and time of the previous shift, like this:

Start Time	End Time
8:00:00 AM	8:00:00 PM
8:00:00 PM	8:00:00 AM

9. When you are finished defining your shifts, click the **Next** button.

   The **Data Entry Frequency** screen appears.



   You can use this screen to define how often you enter production data and production loss information.

10. In the **Data Entry Frequency** list, select the frequency by which you enter production data and loss information.

    Note: If you want to enter production data only *once* over the course of the entire plan period, select ***Campaign***.

11. Click the **Finish** button.

    The plan is generated and appears on the **Manage Production Plans** page.

Deleting Production Plans

To delete a Production Plan:

1. On the Manage Production Plans page, in the **Production Plans** pane, select the production plan that you want to delete.
2. Below the pane, click the **Delete Selected Plan** button.

   A message appears, asking if you are sure you want to delete the production plan.
3. Click the **Yes** button.

   The production plan is deleted.

About Production Events

A *production event* is any event that results in reduced production output, such as:

- An equipment failure.
- An intentional reduction in production output as the result of some condition (e.g., lack of demand for the product).
- User error in operating the piece of equipment.
- Holidays requiring a facility shutdown.
- Loss of employees (i.e., due to vacation days or employee termination).

When an event occurs that causes you to produce less output than you had planned, you can record the event in a *Production Event* record. In the Production Event record, you can identify:

- **The piece of equipment that caused the event.**

  To do so, you will use the Causing Asset field. The Production Event record will be linked to an Equipment record that represents the piece of equipment that caused the event. Not all production events will be associated with a piece of equipment. For example, if several employees take a vacation day on the same day and you are, therefore, unable to produce the maximum amount of product, the production event is not associated with any specific piece of equipment.

- **Work History records that include details about work that was performed as a result of the event.**

  To do so, you will use the Work History Link field. The Production Event record will be linked to the selected Work History records. Not all production events will be associated with a Work History record. For example, if the event has not resulted in a work order yet, no Work History records will exist to define the work that was performed as a result of the event.

The Causing Asset and the Work History linked to an event allows you to determine the Cost of Unreliability. With the hierarchical reference, you can view the losses and cost of losses in conjunction with the maintenance cost data.

- **The production unit in which the event occurred.**

  To do so, you will use the Source Unit field. The Production Event record will be linked to the selected Production Unit record.

- **The type of event.**

  To do so, you will use the Production Event Code field. The Production Event record will be linked to the selected Production Event Code record.

You can view a list of all Production Event records that exist in the database on the **Production Event Management** page.

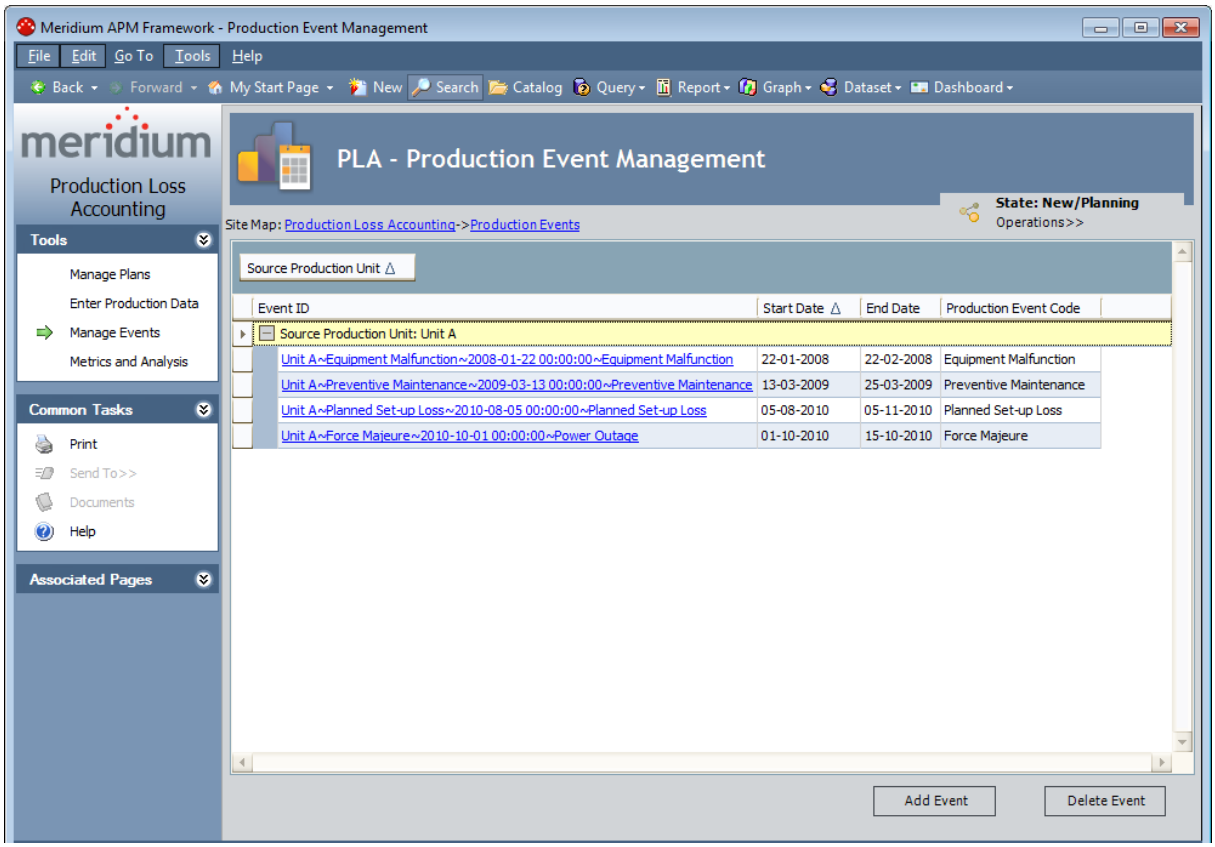
As you enter production data on a daily basis, if any day results in reduced production output, you can enter the amount of production that was lost and identify the production event that caused the loss.

Accessing the Production Event Management Page

To access the Production Event Management page:

- On the **PLA Start Page**, click the **Production Event Management** link.

  The **Production Event Management** page appears.

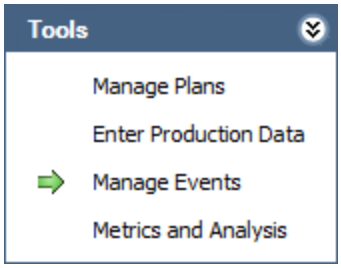


Aspects of the Production Event Management Page

The **Production Event Management** page contains the following items:

- **Task menu pane:** Contains the following task menus:
  - **Tools** menu
  - **Common Tasks** menu
  - **Associated Pages** menu
- **PLA - Production Event Management workspace:** Contains the following items:
  - A grid that displays a row for each Production Event record that exists in the database.
  - The **Add Event** button.
  - The **Delete Event** button.

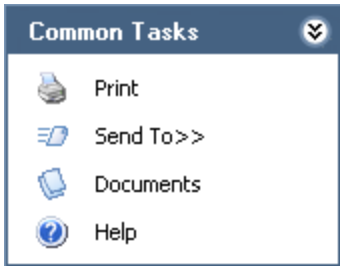
Tools



The **Tools** menu on the **Production Event Management** page contains the following links:

- **Manage Plans:** Displays the **Find Production Unit** window, where you can search for the Production Unit record whose production plans you want to manage on the **Manage Production Plans** page.
- **Enter Production Data:** Displays the **Find Production Plan** window, where you can search for the Production Plan record that you want to use to build the data that will appear on the **Production Data Entry** page.
- **Manage Events:** Displays the **Production Event Management** page. A green arrow appears to the left of this link when you are viewing this page.
- **Metrics and Analyses:** Displays the **Production Analysis** page.

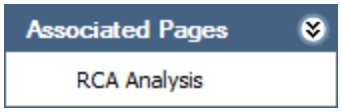
Common Tasks Menu



The **Common Tasks** menu on the **Production Event Management** page contains the following links:

- **Print:** Displays the **Preview** window, which shows a preview of how the grid will be printed. From the **Preview** window, you can select print options and print the record.
- **Send To:** Displays a submenu with options that let you provide a link to the current page on your desktop (create shortcut), in an email message, or on a Home Page.
- **Documents:** Displays the **Reference Documents** window, where you can manage Reference Document records for the Production Event record that is currently selected in the grid.
- **Help:** Displays the context-sensitive Help topic for the **Production Event Management** page.

Associated Pages Menu



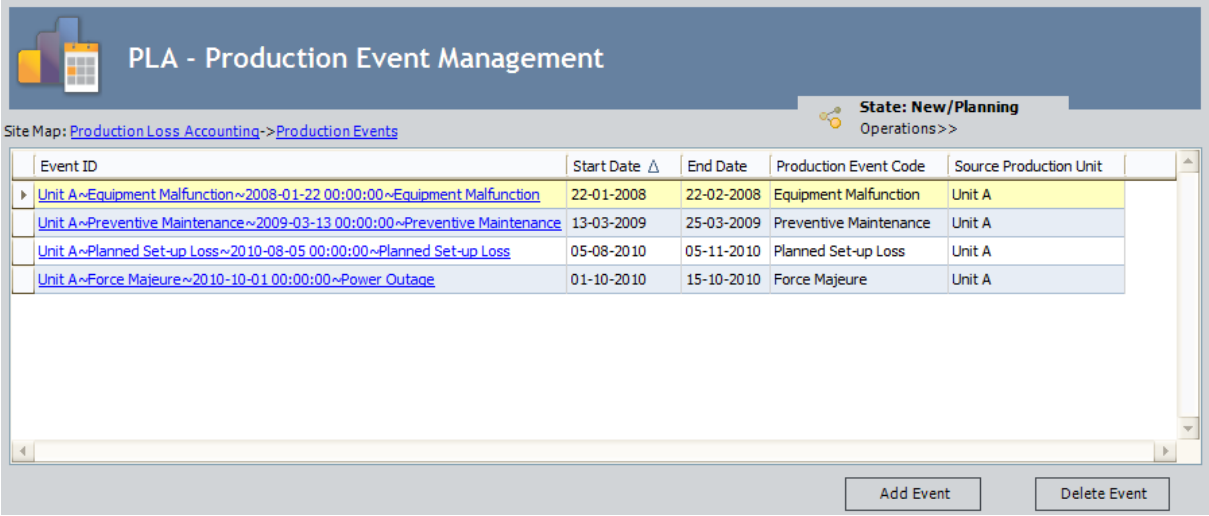
The **Associated Pages** menu on the **Production Event Management** page displays links only if Associated Pages have been configured for the Production Event family. If no Associated Pages have been configured for the Production Event family, the **Associated Pages** menu will be empty.

In the baseline database, the **RCA Analysis** link appears by default.

Note: If the Root Cause Analysis module is not active, the following error appears when you click the link: *Named resource (RCA/AnalysisBuilder) not found.*

PLA - Production Event Management Workspace

The **Production Event Management**workspace displays the results of the AllProductionEvents query, which is stored in the following Catalog folder: \\Public\Meridium\Modules\PLA\Queries.



The **PLA - Production Event Management** workspace contains the State: <Current State> button that allows you to manage the states for a Production Event record. It also contains a grid that displays a row for each Production Event record that exists in the databases. In the baseline database, the grid contains the following columns:

- Event ID
- Start Date
- End Date
- Production Event Code
- Source Production Unit

Below the grid are the following buttons:

- **Add Event:** Displays the **~ ~ (new Production Event)** window, which displays a blank Production Event datasheet.
- **Delete Event:** After asking for confirmation, deletes the selected Production Event record.

About Creating Production Event Records

You can create a Production Event record from the following pages:

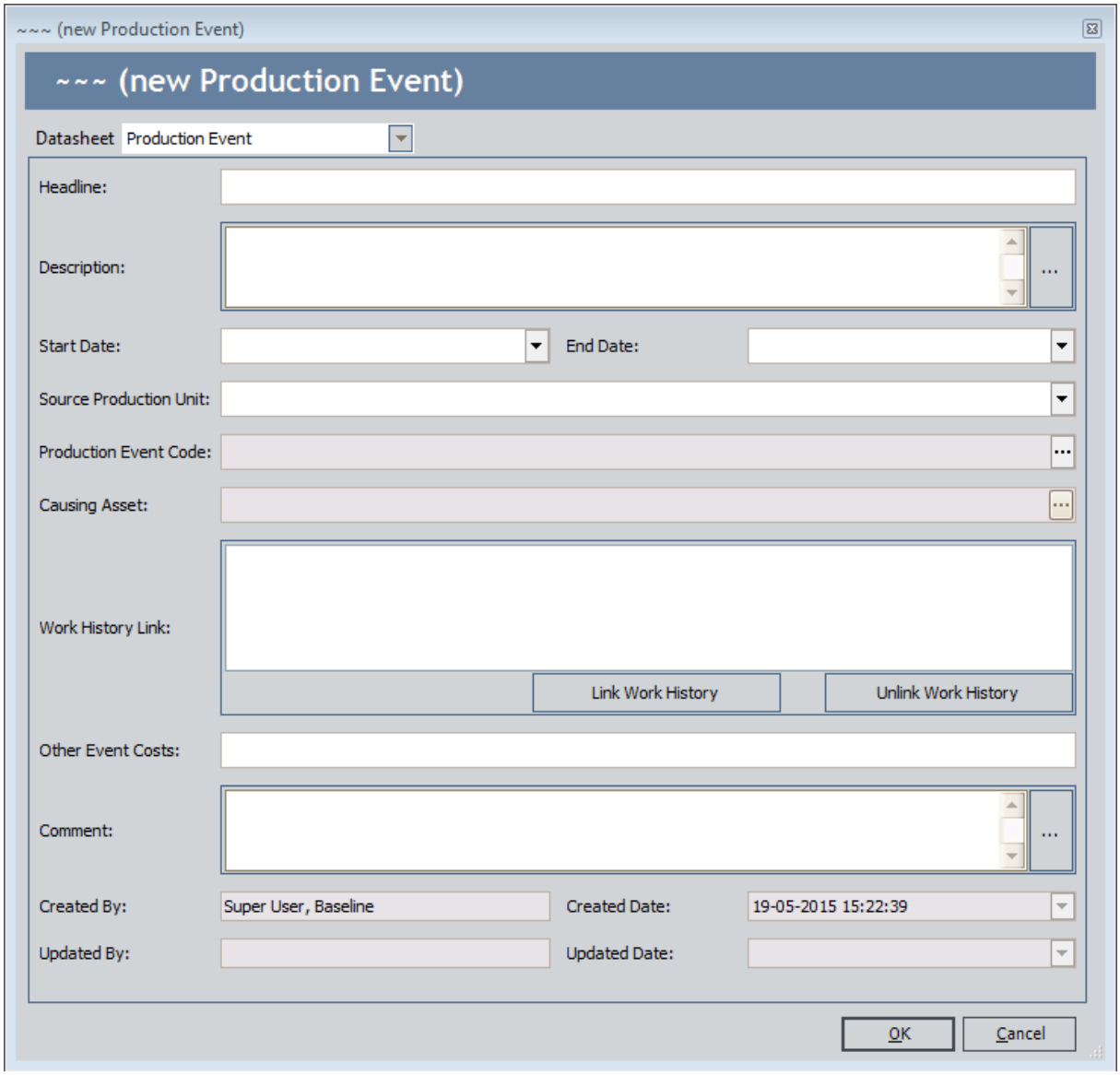
- The **Production Event Management** page. This option is useful if you want to record a production event for historical record-keeping purposes. After the Production Event record exists, it can be associated with daily production losses via the **Production Data Entry** page.
- The **Production Data Entry** page. This option is useful if you want to associate a daily production loss with a production event that does not have a corresponding Production Event record yet. Instead of navigating back to the **Production Event Management** page to create the corresponding record, you can create the Production Event record directly from the **Production Data Entry** page.

Creating a Production Event Record from the Production Event Management Page

To create a Production Event record from the Production Event Management page:

1. On the Production Event Management page, below the grid, click the **Add Event** button.

   The **~ ~ (new Production Event)** window appears.



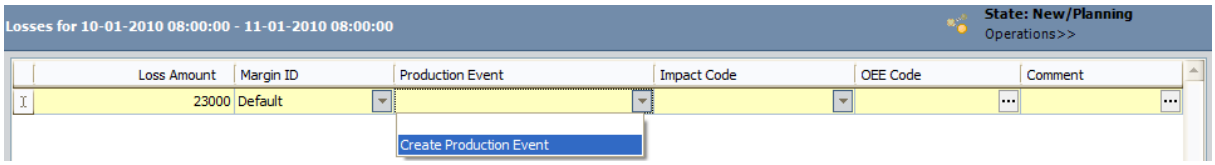
2. Enter data into the fields as desired.
3. When you are finished completing the fields, click **OK**.

   The Production Event record is saved.

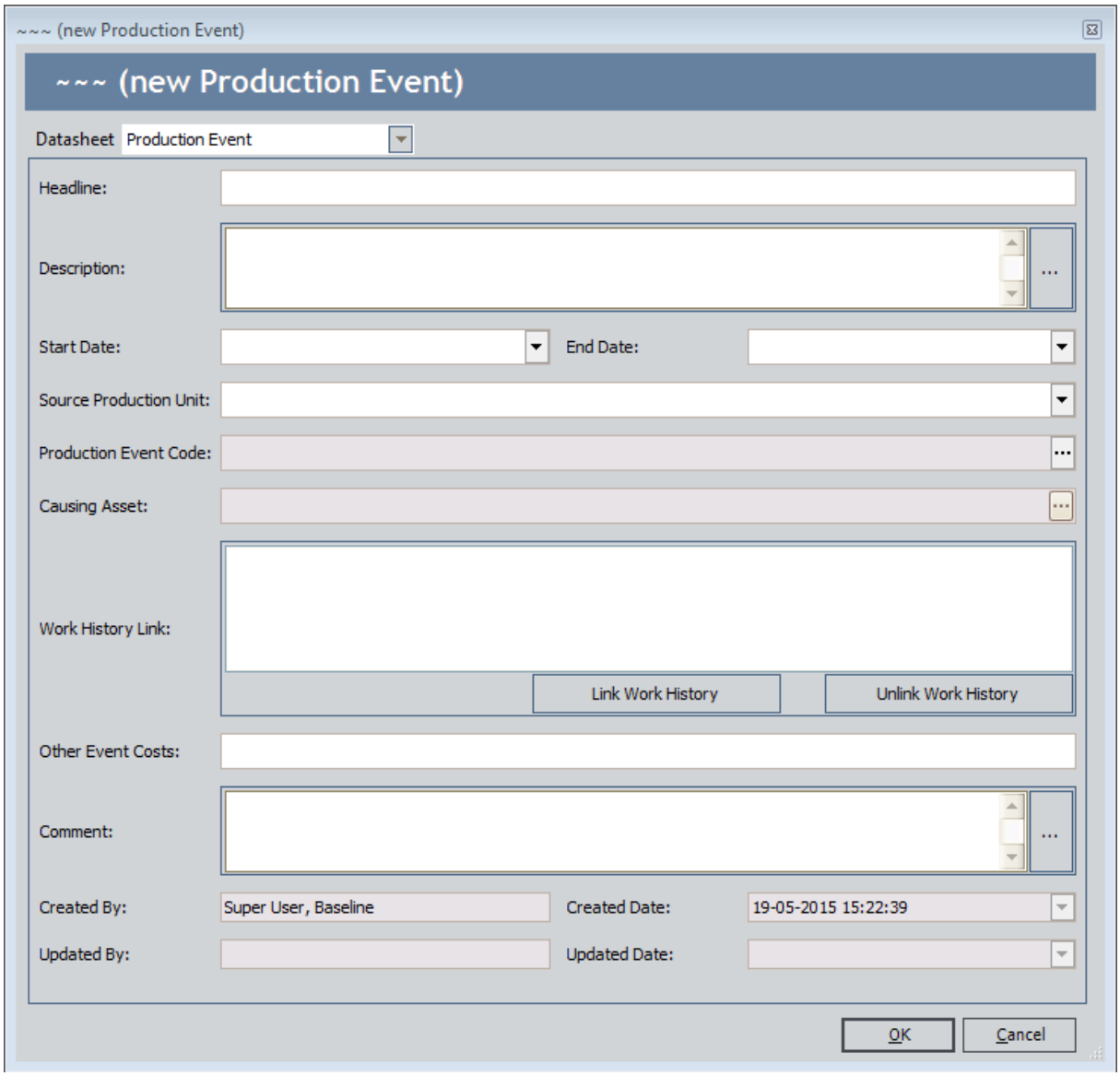
Creating a Production Event Record from the Production Data Entry Page

To create a Production Event record from the Production Data Entry page:

1. Access the **Production Data** tab of the Production Data Entry page.
2. In the grid in the **Production Data** section, select the row representing the day whose loss you want to associate with a new production event.
3. Below the grid, in the **Losses** section, select the row containing the loss that you want to associate with a new production event.
4. In the selected row, in the **Production Event** cell, expand the list, and select *Create Production Event*, as shown in the following image.



The **~ ~ (new Production Event)** window appears.



5. Enter data into the fields as desired.
6. When you are finished completing the fields, click **OK**.

Note: You will be able to associate the Production Loss with the Production Event *only* if the date of Production Loss falls within the date range of the Production Event. If you specified a date range that does not include the day that is represented by the selected row in the **Production Data** section, when you click **OK**, a message will appear, indicating that the date range is not valid for that day. You can click **OK** on the message box to continue creating the Production Event record, but it will not be associated with the selected loss. It will appear, however, on the **Production Event Management** page.

The Production Event record is saved, and its Record ID appears in the **Production Event** list.

Note: After creating a Production Event record, you can modify the Production Event record from the **Production Data Entry** page. To do so, in the **Production Event** cell that you want to modify, right-click and select the **Edit Event** option. Modify the data in the fields as desired. You *cannot* modify the Production Event record if the Production Event record is in *Approved* state.

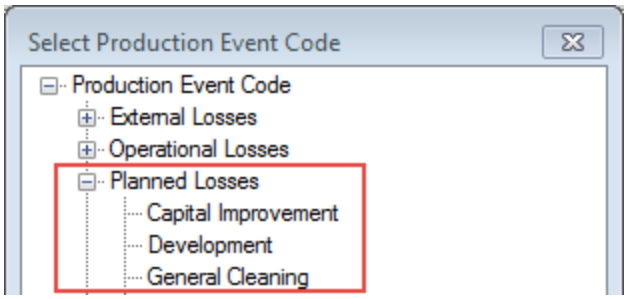
About Relationships Involving Production Event Code Records

When you create a Production Event record, on the datasheet, you can click the ··· button in the **Production Event Code** cell to select the Production Event Code record that most accurately represents the type of event that the Production Event record represents. Likewise, when you create a Production Event Template record, you can click the ··· button in the Production Event Code cell to select the Production Event Code record that most accurately represents the type of events that will be created automatically from that Production Event Template record.

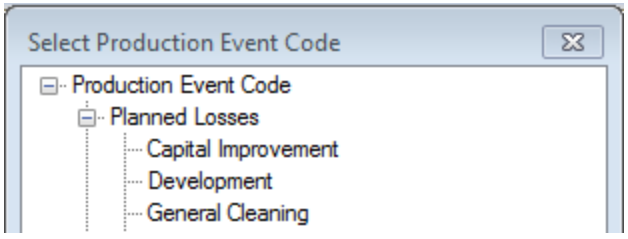
On the Production Event datasheet, if you select a Production Unit in the **Source Production Unit** cell and the Production Unit is associated with one or more Production Event Code records, *only* those Production Event Code records will appear when you click the ··· button in the **Production Event Code** cell.

Note: *Only* a PLA Administrator can define the Production Event Code records that are applicable to a Production Unit.

For example, suppose you selected *Unit A* record as the Production Unit, which is associated with the Production Event Code records as shown in the following image (highlighted in red outline):



In this case, on the Production Event datasheet, when you select the ··· button in the **Production Event Code** cell, only *Planned Losses* will appear in the list as shown in the following image:



On the Production Event datasheet, if you do not select a Production Unit or select a Production Unit that is not associated with any Production Event Code record, all the Pro-

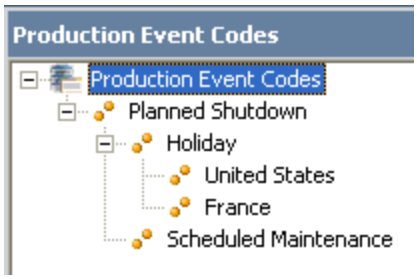
duction Event Code records available in the database appear when you click the ··· button in the **Production Event Code** cell.

When you save the Production Event or Production Event Template record, it will be linked automatically to:

- The selected Production Event Code record, using the Has Base Production Event Code relationship.
- The selected Production Event Code record, using the Has Production Event Code relationship.
- All Production Event Code records that categorize the selected Production Event Code record, using the Has Production Event Code relationship.

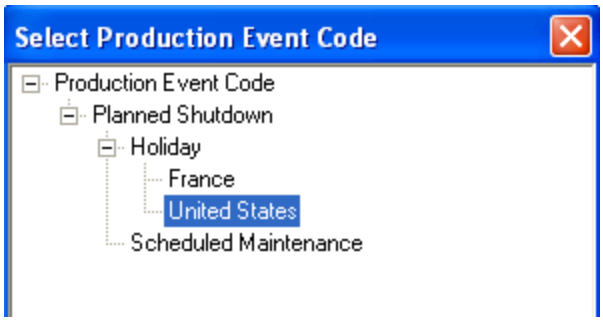
In other words, the new Production Event or Production Event Template record will always be linked to one and only one Production Event Code record through the Has Base Production Event Code relationship and the Has Production Event Code relationship. Depending upon how that Production Event Code record is categorized, the new Production Event or Production Event Template record might *also* be linked to multiple additional Production Event Code records through the Has Production Event Code relationship.

For instance, consider the following Production Event Code records, as they appear in the **Production Event Codes** pane on the **Production Event Coding** page:

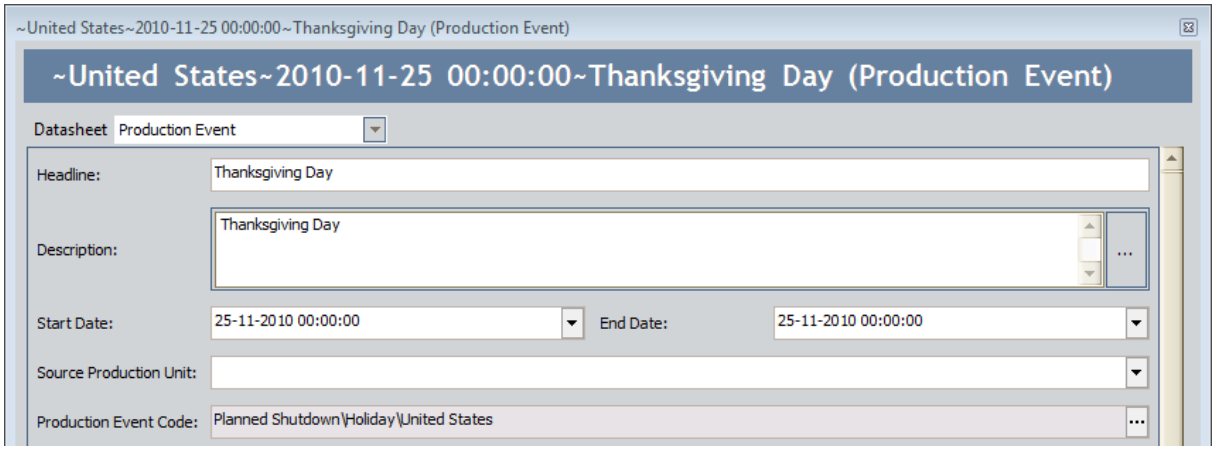


In this image, you can see that the Production Event Code record *Planned Shutdown* is a category that contains two subcategories: *Holiday* and *Scheduled Maintenance*. Likewise, the Production Event Code record *Holiday* is also a category containing a subset of categories: *United States* and *France*.

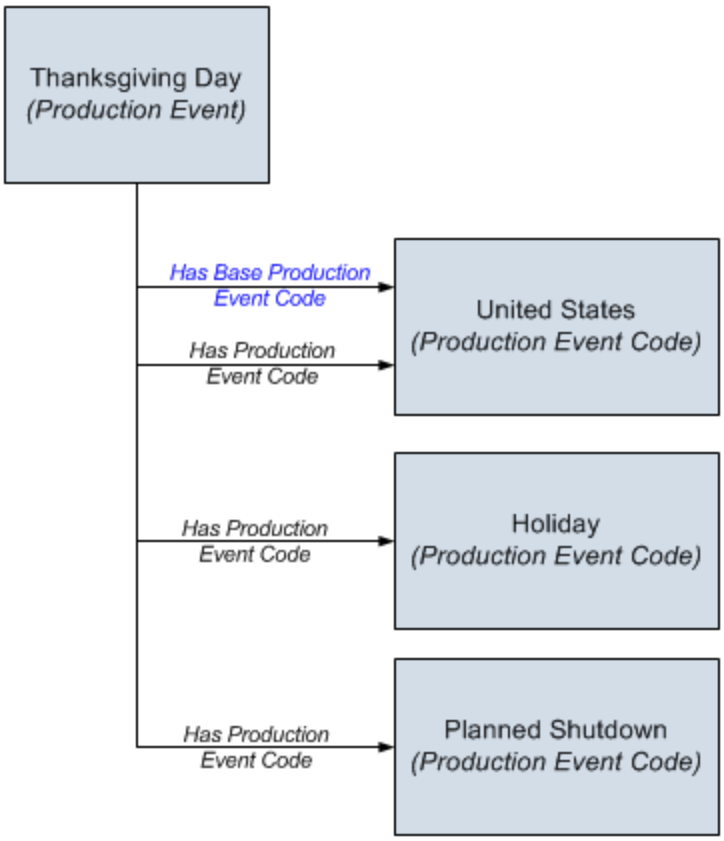
Suppose that you create a Production Event record to track a planned shutdown due to the United States holiday of Thanksgiving Day. In this case, when you create the Production Event record, in the **Production Event Code** cell, you would click the ··· button and select *United States* as the type of event, as shown in the following image.



You would probably use the Headline and Description fields to indicate that the holiday is Thanksgiving Day, so the Production Event record would look something like this:



Based upon this example, the following records and links would be created, where the *Has Base Production Event Code* relationship is colored blue to help you easily identify it.


Thanksgiving Day
(Production Event)
Has Base Production Event Code
Has Production Event Code
United States
(Production Event Code)
Has Production Event Code
Holiday
(Production Event Code)
Has Production Event Code
Planned Shutdown
(Production Event Code)

Deleting a Production Event Record

To delete a Production Event record:

1. On the **Production Event Management** page, in the grid, select the Production Event record that you want to delete.
2. Below the gird, click the **Delete Event** button.

   A message appears, asking if you are sure that you want to delete the record.
3. Click the **Yes** button.

   The Production Event record is deleted.

Creating an RCA Analysis from PLA

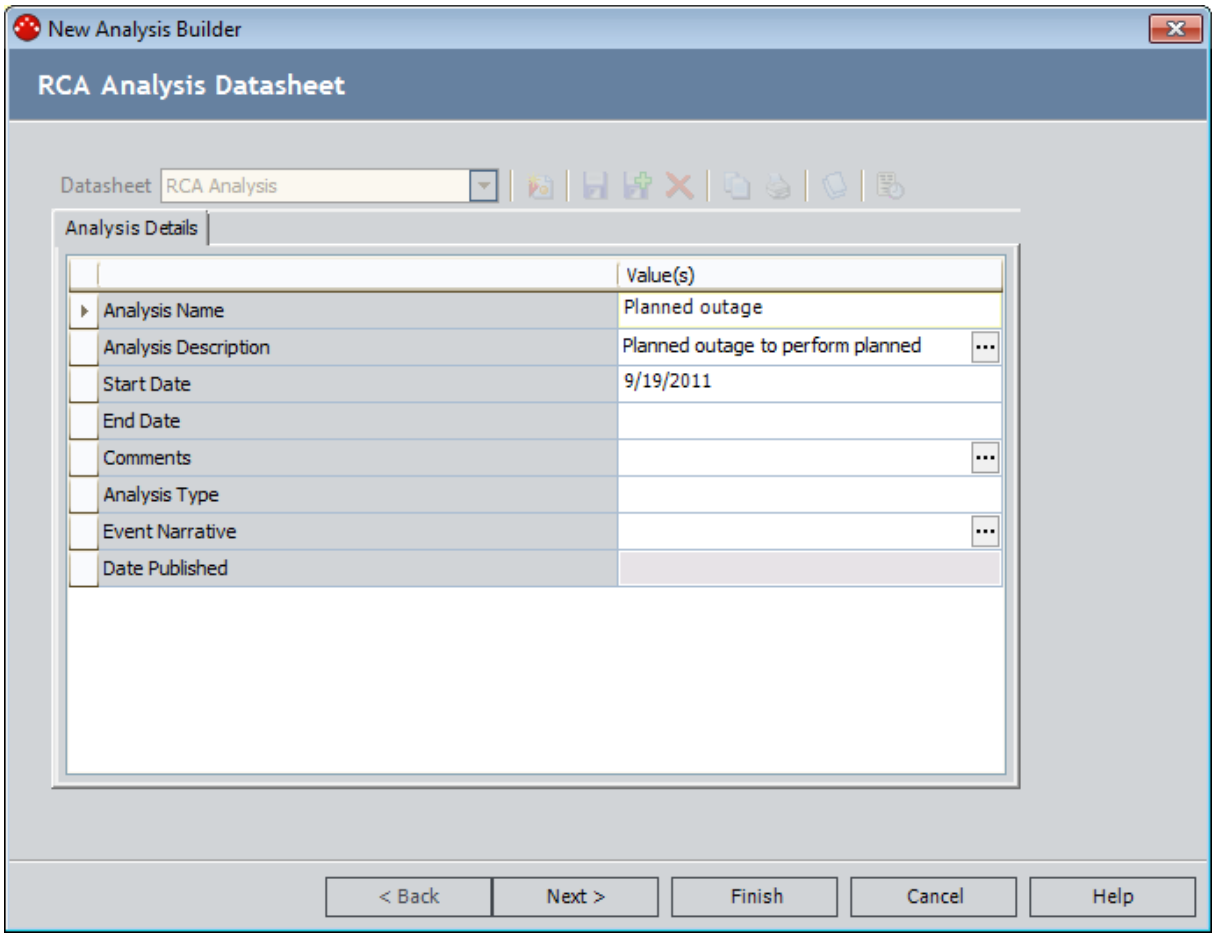
IMPORTANT: You can create an RCA from PLA only if the license for Root Cause Analysis is active.

To create an RCA Analysis from PLA:

1. Access the **Production Event Management** page.
2. In the grid, select the row containing the Production Event record that you want to use to create an RCA Analysis.
3. On the **Associated Pages** menu, click the **RCA Analysis** link.

   Note: The **RCA Analysis** link will appear on the **Associated Pages** menu only if the Root Cause Analysis (RCA) module is active.

   The **New Analysis Builder** appears, displaying the **RCA Analysis Datasheet** screen.



4. Use the **New Analysis Builder** to complete the RCA Analysis.

The Production Event record and the RCA Analysis record are linked automatically. Note that several fields in the RCA Analysis record are populated automatically based on the values in the selected Production Event record.

Opening an RCA Analysis from PLA

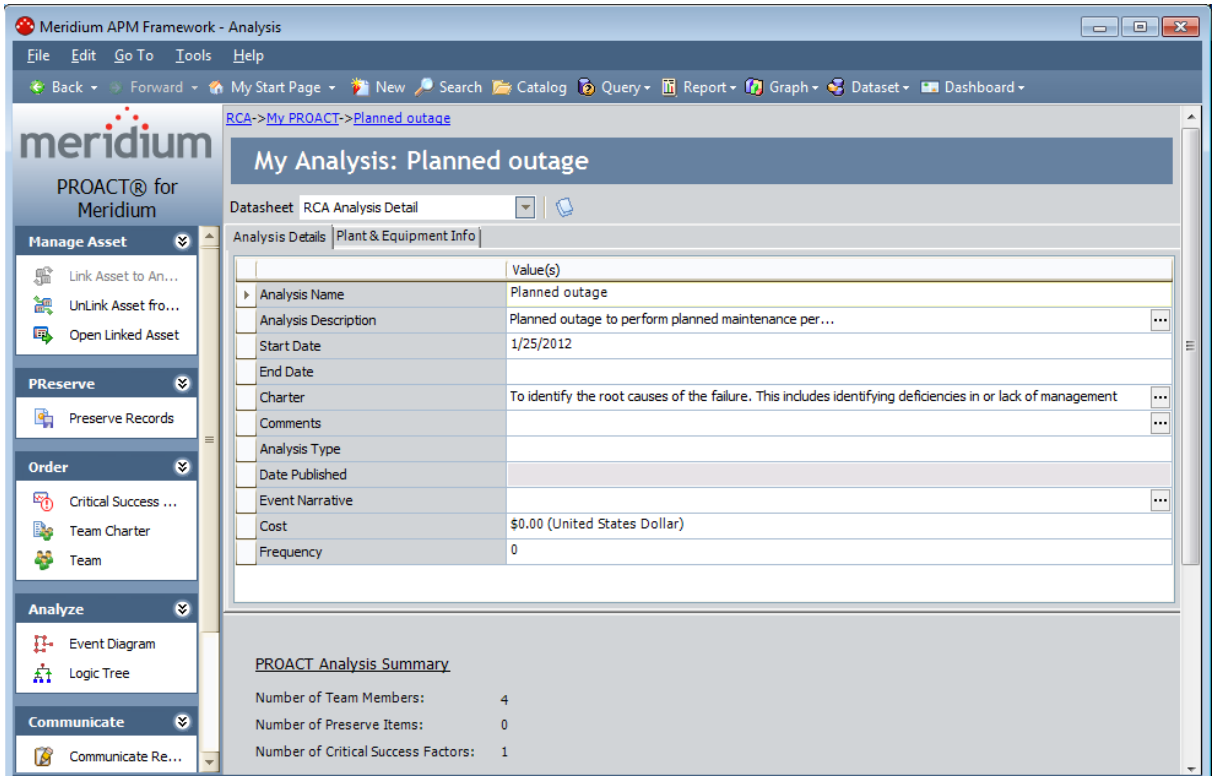
IMPORTANT: You can open an RCA from PLA only if the license for Root Cause Analysis is active.

A production event can be associated with only one RCA Analysis. After an RCA Analysis record is linked to a Production Event record, you can open the corresponding RCA Analysis from the **Production Event Management** page.

To open an RCA Analysis from the Production Event Management page:

1. On the **Production Event Management**page, in the grid, select the row containing the Production Event record that is linked to the RCA Analysis record whose corresponding RCA Analysis you want to open.
2. On the **Associated Pages** menu, click the **RCA Analysis** link.

   The **Analysis** page appears,displaying the datasheet for the RCA Analysis record to which the selected Production Event record is linked.



What Happens When you Create an RCA Analysis from PLA?

When you create an RCA Analysis from a Production Event record, several fields in the RCA Analysis record are populated automatically with the corresponding value in the Production Event record. The field mappings are listed in the following table.

Production Event Field	RCA Analysis Field
Headline	Analysis Name
Description	Analysis Description
Start Date	Start Date
Comments	Comments

Note: Each RCA Analysis record must have a unique value in the Analysis Name field. If there are multiple Production Event records that have the same value in the Headline field, in the first RCA Analysis record that is created from one of these Production Event records, the value in the Analysis Name field will be populated automatically as *<Production Event Headline>*. In the second RCA Analysis record that is created, the value in the Analysis Name will be field populated automatically as *<Production Event Headline> - 1*, and so on.

In addition, if the Production Event record is linked to an Equipment record and the Equipment and Location queries have been configured appropriately in the Root Cause Analysis module, the RCA Analysis record will be linked to that Equipment record. The Record ID of the Equipment record will appear in the **Asset** or **Location** text box, whichever appears, on the **Select an Asset** screen of the **New Analysis Builder**.

When you open the Logic Treein an RCA Analysis you created from a Production Event record, several fields in the RCA Event record will be populated automatically with the corresponding value in the Production Event record. You can modify these fields manually if needed. The field mappings are listed in the following table.

Production Event Field	RCA Event Field
Headline	Label
Description	Long Description
Start Date	Event Start Date
End Date	Event End Date

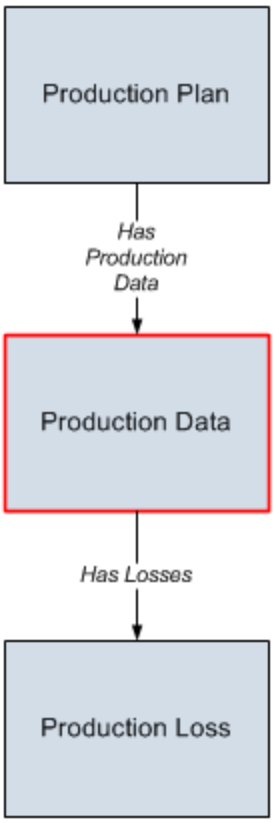
About Production Data

After you establish a production profile and create production plans against it, you are ready to start recording production data and accounting for any production losses. Using the **Production Data Entry** page, you can:

- Record production values.
- Record production losses.
- Associate any production losses with specific production events, impact codes, and OEE codes.

As you record the data, the information will be summarized automatically and displayed on the **Production Summary** tab of the **Production Data Entry** page.

Remember from the PLA data model that each Production Data record must be linked to a single predecessor Production Plan record and can be linked to multiple successor Production Loss records. The following image shows these relationships, where the arrows represent relationship families, and boxes represent entity families. The Production Data family is outlined in red.

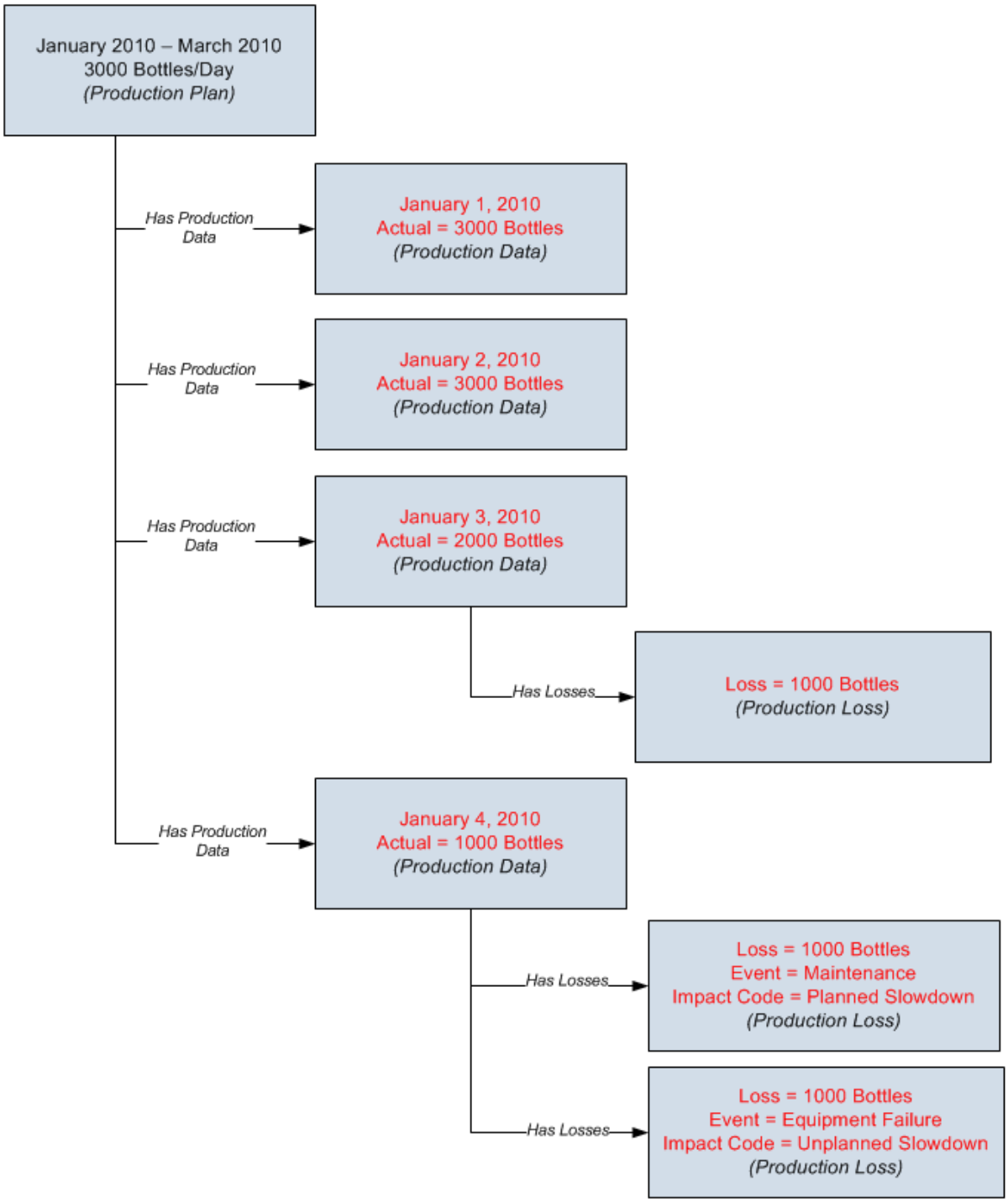


As you begin recording production data, the data is recorded in Production Data records. If you do not produce the planned amount in a given period, the Production Data record for that day can be linked to multiple Production Loss records that indicate

the amount of lost production, the production event that caused the loss, and the impact of the loss.

For example, suppose a production plan spans three months: January 2010 through March 2010. The planned production for each day is 3,000 bottles per day. On January 1 and January 2, you produce all 3,000 bottles, meeting the planned production. On January 3, however, you produce only 2,000 bottles. To account for the loss, you would create a Production Loss record and record the 1,000 bottles that were not produced. Now, suppose that on January 4, you again fail to meet the planned production. This time, you produce only 1,000 bottles due to an equipment failure and a scheduled maintenance activity. In this case, you would create *two* Production Loss records, where one documents 1,000 bottles that were not produced due to a maintenance activity, and the other documents 1,000 bottles that were not produced due to an equipment failure.

The following image illustrates the records and links that would be created in this scenario, where the arrows represent links and the boxes represent records.


January 2010 – March 2010
3000 Bottles/Day
(Production Plan)
Has Production Data
January 1, 2010
Actual = 3000 Bottles
(Production Data)
Has Production Data
January 2, 2010
Actual = 3000 Bottles
(Production Data)
Has Production Data
January 3, 2010
Actual = 2000 Bottles
(Production Data)
Has Losses
Loss = 1000 Bottles
(Production Loss)
Has Production Data
January 4, 2010
Actual = 1000 Bottles
(Production Data)
Has Losses
Loss = 1000 Bottles
Event = Maintenance
Impact Code = Planned Slowdown
(Production Loss)
Has Losses
Loss = 1000 Bottles
Event = Equipment Failure
Impact Code = Unplanned Slowdown
(Production Loss)

Accessing the Production Data Entry Page

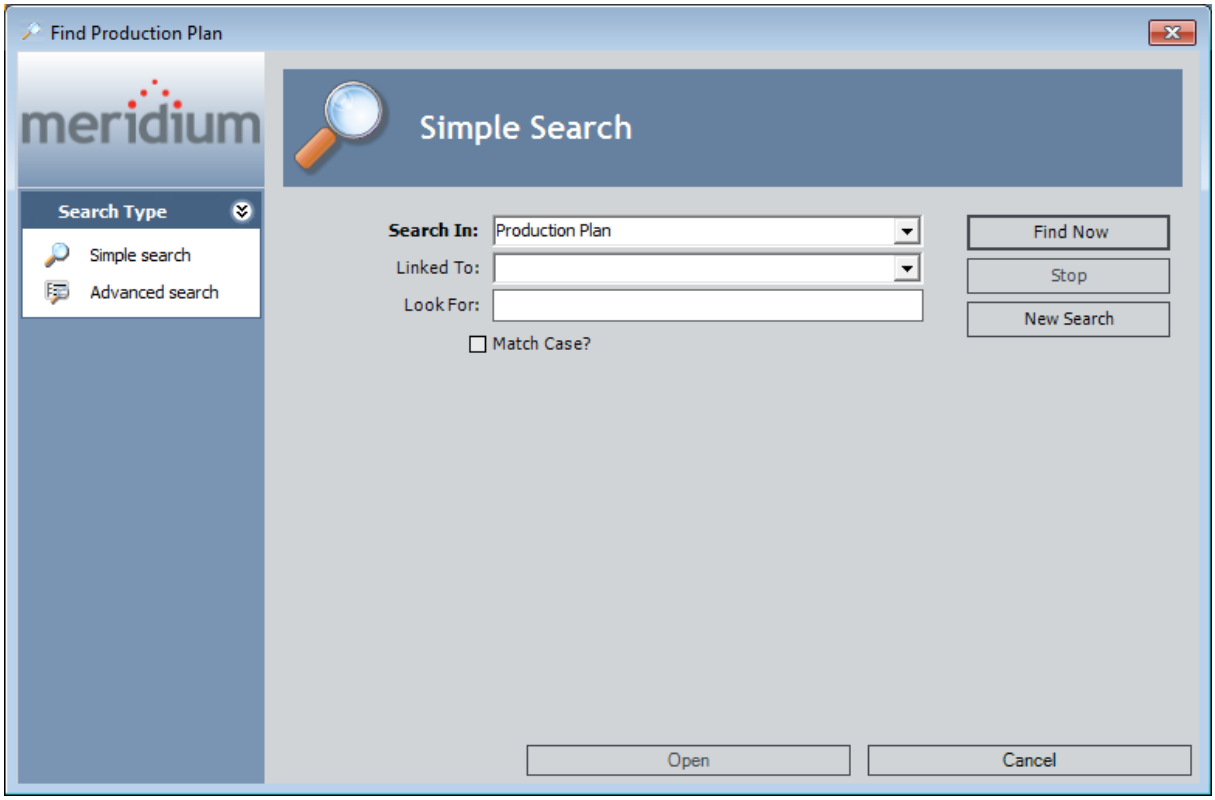
To access the Production Data Entry page:

1. On the **PLA Start Page**, click the **Production Data Management** link.

   -or-

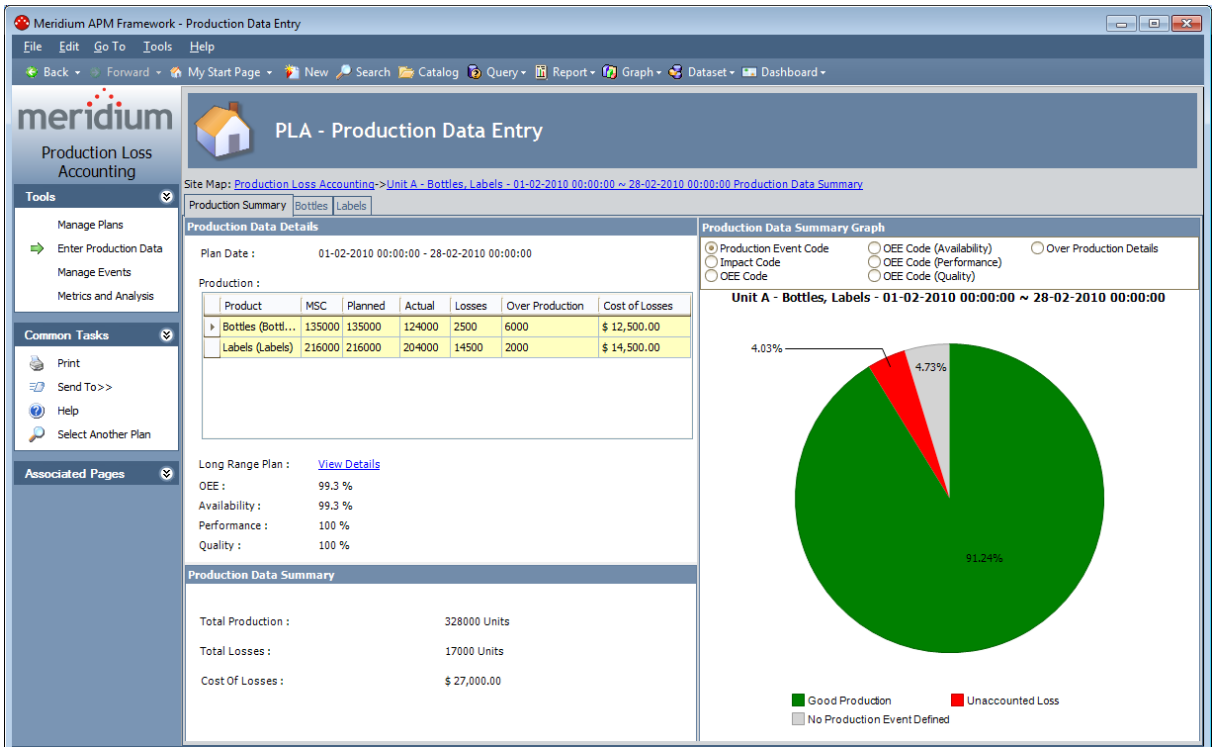
   On the **Tools** menu, click the **Enter Production Data** link.

   The **Find Production Plan** window appears, displaying the **Simple Search** workspace. The value in the **Search In** list is set to *Production Plan* by default. You cannot select a different value.



2. If desired,refine the search criteria.
3. When you are finished defining the search criteria, click the **Find Now** button.
4. In the search results list, select the Production Plan record that represents the plan for which you want to record production data, and click the **Open** button.

   The Production Data Entry page appears.


Meridium APM Framework - Production Data Entry
File Edit Go To Tools Help
Back Forward My Start Page New Search Catalog Query Report Graph Dataset Dashboard
meridium
Production Loss Accounting
Tools
Manage Plans
Enter Production Data
Manage Events
Metrics and Analysis
Common Tasks
Print
Send To>>
Help
Select Another Plan
Associated Pages
PLA - Production Data Entry
Site Map: Production Loss Accounting->Unit A - Bottles, Labels - 01-02-2010 00:00:00 ~ 28-02-2010 00:00:00 Production Data Summary
Production Summary
Bottles
Labels
Production Data Details
Plan Date : 01-02-2010 00:00:00 - 28-02-2010 00:00:00
Production :
Product MSC Planned Actual Losses Over Production Cost of Losses
Bottles (Bottl... 135000 135000 124000 2500 6000 $ 12,500.00
Labels (Labels) 216000 216000 204000 14500 2000 $ 14,500.00
Long Range Plan : View Details
OEE : 99.3 %
Availability : 99.3 %
Performance : 100 %
Quality : 100 %
Production Data Summary
Total Production : 328000 Units
Total Losses : 17000 Units
Cost Of Losses : $ 27,000.00
Production Data Summary Graph
Production Event Code
Impact Code
OEE Code
OEE Code (Availability)
OEE Code (Performance)
OEE Code (Quality)
Over Production Details
Unit A - Bottles, Labels - 01-02-2010 00:00:00 ~ 28-02-2010 00:00:00
4.03%
4.73%
91.24%
Good Production
Unaccounted Loss
No Production Event Defined

Aspects of the Production Data Entry Page

The **Production Data Entry** page contains the following items:

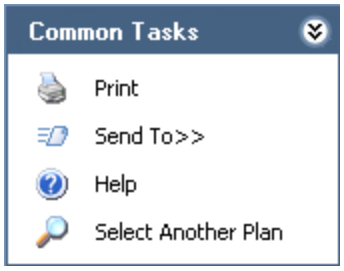
- **Task menu pane:** Contains the following task menus:
  - **Tools** menu
  - **Common Tasks** menu
  - **Associated Pages** menu
- **Production Summary tab:** Displays summary information about the data that appears on the production datatabs.
- **Production data tabs:** Allow you to enter production data and record losses.

Tools Menu

The **Tools** menu on the **Production Data Entry** page contains the following links:

- **Manage Plans:** Displays the **Find Production Unit** window, where you can search for the Production Unit record whose production plans you want to manage on the **Manage Production Plans** page.
- **Enter Production Data:** Displays the **Find Production Plan** window, where you can search for the Production Plan record that you want to use to build the data that will appear on the **Production Data Entry** page. A green arrow appears to the left of this link when you are viewing this page.
- **Manage Events:** Displays the **Production Event Management** page.
- **Metrics and Analyses:** Displays the Metrics & Analysis page.

Common Tasks Menu



The **Common Tasks** menu on the **Production Data Entry** page contains the following links:

- **Print:** Displays the **Preview** window, which shows a preview of how the page will be printed. From the **Preview** window, you can select print options and print the record.
- **Send To:** Displays a submenu with options that let you provide a link to the current page on your desktop (create shortcut), in an email message, or on a Home Page.
- **Help:** Displays the context-sensitive Help topic for the **Production Data Entry** page.
- **Select Another Plan:** Displays the **Find Production Plan** window, where you can search for the Production Plan record that you want to use to build the data that will appear on the current page.

Associated Pages Menu

The **Associated Pages** menu on the **Production Data Entry** page displays links only if Associated Pages have been configured for the Production Data family. If no Associated Pages have been configured for the Production Data family, the **Associated Pages** menu will be empty.

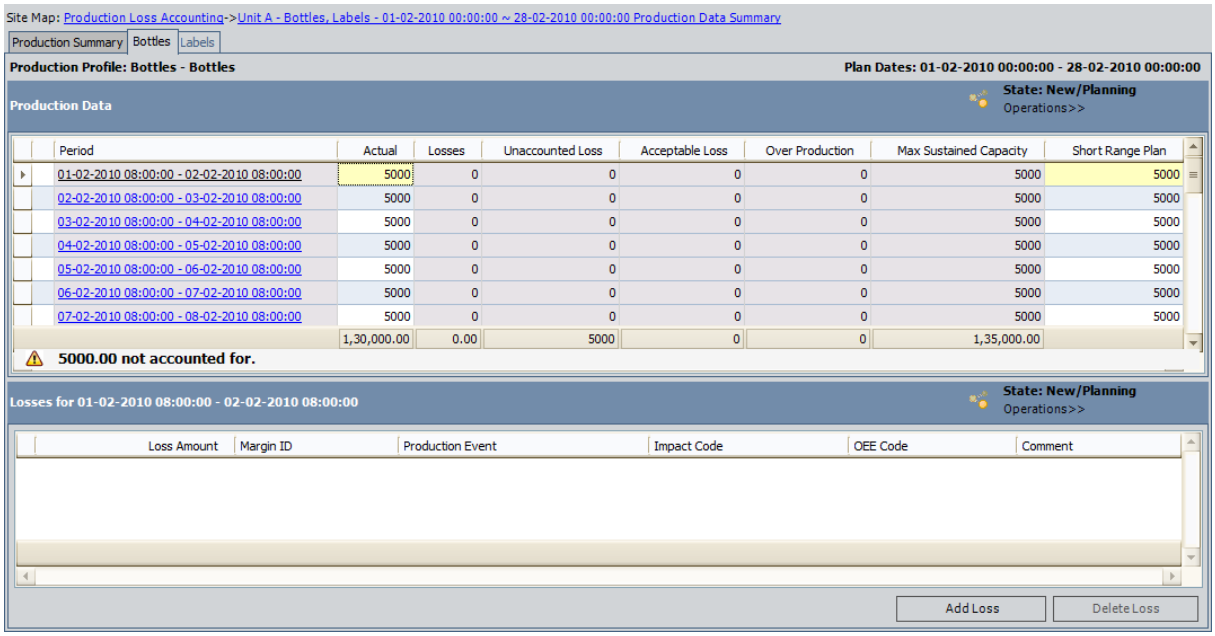
Aspects of the Production Data Tabs

On the Production Data Entry page, for each product that is associated with the production plan whose production data you are viewing, you will see a separate production data tab. For example, if you are viewing production data for a production plan that is responsible for producing bottles and labels, you will see two production data tabs:

- One for bottles
- One for labels

Each production data tab will be labeled according to the product name (e.g., *Bottles*).

The following image shows an example of a production data tab for *bottles*.



Each production data tab contains the following sections:

- **Production Data:**Contains a grid that allows you to enter actual production values and change the short range plan. Each row in the grid represents a Production Data record.
- **Losses for <Period>:**Contains a grid containing a row for each Production Loss record that is linked to the currently selected Production Data record. Each row in the grid represents a Production Loss record. Note that in the section label, **<Period>** is the value in the Period field in the Production Data record that is selected in the **Production Data** section. Throughout this documentation, however, this section is referred to as the ***Losses*** s*ection*.

As you make changes on a production data tab, the changes are saved automatically and are reflected on the Production Summary tab.

Production Data Section

The **Production Data** section on each production data tab contains the **State: <Current State>** button that allows you to manage the states for a Production Data record. It also contains a grid that allows you to enter actual production values and change the short range plan, if needed. Each row in the grid represents a Production Data record. Each time you access a production data tab, the number of rows will correspond to the number of periods (i.e., days or shifts) in the production plan, up to and including the current period. The grid contains the following columns, which display values from fields in the Production Data records:

- Period

  Note: The text in each **Period** cell is a hyperlink, which you can click to access the Production Data datasheet for that Production Data record.

- Actual
- Losses
- Unaccounted Loss
- Acceptable Loss
- Over Production
- Maximum Sustained Capacity
- Short Range Plan

You can modify the default display of the grid using the standardgrid-customization options, with the exception of the data grouping options (i.e., **Group By This Field** and **Group By Box**), which are not available.

The values in the **Acceptable Loss** and the **Unaccounted Loss** columns are *not* stored in the Production Data record and are for display purposes only.

The number that appears in each cell in the **Unaccounted Loss** column is calculated using the following equation:

Unaccounted Loss = Short Range Plan - Losses - Actual

Where **Short Range Plan**, **Losses**, and **Actual** are displayed in the same row as the **Unaccounted Loss** value.

For example, assume that the following values appear in a single row on the **Production Data** tab:

- Short Range Plan = 5,000
- Losses = 0
- Actual = 3,000

In this case, the value in the **Unaccounted Loss** column in that row will be calculated using the following equation:

Unaccounted Loss = 5,000 - 0 - 3,000

Unaccounted Loss = 2,000

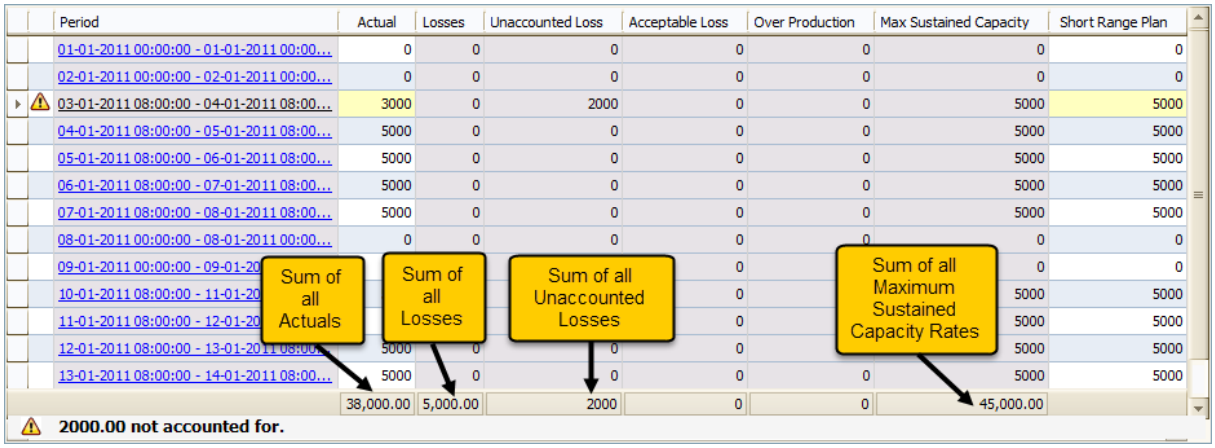
Note: The calculated unaccounted loss is displayed using the number of decimal places defined for the Display Precision setting, regardless of the number of decimal places in the underlying Short Range, Losses, and Actual values.

You can define a threshold value for loss that is acceptable by specifying a value in the **Acceptable Loss** dialog box in the **Settings** menu. If the Unaccounted Loss is less than or equal to the threshold value for the acceptable loss, the loss value will appear in the **Acceptable Loss** column. If the Unaccounted Loss is greater than the threshold value for the acceptable loss, the loss value will appear in the **Unaccounted Loss** column.

The threshold value for loss that is acceptable is calculated using the following equation:

Threshold value = (Value in Acceptable Loss dialog box X Short Range Plan)/100

In the above example, at the bottom of the grid below all columns except for **Short Range Plan**, you will see the sum of all values in that column, as shown in the following image.



Below the summary values, the following text appears, preceded by the ⚠ icon:

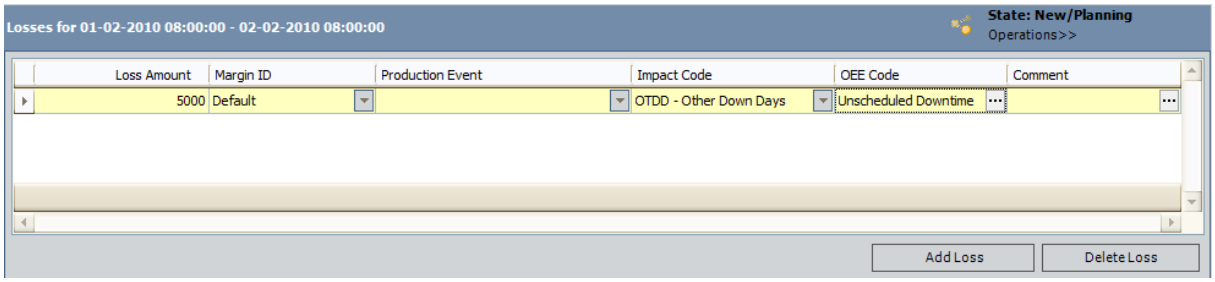
n not accounted for

Where **n** is the sum of unaccounted losses.

For example, using the preceding image, you can see that sum of all unaccounted losses is *2,000*. In this case, below the grid, you would see the following text:

After you add Production Loss records for all periods to account for all the losses, the text **n not accounted for** is replaced with **All losses accounted for**, as shown in the following image.

Losses Section



The **Losses** section on each production data tab contains the **State: <Current State>** button that allows you to manage the states for a Production Loss record. It also contains a grid containing a row for each Production Loss record that is linked to the currently selected Production Data record. The grid displays the following columns of information, which display values from fields in the Production Loss records:

- Loss Amount
- Margin ID
- Production Event
- Impact Code
- OEE Code
- Comment

You can modify the default appearance of the grid using the standardgrid-customization options, with the exception of the data grouping options (i.e., **Group By This Field** and **Group By Box**), which are not available.

The following buttons appear below the grid:

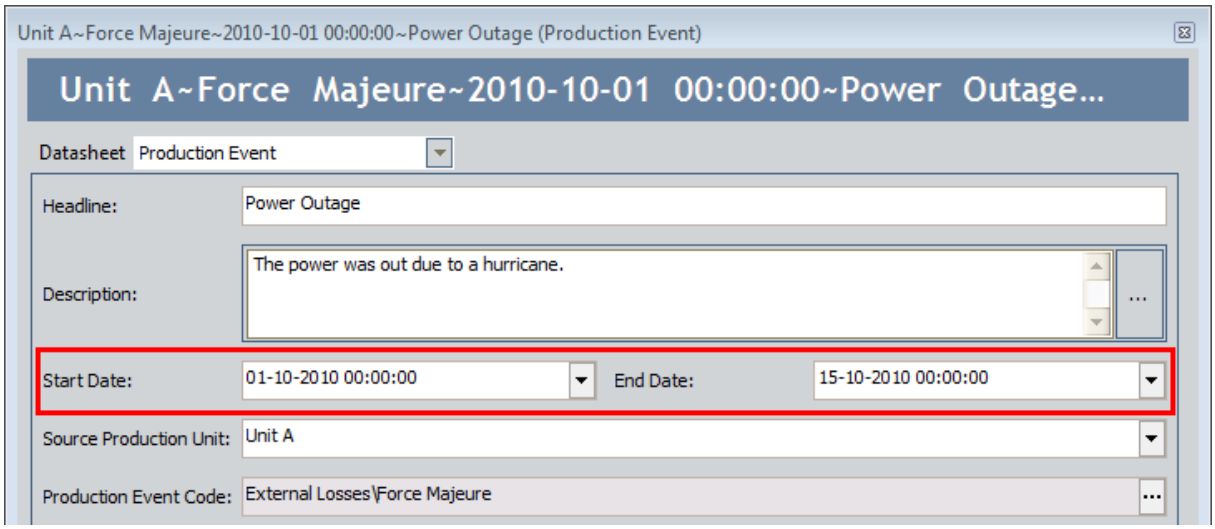
- **Add Loss:** Adds a new row to the grid, where you can account for a loss that occurred that period.
- **Delete Loss:** After asking for confirmation, deletes the selected Production Loss record.

About the Production Event List

On each production data tab, in the **Losses** section, the **Production Event** list displays the Record IDs of all the Production Event records that are returned by the EventList query, which is stored in the Catalog folder \\Public\Meridium\Modules\PLA\Queries.

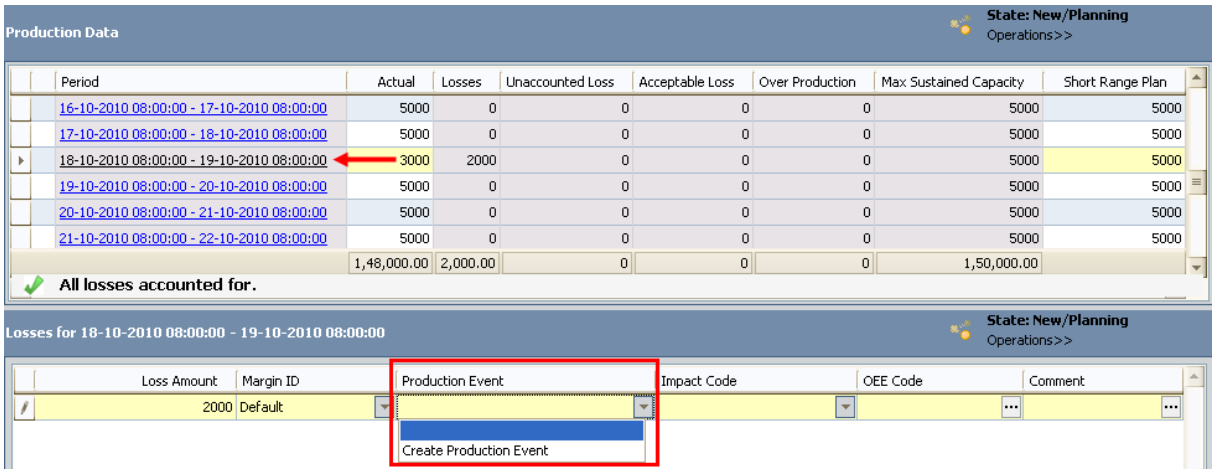
The EventList query returns the Record ID of all Production Event records whose date range includes the date in the Period field in the selected Production Data record (in the **Production Data** section). A Production Event record's date range is determined from the values in its Start Date and End Date fields.

For example, consider a Production Event record with a date range of 10/1/2010 to 10/15/2010. The following image shows the datasheet for this Production Event record. You can see that the date range is determined from the values in the Start Date and End Date fields.



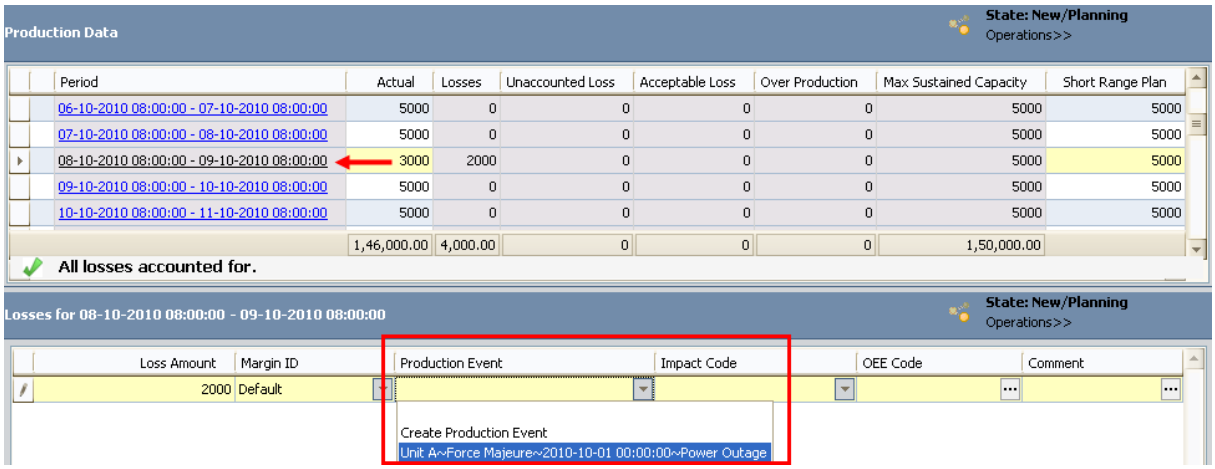
If you were recording a loss for 10/*18*/2010, you would not be able to associate the loss with this Production Event record because the date range of the production event (10/1 through 10/15) does not include 10/18/2010.

In the following image, you can see that the **Production Event** list for a loss associated with 10/18/2010 does not include the Record ID of this Production Event record.



Likewise, if you were recording a loss for 10/*8*/2010, you *would* be able to associate the loss with this Production Event record because the date range of the production event (10/1 through 10/15) *does* include 10/8/2010.

In the following image, you can see that the **Production Event** list associated with 10/8/2010 *does* include the Record ID of this Production Event record.



Note: If the Production Event record does not have a start date, its Record ID will appear in the **Production Event** list for losses that are associated with any day *before the end date*. Likewise, if the Production Event record does not have an end date, its Record ID will appear in the **Production Event** list for losses that are associated with any day *after the start date*.

About the Short Range Plan

When you create a Production Profile record, you define the amount of product that can be consistently produced by a production unit without having any adverse effects on the piece of equipment or location or the quality of the product. This value is stored in the *Maximum Sustained Capacity Rate* field in the Production Profile record.

When you create a production plan, with this value in mind, you can define the amount of product that you plan for that production unit to produce during a given time period. This value might be the same as the maximum sustained capacity rate, or it might be different based on your knowledge of planned events within the facility. For example, if you plan to shut down a production unit for maintenance, the planned production output for that production unit will be less than the maximum sustained capacity rate during the downtime.

When you access the **Production Data Entry** page for a production plan, on each production data tab, a row will be available for each period in the plan. Each row represents a separate Production Data record. In each row, the value in the **Short Range Plan** column is a copy of the *planned production value*.

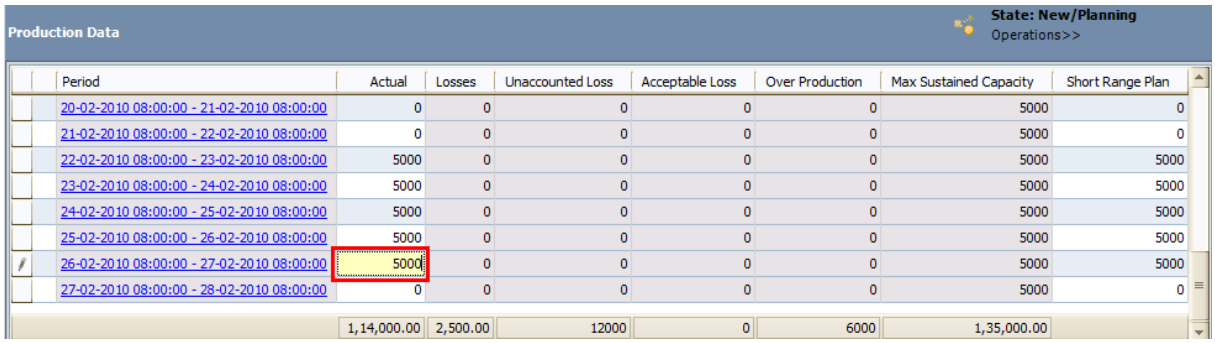
As you enter production values for a specific day, if needed, you can enter an adjusted planned production value based on significant events that occurred that day and could not have been predicted when the plan was created. For example, a planned maintenance is scheduled for 15 days. For those 15 days, you can reduce the planned production values. The adjusted value will be stored in the *Short Range Plan* field in the Production Data record. If the outage due to maintenance exceeds the specified 15 days, the production will incur unaccounted losses on first day after the end of specified 15 days.

Changing the Production Values

The following instructions explain how to change the production values for a given period in the production plan. If desired, you can also copy a production value from one period to another.

To change the production values:

1. Access the appropriate production data tab of the **Production Data Entry** page.
2. In the row representing the period whose production values you want to record, in the **Actual** cell, type the amount of product that you produced that period.



Period	Actual	Losses	Unaccounted Loss	Acceptable Loss	Over Production	Max Sustained Capacity	Short Range Plan
20-02-2010 08:00:00 - 21-02-2010 08:00:00	0	0	0	0	0	5000	0
21-02-2010 08:00:00 - 22-02-2010 08:00:00	0	0	0	0	0	5000	0
22-02-2010 08:00:00 - 23-02-2010 08:00:00	5000	0	0	0	0	5000	5000
23-02-2010 08:00:00 - 24-02-2010 08:00:00	5000	0	0	0	0	5000	5000
24-02-2010 08:00:00 - 25-02-2010 08:00:00	5000	0	0	0	0	5000	5000
25-02-2010 08:00:00 - 26-02-2010 08:00:00	5000	0	0	0	0	5000	5000
26-02-2010 08:00:00 - 27-02-2010 08:00:00	5000	0	0	0	0	5000	5000
27-02-2010 08:00:00 - 28-02-2010 08:00:00	0	0	0	0	0	5000	0
	1,14,000.00	2,500.00	12000	0	6000	1,35,000.00	

The value is stored in the Actual field in that Production Data record. If the value is less than the value in the **Short Range Plan** cell in the same row, the ⚠ icon appears in that row to the left of the Period cell. This icon indicates that you did not produce the planned amount. You will need to account for the loss to remove the icon.

Note: After you type a value in the **Actual** cell, you will need to click in a cell in a *differentrow* in order to see the updated sum of all actual values below the grid.

Copying a Production Value

To copy a production value from one day to another:

1. Access the appropriate production data tab on the **Production Data Entry** page.
2. In the row representing the period whose production value you want to copy, select the cell in the **Actual** column.
3. Press and hold the left mouse button.
4. Drag your pointer to the cells in the **Actual** column to which you want to paste the copied value.

   The pointer changes to a icon, as shown in the following image. In this image, the value *5000* is being copied from the first row to the four subsequent rows.

Period	Actual
10/23/2010 12:00 AM - 10/23/2010 12:00 AM	0
10/24/2010 12:00 AM - 10/24/2010 12:00 AM	0
10/25/2010 8:00 AM - 10/26/2010 8:00 AM	5000
10/26/2010 8:00 AM - 10/27/2010 8:00 AM	0
10/27/2010 8:00 AM - 10/28/2010 8:00 AM	0
10/28/2010 8:00 AM - 10/29/2010 8:00 AM	0
10/29/2010 8:00 AM - 10/30/2010 8:00 AM	0

5. Pause on the last cell to which you want to copy the value, and release the mouse button.

   The value is copied to the selected cells.

10/25/2010 8:00 AM - 10/26/2010 8:00 AM	5000
10/26/2010 8:00 AM - 10/27/2010 8:00 AM	5000
10/27/2010 8:00 AM - 10/28/2010 8:00 AM	5000
10/28/2010 8:00 AM - 10/29/2010 8:00 AM	5000
10/29/2010 8:00 AM - 10/30/2010 8:00 AM	5000

Changing the Short Range Plan Value

The following instructions explain how to change a short range plan manually for a given period. If desired, you can also copy a short range plan value from one day to another.

To change the value in the Short Range Plan field:

1. Access the appropriate production data tab on the **Production Data Entry** page.
2. In the row representing the period for which you want to enter an adjusted planned production value, in the **Short Range Plan** cell, delete the existing value, and type the amount of product that you planned to produce that period based on the new events and information.

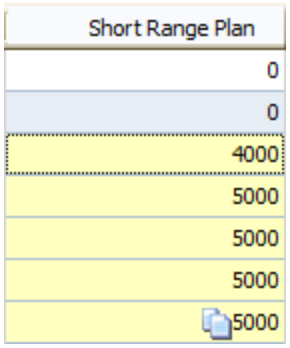
   The value is saved automatically and stored in the Short Range Plan field in that Production Data record.

Copying a Short Range Plan

To copy a short range plan value from one period to another:

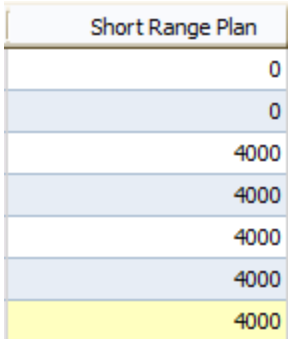
1. Access the appropriate production data tab on the **Production Data Entry** page.
2. In the row representing the period whose short range plan value you want to copy, select the cell in the **Short Range Plan** column.
3. Press and hold the left mouse button.
4. Drag your pointer to the cells in the **Short Range Plan** column to which you want to paste the copied value.

   The pointer changes to a icon, as shown in the following image. In this image, the value *4000* is being copied from the first row to the four subsequent rows.



5. Pause on the last cell to which you want to copy the value, and release the mouse button.

   The value is copied to the selected cells.



About Margin Selection

When you access the **Production Data Entry** page, the value in the Margin field in all new Production Data records is set by default to the value in the Default Margin field in the associated Production Profile record (i.e., the Production Profile record that is linked to the Production Plan record that you selected when you accessed the page).

For instance, suppose that on July 1, the value in the Default Margin field in a Production Profile record is *5.00*. In this case, new Production Data records that are created *on or after* July 1 for the Production Plan record to which that Production Profile record is linked will contain the value *5* in the Margin field. If, however, on July 16 the value in the Default Margin field is changed to *6.00*, any new Production Data records that are created *on or after* July 16 for the same Production Plan record will contain the value *6* in their Margin field.

Keep in mind that Production Data records are created *automatically* when you access the **Production Data Entry** page. The number of records that are created depends upon the day on which you access the page and the planning period of the Production Plan record that you selected when you accessed the page.

For example, suppose the planning period in a Production Plan record is July 1 through July 31. If you were to access the **Production Data Entry** page for that Production Plan record for the first time on July 15, fifteen Production Data records would be created (one for each day between July 1 and July 15). Each of those records would contain the *same* value in the Margin field because they were all created at the same time.

So, using the same example, if you were to increase the value in the Default Margin field on July 16 and access the **Production Data Entry** page again on July 16, one new Production Data record would be created to represent July 16, and the value in its Margin field would be the updated value in the Default Margin field in the Production Profile record.

If desired, you can use a profile margin other than the Default Margin. To do so, in the **Losses** section, you can select the Margin ID for the desired profile margin value from the drop-down list. You might want to do so when a quality loss takes place and the amount that was produced has some value other than zero. For example, suppose that the product is clothing that is sold as "factory-seconds." There are minor quality defects with the product due to which it cannot be sold for 100% value of the actual price. It may, however, be a good bargain when the same product is sold for 50% to 75% of the actual price. In this case the loss is equal to the difference between the value the product is sold for versus the value the product could have been sold for.

The value in the Margin Value field in Production Data records is used to calculate the:

- Cost of losses, which appears on the **Production Summary** tab.
- Lost profit opportunity, which is used in the Total Cost of Unreliability Metric View.

Adding a Production Loss Record

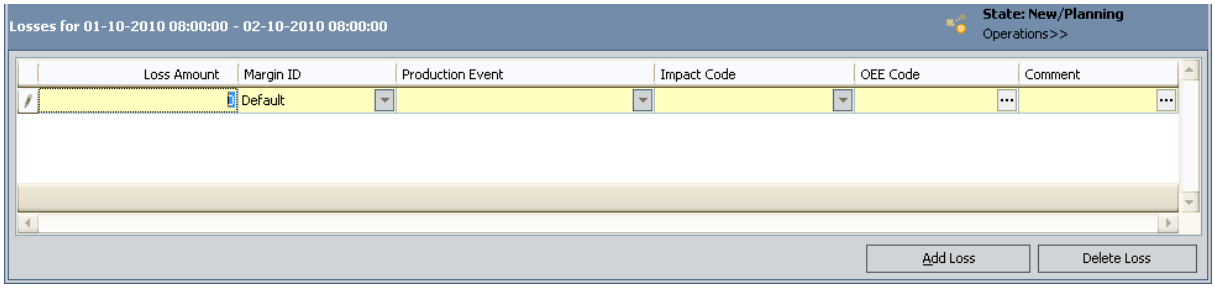
If you enter an Actual value that is less than the Short Range Value for that period, you can account for the loss by creating a Production Loss record. Each Production Loss record contains values that indicate the amount of lost production, the event that caused the loss, and the impact of the loss. If multiple events lead to a production loss, you can create multiple Production Loss records, which will be linked to the same Production Data record.

The following instructions explain how to create a Production Loss record to add a loss manually for a given period. You can also copy losses from one period to another.

Note: After you link a Production Loss record to a Production Event record, you cannot change the start date or end date of the Production Event record.

To create a Production Loss record:

1. Access the appropriate production data tab on the **Production Data Entry** page.
2. In the grid in the **Production Data** section, select the row representing the period for which a loss occurred.
3. Below the grid in the **Losses** section, click the **Add Loss** button.
4. A new row is added to the grid in the **Losses** section.



5. In the new row:
   a. In the **Loss Amount** cell, type a number indicating the amount of lost production.
   b. In the **Margin ID** cell, expand the list, and select the Margin ID for this loss.
   c. In the **Production Event** cell, expand the list, and select the event that caused the loss. The list displays the Record IDs of all Production Event records that are returned by the EventList query, which is stored in the Catalog in the folder \\Public\Meridium\Modules\PLA\Queries. If no applicable events appear in the list, you can create a Production Event record by clicking **Create Production Event**.
   d. In the **Impact Code** cell, expand the list, and select the impact of the loss.

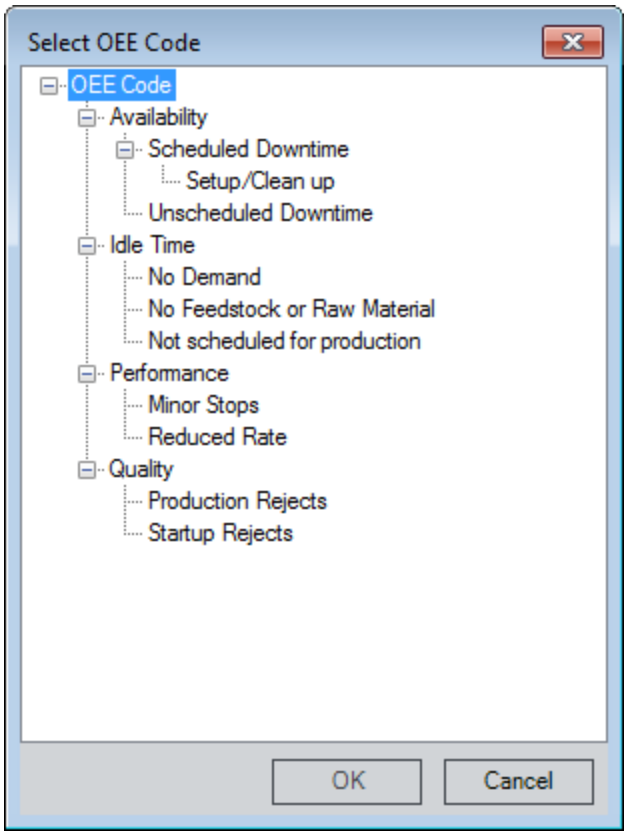
Each item in the list represents an Impact Code record that is returned by the ImpactCodeList query, which is stored in the Catalog in the folder \\Public\Meridium\Modules\PLA\Queries. Each item in the list is displayed in the following format:

<Code> - <Description>

...where:

- **<Code>** is the value in the Code field in the Impact Code record.
- **<Description>** is the value in the Description field in the Impact Code record.

e. In the **OEE Code** cell, click the ··· button. The **Select OEE Code** window appears.



Select the OEE code that is associated with the production loss. Each item in the tree represents an OEE Code record that is returned by the OEECodeListProdLoss query, which is stored in the Catalog in the folder \\Public\Meridium\Modules\PLA\Queries.

Only enabled OEE Code records (i.e., OEE Code records whose Is Inactive field contains the value *False*) can be selected from the list. Disabled OEE Code records will be gray and cannot be selected.

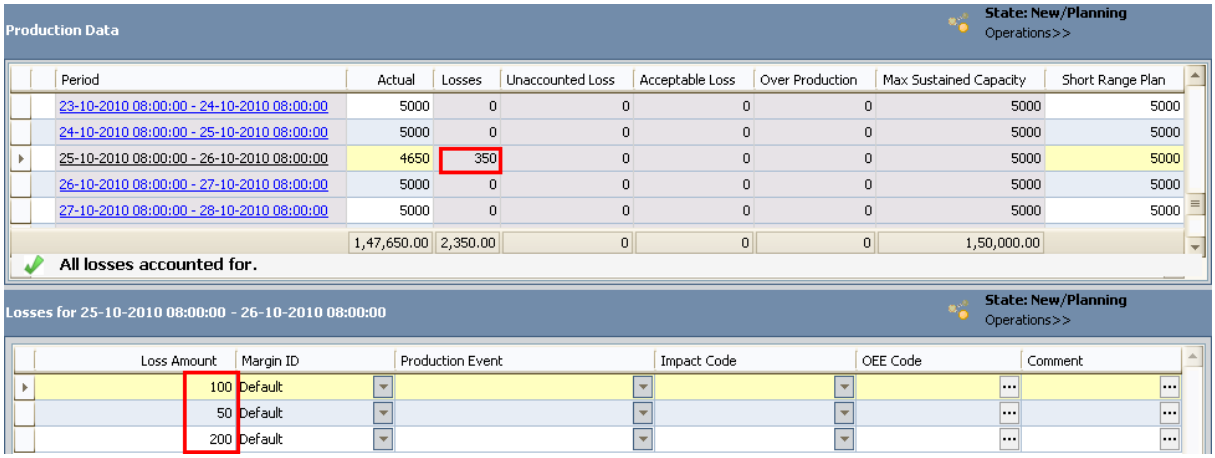
f. In the **Comment** cell, type any additional comments about the loss.

The values are stored in the Production Loss record.

About Copying Losses

The total number of losses for a given period is calculated as the sum of the individual loss values in the Production Loss records that are linked to the Production Data record representing that period. If a Production Data record is linked to only *one* Production Loss record, the total loss value in the Production Data record will be equal to the loss amount in that Production Loss record.

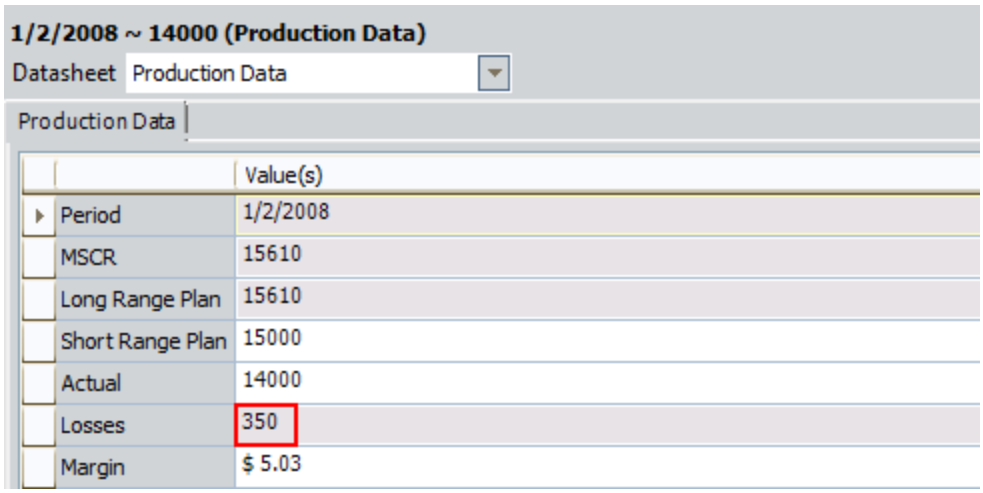
For example, suppose the Production Data record for 10/25/2010 is linked to three Production Loss records whose individual loss values are *100*, *50*, and *200*. In this case, the total number of losses for that day will be *350* (100 + 50 + 200). This scenario is illustrated in the following image, where the total number of losses, *350*, is outlined in red in the **Production Data** section, and the individual losses are outlined in red in the **Losses** section.



If you copy *all* losses from one period to another, the individual Production Loss record(s) that are used to determine the total loss value for that period are used to create *new* Production Loss records, which are linked automatically to the Production Data records representing the target days.

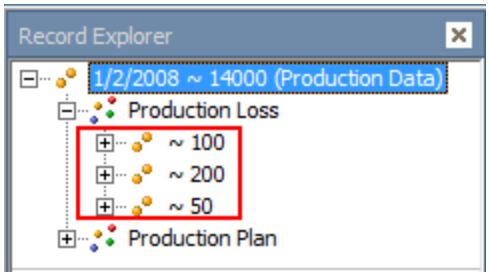
For example, using the previous example, suppose you copied all losses from the source day, 10/25/2010, to the target days 1/2/2008 and 1/3/2008. In this case:

- The total loss value of *350* would be copied to the Production Data records representing 1/2/2008 and 1/3/2008. In the following image, you can see the value *350* outlined in red in the Production Data record for 1/2/2008.

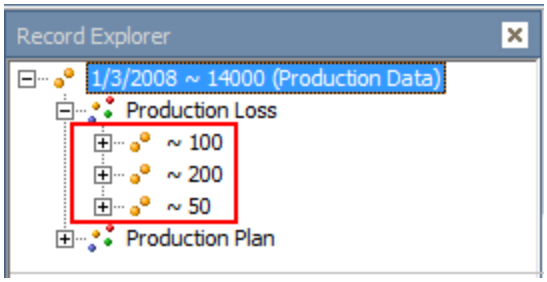


- The three individual Production Loss records that were linked to the Production Data record for 10/25/2010 would be used to create six *new* Production Loss records, where...
  - Three of those records are linked to the Production Data record for 1/2/2008.
  - Three of those records are linked to the Production Data record for 1/3/2008.

  In the following image, you can see that the Production Data record for 1/2/2008 is linked to three Production Loss records, which are outlined in red.



  In addition, you can see in the following image that the Production Data record for 1/3/2008 is also linked to three Production Loss records, which are outlined in red. Although you cannot determine it from the image, these three Production Loss records are *different* records (i.e., with different Entity Keys) from the three records that are outlined in the preceding image.



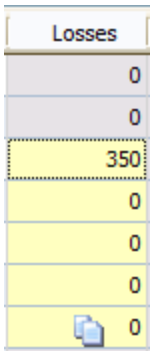
Note: If you try to copy a Production Loss record whose Production Event field contains a value that is invalid for the target period, an error message appears, and the copy operation is stopped automatically.

Copying Losses

To copy losses from one period to another:

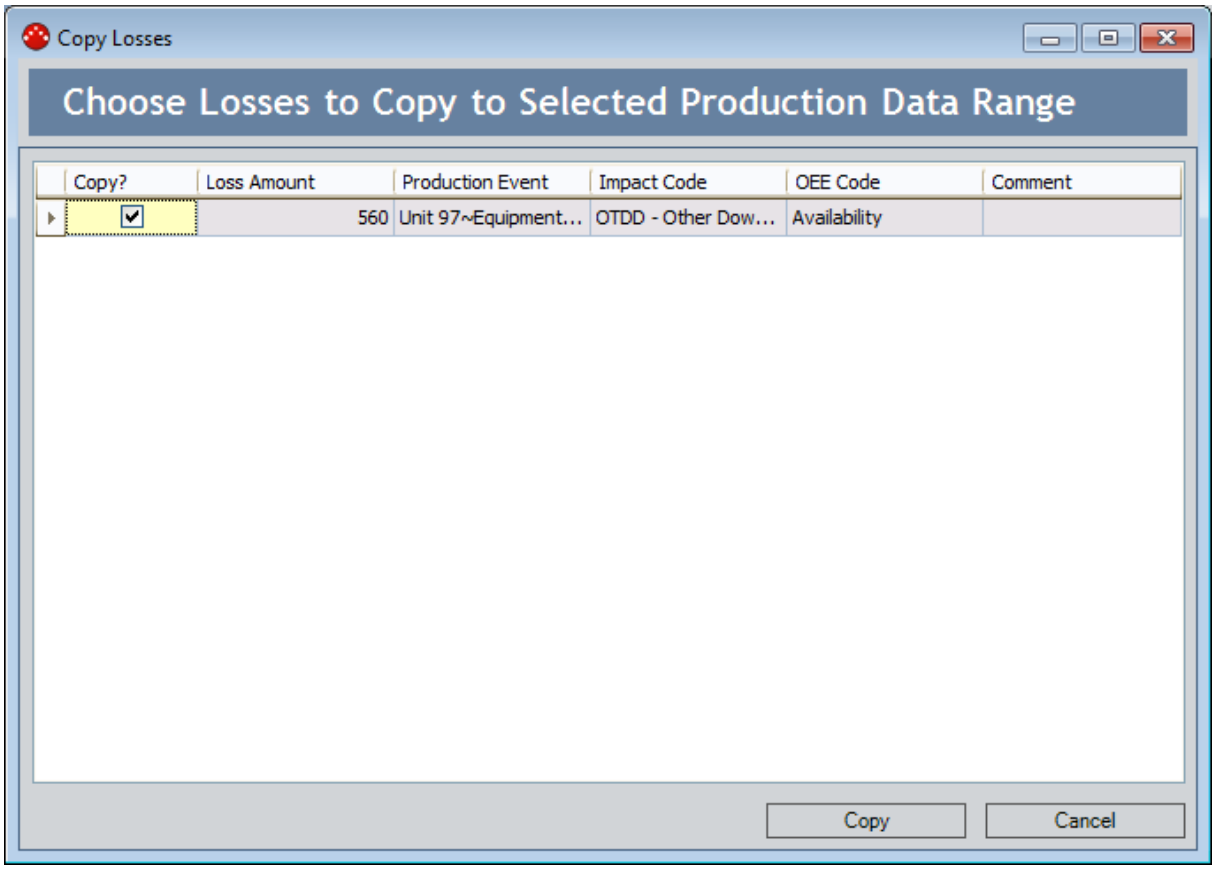
1. Access the appropriate production data tab on the **Production Data Entry** page.
2. In the row representing the period whose losses you want to copy, select the cell in the **Losses** column.
3. Press and hold the left mouse button.
4. Drag your pointer to the cells in the **Losses** column to which you want to paste the copied value.

   The pointer changes to a icon, as shown in the following image. In this image, the value *350* is being copied from the first row to the four subsequent rows.



5. Pause on the last cell to which you want to copy the losses, and release the mouse button.

   The **Copy Losses** window appears.



Note: If you copied the losses from a period for which *no* Production Loss records actually exist, instead of seeing the **Copy Losses** window, you will see a message indicating that no Production Loss records are available to be copied.

Each row in the grid represents a Production Loss record that is linked to the Production Data record that is represented in the row whose losses you copied in step 2. In the preceding image, only one Production Loss record appears in the grid, so the **Copy** check box is selected automatically. If more than one Production Loss record is displayed in the grid, *none* of the **Copy** check boxes are selected automatically.

6. In the rows representing the Production Loss records that you want to copy to the Production Data records that are represented by the rows to which you dragged the pointer, select the **Copy** check box.
7. Click the **Copy** button.

   The selected Production Loss records are used to create *new* Production Loss records, which are linked automatically to the Production Data records that are represented by the rows to which you dragged the pointer. In addition, for each Production Data record to which you copied the losses, the value in the Losses field in the Production Data record is updated to match the value in the Losses field in the Production Data record whose total loss value you copied.

Deleting a Production Loss Record

To delete a Production Loss record:

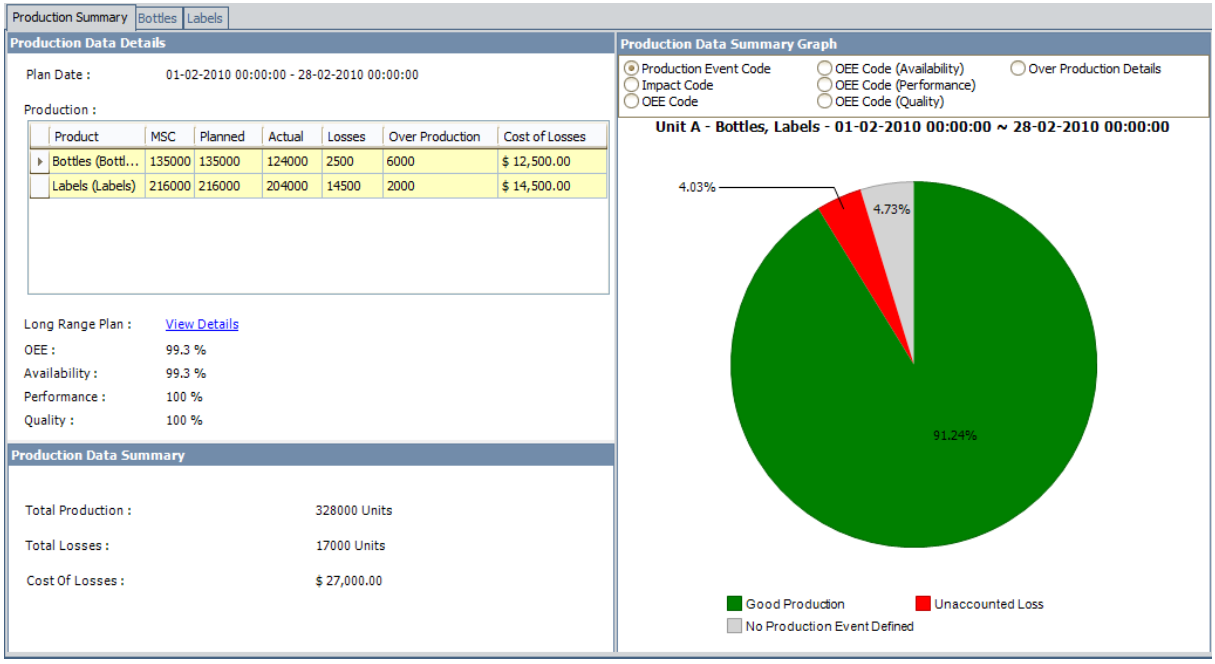
1. Access the appropriate production data tab on the **Production Data Entry** page.
2. In the grid in the **Losses** section, select the row containing the Production Loss record that you want to delete.
3. Below the grid, click the **Delete Loss** button.

   A confirmation message appears, asking if you are sure that you want to delete the record.
4. Click the **Yes** button.

   The Production Loss record is deleted.

About the Production Summary Tab

The **Production Summary** tab appears on the Production Data Entry page, as shown in the following image.



The **Production Summary** tab contains the following items:

- **Production Data Details pane:** Displays the following information:
  - **Plan Date:** The time period associated with the production data that appears on the production data tabs. The plan date is displayed in the format *<Start Date> - <End Date>*, where *<Start Date>* is the value in the Start Date field and *<End Date>* is the value in the End Date field in the Production Plan record that you selected when you accessed the **Production Data Entry** page.
  - **Production grid:** Displays a row for each product that is associated with this production plan. The grid contains the following columns:
    - **Product:** The name of the product.
    - **MSC:** The value in the Maximum Sustained Capacity Rate field in the Production Profile record that is associated with this production plan.
    - **Planned:** The sum of all values in the **Short Range Plan** column on the corresponding production data tab.
    - **Actual:** The sum of all values in the **Actual** column on the corresponding production data tab.
    - **Losses:** The sum of all values in the **Losses** column on the corresponding production data tab.
    - **Over Production:** The sum of all values in the **Over Production**

column on the corresponding production data tab.

- **Cost of Losses:** The cost of all losses for the product, where the value is calculated using the following equation:

Cost of Losses = Loss (Default Margin) + Σ Loss (Additional Margin)
Where,
The *Loss (Default Margin)* is the loss calculated using the value of margin specified in the **Default Margin** text box. The *Loss (Default Margin)* for a product is calculated using the following equation:
Loss (Default Margin) = (Loss Quantity * Default Margin)
The *Loss (Additional Margin)* is the loss calculated using the value of margin specified in the **Margin Value** column on the **Profile Margin** tab. The *Loss (Additional Margin)* for a product is calculated using the following equation:
Loss (Additional Margin) = (Loss Quantity * (1 - (Additional Margin/Default Margin)) * Default Margin)

Note: The currency symbol that appears is defined via the **Currency** dialog box.

- **Long Range Plan:** A hyperlink that displays the **Long Range Plan Profile** dialog box, where you can see the planned production numbers for each period.
- **OEE:** The overall OEE percentage for the products that are selected in the production grid. OEE is calculated using the following equation:

  OEE = (Availability x Performance x Quality) x 100
- **Availability:** The availability percentage for the products that are selected in the production grid. Availability is calculated using the following equation:

  Availability = [(Good Production + Performance Loss + Quality Loss) / (Good Production + Availability Loss + Performance Loss + Quality Loss)] x 100
- **Performance:** The performance percentage for the products that are selected in the production grid. Performance is calculated using the following equation:

  Performance = [(Good Production + Quality Loss) / (Good Production + Performance Loss + Quality Loss)] x 100
- **Quality:** The quality percentage for the products that are selected in the production grid. Quality is calculated using the following equation:

  Quality = [Good Production / (Good Production + Quality Loss)] x 100
- **Production Data Summary pane:** Displays the following information:
  - **Total Production:** The sum of all values in the **Actual** column on the corresponding production data tab or the sum of values in each of the cell in the **Actual** column in the **Production Data Details** grid. The sum of all the values is then appended with the value in the Product UOM field in the Production Profile record that is associated with this production data and displayed as **Total Production**. If the production plan includes more than one product, however, the total production value is appended with *Units*.
  - **Total Losses:** The sum of all values in the **Losses** column on the corresponding production data tab or the sum of values in each of the cell in the **Losses** column in the **Production Data Details** grid. The sum of all the

values is then appended with the value in the Product UOM field in the Production Profile record that is linked to the Production Plan record that you selected when you accessed the **Production Data Entry** page (e.g., Barrels). If the production plan includes more than one product with different units of measure, however, the total losses value is appended with *Units*.

- **Cost Of Losses:** The cost of all losses across all products that are included in this plan. The value is the sum of values in each of the cell in the **Cost of Losses** column in the **Production Data Details** grid.

The currency symbol that appears is defined via the **Currency** dialog box, and the number of decimal places that appear in the Cost of Losses value is defined via the **Display Precision** dialog box.

- **Production Data Summary Graph pane:** Displays the Production Data Summary graph. The label on the graph is the value that is stored in the Plan ID field in the Production Plan record that you selected when you accessed the **Production Data Entry** page.

Cost of Losses Calculation

On the **Production Data Summary** pane on the **Production Data Entry** page, you will see the *Cost Of Losses* value. This value is calculated using the values in the following fields in the Production Data records that are displayed on the corresponding production data tabs:

- Losses

  Note: The Losses value is displayed in the **Losses** column on the production data tabs.

- Margin

  Note: The Margin value is displayed in the **Margin ID** column in the **Losses** section on the **Production Data Entry** page.

The Cost of Losses is calculated using the following equations:

Cost of Losses = Loss (Default Margin) + Σ Loss (Additional Margin)

Where,

The *Loss (Default Margin)* is the loss calculated using the value of margin specified in the **Default Margin** text box. The *Loss (Default Margin)* for a product is calculated using the following equation:

Loss (Default Margin) = (Loss Quantity * Default Margin)

The *Loss (Additional Margin)* is the loss calculated using the value of margin specified in the **Margin Value** column on the **Profile Margin** tab. The *Loss (Additional Margin)* for a product is calculated using the following equation:

Loss (Additional Margin) = (Loss Quantity * (1 - (Additional Margin/Default Margin)) * Default Margin)

Consider the following table, which indicates the values that exist in the Period, Losses, and Margin Value fields in Production Data record for *one* product, *Bottles*. You can see that all of the records contain the same value in the Losses field. This example assumes that the default margin specified in the **Default Margin** text box is 5 and the additional margin defined on the **Profile Margin** tab is 3. Half of the records contain the value *5* in the Margin Value field (shown in blue in the table), and the other half of the records contain the value *3* in the Margin Value field (shown in green in the table).

Period	Losses	Margin Value
7/1/2011	10	5
7/2/2011	10	5

Period	Losses	Margin Value
7/3/2011	10	5
7/4/2011	10	5
7/5/2011	10	5
7/6/2011	10	3
7/7/2011	10	3
7/8/2011	10	3
7/9/2011	10	3
7/10/2011	10	3

Based on the equations for Cost of Losses calculations, for the records displayed in the previous table, the cost of losses per day for each record is shown in the **Cost of Losses** column in the following table.

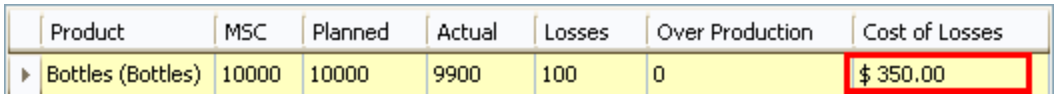
Period	Losses	Margin Value	Cost of Losses Equation	Cost of Losses
7/1/2011	10	5	(10 x 5)	50
7/2/2011	10	5	(10 x 5)	50
7/3/2011	10	5	(10 x 5)	50
7/4/2011	10	5	(10 x 5)	50
7/5/2011	10	5	(10 x 5)	50
7/6/2011	10	3	(10 x (1- (3/5)) x 5)	20
7/7/2011	10	3	(10 x (1- (3/5)) x 5)	20
7/8/2011	10	3	(10 x (1- (3/5)) x 5)	20
7/9/2011	10	3	(10 x (1- (3/5)) x 5)	20
7/10/2011	10	3	(10 x (1- (3/5)) x 5)	20

On the **Production Data Details** pane, the *Cost of Losses* value is the *sum* of the cost of losses for *all* days in the plan. Continuing with the example, in the following table, you can see the total cost of losses in the last row (shaded orange):

Period	Losses	Margin Value	Cost of Losses
7/1/2011	10	5	50

Period	Losses	Margin Value	Cost of Losses
7/2/2011	10	5	50
7/3/2011	10	5	50
7/4/2011	10	5	50
7/5/2011	10	5	50
7/6/2011	10	3	20
7/7/2011	10	3	20
7/8/2011	10	3	20
7/9/2011	10	3	20
7/10/2011	10	3	20
			350

Based on this data, you would see *$350* in the cell corresponding to *Bottles* product in the **Cost of Losses** column in the **Production Data Details** pane, as shown in the following image (a red outline has been added to the image to highlight the value).



Product	MSC	Planned	Actual	Losses	Over Production	Cost of Losses
Bottles (Bottles)	10000	10000	9900	100	0	$ 350.00

Now, consider the following table, which indicates the values that exist in the Period, Losses, and Margin Value fields in Production Data record for *second* product, *Labels*. You can see that all of the records contain the same value in the Losses field. This example assumes that the default margin specified in the **Default Margin** text box is 6 and the additional margin defined on the **Profile Margin** tab is 5. Half of the records contain the value 6 in the Margin Value field (shown in blue in the table), and the other half of the records contain the value *5* in the Margin Value field (shown in green in the table).

Period	Losses	Margin Value
7/1/2011	10	6
7/2/2011	10	6
7/3/2011	10	6
7/4/2011	10	6
7/5/2011	10	6
7/6/2011	10	5

Period	Losses	Margin Value
7/7/2011	10	5
7/8/2011	10	5
7/9/2011	10	5
7/10/2011	10	5

Based on the equations for Cost of Losses calculations, for the records displayed in the previous table, the cost of losses per day for each record is shown in the **Cost of Losses** column in the following table.

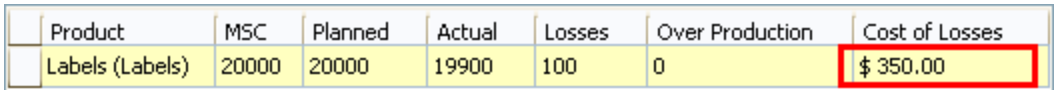
Period	Losses	Margin Value	Cost of Losses Equation	Cost of Losses
7/1/2011	10	6	(10 x 6)	60
7/2/2011	10	6	(10 x 6)	60
7/3/2011	10	6	(10 x 6)	60
7/4/2011	10	6	(10 x 6)	60
7/5/2011	10	6	(10 x 6)	60
7/6/2011	10	5	(10 x (1- (5/6)) x 6)	10
7/7/2011	10	5	(10 x (1- (5/6)) x 6)	10
7/8/2011	10	5	(10 x (1- (5/6)) x 6)	10
7/9/2011	10	5	(10 x (1- (5/6)) x 6)	10
7/10/2011	10	5	(10 x (1- (5/6)) x 6)	10

On the **Production Data Details** pane, the *Cost of Losses* value is the *sum* of the cost of losses for *all* days in the plan. Continuing with the example, in the following table, you can see the total cost of losses in the last row (shaded orange):

Period	Losses	Margin Value	Cost of Losses
7/1/2011	10	5	50
7/2/2011	10	5	50
7/3/2011	10	5	50
7/4/2011	10	5	50
7/5/2011	10	5	50

Period	Losses	Margin Value	Cost of Losses
7/6/2011	10	3	20
7/7/2011	10	3	20
7/8/2011	10	3	20
7/9/2011	10	3	20
7/10/2011	10	3	20
			350

Based on this data, you would see *$350* in the cell corresponding to *Labels* product in the **Cost of Losses** column on the **Production Data Details** pane, as shown in the following image (a red outline has been added to the image to highlight the value).



Product	MSC	Planned	Actual	Losses	Over Production	Cost of Losses
Labels (Labels)	20000	20000	19900	100	0	$ 350.00

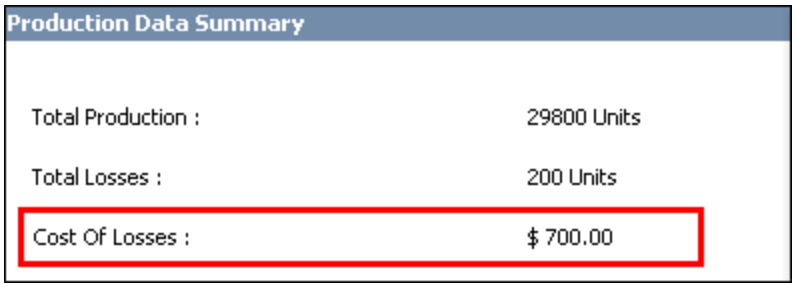
The Cost Of Losses in the **Production Data Summary** pane is the sum of all the values in the **Cost of Losses** column on the **Production Data Details** pane. Based on the calculations for both products, *bottles* and *labels*, the Cost Of Losses is calculated using the following equation:

Cost Of Losses = Cost of Losses (Bottles) + Cost of Losses (Labels)

Cost Of Losses = $350 + $350

Cost Of Losses = $700

Based on this data, you would see *$700* next to the **Cost Of Losses** label on the **Production Data Summary** pane, as shown in the following image (a red outline has been added to the image to highlight the value).



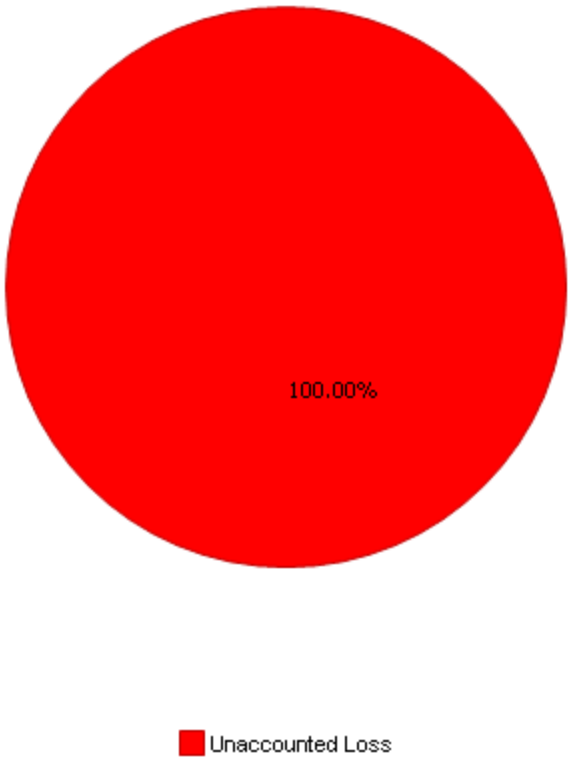
Note: The calculated Cost of Losses value is displayed using the number of decimal places defined for the Display Precision setting, regardless of the number of decimal places in the underlying Losses and Margin values.

About the Production Data Summary Graph

Note: The standard toolbar is not displayed on the graph by default. You can display it manually by right-clicking the graph and clicking **Toolbar**.

The Production Data Summary graph appears on the **Production Summary** tab of the Production Data Entry page. The Production Data Summary graph displays a graphical representation of the data that exists on the production data tabs. The graph represents the product or product (s) that are selected in the **Production Data Details** pane. The graph is built dynamically and is not stored in the Meridium Catalog.

By default, the graph is configured as a pie graph. When you first access the **Production Data Entry** page and before you have entered any values on the **Production Data** tab, the graph looks like this:



Note: We recommend that you not change the graph *type*. If you do, it may not work as expected.

You can see different production data details on the graph using the following categories at the top of the graph:

- **Production Event Code:** Displays information about the production events that are selected on the production data tabs.
- **Impact Code:** Displays information about the impact codes that are selected on

the production data tabs.

- **OEE Code:** Displays information about all OEE codes that are selected on the production data tabs.
- **OEE Code (Availability):** Displays information about the availability OEE codes that are selected on the production data tabs.
- **OEE Code (Performance):** Displays information about the performance OEE codes that are selected on the production data tabs.
- **OEE Code (Quality):** Displays information about the quality OEE codes that are selected on the production data tabs.
- **Over Production Details:** Displays information about the over production for the product that is selected in the **Production Data Details** grid.

Production Data Summary Graph Details

The following table provides details about the categories (above the graph) and sub-categories (below the graph) that appear on the Production Data Summary graph. The calculations used in each subcategory are colored blue to help them stand out from the rest of the text.

Sub-category	Main Category	Question	Calculation	Example
Good Production	Production Event Code Impact Code OEE Code	*What percentage of periods contains an Actual value that is greater than or equal to the Planned Production value?*	**Good Production** = (Σ All Actual Values / Σ All MSC Values) x 100	The sum of all Actual values is 45,000. The sum of all *MSC* values is 65,000. Therefore: • Good Production = (45,000 / 65,000) x 100 • Good Production = .6923 x 100 • Good Production = 69.23%
Over Production	Over Production Details	*What percentage of an Actual value is greater than the Short Range Plan value?*	**Over Production** = (Σ All Over Production Values / (Σ All Actual Values + Σ All Over Production Values)) x 100	The sum of all Actual values is 45,000. The sum of all Over Production values is 7,000. Therefore: • Over Production = (7,000 / (45,000+7000)) x 100 • Over Production = .1346 x 100 • Over Production = 13.46%

Sub-category	Main Category	Question	Calculation	Example
Unaccounted Loss	Production Event Code Impact Code OEE Code	*What percentage of available time was the production unit not scheduled for production?*	**Unaccounted Loss** = [(Σ All Short Range Values - Σ All Actual Values - Σ All Losses) / Σ All MSC Values] x 100	The sum of all MSC values is 80,000. The sum of all Short Range Plan values is 65,000. The sum of all Actual values is 45,000. The sum of all Loss values is 16,000. Therefore: • Unaccounted Losses = [(65,000 - 45,000 - 16,000) / 80,000] x 100 • Unaccounted Losses = (4000 / 80,000) x 100 • Unaccounted Losses = .05 x 100 • Unaccounted Losses = 5%

Sub-category	Main Category	Question	Calculation	Example
No Planned Production	Production Event Code Impact Code OEE Code	*In what percentage of periods did I reduce the Short Range Value?*	**No Planned Production** = [(Σ All MSC Values - Σ All Short Range Values) / Σ All MSC Values] x 100	The sum of all MSC values is 150,000. One day, the MSC value is 5,000, and the Short Range Plan value is 4,000. So, the No Planned Production Value is 1,000 (5,000 - 4,000). Another day, the MSC value is 5,000, and the Short Range Plan value is 3,000. So, the No Planned Production Value is 2,000 (5,000 - 3,000). Therefore: • No Planned Production = [(1,000 + 2,000) / 150,000] x 100 • No Planned Production = (3,000 / 150,000) x 100 • No Planned Production = .02 x 100 • No Planned Production = 2%

Sub-category	Main Category	Question	Calculation	Example
No Production Event Defined	Production Event Code	*What percentage of losses are missing a Production Event?*	**NPED** = (Σ Losses where the Production Event value is null / Σ All MSC Values) x 100	The sum of losses in all Production Loss records where the Production Event value is null is 31,220. The sum of all MSC values is 483,910. Therefore: • NPED = (31,220 / 483,910) x 100 • NPED = .00546 x 100 • NPED = 0.55%
No Production Event Code Defined	Production Event Code	*What percentage of losses contain a value in the Production Event field but the corresponding Production Event record does **not** have a value in the Production Event Code field?*	**NPECD** = (Σ Losses where the Production Event value is populated but the associated Production Event record contains *no* Production Event Code / Σ All MSC Values) x 100	The sum of losses where the Production Event comes from a Production Event record whose Production Event Code field is null is 31,220. The sum of all MSC values is 483,910. Therefore: • NPECD = (31,220 / 483,910) x 100 • NPECD = .0645 x 100 • NPECD = 6.45%

Sub-category	Main Category	Question	Calculation	Example
<Production Event Code Name>	Production Event Code	*What percentage of loss is not associated with a given <Production Event Code>?*	**<Production Event Code Name>** = (Σ All Losses where the Production Event Code value is <Production Event Code Name> / Σ All MSC Values) x 100 **Note:** The colors that are used to represent the Production Event Codes come from the Color field in Production Event Code records.	The sum of losses where the value in the Production Event field is *Weekends/Holidays* is 23,000. The sum of all MSC values is 713,000. Therefore: • *Weekends/Holidays* = (23,000 / 713,000) x 100 • *Weekends/Holidays* = .03225 x 100 • *Weekends/Holidays* = 3.23%

Sub-category	Main Category	Question	Calculation	Example
<Impact Code Name>	Impact Code	*What percentage of loss is associated with a given <Impact Code>?*	**<Impact Code Name>** = (Σ All Losses where the Impact Code value is <Impact Code Name> / Σ All MSC Values) x 100 **Note:** The colors that are used to represent the Impact Codes come from the Color field in Impact Code records.	The sum of losses where the Impact Code value is *TADD* is 10,000. The sum of all MSC values is 65,000. Therefore: • *TADD* = (10,000 / 65,000) x 100 • *TADD* = .1538 x 100 • *TADD* = 15.38%
No Impact Code Defined	Impact Code	*What percentage of losses are missing an Impact Code?*	**NICD** = (Σ Losses where the Impact Code value is null / Σ All MSC Values) x 100	The sum of losses where the Impact Code value is null is 2,000. The sum of all MSC values is 65,000. Therefore: • NICD = (2,000 / 65,000) x 100 • NICD = .0308 x 100 • NICD = 3.08%

Sub-category	Main Category	Question	Calculation	Example
<OEE Code Name>	OEE Code		**<OEE Code Name>** = (Σ All Losses where the OEE Code value is <OEE Code Name> x Σ All MSC Values) x 100	The sum of losses where the OEE Code is *Unscheduled Downtime* is 10,000. The sum of all MSC values is 65,000. Therefore: • *Unscheduled Downtime* = (10,000 / 65,000) x 100 • *Unscheduled Downtime* = .1538 x 100 • *Unscheduled Downtime* = 15.38%
No OEE Code Defined	OEE Code	*What percentage of losses are missing an OEE Code?*	**NOCD** = (Σ Losses where the OEE Code value is null / Σ All MSC Values) x 100	The sum of losses where the OEE Code value is null is 4,000. The sum of all MSC values is 65,000. Therefore: • NOCD = (4,000 / 65,000) x 100 • NOCD = .0615 x 100 • NOCD = 6.15%

Sub-category	Main Category	Question	Calculation	Example
Idle Time Loss	OEE Code	*What the percentage of time is the production unit Idle?*	**Idle Time Loss** = (Σ All Losses where the OEE Code value is under *Idle Time* / Σ All MSC Values) x 100	The sum of losses where the OEE Code value is under *Idle Time* is 4,000. The sum of all MSC values is 65,000. Therefore: • Idle Time Loss = (4,000 / 65,000) x 100 • Idle Time Loss = .0615 x 100 • Idle Time Loss = 6.15%
Availability Loss	OEE Code	*What percentage of scheduled production time is the production unit mechanically "available"?*	**Availability Loss** = (Σ All Losses where the OEE Code value is under *Availability* / Σ All MSC Values) x 100	The sum of losses where the OEE Code value is under *Availability* is 4,000. The sum of all MSC values is 65,000. Therefore: • Availability Loss = (4,000 / 65,000) x 100 • Availability Loss = .0615 x 100 • Availability Loss = 6.15%

Sub-category	Main Category	Question	Calculation	Example
Performance Loss	OEE Code	*What is the efficiency of the production unit?*	**Performance Loss** = (Σ All Losses where the OEE Code value is under *Performance* / Σ All MSC Values) x 100	The sum of losses where the OEE Code value is under *Performance* is 4,000. The sum of all MSC values is 65,000. Therefore: • Performance Loss = (4,000 / 65,000) x 100 • Performance Loss = .0615 x 100 • Performance Loss = 6.15%
Quality Loss	OEE Code	*What percentage of scheduled production time is the production unit producing products that met "1st run quality requirements"?*	**Quality Loss** = (Σ All Losses where the OEE Code value is under Quality / Σ All MSC Values) x 100	The sum of losses where the OEE Code value is under *Quality* is 4,000. The sum of all MSC values is 65,000. Therefore: • Quality Loss = (4,000 / 65,000) x 100 • Quality Loss = .0615 x 100 • Quality Loss = 6.15%

Sub-category	Main Category	Question	Calculation	Example
<Availability OEE Code Name>	OEE Code (Availability)	*What percentage of loss is associated with a given <Availability OEE Code>?*	**<Availability OEE Code Name>** = [Σ All Losses where the OEE Code value is <Availability OEE Code Name> / (Σ All Actual Values + Σ All Losses where the OEE Code value is under *Availability* + Σ All Losses where the OEE Code value is under *Performance* + Σ All Losses where the OEE Code value is under *Quality*)] x 100	The sum of losses where the OEE Code is *Unscheduled Downtime* is 10,000. The sum of (All Actual Values + All Losses where the OEE Code value is under *Availability* + All Losses where the OEE Code value is under *Performance* + All Losses where the OEE Code value is under *Quality* is 65,000. Therefore: • *Unscheduled Downtime* = (10,000 / 65,000) x 100 • *Unscheduled Downtime* = .1538 x 100 • *Unscheduled Downtime* = 15.38%

Sub-category	Main Category	Question	Calculation	Example
<Performance OEE Code Name>	OEE Code (Performance)	*What percentage of loss is associated with a given <Performance OEE Code>?*	**<Performance OEE Code Name>** = [Σ All Losses where the OEE Code value is <Performance OEE Code Name>)/(Σ All Actual Values + Σ All Losses where OEE Code value is under *Performance* + Σ All Losses where OEE Code value is under *Quality*)] x 100	The sum of losses where the OEE Code is *Minor Stops* is 10,000. The sum of all (All Actual Values + All Losses where OEE Code value is under *Performance* + All Losses where OEE code value is under *Quality*) is 65,000. Therefore: • *Minor Stops* = (10,000 / 65,000) x 100 • *Minor Stops* = .1538 x 100 • *Minor Stops* = 15.38%
<Quality OEE Code Name>	OEE Code (Quality)	*What percentage of loss is associated with a given <Quality OEE Code>?*	**<Quality OEE Code Name>** = [Σ All Losses where the OEE code value is <Quality OEE Code Name>/(Σ All Actual Values + Σ All Losses where the OEE Code value is under *Quality*)] x 100	The sum of losses where the OEE Code is *Startup Rejects* is 10,000. The sum of all (Actual Values + Losses where the OEE Code value is under *Quality*) is 65,000. Therefore: • *Startup Rejects* = (10,000 / 65,000) x 100 • *Startup Rejects* = .1538 x 100 • *Startup Rejects* = 15.38%

Sub-category	Main Category	Question	Calculation	Example
OEE - Availability	OEE Code (Availability)	*What percentage of time was the production unit "Mechanically Available" to produce products?*	**OEE Code - Availability** = [(Σ All Actual Values + Σ All Losses where OEE Code value is under *Performance* + Σ All Losses where OEE Code value is under *Quality*)/(Σ All Actual Values + Σ All Losses where OEE Code value is under *Availability* + Σ All Losses where OEE Code value is under *Performance* + Σ All Losses where OEE Code value is under *Quality*)[x 100	The sum of all Actual values is 10,000. The sum of all losses where the OEE Code is under *Performance* is 2,000. The sum of all losses where the OEE Code is under *Quality* is 1,000. The sum of all losses where the OEE Code is under *Availability* is 3,000. Therefore: • OEE Code - Availability = [(10,000 + 2,000 + 1,000) / (10,000 + 3,000 + 2,000 + 1,000)] x 100 • OEE Code - Availability = (13,000 / 16,000) x 100 • OEE Code - Availability = 81.25%

Sub-category	Main Category	Question	Calculation	Example
OEE - Performance	OEE Code (Performance)	*What is the efficiency of the production unit for the time that production was scheduled?*	**OEE Code - Performance** = [(Σ All Actual Values + Σ All Losses where OEE Code value is under *Quality*)/(Σ All Actual Values + Σ All Losses where OEE Code value is under *Performance* + Σ All Losses where OEE Code value is under *Quality*)] x 100	The sum of all Actual values is 10,000. The sum of all losses where the OEE Code is under *Performance* is 2,000. The sum of all losses where the OEE Code is under *Quality* is 1,000. Therefore: • OEE Code - Availability = [(10,000 + 1,000) / (10,000 + 2,000 + 1,000)] x 100 • OEE Code - Availability = (11,000 / 13,000) x 100 • OEE Code - Availability = 84.61%
OEE - Quality	OEE Code (Quality)	*What percentage of "1st run quality products" were produced?*	**OEE Code - Quality** = [Σ All Actual Values / (Σ All Actual Values + Σ All Losses where OEE Code value is under *Quality*)] x 100	The sum of all Actual values is 10,000. The sum of all losses where the OEE Code is under *Quality* is 1,000. Therefore: • OEE Code - Availability = [10,000 / (10,000 + 1,000)] x 100 • OEE Code - Availability = (10,000 / 11,000) x 100 • OEE Code - Availability = 90.9%

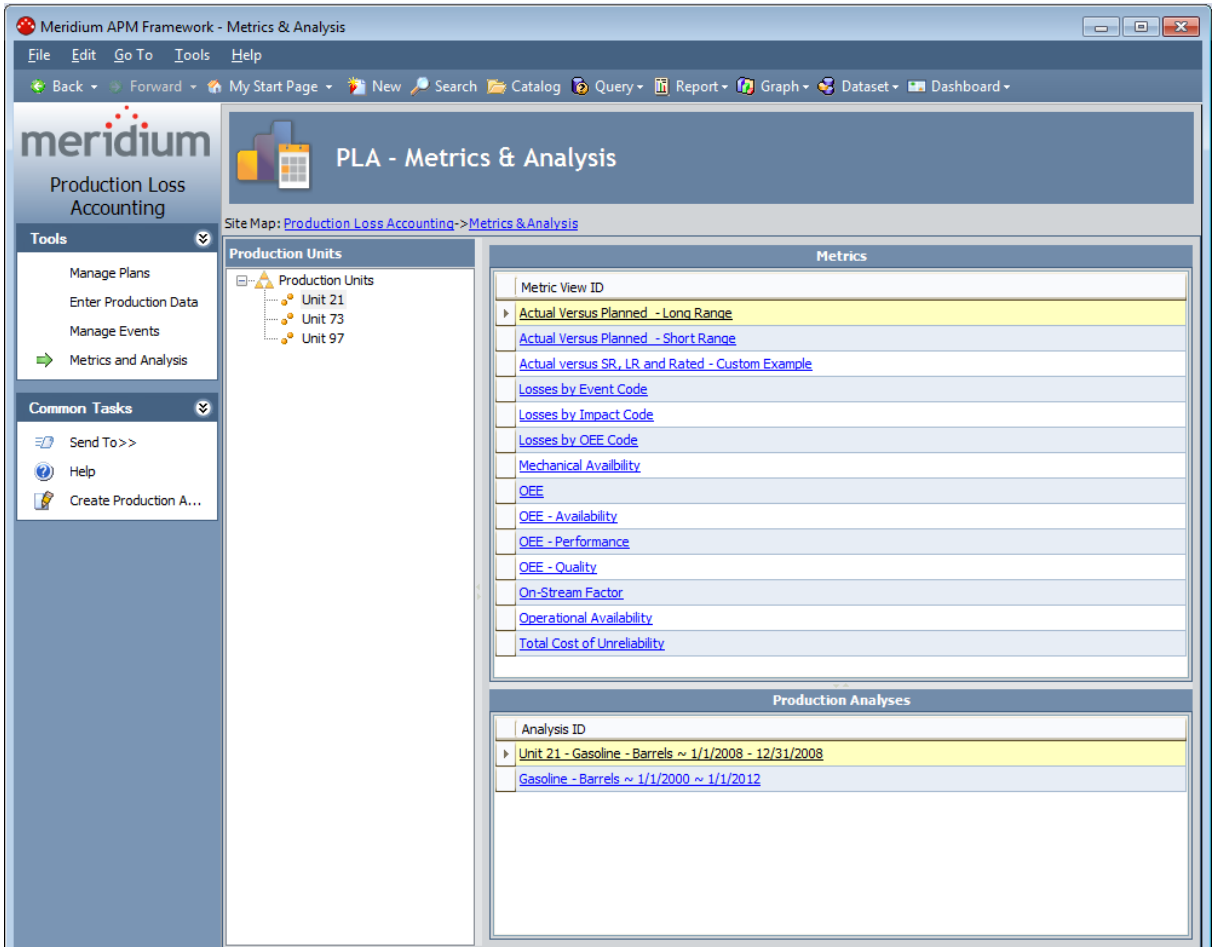
Accessing the Metrics & Analysis Page

To access the Metrics & Analysis page:

- On the **PLA Start Page**, click the **Metrics and Analysis** link.

  Note: The **Metrics and Analysis** link appears on the **PLA Start Page** only if the Metrics and Scorecards and/or Reliability Analytics module is active. If neither is active, the link does not appear.

  The **Metrics & Analysis** page appears.



Aspects of the Metrics & Analysis Page

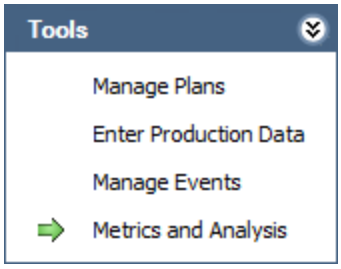
The **Metrics & Analysis** page contains the following items:

- **Task menu pane:** Contains the following task menus:
  - **Tools** menu
  - **Common Tasks** menu
- **Production Units pane:** Contains a tree that displays all Production Unit records that exist in the database.
- **Metrics pane:** Displays a list of Metric Views that you can open to display data from the Production Unit record that is selected in the **Production Units** pane.

  Note: This section appears only if the Metrics and Scorecards module is active.
- **Production Analyses pane:** Displays a list of Production Analysis records that are linked to the Production Unit record that is selected in the **Production Units** pane.

  Note: This section appears only if the Reliability Analytics module is active.

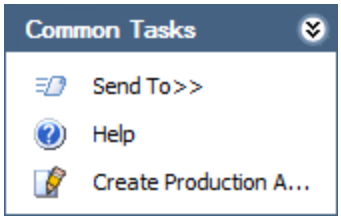
Tools



The **Tools** menu on the **Metrics & Analysis** page contains the following links:

- **Manage Plans:** Displays the **Find Production Unit** window, where you can search for the Production Unit record whose production plans you want to manage on the **Manage Production Plans** page.
- **Enter Production Data:** Displays the **Find Production Plan** window, where you can search for the Production Plan record that you want to use to build the data that will appear on the **Production Data Entry** page.
- **Manage Events:** Displays the Production Event Management page, where you can manage Production Event records.
- **Metrics and Analyses:** Continues to display the **Metrics & Analysis** page. A green arrow appears to the left of this link when you are viewing the **Metrics & Analysis** page.

Common Tasks Menu



The **Common Tasks** menu on the **Metrics & Analysis** page contains the following links:

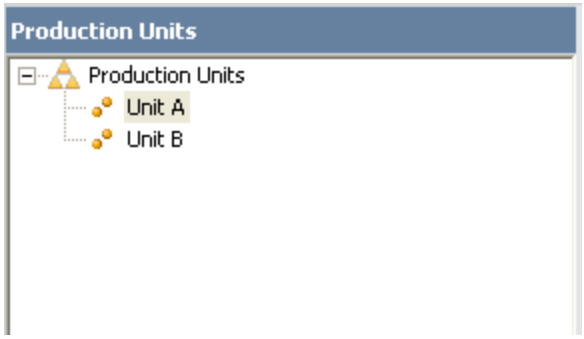
- **Send To:** Displays a submenu with options that let you provide a link to the current page on your desktop (create shortcut), in an email message, or on a Home Page.
- **Help:** Displays the context-sensitive Help topic for the **Metrics & Analysis** page.
- **Create Production Analysis:** Displays the **Production Analysis Builder**, which you can use to build a new Production Analysis.

> **Note:** The **Create Production Analysis** link appears only if the Reliability Analytics module is active.

Production Units Pane

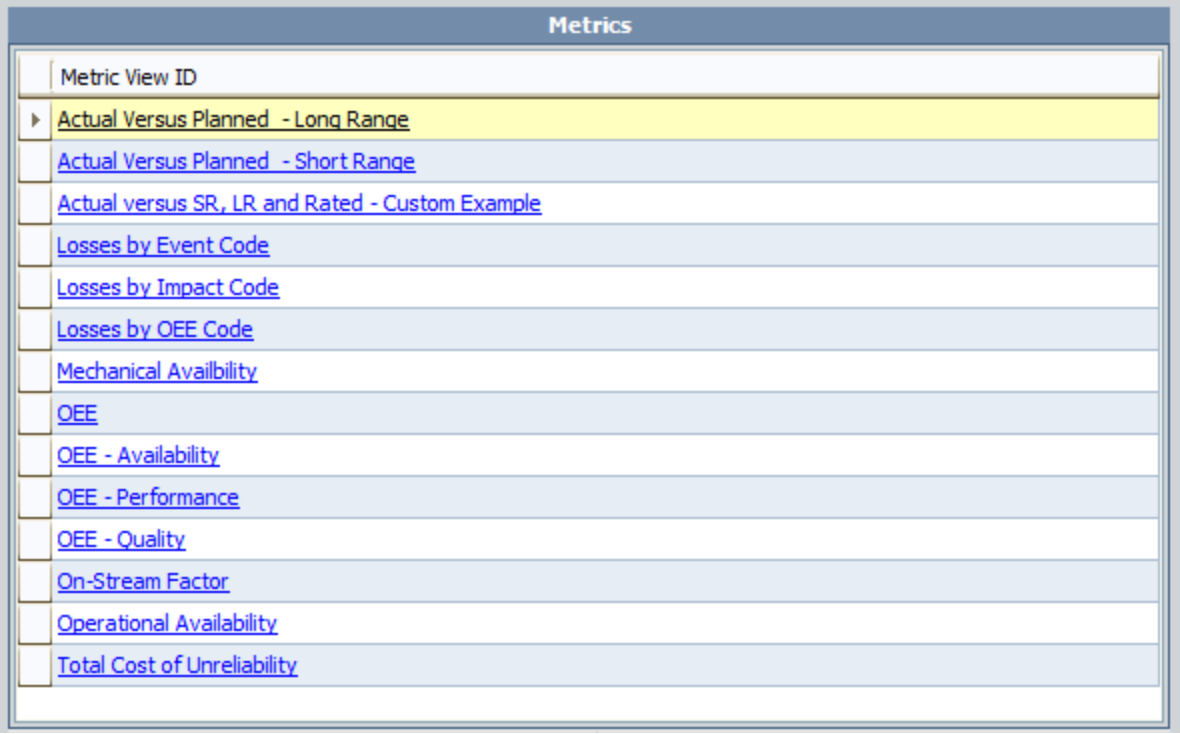
The **Production Units** pane on the **Metric Views and Production Analyses** page contains a tree that displays all Production Unit records that exist in the database. The root level of the tree displays the family grouping *Production Units*, which is represented by the icon. Directly below the family node are nodes representing the Product records. Each record is represented by the icon. To the right of each icon is the Record ID.

For example, suppose the following Production Units records exist in the database: *Unit A* and *Unit B*. In this case, the tree would look like this:



Metrics Pane

The **Metrics** pane on the Metric Views and Production Analyses page contains a grid, which displays a list of all Metric Views that exist in the Catalog folder \\Public\Meridium\Modules\PLA\Metrics. The **Metrics** pane is shown in the following image.

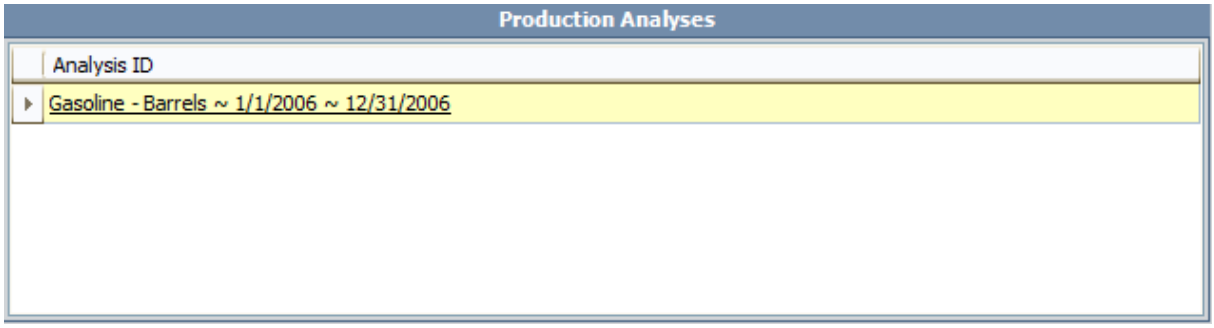


Each row in the grid contains the hyperlinked Catalog caption of one Metric View, which you can click to open the Metric View. Data from the Production Unit record that is selected in the **Production Units** pane will be passed into the Metric View.

Note: If the selected Production Unit record is not linked to any Production Profile records, when you try to open a Metric View for that Production Unit record, an error message will appear.

Production Analyses Pane

The **Production Analyses** pane on the Metric Views and Production Analyses page contains a grid, which displays a list of all Production Analysis records that are linked to the Production Unit record that is selected in the **Production Units** pane. The **Production Analyses** pane is shown in the following image.



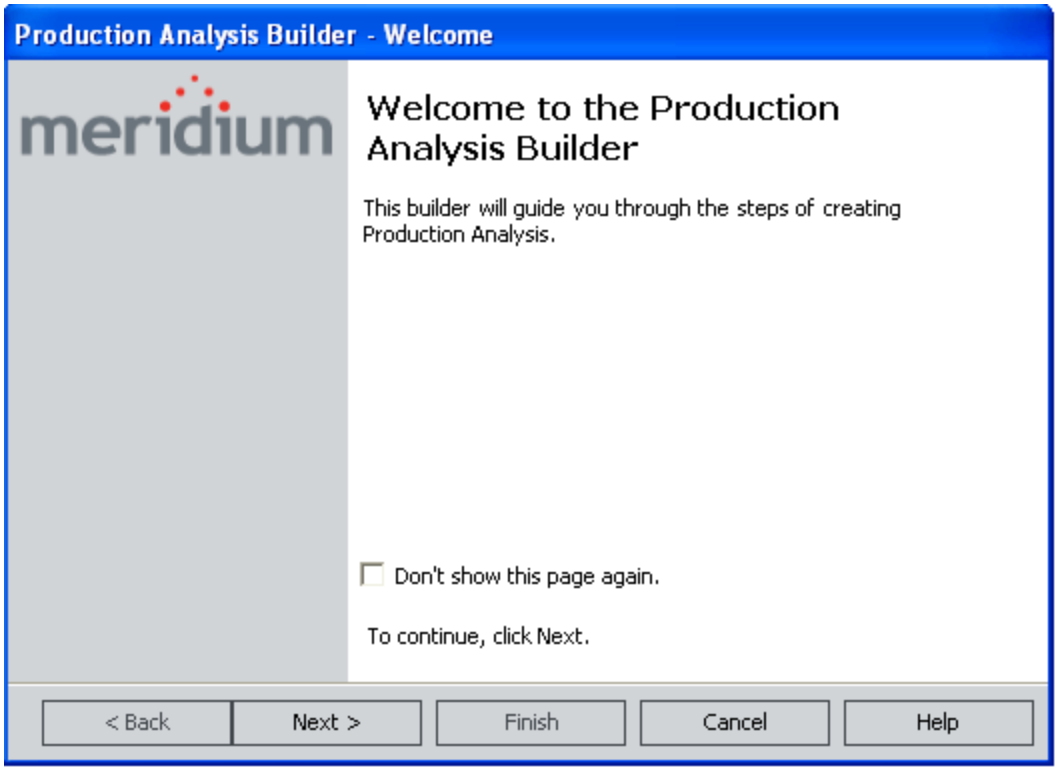
Each row in the grid contains the hyperlinked ID of one Production Analysis record, which you can click to open the Production Analysis on the **Production Analysis** page.

Accessing the Production Analysis Builder

To access the Production Analysis Builder from within PLA:

1. Access the **Metric Views and Production Analyses** page.
2. On the **Common Tasks** menu, click the **Create Production Analysis** link.

   The **Production Analysis Builder** appears, displaying the Welcome screen.

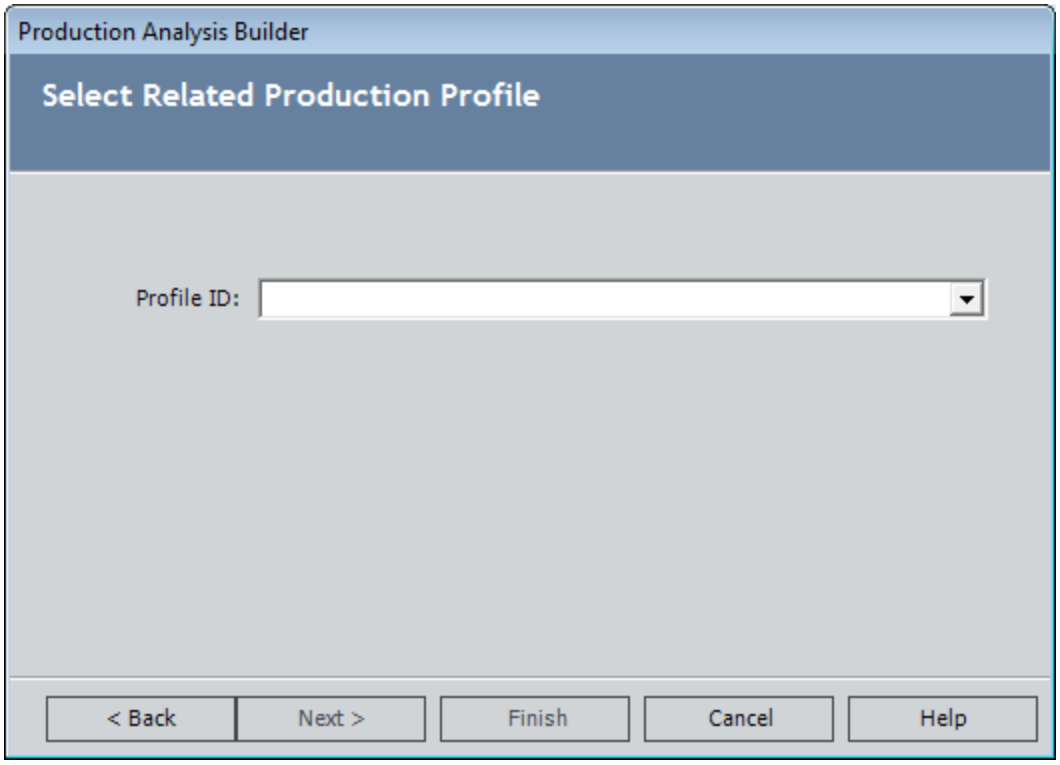


Using the Production Analysis Builder to Create a Production Analysis from PLA

To use the Production Analysis Builder to create a Production Analysis from PLA:

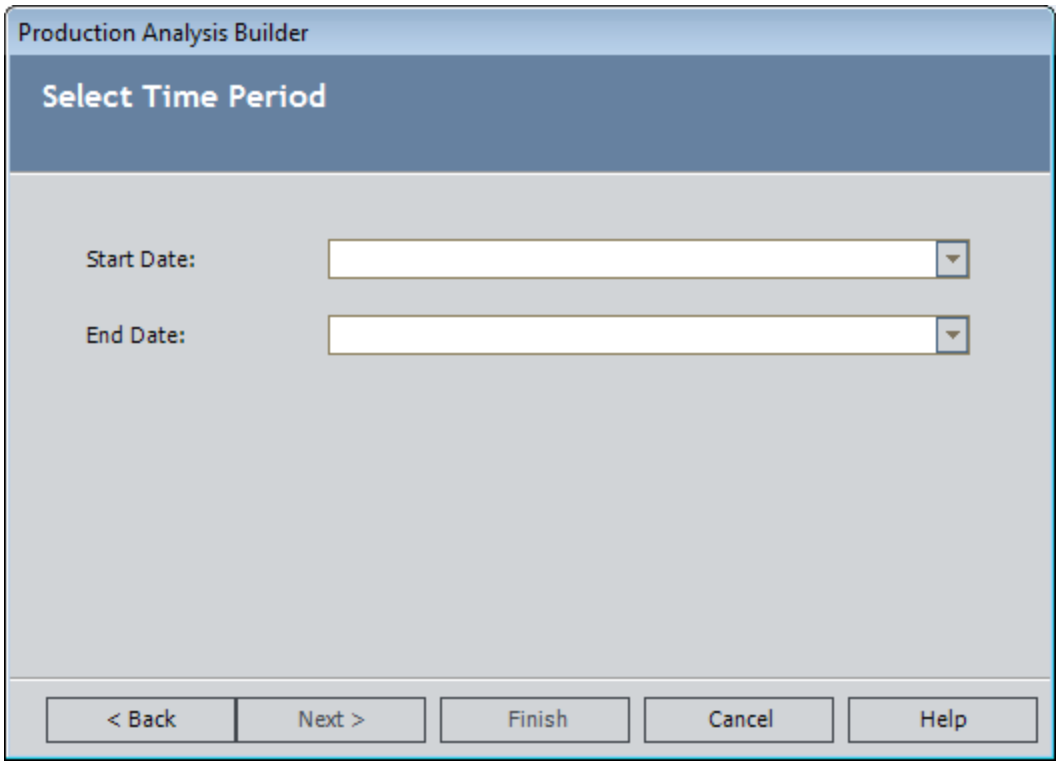
1. In the Production Analysis Builder, on the **Welcome** screen, click the **Next** button.

   The **Select Related Production Profile** screen appears.



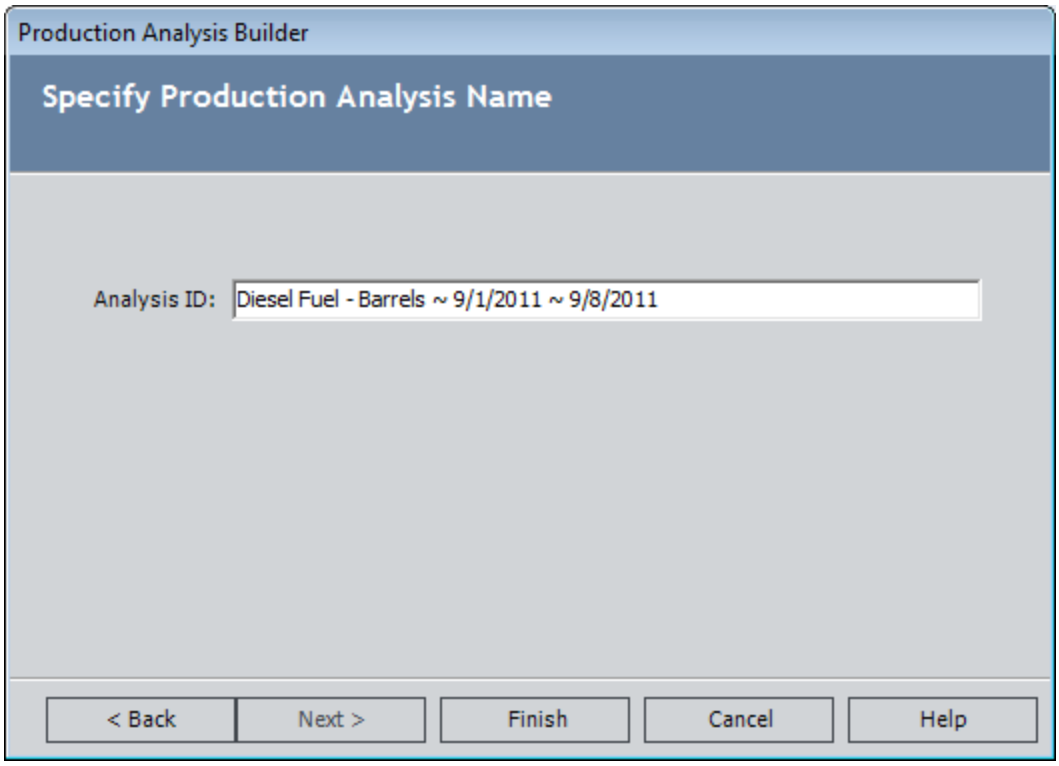
2. In the list, select the Production Profile record that you want to use to build the Production Analysis.
3. Click the **Next** button.

   The **Select Time Period** screen appears.



4. In the **Start Date** list, select the first day whose production data you want to plot in the Production Analysis.
5. In the **End Date** list, select the last day whose production data you want to plot in the Production Analysis.
6. Click the **Next** button.

   The **Specify Production Analysis Name** screen appears, displaying a default Analysis ID.



7. If desired, change the Analysis ID.
8. Click the **Finish** button.

   The Production Analysis is created and appears on the **Production Analysis** page. Note that several fields in the Production Analysis record are populated automatically.

Values Mapped to the Production Analysis Record

When you create a Production Analysis from Production Profile and Production Data records, several fields in the Production Analysis record are populated automatically as shown in the following table.

Production Analysis Field	Default Value
Analysis ID	A value that is constructed using the following format: **<Production Profile ID> ~ <Start Date> ~ <End Date>** ...where: • **<Production Profile ID>** is the Record ID of the Production Profile record that you selected in the **Production Analysis Builder**. • **<Start Date>** is the Start Date that you selected in the **Production Analysis Builder**. • **<End Date>** is the End Date that you selected in the **Production Analysis Builder**.
Start Date	The Start Date that you selected in the **Production Analysis Builder**.
End Date	The End Date that you selected in the **Production Analysis Builder**.
Unit of Measure	The value in the Product UOM field in the Production Profile record that you selected in the **Production Analysis Builder**.
Margin Value	The value in the Default Margin field in the Production Profile record that you selected in the **Production Analysis Builder**.
Analysis Type	The value *Production Analysis*.
Ignored Points	The value *0*.
Min Production	The value *0.0001*.

Production Analysis Field	Default Value
Production Data	Contains code representing a combination of values that make up the production data that is displayed on the Production Analysis plot. This combination of values is mapped from the following fields in PLA: Production Data records: • Actual • Period • MSCR Production Loss records: • OEE Code • Event Code • Impact Code
Total Points	The number of Production Data records that meet the following criteria: • They are associated with the Production Profile record that you selected in the **Production Analysis Builder**. -and- • The date in their Period field is on or after the Start Date and on or before the End Date that you selected in the **Production Analysis Builder**.

Values Mapped to the Production Data Field

About Values Mapped to the Production Data field

When you create a Production Analysis from records in the Production Loss Accounting module, several field values are passed from those records to the Production Data field in the Production Analysis record. The Production Data field stores code representing the production data that is used to create the Production Analysis plot. You can view the underlying production data on the **Edit Production Data**window in the Production Analysis module.

The All Production Data query, which is located in the Catalog folder **\\Public\Meridium\Modules\Reliability Manager\Analyses**, determines which values from PLA are mapped to the Production Data field.

The following table lists the PLA fields whose values are mapped to the Production Data field by default, along with the columns in the **Edit Production Data** window in which you can see those values.

PLA Family	PLA Field	Edit Production Data Window Column
Production Data	Actual	Production Output
Production Data	Period	Date
Production Data	MSCR	MSCR
Production Loss	OEE Code	OEE
Production Loss	Event Code	Event Code
Production Loss	Impact Code	Impact Code

On the **Production Analysis** page, you can use the group data feature to display production data according to the values (e.g., impact codes) that are mapped from PLA.

Note: An administrative user can map values in different fields by modifying the All Production Data query, which is located in the Catalog folder **\\Public\Meridium\Modules\Reliability Manager\Analyses**.

About Mapping OEE, Event, and Impact Code Values

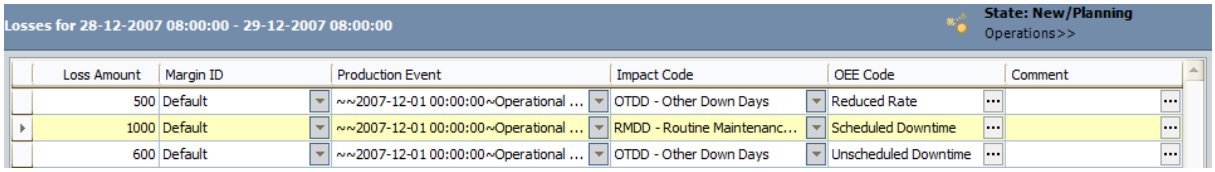
To determine which OEE codes, event codes, and impact codes associated with losses for a given date get mapped from PLA to the Production Data field in a Production Analysis, the Meridium APM system looks at all Production Loss records that are associated with the Production Data record for that date. Those Production Loss records are then grouped by event code, impact code, and OEE code to determine which event code is

associated with the highest loss, which impact code is associated with the highest loss, and which OEE code is associated with the highest loss.

For each item (event code, impact code, and OEE code) values from the ones that are associated with the *highest* loss are mapped to the Production Data field in the Production Analysis record.

Note: If there is no value (e.g., impact code) defined for the highest loss, the value *No <Field> Defined* will be mapped to the Production Analysis dataset.

For example, consider the following Production Loss records that are linked to the Production Data record for 12/28/2007 to 12/29/2007.



You can see that:

- All losses are associated with the same event code: *Operational Losses*. The Total loss amount for this event code is *2,100* (500 + 1,000 + 600).
- Two of the losses are associated with the same impact code: *OTDD — Other Down Days*. The total loss amount for this impact code is *1,100* (500 + 600).
- All of the losses are associated with different OEE codes. The individual loss amounts associated with these OEE codes are *500*, *1,000*, and *600*.

Using this example, for 12/28/2007 to 12/29/2007, the following data would be mapped to the Production Data field in a Production Analysis:

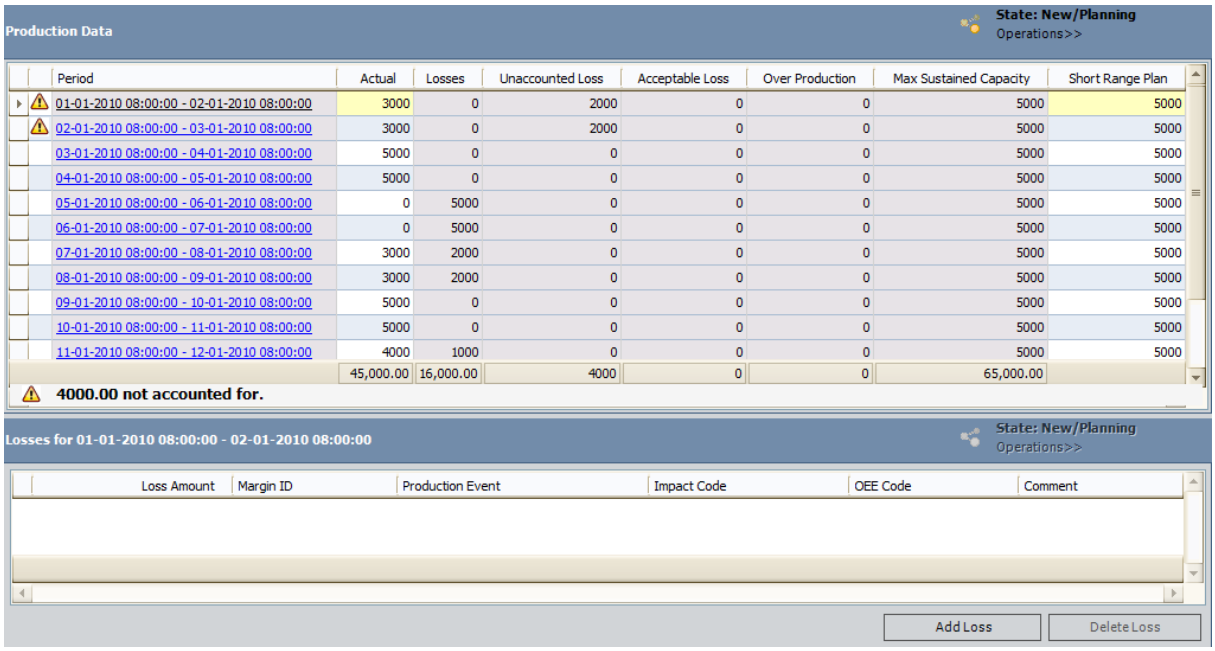
- **Production Event**: *Operational Losses*, because it is the only event code that exists for this date.
- **Impact Code**: *OTDD*, because the combined loss amount associated with this impact code is 1,100, which is higher than the loss amount associated with the remaining Production Loss record (1,000).
- **OEE Code**: *Scheduled Downtime*, because the loss amount associated with this OEE code is 1000, which is higher than the loss amount associated with the remaining two Production Loss records (500 and 600).

Note: The values that are mapped for each field for a given day do not have to be from the same Production Loss record. In the example, *OTDD* and *Scheduled Downtime* are not in the same Production Loss record.

Example of a Production Analysis Created from PLA

Note: The purpose of the following example is only to show how data gets mapped from PLA to a Production Analysis. It is not meant to show how production data can be used to create a realistic Production Analysis.

Suppose a production plan is for January 1, 2010 through January 31, 2010 and that the current day is January 13, 2010. In this case, the Production Data tab on the Production Data Entry page would look something like this:



Production Data — State: New/Planning — Operations>>

Period	Actual	Losses	Unaccounted Loss	Acceptable Loss	Over Production	Max Sustained Capacity	Short Range Plan
01-01-2010 08:00:00 - 02-01-2010 08:00:00	3000	0	2000	0	0	5000	5000
02-01-2010 08:00:00 - 03-01-2010 08:00:00	3000	0	2000	0	0	5000	5000
03-01-2010 08:00:00 - 04-01-2010 08:00:00	5000	0	0	0	0	5000	5000
04-01-2010 08:00:00 - 05-01-2010 08:00:00	5000	0	0	0	0	5000	5000
05-01-2010 08:00:00 - 06-01-2010 08:00:00	0	5000	0	0	0	5000	5000
06-01-2010 08:00:00 - 07-01-2010 08:00:00	0	5000	0	0	0	5000	5000
07-01-2010 08:00:00 - 08-01-2010 08:00:00	3000	2000	0	0	0	5000	5000
08-01-2010 08:00:00 - 09-01-2010 08:00:00	3000	2000	0	0	0	5000	5000
09-01-2010 08:00:00 - 10-01-2010 08:00:00	5000	0	0	0	0	5000	5000
10-01-2010 08:00:00 - 11-01-2010 08:00:00	5000	0	0	0	0	5000	5000
11-01-2010 08:00:00 - 12-01-2010 08:00:00	4000	1000	0	0	0	5000	5000
	45,000.00	16,000.00	4000	0	0	65,000.00	

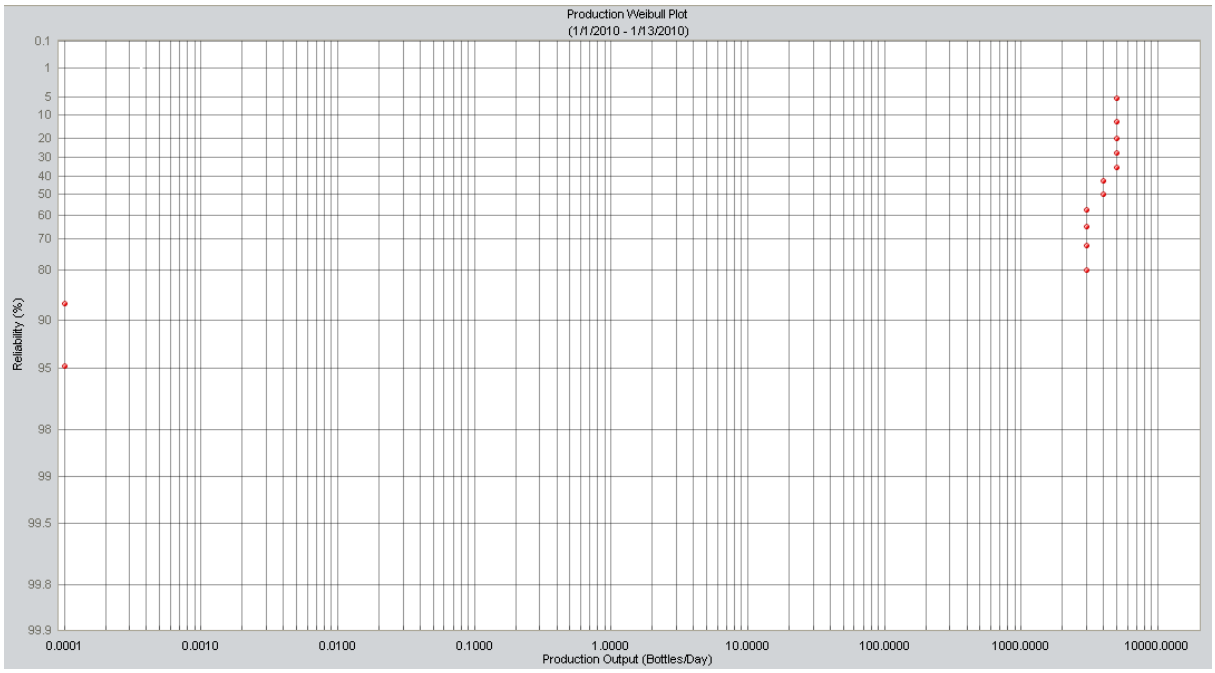
4000.00 not accounted for.

Losses for 01-01-2010 08:00:00 - 02-01-2010 08:00:00 — State: New/Planning — Operations>>

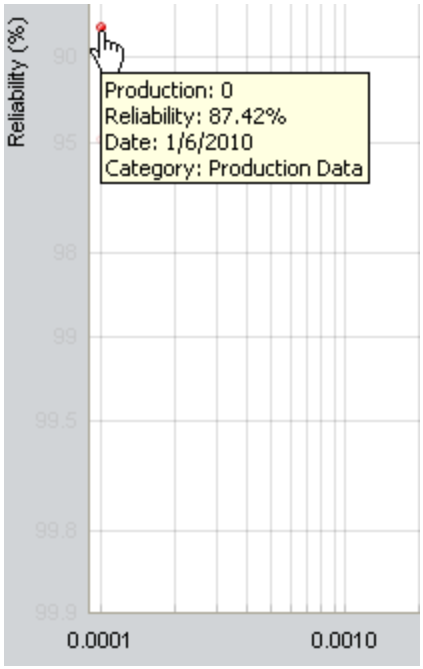
Loss Amount	Margin ID	Production Event	Impact Code	OEE Code	Comment

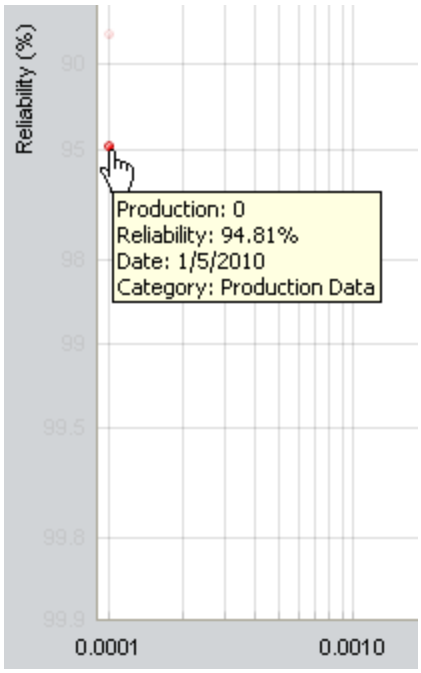
Add Loss | Delete Loss

If you created a Production Analysis from this data, it would look like this, where the Actual values are plotted on the x-axis:

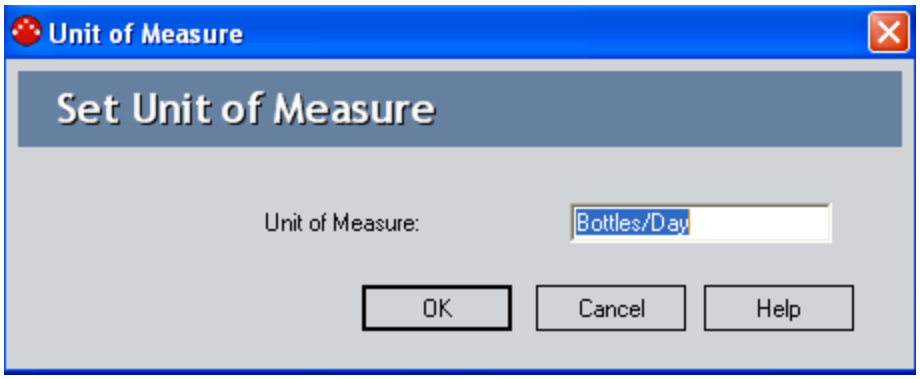


For example, you can see the two Production Data records that have an Actual value of 0.

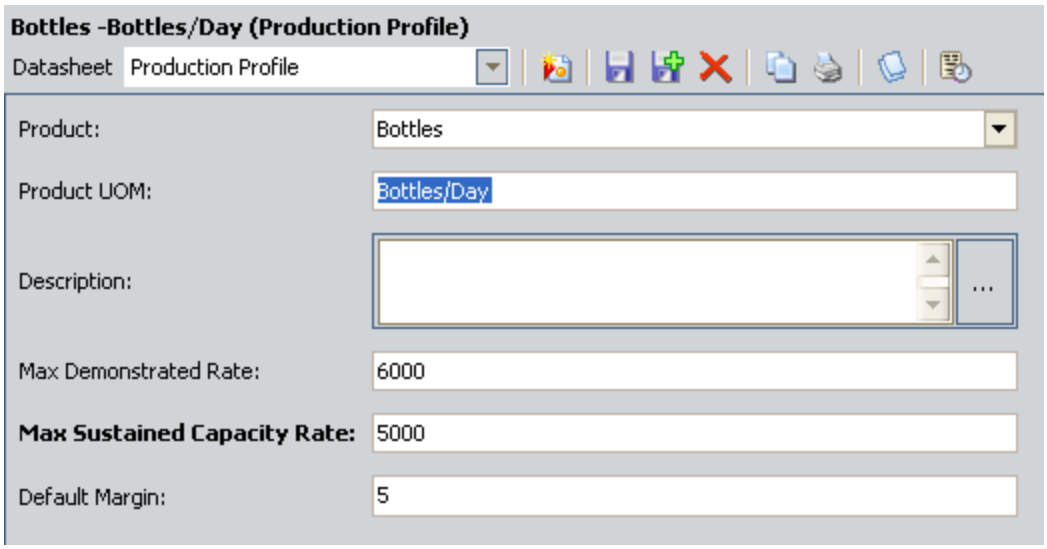




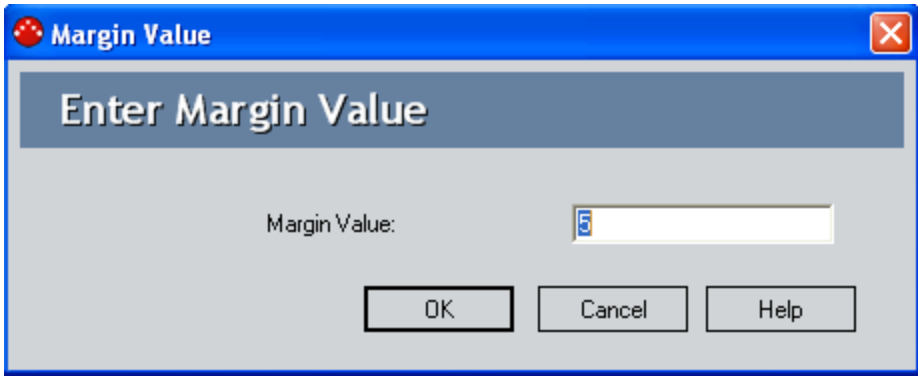
If you clicked the **Unit of Measure** link on the **Analysis Settings** task menu, you would see *Bottles/Day*.



If you opened the Production Profile record that you selected in the **Production Analysis Builder** when you created the Production Analysis, you would see the same value in the Product UOM field, as shown in the following image.

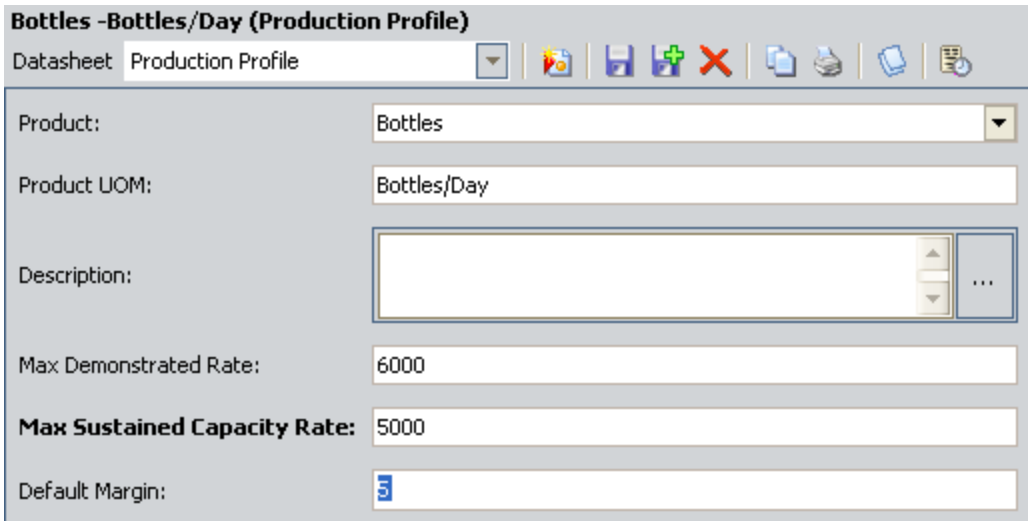


If you clicked the **Margin Value** link on the **Analysis Settings** task menu, you would see *5*.



If you opened the Production Profile record that you selected in the **Production Analysis Builder** when you created the Production Analysis, you would see the same value in the Default Margin field.

Example of a Production Analysis Created from PLA



About the Integration Between PLA and Metric Views

The baseline Meridium APM database contains the following PLA Metric Views, which are stored in the Catalog folder \\Public\Meridium\Modules\PLA\Metrics:

- Actual Versus Planned - Long Range
- Actual Versus Planned - Short Range
- Losses By Event Code
- Losses By Impact Code
- Losses By OEE Code
- Mechanical Availability
- OEE
- OEE - Availability
- OEE - Performance
- OEE - Quality
- On-Stream Factor
- Operational Availability
- Total Cost of Unreliability

After you record production values and account for losses using the **Production Data Entry** page, you can access these Metric Views from the **Metric Views and Production Analyses** page.

Note: You will be able to access the Metric Views only if an administrative user has completed the necessary configuration steps.

Actual Versus Planned - Long Range

Using the Long Range Plan field in Production Data records that are associated with that Production Unit record, the *Actual Versus Planned - Long Range* Metric View illustrates for a single production unit how much output it produced versus how much you planned for it to produce.

Each level of the Metric View displays a percentage of production output values using the following equation:

Actual Versus Planned (Long Range) = (Σ All Actual Values / Σ All Long Range Values) x 100

For example, assume that for Unit 1, the following values exist as of January 10, 2009.

Product	Date	Actual Value	Long Range Plan
Bottles	1/1/2009	3000	3000
Bottles	1/2/2009	3000	3000
Bottles	1/3/2009	2000	3000
Bottles	1/4/2009	3000	3000
Bottles	1/5/2009	2000	3000
Bottles	1/6/2009	3000	3000
Bottles	1/7/2009	0	
Bottles	1/8/2009	0	
Bottles	1/9/2009	1500	
Bottles	1/10/2009	1800	
Labels	1/1/2009	5000	6000
Labels	1/2/2009	5000	6000
Labels	1/3/2009	4000	6000
Labels	1/4/2009	4500	6000
Labels	1/5/2009	5000	6000
Labels	1/6/2009	6000	6000
Labels	1/7/2009	0	
Labels	1/8/2009	0	
Labels	1/9/2009	4800	
Labels	1/10/2009	5000	

From this table, for Unit 1 for January 1 through January 10:

- The sum of all Actual values is *58,600*.
- The sum of all Long Range values is *90,000*.

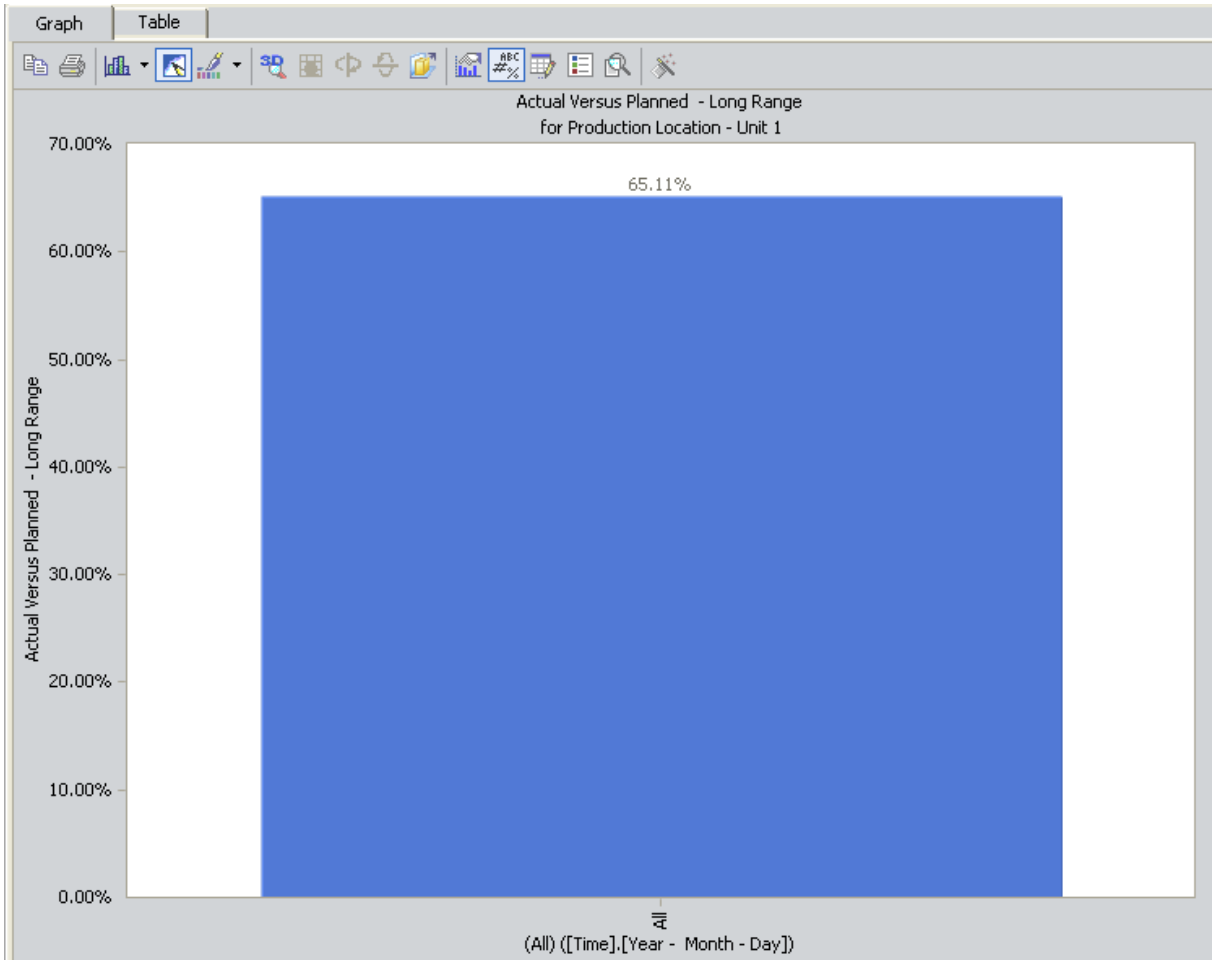
In this case, if you were to view the *Actual Versus Planned - Long Range* Metric View for Unit 1, the level that displays Actual Versus Planned Long Range values for January would use this equation:

Actual Versus Planned (Long Range) = (58,600 / 90,000) x 100

Actual Versus Planned (Long Range) = .6511 x 100

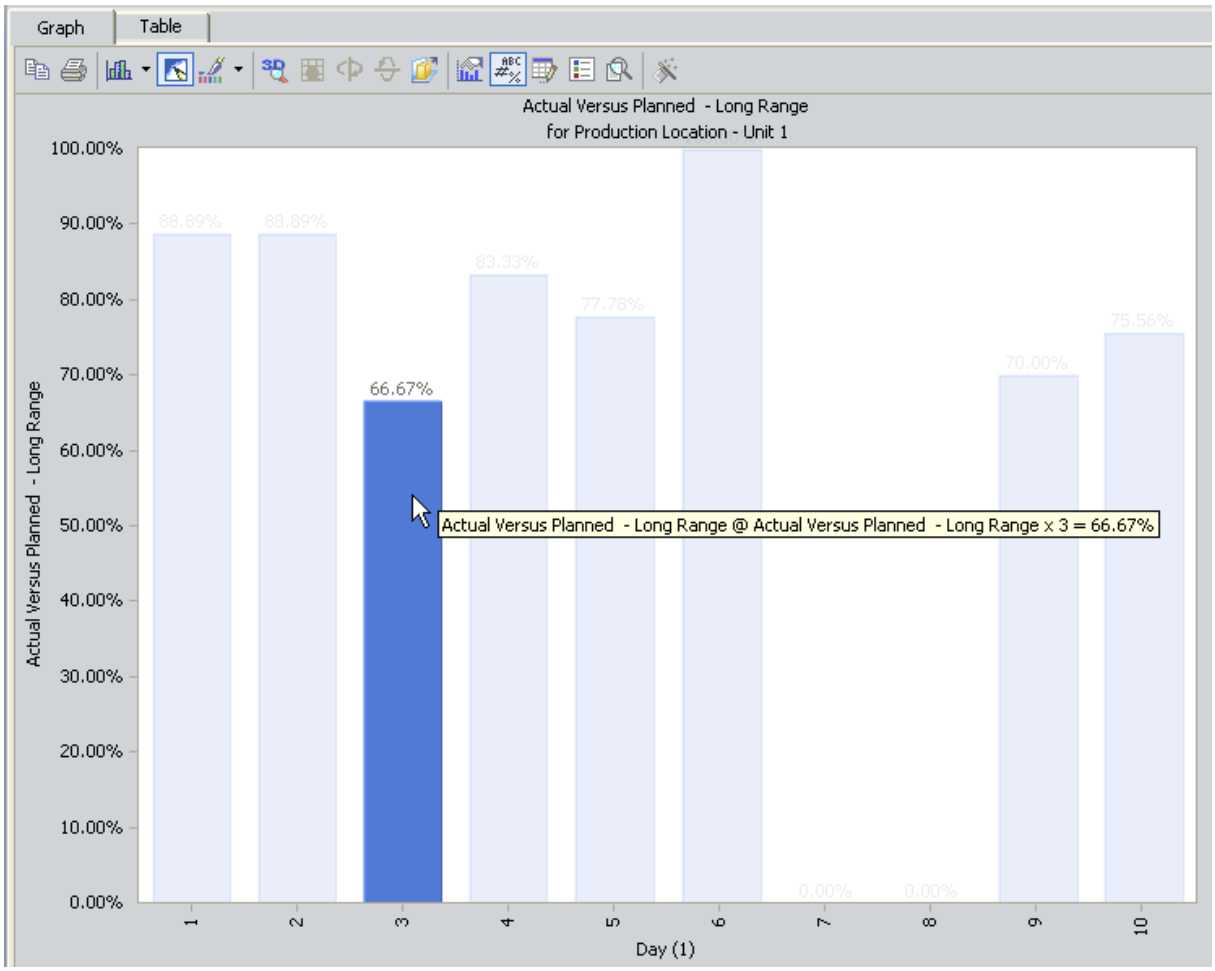
Actual Versus Planned (Long Range) = 65.11%

The graph would look like this, where the month of January is displayed on the x-axis, and the production output is displayed on the y-axis as a percentage:



In other words, from January 1 through January 10, Unit 1 produced 65.11% of what you planned for it to produce.

If you were to drill down into the next level of the graph, you would see this:



Here, you can see that for day 3 (January 3), Unit 1 produced 66.67% of the output you planned for it to produce. This value is calculated using the following values from the previous table.

Product	Date	Actual Value	Long Range Plan
Bottles	1/3/2009	2000	
Labels	1/3/2009	4000	

Using these values, for January 3:

- The sum of all Actual values is *6,000*.
- The sum of all Long Range values is *9,000*.

In this case, Actual Versus Planned (Long Range) is calculated as:

Actual Versus Planned (Long Range) = (6,000 / 9,000) x 100

Actual Versus Planned (Long Range) = .6666 x 100

Actual Versus Planned (Long Range) = 66.67%

Actual Versus Planned - Short Range

Using the Short Range Plan field in Production Data records that are associated with that Production Unit record, the *Actual Versus Planned - Short Range* Metric View illustrates for a single production unit how much output it produced versus how much you planned for it to produce after you adjusted the planned output amount.

Each level of the Metric View displays a percentage of production output values using the following equation:

Actual Versus Planned (Short Range) = (Σ All Actual Values / Σ All Short Range Values) x 100

For example, assume that for Unit 1, the following values exist as of January 10, 2009.

Product	Date	Actual Value	Short Range Plan
Bottles	1/1/2009	3000	3000
Bottles	1/2/2009	3000	3000
Bottles	1/3/2009	2000	3000
Bottles	1/4/2009	3000	3000
Bottles	1/5/2009	2000	3000
Bottles	1/6/2009	3000	3000
Bottles	1/7/2009	0	
Bottles	1/8/2009	0	
Bottles	1/9/2009	1500	
Bottles	1/10/2009	1800	
Labels	1/1/2009	5000	6000
Labels	1/2/2009	5000	6000
Labels	1/3/2009	4000	6000
Labels	1/4/2009	4500	6000
Labels	1/5/2009	5000	6000
Labels	1/6/2009	6000	6000
Labels	1/7/2009	0	
Labels	1/8/2009	0	

Product	Date	Actual Value	Short Range Plan
Labels	1/9/2009	4800	
Labels	1/10/2009	5000	

From this table, for Unit 1 for January 1 through January 10:

- The sum of all Actual values is *58,600*.
- The sum of all Short Range values is *68,000*.

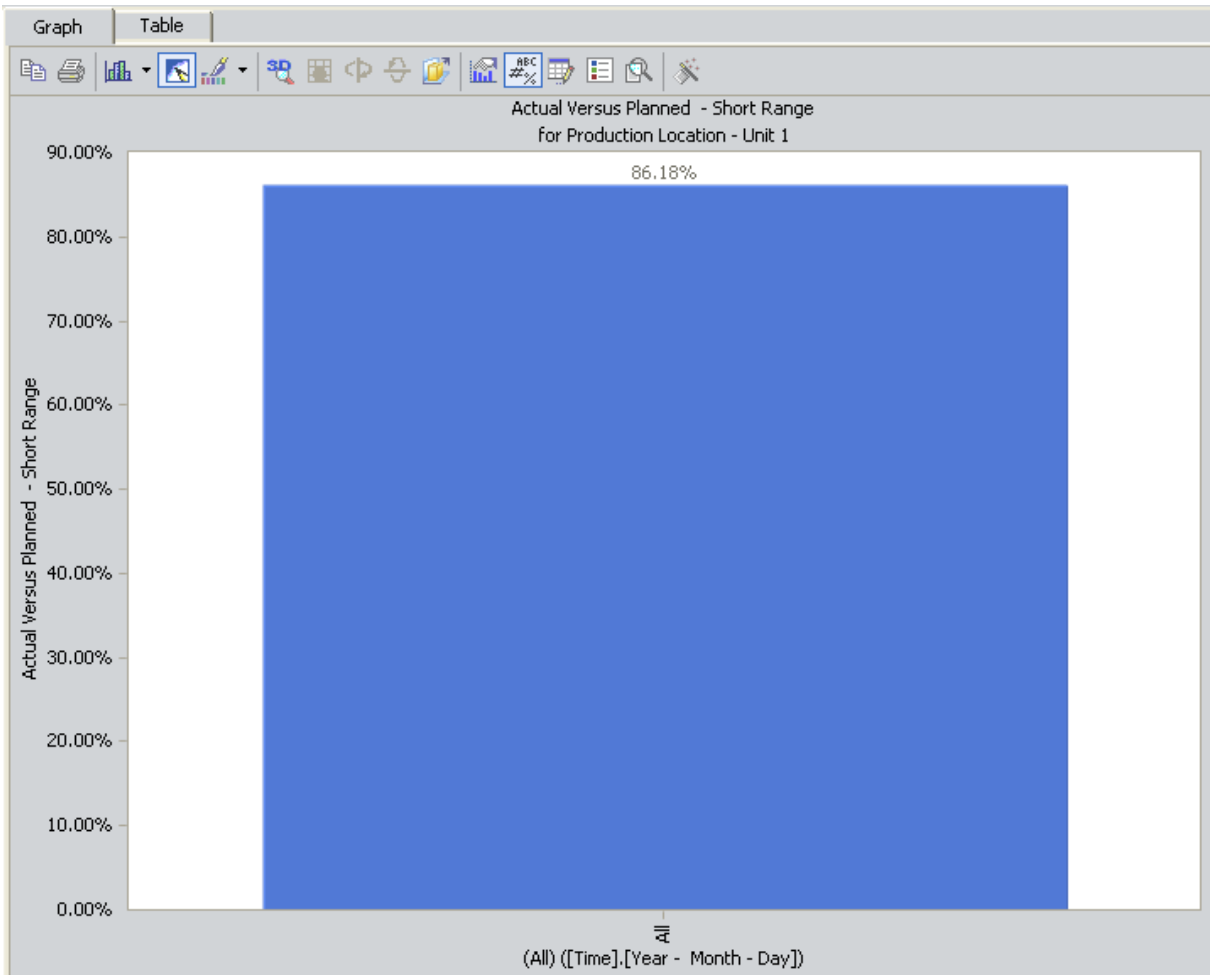
In this case, if you were to view the *Actual Versus Planned - Short Range* Metric View for Unit 1, the level that displays Actual Versus Planned Short Range values for January would use this equation:

Actual Versus Planned (Short Range) = (58,600 / 68,000) x 100

Actual Versus Planned (Short Range) = .86176 x 100

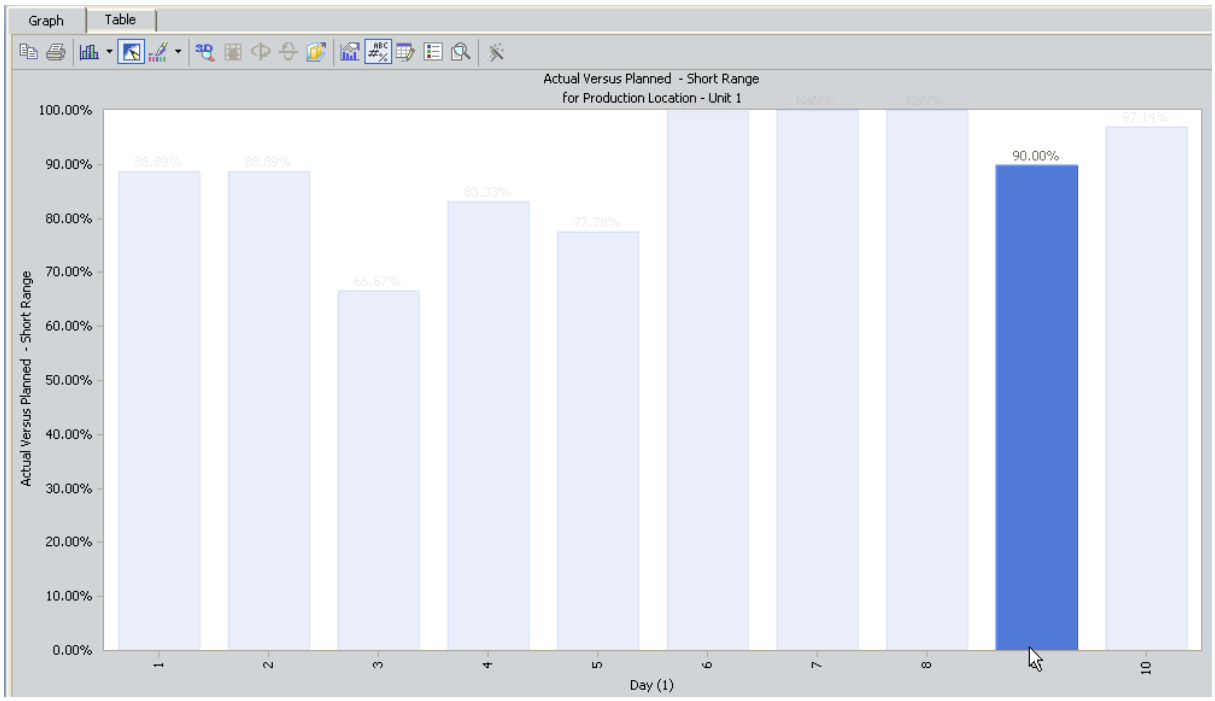
Actual Versus Planned (Short Range) = 86.18%

The graph would look like this, where the month of January is displayed on the x-axis, and the production output is displayed on the y-axis as a percentage:



In other words, from January 1 through January 10, Unit 1 produced 84.93% of what you planned for it to produce based on the adjusted planned output values.

If you were to drill down into the next level of the graph, you would see this:



Here, you can see that for day 9 (January 9), Unit 1 produced 90% of the output you planned for it to produce after you adjusted the planned output amount. This value is calculated using the following values from the previous table.

Product	Date	Actual Value	Short Range Plan
Bottles	1/9/2009	1500	
Labels	1/9/2009	4800	

Using these values, for January 9:

- The sum of all Actual values is *6,300*.
- The sum of all Short Range values is *7,000*.

In this case, Actual Versus Planned (Short Range) is calculated as:

Actual Versus Planned (Short Range) = (6,300 / 7,000) x 100

Actual Versus Planned (Short Range) = .9 x 100

Actual Versus Planned (Short Range) = 90%

Losses By Event Code

The *Losses By Event Code* Metric View indicates the total amount of production losses for a single production unit. Each level of the Metric View displays the sum of all values in the **Losses** column on the **Production Data** tab.

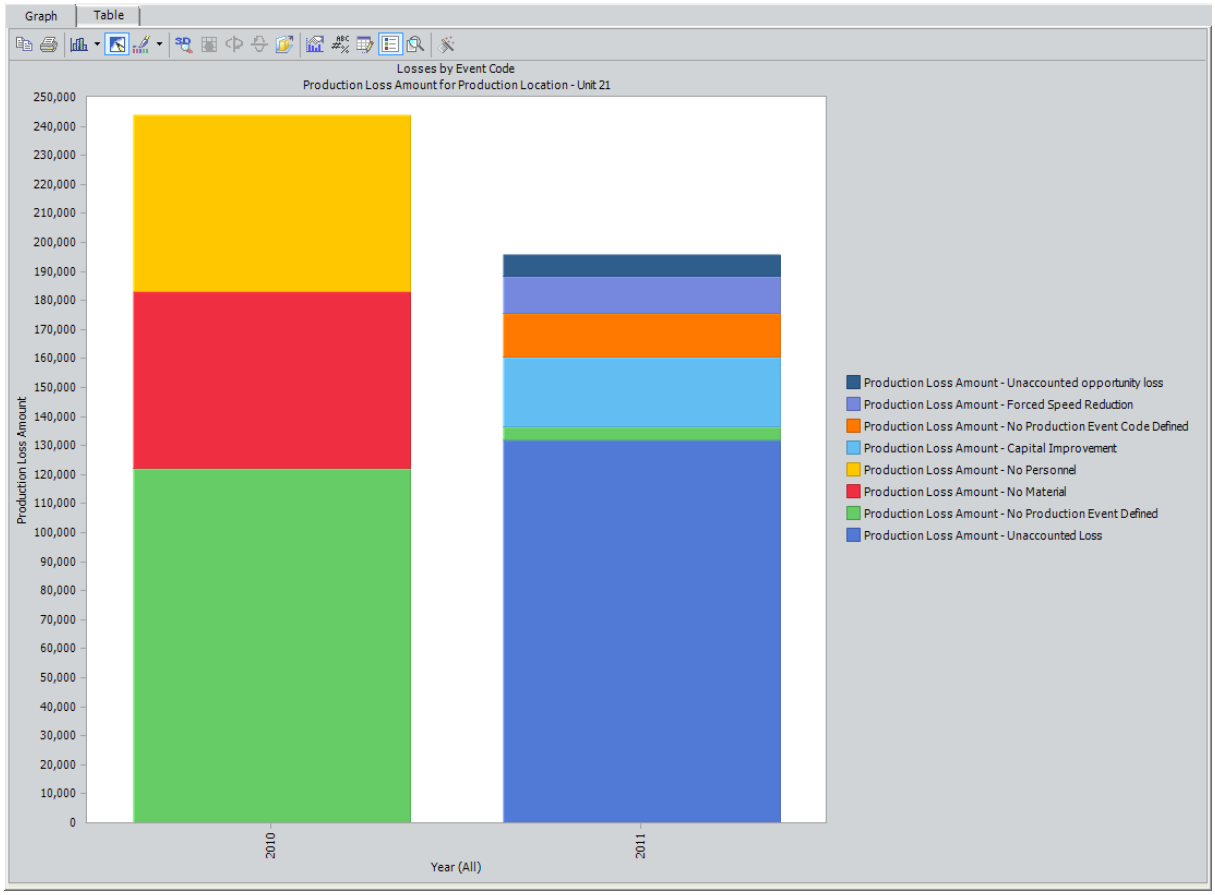
The losses are displayed by Production Event Code, which is defined in the Production Event Code field of the Production Event record that is linked to a Production Loss record.

- If there is no Production Event associated with a Production Loss, the loss will be labeled *No Production Event Defined* on the legend.
- If there is a Production Event associated with the Production Loss but it does not have a Production Event Code, the loss will be labeled *No Production Event Code Defined* on the legend.
- If there is unaccounted loss that is not defined in a Production Loss record (i.e., the value in the **Unaccounted Loss** column on the **Production Data** tab), the loss will be labeled *Unaccounted Loss* on the legend.

For example, assume that Unit 21 experiences the following losses on a monthly basis in 2011.

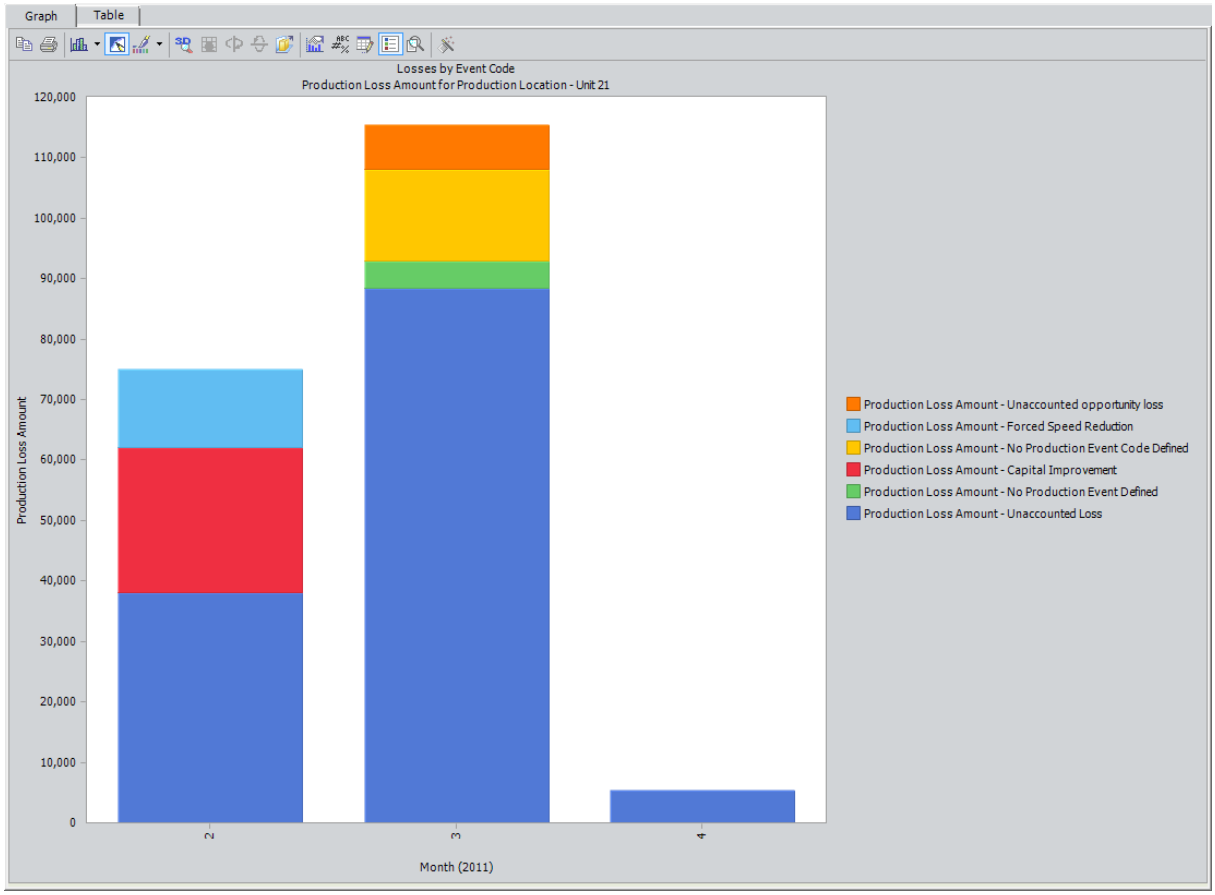
Production Loss	Event Code
February	
13,000	Forced Speed Reduction
24,000	Capital Improvement
38,000	Unaccounted Loss
March	
7,500	Unaccounted Opportunity Loss
15,000	No Production Event Code Defined
4,500	No Production Event Defined
88,500	Unaccounted Loss
April	
5,500	Unaccounted Loss

The *Losses By Event Code* Metric View graph for this dataset is displayed in the following image, where Time is displayed on the x-axis, Production Loss Amount is displayed on the y-axis, and the Production Event Code is displayed on the legend.



If you drill down into the next level of the graph, the Metric View is divided into separate months, as shown in the following image.

Losses By Event Code



Losses By Impact Code

The *Losses By Event Code* Metric View indicates the total amount of production losses for a single production unit. Each level of the Metric View displays the sum of all values in the **Losses** column on the **Production Data** tab.

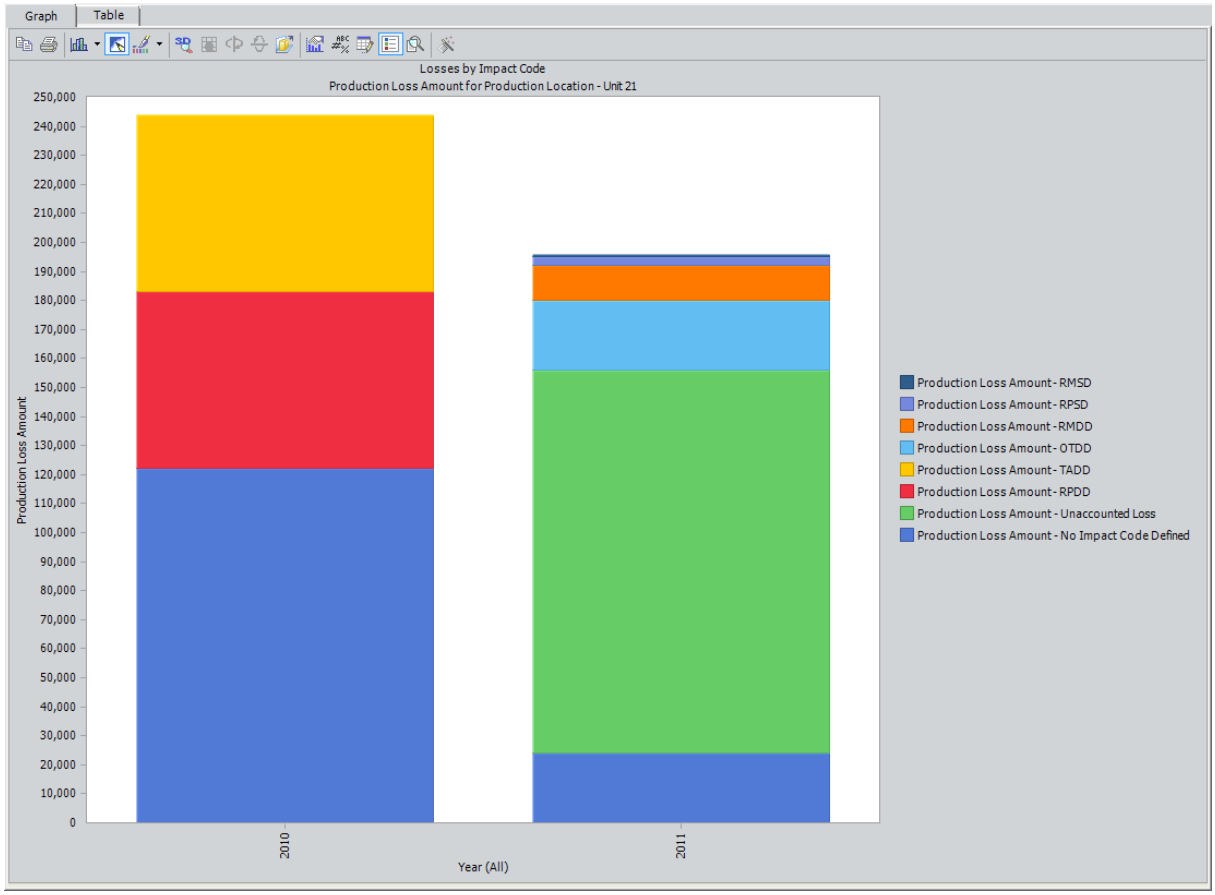
The losses are displayed by Impact Code, which is defined in the Impact Code field of each Production Loss record.

- If there is no value defined in the Impact Code field of a Production Loss record, the loss will be labeled *No Impact Code Defined* on the legend.
- If there is unaccounted loss that is not defined in a Production Loss record (i.e., the value in the **Unaccounted Loss** column on the **Production Data** tab), the loss will be labeled *Unaccounted Loss* on the legend.

For example, assume that Unit 21 experiences the following losses on a monthly basis in 2011.

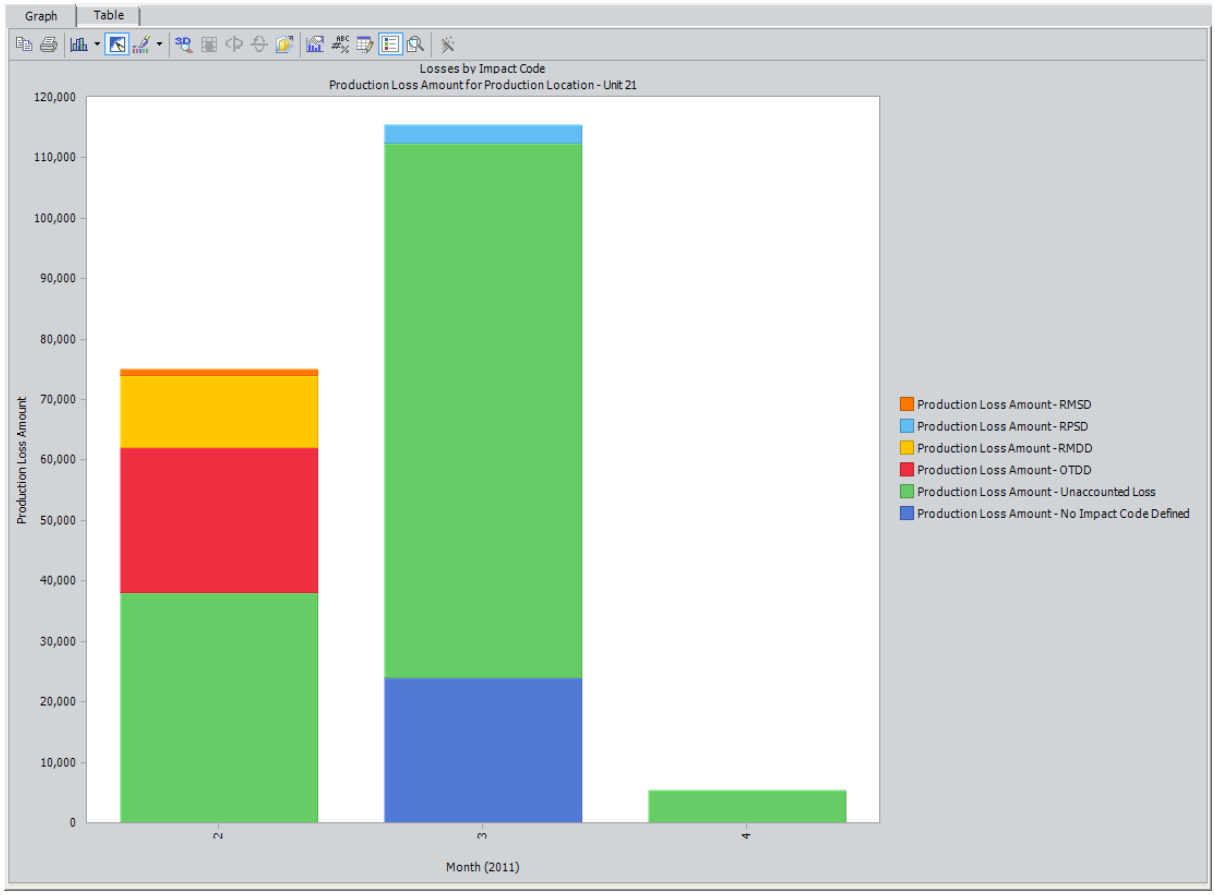
Production Loss	Impact Code
February	
1,000	RMSD (Routine Maintenance Slowdown Day)
12,000	RMDD (Routine Maintenance Down Day)
24,000	OTDD (Other Type of Down Day)
38,000	Unaccounted Loss
March	
3,000	RPSD (Regulatory Process Slowdown Day)
88,500	Unaccounted Loss
24,000	No Impact Code Defined
April	
5,500	Unaccounted Loss

The *Losses By Impact Code* Metric View would look like this, where Time is displayed on the x-axis, Production Loss Amount is displayed on the y-axis, and the Impact Code is displayed on the legend:



If you drill down into the next level of the graph, the Metric View is divided into separate months, as shown in the following image.

Losses By Impact Code



Losses By OEE Code

The *Losses By OEE Code* Metric View indicates the total amount of lost production, grouped by OEE Code, for a single production unit. Each level of the Metric View displays the sum of all values in the **Losses** column on the Production Data tab.

The losses are grouped by OEE Code, which is defined in the OEE Code field of each Production Loss record.

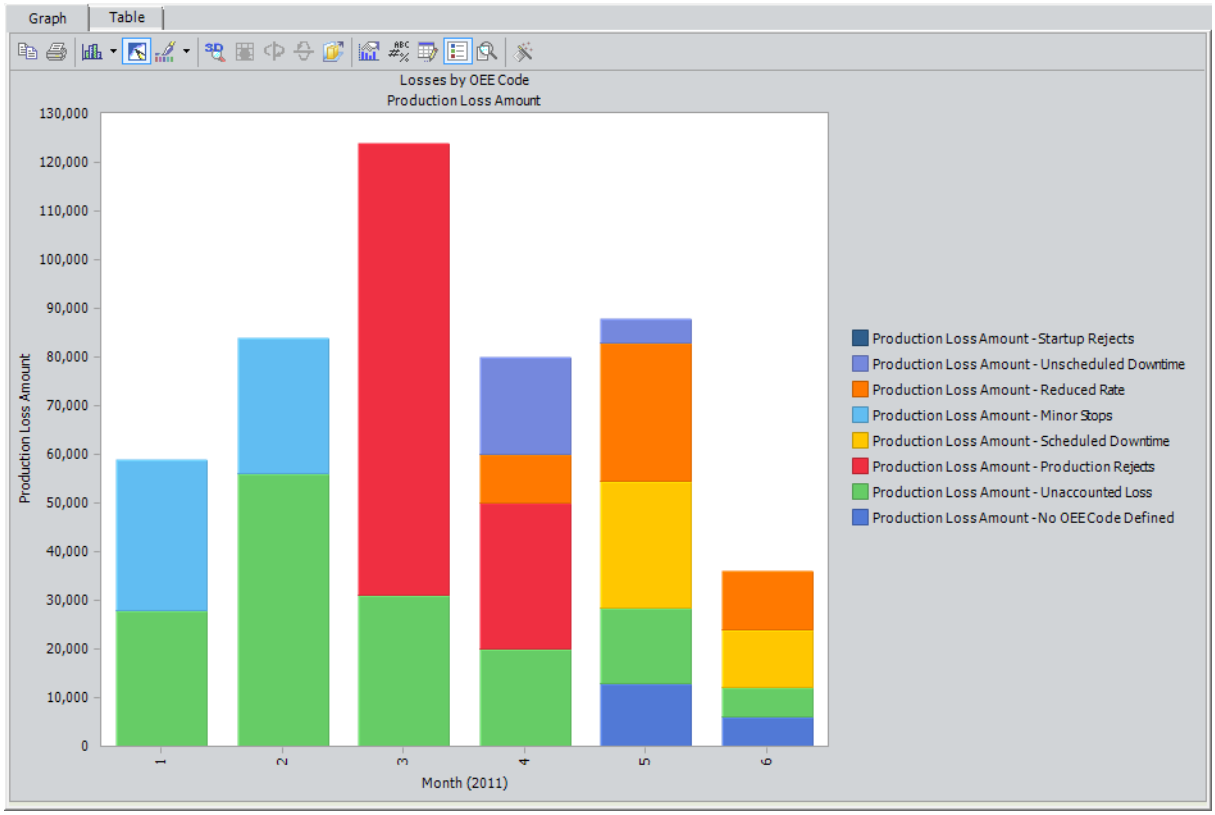
- If there is no value in this field, the loss will be labeled *No OEE Code Defined* on the legend.
- If there is unaccounted loss that is not defined in a Production Loss record (i.e., the value in the **Unaccounted Loss** column on the **Production Data** tab), the loss will be labeled *Unaccounted Loss* on the legend.

For example, assume that Unit 16 experiences the following losses in 2011.

Production Loss	OEE Code
January	
27,900	(Unaccounted Loss)
31,000	Minor Stops
100	Startup Rejects
February	
56,000	(Unaccounted Loss)
28,000	Minor Stops
March	
31,000	(Unaccounted Loss)
93,000	Production Rejects
April	
20,000	(Unaccounted Loss)
30,000	Production Rejects
10,000	Reduced Rate
20,000	Unscheduled Downtime
May	
13,000	(No OEE Code Defined)

Production Loss	OEE Code
15,500	(Unaccounted Loss)
26,000	Scheduled Downtime
28,500	Reduced Rate
5,000	Unscheduled Downtime
June	
6,000	(No OEE Code Defined)
6,000	(Unaccounted Loss)
12,000	Scheduled Downtime
12,000	Reduced Rate

Given these numbers, the *Losses By OEE Code* Metric View would look like this, where time is displayed on the x-axis, production loss amount is displayed on the y-axis, and the OEE Code is displayed on the legend:



Mechanical Availability

The *Mechanical Availability* Metric View illustrates for a single production unit how much time the unit was available for production and not down for one of the following reasons:

- Turnaround Down Day
- Routine Maintenance Down Day
- Routine Maintenance Slowdown Day

Each level of the Metric View displays a percentage of available time using the following equation:

Mechanical Availability = (Time x Short Range Plan - Σ [TADD + RMDD + RMSD]) / (Time x Short Range Plan) x 100

...where:

- **Time** is the number of days for which the production data exists.
- **Short Range Plan** is the Short Range Plan value for any day for which the production data exists.

  Note: If a production unit produces more than one product, where each of those products has its own Short Range Plan values, the sum of those Short Range Plan values is used in the equation. This is illustrated in the example following this list.

- **TADD** is the amount of production that was lost due to a Turnaround Down Days (i.e., the Impact Code is TADD).
- **RMDD** is the amount of production that was lost due to a Routine Maintenance Down Day (i.e., the Impact Code is RMDD).
- **RMSD** is the amount of production that was lost due to a Routine Maintenance Slowdown Day (i.e., the Impact Code is RMSD).

Note: If you have created custom impact codes to categorize your data, you will need to modify the calculation for the Mechanical Availability Metric View in the Production Data cube in SQL Server Analysis Services. Instructions for completing this task are not provided in the Meridium APM Documentation. For more information, consult your Microsoft documentation.

For example, assume that for Unit 1:

- Production data exists for January 1 through January 10. So, time is *10* (ten days).
- Unit 1 produced both bottles and labels during those ten days.
- Unit 1 can produce 5,000 bottles per day and 8,000 labels per day.
- Within the ten days, 24,500 bottles and labels were not produced as a result of Turnaround Down Days.

- Within the ten days, 8,200 bottles and labels were not produced as a result of Routine Maintenance Down Days.
- Within the ten days, 19,500 bottles and labels were not produced as a result of Routine Maintenance Slowdown Days.

Using this data, Mechanical Availability is calculated using the following values:

- Time = 10
- Short Range Plan = 13,000 (i.e., 5,000 + 8,000)
- TADD = 24,500
- RMDD = 8,200
- RMSD = 19,500

Remember that Mechanical Availability is calculated as:

Mechanical Availability = (Time x Short Range Plan - ∑ [TADD + RMDD + RMSD]) / (Time x Short Range Plan) x 100

...so:

Mechanical Availability = (10 x 13,000 - [24,500 + 8,200 + 19,500] / [10 x 13,000]) x 100

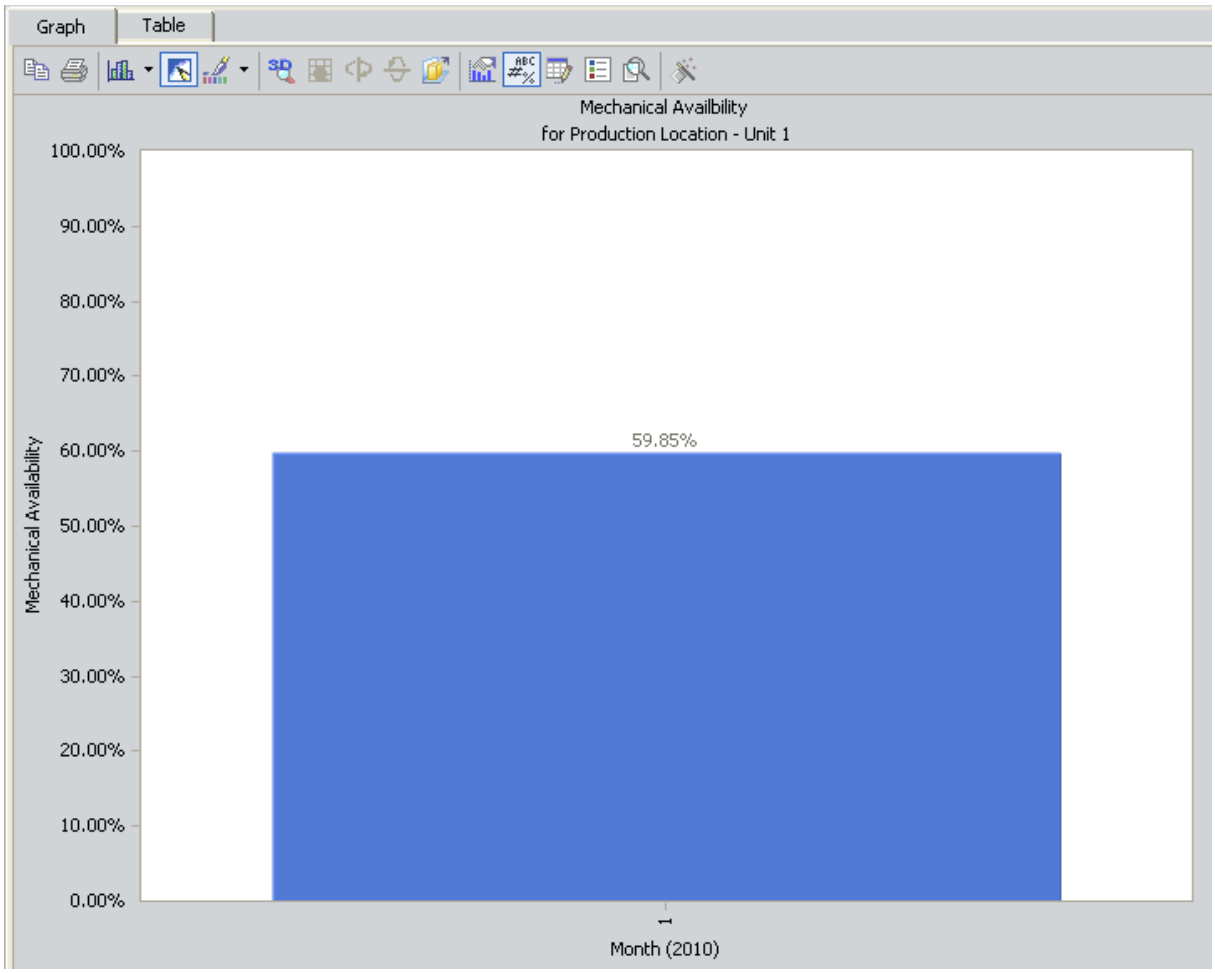
Mechanical Availability = ([130,000 - 52,200] / 130,000) x 100

Mechanical Availability = (77,800 / 130,000) x 100

Mechanical Availability = .59846 x 100

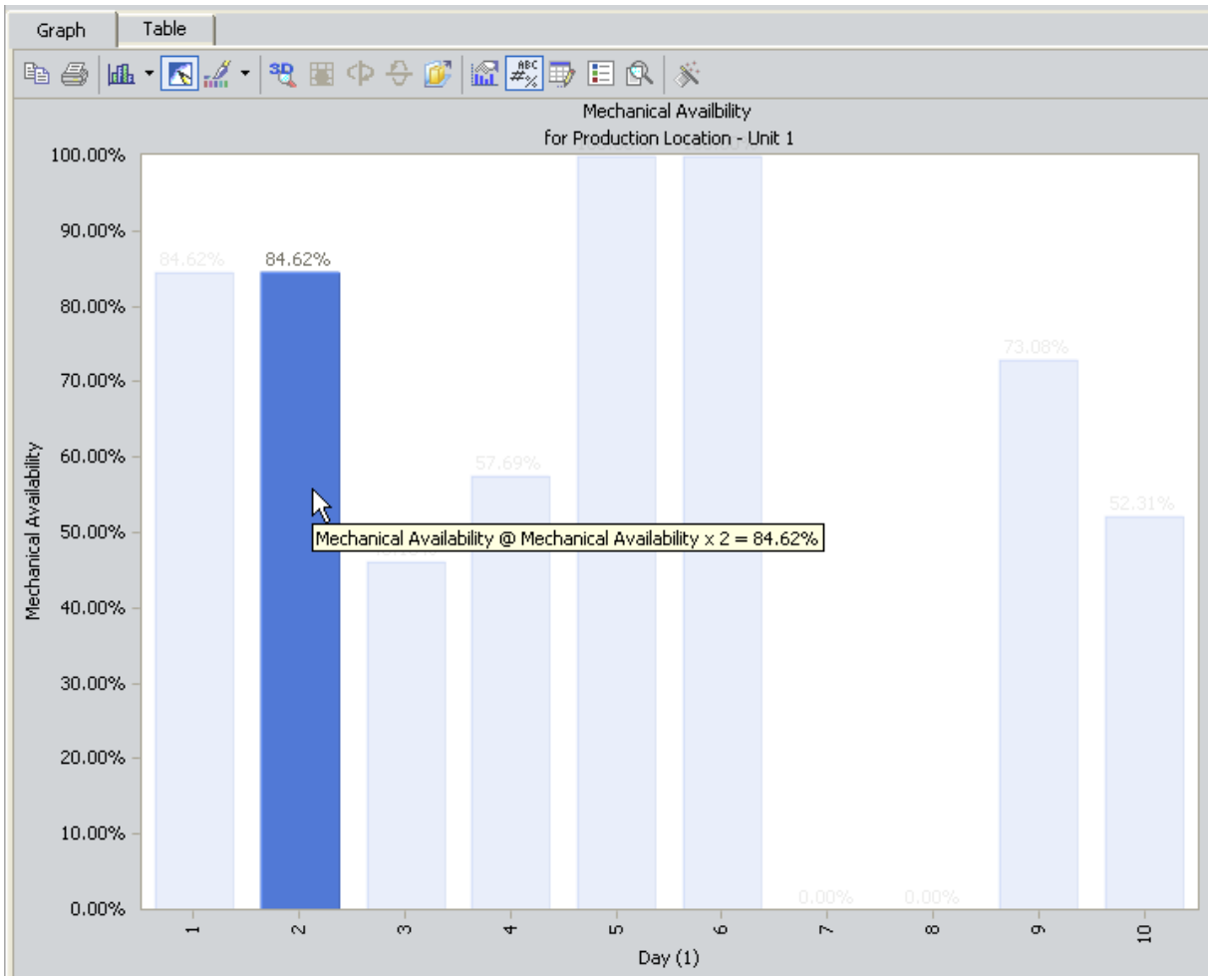
Mechanical Availability = 59.85%

In this case, if you were to view the *Mechanical Availability* Metric View for Unit 1, the level that displays Mechanical Availability for January would look like this, where the month of January is displayed on the x-axis, and the mechanical availability is displayed on the y-axis as a percentage:



In other words, from January 1 through January 10, Unit 1 operated 59.85% of the time without experiencing a Turnaround Down Day, Routine Maintenance Down Day, or Routine Maintenance Slowdown Day.

If you were to drill down into the next level of the graph, you would see this:



Here, you can see that for day 2 (January 2), Unit 1 was available 84.62% of the day without experiencing a Turnaround Down Day, Routine Maintenance Down Day, or Routine Maintenance Slowdown Day. This value is calculated using the following values.

Product	Date	MSCR	Loss	Impact Code
Bottles	1/2/2010	5000		
Labels	1/2/2010	8000		

Using these values, for January 2:

- Time = 1 day
- Short Range Plan = 13,000 (5,000 + 8,000)
- TADD = 0
- RMDD = 0
- RMSD = 2,000

...Mechanical Availability is calculated as:

Mechanical Availability = ([1 x 13,000 - 2,000] / [1 x 13,000]) x 100

Mechanical Availability = .84615 x 100

Mechanical Availability = 84.62%

OEE Metric Views

The *OEE* Metric View indicates how well a manufacturing unit is performing by evaluating the total availability, performance, and quality of that production unit and its products. Using the OEE Code field in Production Loss records that are associated with a Production Unit record, the OEE Metric View categorizes the production losses for a given Production Unit into these three categories.

The results are displayed as an overall OEE percentage. A manufacturer's goal is to operate at 100% OEE (or as close to it as possible), which can be accomplished only by achieving 100% availability, 100% performance, and 100% quality. Each production loss categorized by an availability, performance, idle time, or quality OEE code, or a child code of these codes, will subtract from each percentage.

Note: If you have created a custom OEE code, it must be a child of a baseline OEE code (i.e., Availability, Performance, Idle Time, or Quality) in order to be included in the OEE Metric View calculations.

Each level of the OEE Metric View displays the OEE percentage for a production unit during a given time frame (year, month, day), where the time frame is displayed along the x-axis and gets progressively smaller as you drill into the Metric View. The OEE percentage at each level of the Metric View is calculated using the following equation:

OEE (%) = [OEE (Availability) (%) x OEE (Performance) (%) x OEE (Quality) (%)] x 100

This formula can be further divided into three subformulas, where each subformula is used to calculate the percentage of availability, performance, or quality.

For example, we want to measure the OEE of a bottling plant during the month of April. The actual production for the month is 1,000 bottles. The following chart displays the total production loss associated with each OEE code during that month.

Parent OEE Code	Child OEE Code	Production Loss Amount
Availability	Scheduled Downtime	40
Availability	Unscheduled Downtime	150
Performance	Reduced Rate	75
Performance	Minor Stops	77
Quality	Production Rejects	300
Quality	Startup Rejects	4

To calculate OEE percentage for our bottling process, we must first calculate the availability, performance, and quality percentages using the OEE codes that are assigned to

production losses. Each of these subformulas within the OEE calculation has its own corresponding Metric View, which are described below.

OEE (Availability) (%)

OEE (Availability) (%) = (Actual + Performance Losses + Quality Losses) / (Actual + Performance Losses + Quality Losses + Availability Losses)

...where:

- **Availability Losses** = ∑ Losses due to Availability + ∑ Losses due to Unscheduled Downtime + ∑ Losses due to Scheduled Downtime + ∑ Losses due to custom child OEE codes with Availability as a parent code
- **Performance Losses** = ∑ Losses due to Performance + ∑ Losses due to Minor Stops + ∑ Losses due to Reduced Rate + ∑ Losses due to custom child OEE codes with Performance as a parent code
- **Quality Losses** = ∑ Losses due to Quality + ∑ Losses due to Production Rejects + ∑ Losses due to Startup Rejects + ∑ Losses due to custom child OEE codes with Quality as a parent code

For our example, suppose that:

- Actual values are *1,000*.
- Quality Losses are *304* (300 + 4).
- Performance Losses are *152* (75 + 77).
- Availability Losses are *190* (150 + 40).

In this case, the Availability (%) calculation would look like this:

OEE (Availability) (%) = (1,000 + 152 + 304) / (1,000 + 152 + 304 + 190)

OEE (Availability) (%) = 1,456 / 1,646

OEE (Availability) (%) = 0.88

OEE (Performance) (%)

OEE (Performance) (%) = (Actual + Quality Losses) / (Actual + Quality Losses + Performance Losses)

Where...

- **Performance Losses** = ∑ Losses due to Performance + ∑ Losses due to Minor Stops + ∑ Losses due to Reduced Rate + ∑ Losses due to custom child OEE codes with Performance as a parent code
- **Quality Losses =** ∑ Losses due to Quality + ∑ Losses due to Production Rejects + ∑ Losses due to Startup Rejects + ∑ Losses due to custom child OEE codes with Quality as a parent code

For our example, Performance Losses are *152* (77 + 75) and Quality Losses are *304* (300 + 4). The Performance (%) calculation would look like this:

OEE (Performance) (%) = (1,000 + 304) / (1,000 + 304 + 152)

OEE (Performance) (%) = 1,304 / 1,456

OEE (Performance) (%) = 0.90

OEE (Quality) (%)

OEE (Quality) (%) = Actual / (Actual + Quality Losses)

Where...

- **Quality Losses** = ∑ Losses due to Quality + ∑ Losses due to Production Rejects + ∑ Losses due to Startup Rejects + ∑ Losses due to custom child OEE codes with Quality as a parent code

For our example, Quality Losses are *304*(300 + 4). The Quality (%) calculation would look like this:

OEE (Performance) (%) = 1,000 / 1,304

OEE (Performance) (%) = 0.77

OEE (%)

After each subformula has been calculated, we can use those percentages to calculate the overall OEE percentage.

OEE (%) = [OEE (Availability) (%) x OEE (Performance) (%) x OEE (Quality) (%)] x 100

OEE (%) = [0.88 x 0.90 x 0.77] x 100

OEE (%) = [0.61] x 100

OEE (%) = 61%

You can use the OEE Metric View to see how well your manufacturing operation is performing. For example, perhaps in 2011, this unit had an OEE percentage of 85% during the month of February. This means that due to a decrease in availability, performance, or quality, the production unit was not 100% efficient. In April, the month we used in our example, OEE dropped to 61%. We may conclude that a change in our production process caused a loss of efficiency, and we should examine the areas of availability, quality, and performance to determine what changes can be made to improve OEE. To see which OEE code was associated with the highest amount of production loss, use the *Losses By OEE Code*Metric View.

On-Stream Factor

The *On-Stream Factor* Metric View illustrates for a single production unit how much time the unit was available for production and not down for any reason indicated in the baseline Impact Code records.

Each level of the Metric View displays a percentage of available time using the following equation:

On-Stream Factor = (Time x Short Range Plan - Σ [TADD + RMDD + RMSD + RPDD + RPSD + OTDD + OTSD]) / (Time x Short Range Plan) x 100

...where:

- **Time** is the number of days for which the production data exists.
- **Short Range Plan** is the Short Range Plan value for any day for which the production data exists.

  Note: If a production unit produces more than one product, where each of those products has its own production plan and Short Range Plan values, the sum of those Short Range Plan values is used in the equation. This is illustrated in the example following this list.

- **TADD** is the amount of product that was lost due to a Turnaround Down Days (i.e., the Impact Code is TADD).
- **RMDD** is the amount of product that was lost to a Routine Maintenance Down Day (i.e., the Impact Code is RMDD).
- **RMSD** is the amount of product that was lost due to a Routine Maintenance Slowdown Day (i.e., the Impact Code is RMSD).
- **RPDD** is the amount of product that was lost due to a Regulatory Process Down Day (i.e., the Impact Code is RPDD).
- **RPSD** is the amount of product that was lost due to a Regulatory Process Slowdown Day (i.e., the Impact Code is RPSD).
- **OTDD** is the amount of product that was lost due to another type of Down Day (i.e., the Impact Code is OTDD).
- **OTSD** is the amount of product that was lost due to another type of Slowdown Day (i.e., the Impact Code is OTSD).

Note: If you have created custom impact codes to categorize your data, you will need to modify the calculation for the On-Stream Factor Metric View in the Production Data cube in SQL Server Analysis Services. Instructions for completing this task are not provided in the Meridium APM Documentation. For more information, consult your Microsoft documentation.

For example, assume that for Unit 1:

- Production data exists for January 1 through January 10. So, time is *10* (ten days).
- Unit 1 produced both bottles and labels during those ten days.
- Unit 1 can produce 5,000 bottles per day and 8,000 labels per day.
- Within the ten days, 24,500 bottles and labels were not produced as a result of Turnaround Down Days.
- Within the ten days, 8,200 bottles and labels were not produced as a result of Routine Maintenance Down Days.
- Within the ten days, 19,500 bottles and labels were not produced as a result of Routine Maintenance Slowdown Days.
- Within the ten days, no Regulatory Process Down Days occurred.
- Within the ten days, 14,200 bottles and labels were not produced as a result of Regulatory Process Slowdown Days.
- Within the ten days, no other type of Down Day occurred.
- Within the ten days, 2,000 bottles and labels were not produced as a result of another type of Slowdown Day.

Using this data, Mechanical Availability is calculated using the following values:

- Time = 10
- Short Range Plan = 13,000 (i.e., 5,000 + 8,000)
- TADD = 24,500
- RMDD = 8,200
- RMSD = 19,500
- RPDD = 0
- RPSD = 14,200
- OTDD = 0
- OTSD = 5,000

Remember that On-Stream Factor is calculated as:

On-Stream Factor = (Time x Short Range Plan - Σ [TADD + RMDD + RMSD + RPDD + RPSD + OTDD + OTSD]) / (Time x Short Range Plan) x 100

...so:

On-Stream Factor = (10 x 13,000 - [24,500 + 8,200 + 19,500 + 0 + 14,200 + 0 + 5,000] / [10 x 13,000]) x 100

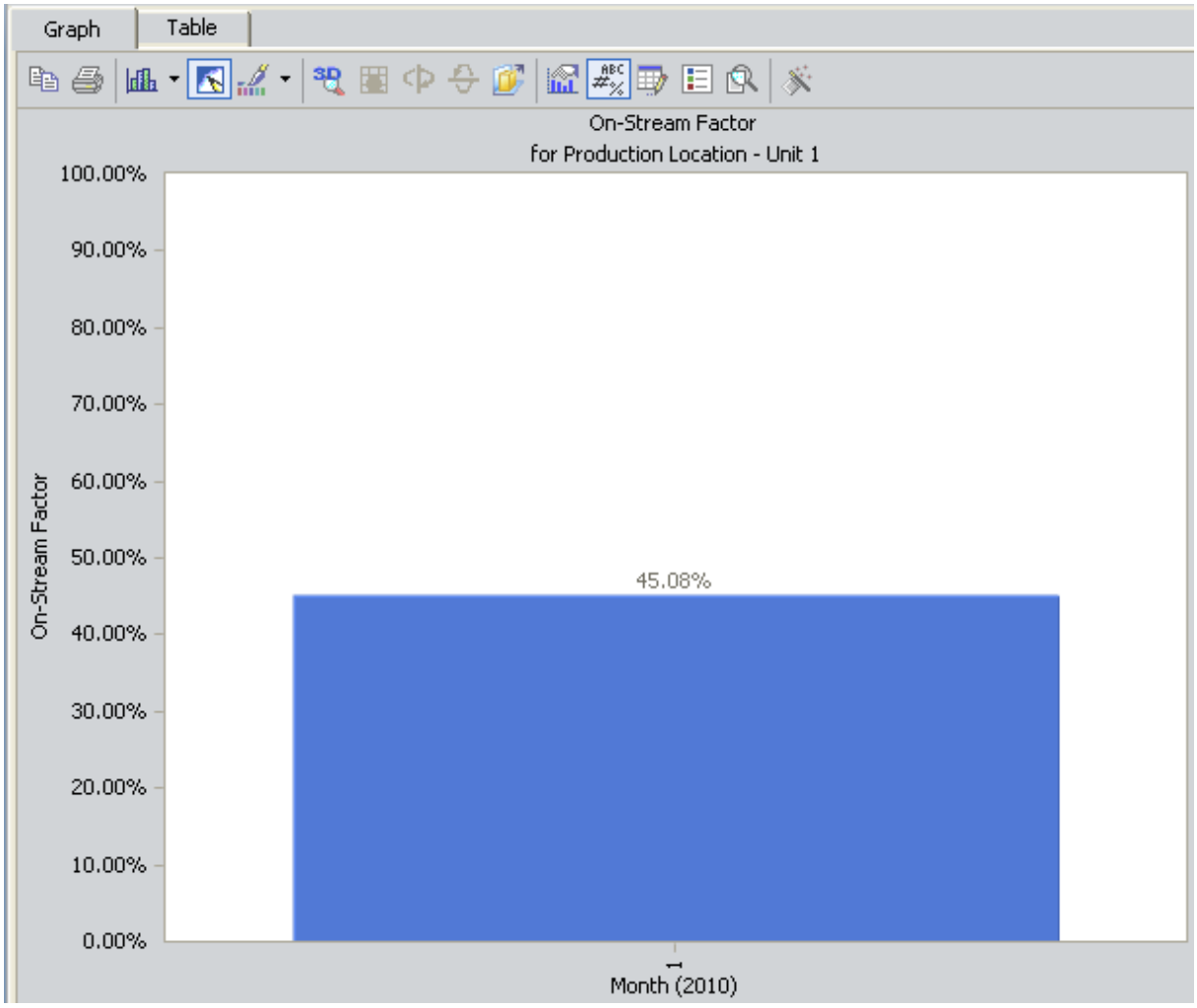
On-Stream Factor = ([130,000 - 71,400] / 130,000) x 100

On-Stream Factor = (58,600 / 130,000) x 100

On-Stream Factor = .4507 x 100

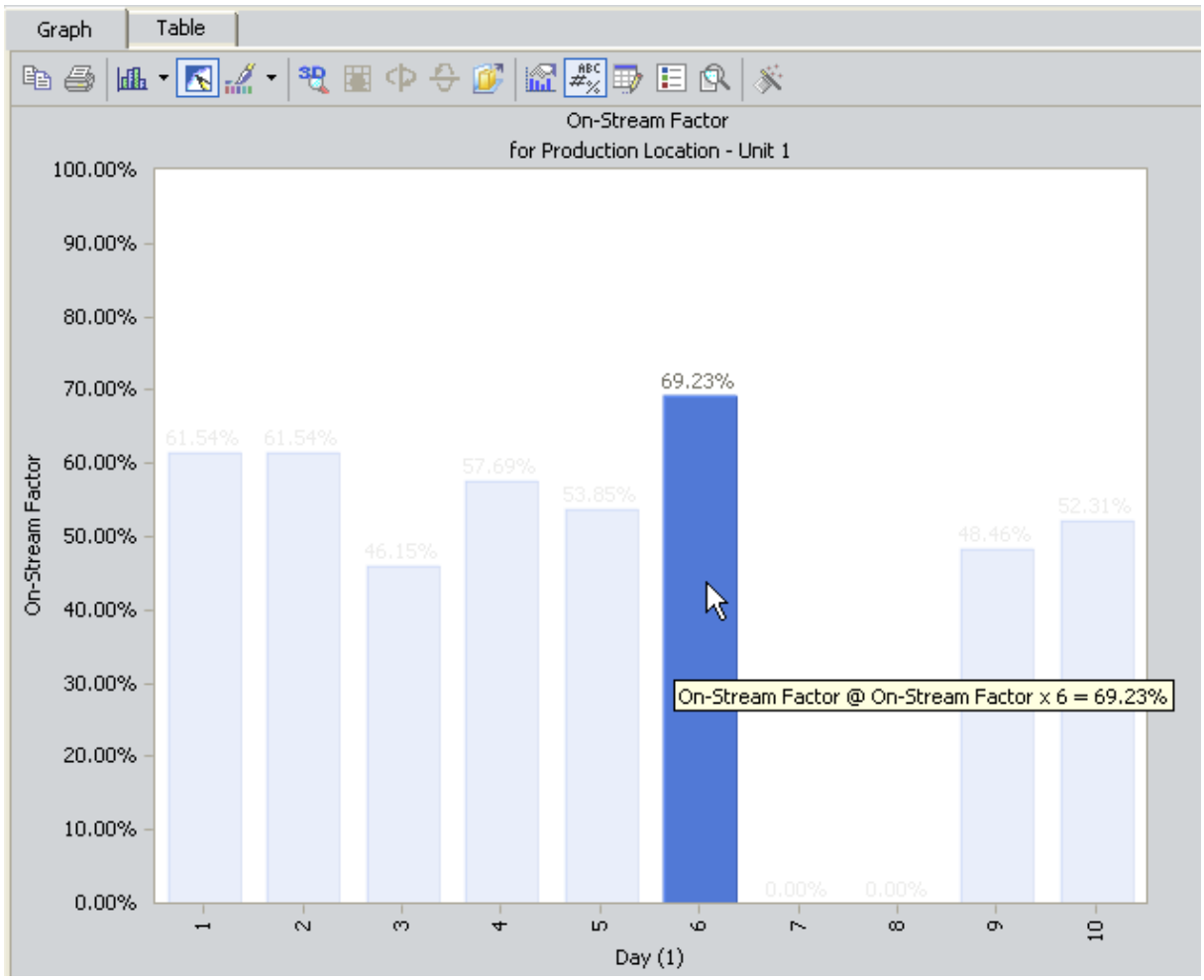
On-Stream Factor = 45.07%

In this case, if you were to view the *On-Stream Factor* Metric View for Unit 1, the level that displays on-stream factor for January would look like this, where the month of January is displayed on the x-axis, and the on-stream factor is displayed on the y-axis as a percentage:



In other words, from January 1 through January 10, Unit 1 operated 48.92% of the time without experiencing a Down Day or Slowdown Day.

If you were to drill down into the next level of the graph, you would see this:



Here, you can see that for day 6 (January 6), Unit 1 was available 46.15% of the day without experiencing a Down Day or Slowdown Day. This value is calculated using the following values.

Product	Date	MSCR	Losses	Impact Code
Bottles	1/6/2010	5000		
Labels	1/6/2010	8000		

Using these values, for January 2:

- Time = 1 day
- Short Range Plan = 13,000 (5,000 + 8,000)
- TADD = 0
- RMDD = 0
- RMSD = 0

- RPDD = 0
- RPSD = 2,000
- OTDD = 0
- OTD = 2,000

...On-Stream Factor is calculated as:

On-Stream Factor = ([1 x 13,000 - 4,000] / [1 x 13,000]) x 100

On-Stream Factor = .6923 x 100

On-Stream Factor = 69.23%

Operational Availability

The *Operational Availability* Metric View illustrates for a single production unit how much time the unit was available for production and not down for one of the following reasons:

- Turnaround Down Day
- Routine Maintenance Down Day
- Routine Maintenance Slowdown Day
- Regulatory Process Down Day
- Regulatory Process Slowdown Day

Each level of the Metric View displays a percentage of available time using the following equation:

Operational Availability = (Time x Short Range Plan - Σ [TADD + RMDD + RMSD + RPDD + RPSD]) / (Time x Short Range Plan) x 100

...where:

- **Time** is the number of days for which the production data exists.
- **Short Range Plan** is the Short Range Plan value for any day for which the production data exists.

  Note: If a production unit produces more than one product, where each of those products has its own production plan and Short Range Plan values, the sum of those Short Range Plan values is used in the equation. This is illustrated in the example following this list.

- **TADD** is the amount of product that was lost due to a Turnaround Down Days (i.e., the Impact Code is TADD).
- **RMDD** is the amount of product that was lost to a Routine Maintenance Down Day (i.e., the Impact Code is RMDD).
- **RMSD** is the amount of product that was lost due to a Routine Maintenance Slowdown Day (i.e., the Impact Code is RMSD).
- **RPDD** is the amount of product that was lost due to a Regulatory Process Down Day (i.e., the Impact Code is RPDD).
- **RPSD** is the amount of product that was lost due to a Regulatory Process Slowdown Day (i.e., the Impact Code is RPSD).

Note: If you have created custom impact codes to categorize your data, you will need to modify the calculation for the Operational Availability Metric View in the Production Data cube in SQL Server Analysis Services. Instructions for completing this task are not provided in the Meridium APM Documentation. For more information, consult your Microsoft documentation.

For example, assume that for Unit 1:

- Production data exists for January 1 through January 10. So, time is *10* (ten days).
- Unit 1 produced both bottles and labels during those ten days.
- Unit 1 can produce 5,000 bottles per day and 8,000 labels per day.
- Within the ten days, 24,500 bottles and labels were not produced as a result of Turnaround Down Days.
- Within the ten days, 8,200 bottles and labels were not produced as a result of Routine Maintenance Down Days.
- Within the ten days, 19,500 bottles and labels were not produced as a result of Routine Maintenance Slowdown Days.
- Within the ten days, no Regulatory Process Down Days occurred.
- Within the ten days, 14,200 bottles and labels were not produced as a result of Regulatory Process Slowdown Days.

Using this data, Mechanical Availability is calculated using the following values:

- Time = 10
- Short Range Plan = 13,000 (i.e., 5,000 + 8,000)
- TADD = 24,500
- RMDD = 8,200
- RMSD = 19,500
- RPDD = 0
- RPSD = 14,200

Remember that Mechanical Availability is calculated as:

Operational Availability = (Time x Short Range Plan - Σ [TADD + RMDD + RMSD + RPDD + RPSD]) / (Time x Short Range Plan) x 100

...so:

Operational Availability = (10 x 13,000 - [24,500 + 8,200 + 19,500 + 0 + 14,200] / [10 x 13,000]) x 100

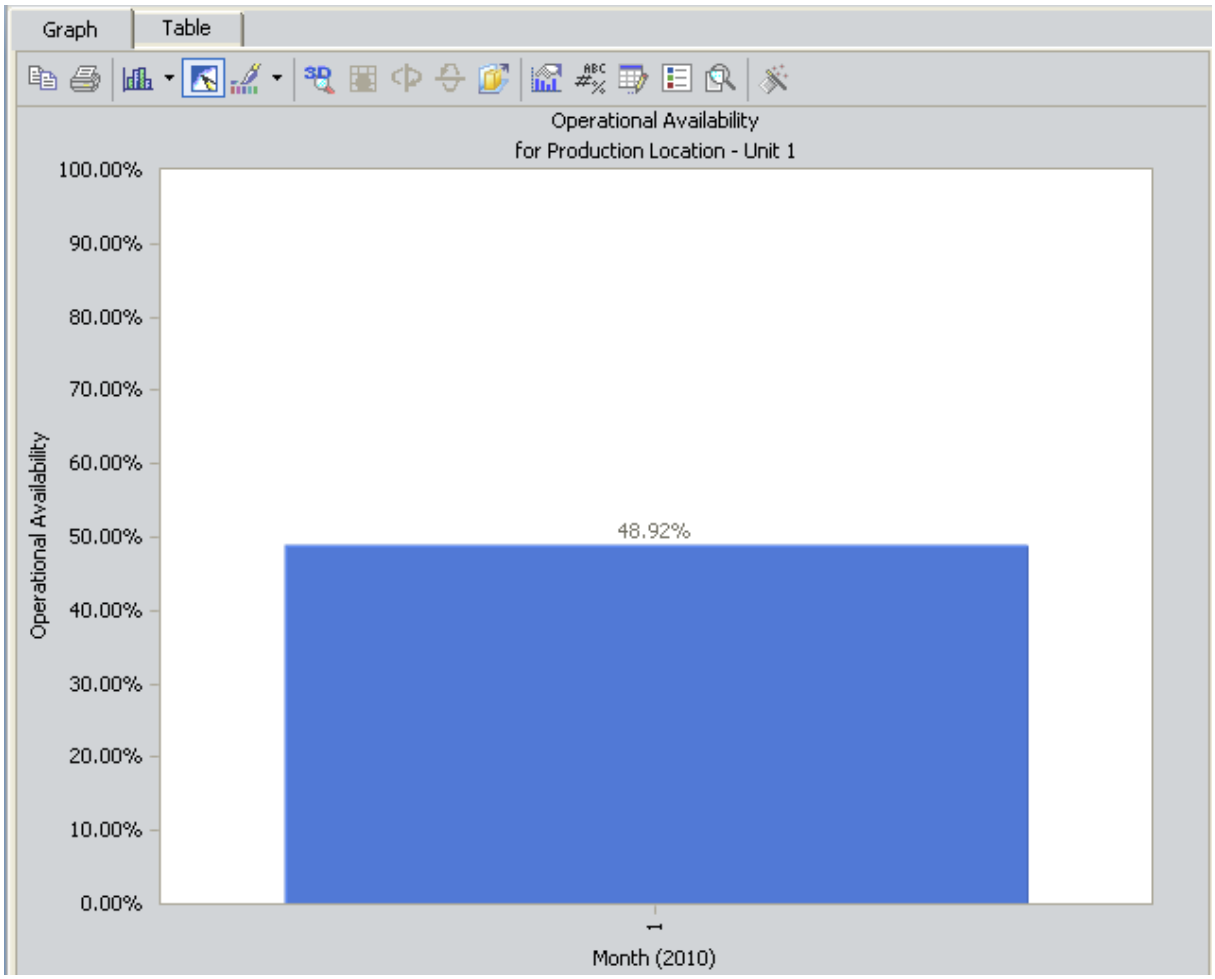
Operational Availability = ([130,000 - 66,400] / 130,000) x 100

Operational Availability = (63,600 / 130,000) x 100

Operational Availability = .4892 x 100

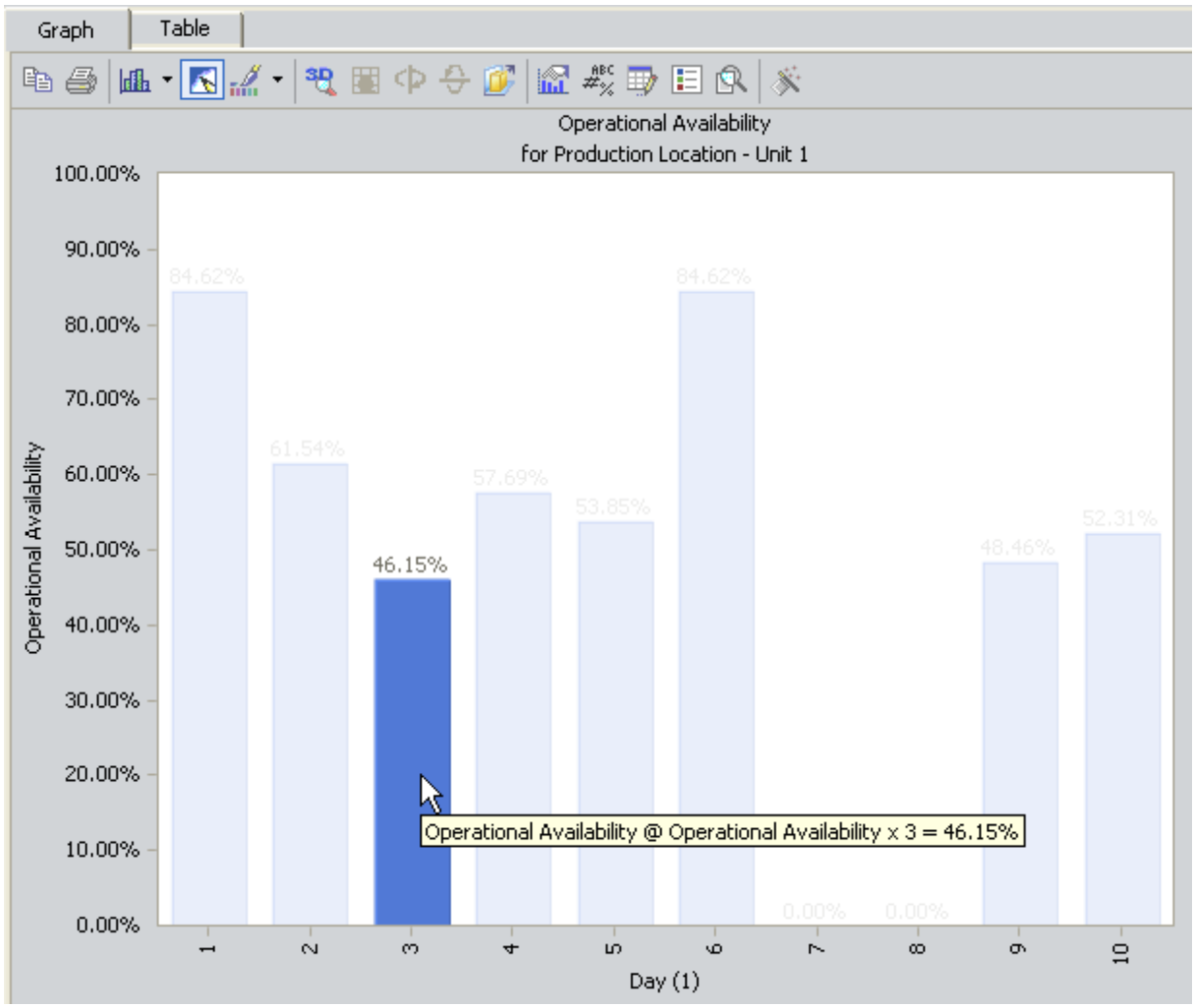
Operational Availability = 48.92%

In this case, if you were to view the *Operational Availability* Metric View for Unit 1, the level that displays Operational Availability for January would look like this, where the month of January is displayed on the x-axis, and the operational availability is displayed on the y-axis as a percentage:



In other words, from January 1 through January 10, Unit 1 operated 48.92% of the time without experiencing a Turnaround Down Day, Routine Maintenance Down Day, Routine Maintenance Slowdown Day, Regulatory Process Down Day, or Regulatory Process Slow-down Day.

If you were to drill down into the next level of the graph, you would see this:



Here, you can see that for day 3 (January 3), Unit 1 was available 46.15% of the day without experiencing Turnaround Down Day, Routine Maintenance Down Day, Routine Maintenance Slowdown Day, Regulatory Process Down Day, or Regulatory Process Slowdown Day. This value is calculated using the following values.

Product	Date	MSCR	Losses	Impact Code
Bottles	1/3/2010	5000		
Labels	1/3/2010	8000		

Using these values, for January 2:

- Time = 1 day
- Short Range Plan = 13,000 (5,000 + 8,000)
- TADD = 0
- RMDD = 0

- RMSD = 7,000
- RPDD = 0
- RPSD = 0

...Operational Availability is calculated as:

Operational Availability = ([1 x 13,000 - 7,000] / [1 x 13,000]) x 100

Operational Availability = .4615 x 100

Operational Availability = 46.15%

Total Cost of Unreliability

The *Total Cost of Unreliability* Metric View indicates the total cost associated with all production losses in all plans for a single production unit. Causing Equipment (i.e., the value in the Causing Asset field of a Production Event record linked to a Production Loss record) is displayed on the x-axis using the value in the Equipment Technical Number field of the causing Equipment record. Cost associated with production losses is displayed on the y-axis. The type of cost is displayed on the legend.

The Metric View displays cost of unreliability using the following equation:

$$\text{Total Cost of Unreliability} = \sum \text{All Maintenance Costs} + \sum \text{All Lost Profit Opportunity} + \sum \text{Other Event Costs}$$

For example, during the month of January, two production events occur for Unit 16.

Event 1 is an equipment breakdown, which is caused by a bottling machine associated with the Equipment Record *A0001-104*. The value *A0001-104*appears in the Causing Equipment field of the Production Event record*Event 1*.

Event 2 is a power outage, which is associated with a Production Loss record but is not associated with an Equipment Record (i.e., no value appears in the Causing Equipment field of the Production Event record *Event 2*).

The following formulas are used to calculate the Total Cost of Unreliability for Unit 16.

Maintenance Cost

Maintenance Cost is the value in the Maintenance Cost field in a Work History record that is associated with a Production Loss record for a production unit. The following table displays how Work History records are associated with Production Loss records via other records.

Record	Relationship	Record
Work History	Has Work History	Equipment
Equipment	Has Production Event	Production Event
Production Event	Caused By Production Event	Production Loss

Note: In order for the Maintenance Cost to appear in the Total Cost of Unreliability Metric View for a production unit, the Production Unit record must be linked to the *same*Functional Location record as the Work History record. In other words, work history must be associated with a location that is part of the production unit.

For example, consider *Event 1*, the equipment breakdown event for Unit 16. The causing equipment for this event, *A0001-104*, is linked to a Work History record with the value *6,395* in the Maintenance Cost field. In this case:

Maintenance Cost = $6,395

*Event 2*does not have any maintenance cost because it is not associated with an Equipment record.

Lost Profit Opportunity

Lost Profit Opportunity is a value representing the cost of production loss. LPO is calculated using the following equation:

Lost Profit Opportunity = Losses x Margin

The margin value is located in the Margin field of a Production Profile record that is linked to a Production Unit record. Losses are located in the Loss Amount field of a Production Loss record.

For example, due to *Event 1*, Unit 16 records a loss of 9,000 bottles. The margin is $5.00. This Lost Profit Opportunity for this example is calculated using the following values:

- **Losses = 9,000**
- **Margin = $5**

In other words, Lost Profit Opportunity is calculated as:

Lost Profit Opportunity = 9,000 x $5

Lost Profit Opportunity = $45,000

In the graph, $45,000 is displayed as LPO associated with *A0001-104*, the causing equipment for Event 1.

For *Event 2*, a power outage causes a loss of 3,100 bottles. The loss is associated with the same production profile, so the margin is $5. The Lost Profit Opportunity for Event 2 is calculated as:

Lost Profit Opportunity = 3,100 x $5

Lost Profit Opportunity = $15,500

This loss was not attributed to a particular piece of equipment. In the graph, $15,500 is displayed as LPO labeled *No Causing Equipment Defined*.

Other Event Costs

Other Event Costs are any additional costs that are associated with a production event that is associated with a production loss. These values are located in the Other Event Costs field of a Production Event record that is linked to a Production Loss record.

For example, additional replacement parts need to be bought for Unit 16 as a result of *Event 1*. The Other Event Costs field in the Production Event record contains a value of $3,000 to account for additional replacement parts. In this case:

Other Event Costs = $3,000

In the graph, $3,000 is displayed as Other Event Costs associated with *A0001-104*, the causing equipment for Event 1.

For*Event 2*, additional costs were incurred as a result of the storm that caused the power outage. The Other Event Costs field the in the Production Event record contains a value of $1,500 to account for those costs. In this case:

Other Event Costs = $1,500

This loss was not attributed to a particular piece of equipment. In the graph, $1,500 is displayed as Other Event Costs labeled *No Causing Equipment Defined*.

Complete Example

Consider the previous example for Unit 16.

The following totals were associated with the causing equipment *A0001-104*(i.e., Event 1):

- **Maintenance Cost = $6,395**
- **Lost Profit Opportunity = $45,000**
- **Other Event Costs = $3,000**

Given these values, Total Cost of Unreliability for *A0001-104*for Unit 16 is calculated as:

Total Cost of Unreliability = Maintenance Cost + Lost Profit Opportunity + Other Event Costs

Total Cost of Unreliability = $6,395 + $45,000 +$3,000

Total Cost of Unreliability = $54,395

The following totals were associated with an Equipment record (i.e., Event 2):

- **Lost Profit Opportunity = $15,500**
- **Other Event Costs = $1,500**

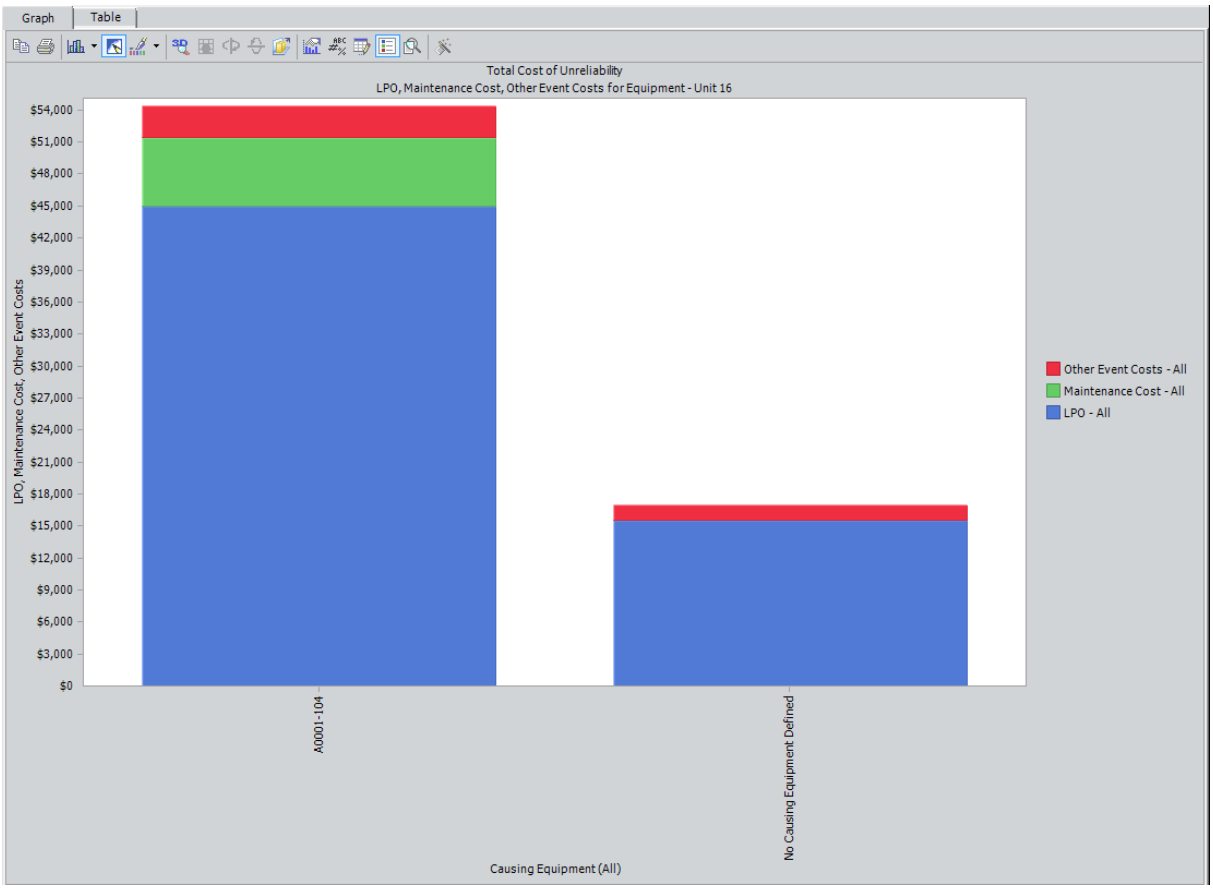
Given these values, Total Cost of Unreliability for *No Causing Equipment Defined* for Unit 16 is calculated as:

Total Cost of Unreliability = Lost Profit Opportunity + Other Event Costs

Total Cost of Unreliability = $15,500+$1,500

Total Cost of Unreliability = $17,000

The Total Cost of Unreliability Metric View would look like this, where the Total Cost of Unreliability is displayed on the y-axis, Causing Equipment is displayed on the x-axis, and type of cost is displayed on the legend.


Graph
Table
Total Cost of Unreliability
LPO, Maintenance Cost, Other Event Costs for Equipment - Unit 16
$54,000
$51,000
$48,000
$45,000
$42,000
$39,000
$36,000
$33,000
$30,000
$27,000
$24,000
$21,000
$18,000
$15,000
$12,000
$9,000
$6,000
$3,000
$0
LPO, Maintenance Cost, Other Event Costs
A0001-104
No Causing Equipment Defined
Causing Equipment (All)
Other Event Costs - All
Maintenance Cost - All
LPO - All

PLA Associated Pages

The following Associated Page is configured by default for the Production Event family to facilitate workflows in PLA:

- **RCA Analysis:** Displays one of the following items:
  - The **New Analysis Builder**: Displayed for Production Event records that are not linked to an RCA Analysis record. You can use the **New Analysis Builder** to create a new RCA Analysis from the selected Production Event record.
  - The **Analysis** page: Displayed for Production Event records that ARE linked to an RCA Analysis record. On the **Analysis** page, you can view the details of the RCA Analysis record that is linked to the selected Production Event record.

Note: To see the underlying URL for this Associated Page, you can use the URL Manager application.

Metrics Folder

The folder **\\Public\Meridium\Modules\PLA\Metrics** contains Metric Views with the following names, which are displayed on the **Metric Views and Production Analyses** page:

- Actual Versus Planned - Long Range
- Actual Versus Planned - Short Range
- Losses by Event Code
- Losses by Impact Code
- Losses by OEE Code
- Mechanical Availability
- OEE
- OEE - Availability
- OEE - Performance
- OEE - Quality
- On-Stream Factor
- Operational Availability
- Total Cost of Unreliability

Queries Folder

The folder **\\Public\Meridium\Modules\PLA\Queries** contains the following queries:

Query Name	Behavior and Usage
AllProductionEvents	Returns the Entity ID of all Production Event records. The query is used to display values in the **Production Event** list on the **Production Event Management** page. If desired, you can modify the query to further limit the Production Event records that are displayed in the list.
EventList	Returns the Entity ID of all Production Event records whose date range includes the date in the Period field in a given Production Data record. This query is used to display values in the **Production Event** list on the **Production Data Entry** page. If desired, you can modify the query to further limit the Production Event records that are displayed in the list.
ImpactCodeList	Returns the Entity ID of all Impact Code records. This query is used to display values in the **Impact Code** list on the **Production Data Entry** page. If desired, you can modify the query to further limit the Impact Code records that are displayed in the list.
OEECodeList	Returns the Entity ID of all OEE Code records. This query is used to display values in the OEE Codes pane on the OEE Coding page. If desired, you can modify the query to further limit the OEE Code records that are displayed in the list.
OEECodeListProdLoss	Returns the Entity ID of all OEE Code records that contain the value *False* in the Is Inactive field. This query is used to display values in the **OEE Coding** list on the **Production Data Entry** page. If desired, you can modify the query to further limit the OEE Code records that are displayed in the list.

Impact Code

Impact Code records store information about the impact of a production loss. The following table provides an alphabetical list and description of the fields that exist for the Impact Code family and appear on the Impact Code datasheet by default. The information in the table reflects the baseline state and behavior of these fields.

Field	Data Type	Description	Behavior and Usage
Code	Character	A short code that represents the impact of the production loss.	This field is required. A list of baseline Impact Code records can be found here.
Color	Character	The color that is used to represent the impact code on the Production Data Summary graph.	This field contains a list, which displays all colors that you can assign to the impact code. In the baseline database, colors are not assigned to the baseline Impact Code records. You will need to assign the desired colors manually.
Description	Character	A description of the impact.	You can define this field manually.

OEE Code

OEE Code records store information about the overall effectiveness of a piece of equipment that causes a production loss. The following table provides an alphabetical list and description of the fields that exist for the OEE Code family and appear on the OEE Code datasheet by default. The information in the table reflects the baseline state and behavior of these fields.

Field	Data Type	Description	Behavior and Usage
OEE Code	Character	A short code that identifies a reason for a loss in equipment efficiency that caused a production loss.	This field is required.
Description	Character	A description of the OEE code.	You can define this value manually by typing a description into this field.
Is Inactive	Logical	Indicates whether the OEE code is enabled or disabled.	If this field contains the value *True*, the code is disabled in the **OEE codes** pane on the **OEE Coding**page. If the code is disabled, you will not be able to add a child code under it. Also, you will not be able to assign a disabled code to a production loss. If this field contains the value *False*, the code is enabled and you will be able to use the code throughout PLA.

Field	Data Type	Description	Behavior and Usage
Root Code	Character	The parent code of the OEE code.	This field does not appear on the datasheet. The OEE Metric View uses the value in this field to determine whether an OEE code is an *Availability*, *Performance*, or *Quality* code in the OEE (%) calculation. This field contains the following values, depending on the type of OEE code: • For child OEE codes, this field contains the parent OEE code. • For parent OEE codes, this field contains the same value as the OEE code field.

Product

Product records store basic information about a product in the Meridium APM system. The following table provides an alphabetical list and description of the fields that exist for the Product family and appear on the Product datasheet by default. The information in the table reflects the baseline state and behavior of these fields.

Field	Data Type	Description	Behavior and Usage
Description	Text	A description of the product.	You can define this field manually
Name	Character	The name of the product.	This field is required. You can define this field manually.

Production Data

Production Data records store information about production values. The following table provides an alphabetical list and description of the fields that exist for the Production Data family and are appear on the Production Data datasheet. The information in the table reflects the baseline state and behavior of these fields.

The baseline Production Data fields are displayed in the grid on the **Production Data** tab of the **Production Data Entry** page. You can access the Production Data datasheet for a Production Data record by clicking any hyperlinked Period in that grid. If, however, you add fields to the Production Data family and datasheet, those fields will not appear on the **Production Data** tab.

Field	Data Type	Description	Behavior and Usage
Actual	Number	The amount of product you produced on the period in the Period field.	When the Production Data record is created, the value is set by default to zero (0). It is updated automatically with the Actual value that you enter in the grid on the **Production Data** tab on the **Production Data Entry** page.
End Time	Date	The period for which the production data begins.	On the **Production Data Entry** page, the **Period** column displays the start time and end time, separated by a dash. In the baseline database, this field stores time using the Coordinated Universal Time (UTC) format (i.e., the UTC check box is selected when you view the field properties in the Configuration Manager). This field is disabled.
Long Range Plan	Number	The amount of product that you planned to produce in this period.	By default, the value is set to the planned production amount, which appears in the **<Product Name (<UOM>)>** cell on the **Production Plan Management** page for the associated production plan. This field is disabled.

Field	Data Type	Description	Behavior and Usage
Losses	Number	The amount of product that you could have produced but did not produce during the period in the Period field.	When the Production Data record is created, this field does not contain a value. It is populated automatically with the sum of the values in the Loss Amount field in all Production Loss records to which the Production Data record is linked. This field is disabled. Along with the value in the Margin field in the Production Data record, the value in the Losses field is used to calculate the cost of losses, which appears on the **Production Data Summary** tab on the **Production Data Entry** page.
Margin ID	Number	The profit associated with producing one unit of the product, where the product is defined in the Product field in the Production Profile record that is linked to the Production Plan record to which this Production Data record is linked.	When the Production Data record is created, the value in the Margin ID field is set by default to the value in the Default Margin field in the associated Production Profile record (i.e., the Production Profile record that is linked to the Production Plan record to which the Production Data record is linked). If desired, you can use a profile margin other than the Default Margin by selecting the Margin ID for the desired profile margin from the drop-down list. Along with the value in the Losses field in the Production Data record, the value in the Margin ID field is used to calculate the cost of losses, which appears on the **Production Data Summary** tab on the **Production Data Entry** page.

Field	Data Type	Description	Behavior and Usage
Max Sustained Capacity	Number	The value against which the Actual value is compared to determine if a loss occurred.	This value is set by default to the value in the Maximum Sustained Capacity Rate field in the Production Profile record that is linked to the Production Plan record to which the Production Data record is linked. This field is disabled.
Over Production	Number	The amount of product that is produced more than you planned to produce in this period.	This value is populated automatically using the following equation: **Over Production = Actual - Short Range Plan** Note that a value will be populated in this field only if value in the **Actual** column is greater than the value in **Short Range Plan** column for a period.
Start Time	Date	The period for which the production data begins.	On the **Production Data Entry** page, the **Period** column displays the start time and end time, separated by a dash. In the baseline database, this field stores time using the Coordinated Universal Time (UTC) format (i.e., the UTC check box is selected when you view the field properties in the Configuration Manager). This field is disabled.
Short Range Plan	Number	The adjusted planned production output due to a circumstance that could not have been predicted at the time the plan was created (e.g., natural disaster such as a flood or a hurricane).	By default, the value is set to the planned production amount, which appears in the **<Product Name (<UOM>)>** cell on the Production Plan Management page for the associated production plan. You can modify this value is needed.

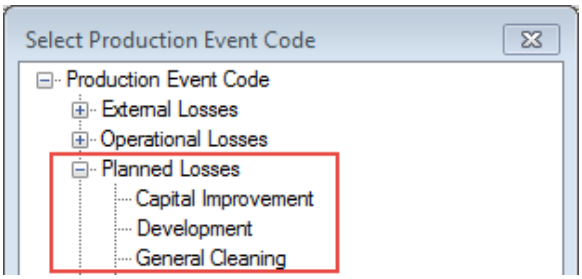
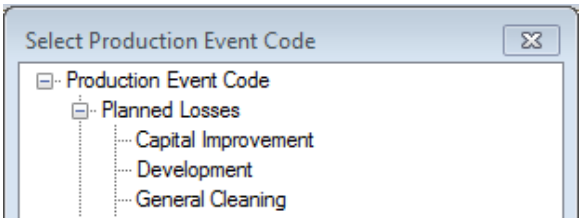
Production Event

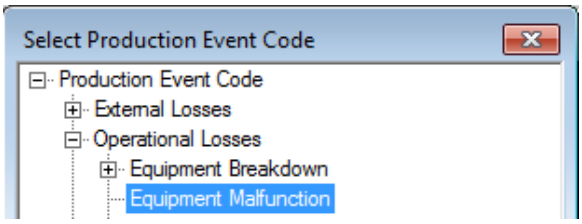
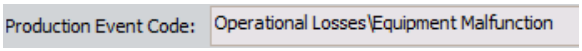
Production Event records store details about an event that results in reduced production output. The following table provides an alphabetical list and description of the fields that exist for the Production Event family and appear on the baseline Production Event datasheet. The information in the table reflects the baseline state and behavior of these fields.

Field	Data Type	Description	Behavior and Usage
Causing Asset	Character	The piece of equipment that caused the event.	This field contains a ··· button, which you can click to select the Equipment record that represents the piece of equipment that caused the event. When you save the Production Event record, it will be linked automatically to the selected Equipment record.
Comment	Text	Additional comments about the event.	This field can be define manually.
Created By	Character	The User Name of the Security User who created the Production Event record.	When the record is created, this field is populated automatically with the User Name of the Security User who is currently logged in. You cannot modify the value in this field.
Created Date	Date	The date and time the Production Event record was created.	When the record is created, this field is populated automatically with the current date and time. You cannot modify the value in this field.
Description	Text	A detailed description of the event.	You can define this field manually.

Field	Data Type	Description	Behavior and Usage
End Date	Date	The date that the event ended.	Along with the production event start date, the end date determines whether or not this production event will be available in the **Production Event** list on the **Production Data Entry** page. If the Production Event record does not have an end date, the production event will appear in the **Production Event** list for losses that are associated with any day *after* the start date. In the baseline database, this field stores time using the Coordinated Universal Time (UTC) format (i.e., the UTC check box is selected when you view the field properties in the Configuration Manager).
Event ID	Character	The ID of the event.	This field is populated automatically with a value that appears in the following format: **<Source Unit>~<Production Event Code>~<Start Date>~<Headline>** ...where: • **<Source Unit>** is the value in the Source Unit field in this Production Event record. • **<Production Event Code>**is the value in the Production Event Code field in this Production Event record. • **<Start Date>** is the value in the Start Date field in this Production Event record. • **<Headline>** is the value in the Headline field in this Production Event record. This field does not appear on the datasheet but it *does* appear in the grid on the **Production Event Management** page.

Field	Data Type	Description	Behavior and Usage
Headline	Character	A short description of the event.	You can define this field manually.
Other Event Costs	Number	Costs that are associated with the event and are not recorded in the selected Work History record.	This value is preceded by a currency symbol, which is set by default to *$* but can be changed via the **Currency** dialog box if desired.

Field	Data Type	Description	Behavior and Usage
Production Event Code	Character	The type of production event.	This field contains a ··· button, which you can click to select the Production Event Code record that most accurately represents the type of event. On the Production Event datasheet, if you select a Production Unit in the **Source Production Unit** cell and the Production Unit is associated with one or more Production Event Code records, *only* those Production Event Code records will appear when you click the ··· button in the **Production Event Code** cell. For example, suppose you selected *Unit A* record as the Production Unit, which is associated with the Production Event Code records as shown in the following image (highlighted in red outline):  In this case, on the Production Event datasheet, when you select the ··· button in the **Production Event Code** cell, only *Planned Losses* will appear in the list as shown in the following image:  On the Production Event datasheet, if you do not select a Production Unit or select a Production Unit that is not associated

Field	Data Type	Description	Behavior and Usage
			with any Production Event Code record, all the Production Event Code records available in the database appear when you click the ··· button in the **Production Event Code** cell. After you select the appropriate record and click **OK**, the full path to the selected Production Event Code record is displayed on the datasheet, including all categories into which that Production Event Code record is grouped. For example, suppose you selected *Equipment Malfunction*, which is grouped under *Operational Losses*, as shown in the following image:  In this case, the **Production Event Code** cell on the datasheet would display the value *Operational Losses\Equipment Malfunction*, as shown in the following image:  When you save the Production Event record, it will be linked automatically to the selected Production Event Code record. After the two records are linked, if you change the value in the Code field in the Production Event Code record, the value in the Production Event Code field in the Production Event record will be updated automatically to reflect the change.

Field	Data Type	Description	Behavior and Usage
Source Production Unit	Character	The production unit in which the event occurred.	This field contains a list, which displays the Record IDs of all Production Unit records. When you save the Production Event record, it will be linked automatically to the selected Production Unit record. After the two records are linked, if you change the value in the Production Unit Name field in the Production Unit record, the value in the Source Production Unit field in the Production Event record will be updated automatically to reflect the change.
Start Date	Date	The date that the event started.	Along with the production event end date, the start date determines whether or not this production event will be available in the **Production Event** list in the **Losses** section on the **Production Data Entry** page. If the Production Event record does not have a start date, the production event will appear in the **Production Event** list for losses that are associated with any day *before* the end date. In the baseline database, this field stores time using the Coordinated Universal Time (UTC) format (i.e., the UTC check box is selected when you view the field properties in the Configuration Manager).
Updated By	Character	The User Name of the Security User who *last* updated the Production Event record.	This field is populated automatically. If there have been no updates to the record, this field will be empty. You cannot modify the value in this field.

Field	Data Type	Description	Behavior and Usage
Updated Date	Date	The date and time the Production Event record was *last* updated.	This field is automatically populated. If there have been no updates to the record, this field will empty. You cannot modify the value in this field.
Work History Link	Character	A reference to the work that was performed as a result of the event.	This field contains the following buttons: ■ **Link Work History**: Lets you select the Work History records that contain more information about work that was performed as a result of the event. When you save the Production Event record, it will be linked automatically to the selected Work History records. ■ **Unlink Work History**: Lets you unlink Work History records that are already linked to the Production Event record.

Production Event Code

Production Event Code records store details that represent a type of Production Event. The following table provides an alphabetical list and description of the fields that exist for the Production Event Code family and appear on the baseline Production Event Code datasheet. The information in the table reflects the baseline state and behavior of these fields.

Field	Data Type	Description	Behavior and Usage
Code	Character	A short code that represents the type of event.	This field is required. On the Production Event datasheet, the Production Event field contains a ··· button, which you can click to select the Production Event Code record that most accurately represents the type of event.
Color	Character	The color that is used to represent the production event code on the Production Data Summary graph.	On the datasheet, this field contains a list, which displays all colors that you can assign to the impact code. In the baseline database, colors are not assigned to the baseline Production Event Code records. You will need to assign the desired colors manually.
Description	Character	A description of the type of event.	You can define this field manually.

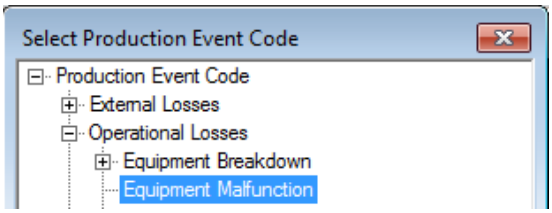
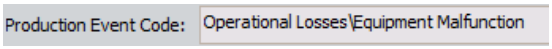
Production Event Template

A Production Event Template record stores general event information that can be used to create more specific Production Event records. The following table provides an alphabetical list and description of the fields that exist for the Production Event Template family and appear on the baseline Production Event Template datasheet. The information in the table reflects the baseline state and behavior of these fields.

Field	Data Type	Description	Behavior and Usage
Abnormal State	Character	A name that represents an abnormal state of operation.	This value in Xi Reading records (that are linked to the Xi Tag record identified in the Xi Tag ID field) should trigger a Production Event record to be created automatically from this Production Event Template record.
Causing Asset	Character	The piece of equipment that caused the events that will be created automatically from this template.	This field contains a ··· button, which you can click to select the Equipment record that represents the piece of equipment that caused the events that will be created automatically from this template. When you save the Production Event Template record, it will be linked automatically to the selected Equipment record.
Comment	Text	Additional comments about the events that will be created automatically from this template.	You can define this field manually.
Description	Text	A detailed description of the events that will be created automatically from this template.	You can define this field manually.

Field	Data Type	Description	Behavior and Usage
Event Template ID	Character	The ID of the event template.	This field is populated automatically with a value that appears in the following format: **<Source Unit>~<Production Event Code>~<Start Date>~<Headline>** ...where: • **<Source Unit>** is the value in the Source Unit field in this Production Event Template record. • **<Production Event Code>** is the value in the Production Event Code field in this Production Event Template record. • **<Start Date>** is the value in the Start Date field in this Production Event Template record. • **<Headline>** is the value in the Headline field in this Production Event Template record. This field does not appear on the datasheet.
Headline	Character	A short description of the events that will be created automatically from this template.	You can define this field manually.
Normal State	Character	A name that represents a normal state of operation.	This value in Xi Reading records (that are linked to the Xi Tag record identified in the Xi Tag ID field) should trigger a Production Event record to be updated automatically from this Production Event Template record.

Field	Data Type	Description	Behavior and Usage
Other Event Costs	Number	Costs that are associated with the events that will be created automatically from this template and are not recorded in the selected Work History record.	The value is preceded by a currency symbol, which is set by default to *$* but can be changed via the **Currency** dialog box if desired.

Field	Data Type	Description	Behavior and Usage
Production Event Code	Character	The type of production events that will be created automatically from this template.	This field contains a ··· button, which you can click to select the Production Event Code record that most accurately represents the type of events that will be created automatically from this template. After you select the appropriate record and click **OK**, the full path to the selected the Production Event Code record is displayed on the datasheet, including all categories into which that Production Event Code record is grouped. For example, suppose you selected *Equipment Malfunction*, which is grouped under *Operational Losses*, as shown in the following image:  In this case, the **Production Event Code** cell on the datasheet would display the value *Operational Losses\Equipment Malfunction*, as shown in the following image:  When you save the Production Event Template record, it will be linked automatically to the selected Production Event Code record. After the two records are linked, if you change the value in the Code field in the Production Event Code record, the value in the Production Event Code field in the Production Event Template record will be updated automatically to reflect the change.

Field	Data Type	Description	Behavior and Usage
Source Production Unit	Character	The production unit in which the events that will be created automatically from this template occurred.	This field contains a list, which displays the Record IDs of all Production Unit records. When you save the Production Event Template record, it will be linked automatically to the selected Production Unit record. After the two records are linked, if you change the value in the Production Unit Name field in the Production Unit record, the value in the Source Production Unit field in the Production Event Template record will be updated automatically to reflect the change.
Work History Link	Character	A reference to the Work History records that are related to the Production Event Template record.	This field contains the following buttons: ■ **Link Work History**: Lets you select the Work History records that contain more information about work that is related to the events that will be created automatically from this template. When you save the Production Event Template record, it will be linked automatically to the selected Work History records. ■ **Unlink Work History**: Lets you unlink Work History records that are already linked to the Production Event Template record.

Field	Data Type	Description	Behavior and Usage
Xi Tag ID	Character	A reference to the Xi Tag record representing the tag whose readings will be used to create Production Event records automatically from this Production Event Template record.	This field contains a ··· button, which you can click to select the desired Xi Tag record. When you save the Production Event Template record, it will be linked automatically to the selected Xi Tag record.

Production Loss

Production Loss records store information about the loss of production caused be an event. The following table provides an alphabetical list and description of the fields that exist for Production Loss family and appear on the Production Loss datasheet. The information in the table reflects the baseline state and behavior of these fields.

Field	Data Type	Description	Behavior and Usage
Comment	Type	Additional comments about the production loss.	You can define this field manually.
Impact Code	Character	The impact of the production loss.	This field contains a list that displays all Impact Code records that are returned by the ImpactCodeList query, which is stored in the Catalog in the folder \\Public\Meridium\Modules\PLA\Queries. Each item in the list is displayed in the following format: **<Code> - <Description>** ...where: ■ **<Code>** is the value in the Code field in the Impact Code record. ■ **<Description>** is the value in the Description field in the Impact Code record. When you select a value in the list, while the Code and Description are displayed on the datasheet, only the Code is *stored* in the field.

Field	Data Type	Description	Behavior and Usage
Margin ID	Character	A value that identifies the Profile Margin.	This field contains a list that displays the IDs of all the Profile Margin records defined on the **Production Profiles** tab. When the Production Data record is created, the value in the Margin ID field is set by default to the value in the Default Margin field in the associated Production Profile record (i.e., the Production Profile record that is linked to the Production Plan record to which the Production Data record is linked). If desired, you can use a profile margin other than the Default Margin by selecting the Margin ID for the desired profile margin from the drop-down list. Along with the value in the Losses field in the Production Data record, the value in the Margin ID field is used to calculate the cost of losses, which appears on the **Production Data Summary** tab on the **Production Data Entry** page.
OEE Code	Character	A value that identifies a reason for equipment efficiency that led to a production loss.	This field displays the **Select OEE Code** window, which contains a hierarchal tree of OEE Codes. Each item in the tree represents an OEE Code record that is returned by the OEECodeListProdLoss query, which is stored in the Catalog in the folder \\Public\Meridium\Modules\PLA\Queries. Only enabled OEE Code records (i.e., OEE Code records whose Is Inactive field contains the value *False*) can be selected from the list. Disabled OEE Code records will be gray and cannot be selected. When you select a value from the tree and click **OK**, the value in the OEE Code field of the OEE Code record is displayed in the OEE Code field of the Production Loss record.

Field	Data Type	Description	Behavior and Usage
Production Event	Character	The production event that caused the loss.	This field contains a list that displays the Record IDs of all Production Event records that are returned by the EventList query, which is stored in the Catalog in the folder \\Public\Meridium\Modules\PLA\Queries. When you save the Production Loss record, it will be linked automatically to the selected Production Event record. After the two records are linked, if you change any part of the Production Event record's Record ID, the value in the Production Event field in the Production Loss record will be updated automatically to reflect the change.
Production Loss	Number	The amount of production that was lost.	You can define this field manually.

Profile Margin

Profile Margin records store information about customized margins that you specify for a Production Profile. The following table provides an alphabetical list and description of the fields that exist for the Profile Margin family and appear on the Profile Margin data-sheet. The information in the table reflects the baseline state and behavior of these fields.

Field	Data Type	Description	Behavior and Usage
Margin ID	Character	A value that identifies the Profile Margin.	This field is required.
Margin Value	Number	The alternate value that can be associated with a product. For example, you can define a margin value for *Summer* and a margin value for *Winter* if the margin value associated with a product changes seasonally.	This field is required.

Production Plan

Production Plan records store information about how much product you plan to produce within a certain time period. The following table provides an alphabetical list and description of the fields that exist for the Production Plan family and appear on the Production Plan datasheet. The information in the table reflects the baseline state and behavior of these fields.

Note: All fields on the Production Plan datasheet are disabled and populated automatically based upon your selections in the **Production Plan Builder**. The **Behavior and Usage** column, therefore, is not displayed in this table.

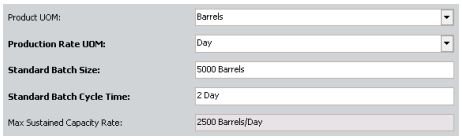
Field	Data Type	Description
Data Entry Frequency	Character	How often you plan to enter production data and losses.
End Date	Date	The date and time on which the plan ends.
Plan Basis	Character	The type of plan: *Time-based* or *Quantity-based*.
Plan ID	Character	A value that identifies the production plan.
Production Model	Character	The order in which the products will be produced (at the same time or one after the other).
Start Date	Date	The date and time on which the plan begins.

Production Profile

Production Profile records store information about a product and its corresponding production unit. The following table provides an alphabetical list and description of the fields that exist for the Production Profile family and appear on the Production Profile datasheet. The information in the table reflects the baseline state and behavior of these fields.

Field	Data Type	Description	Behavior and Usage
Description	Text	A detailed description of the production profile.	You can define this field manually.
Default Margin	Number	The profit that one unit of the product yields.	This value is preceded by a currency symbol, which is set by default to *$* but can be changed via the **Currency** dialog box if desired. **Note:** You can also add additional Profile Margins via the **Profile Margin** tab on the **Production Units and Profiles** page.

Field	Data Type	Description	Behavior and Usage
Max Demonstrated Rate	Number	The highest number of products the production unit produced, disregarding the impact it may have had on the equipment or locations involved in the process or the quality of the product.	On the datasheet, after you navigate away from the **Max Demonstrated Rate** text box, the value that you typed is appended with the value **<Product UOM>/<Production Rate UOM>**, where: • **<Product UOM>** is the value in the Product UOM field. • **<Production Rate UOM>** is the value in the Production Rate UOM field. For example, if the Product UOM is *Tons* and the Production Rate UOM is *Hour*, if you type *3,000* in the **Max Demonstrated Rate** text box, the value will be displayed as *3,000 Tons/Hour*.

Field	Data Type	Description	Behavior and Usage
Max Sustained Capacity Rate	Number	The number of products that the production unit can produce consistently without having any adverse effects on the assets involved in the process or the quality of the product.	This field is disabled, and the value is set by default based upon the values in the following fields: • Product UOM • Production Rate UOM • Standard Batch Size • Standard Batch Cycle Time Specifically, the numeric part of the value is calculated as: **Standard Batch Size / Standard Batch Cycle Time** So, if the Standard Batch Size is *5,000* and the Standard Batch Cycle Time is *2 days*, the numeric part of the Max Sustained Capacity Rate would be *2,500* (5,000 / 2). The numericvalue is then appended with the value **<Product UOM>/<Production Rate UOM>**, where: • **<Product UOM>** is the value in the Product UOM field. • **<Production Rate UOM>** is the value in the Production Rate UOM field. For example, consider the complete example in the following image. 

Field	Data Type	Description	Behavior and Usage
Product	Character	The product associated with the profile.	This field contains a list of all values in the Name field in all Product records. When you save the Production Profile record, it will be linked automatically to the selected Product record. After the two records are linked, if you change the value in the Name field in the Product record, the value in the Product field in the Production Profile record will be updated automatically top reflect the change.
Product UOM	Character	The unit that is associated with the product that is stored in the Product field. For example, if you are producing steel, the unit might be *Tons*.	This field contains a list, which displays the values that exist in the Product UOM field in all existing Production Profile records. You can select a value from the list or type a new value.
Production Rate UOM	Character	How often you measure production (e.g., Day).	This field contains a list with the following values, which come from the System Code Table with the ID MI_PLA_RATE_UOM: • Hour • Day • Week • Month • Quarter • Year The default value is *Day*. This field is required.

Field	Data Type	Description	Behavior and Usage
Standard Batch Cycle Time	Character	The amount of time it takes you to produce one batch of the product that is stored in the Product field.	The number that you type will be appended automatically with the value in the Production Rate UOM field. This field is required.
Standard Batch Size	Character	The amount of product that you can produce in one batch.	The number that you type will be appended automatically with the value in the Product UOM field. This field is required.
Xi Tag ID	Character	The tag whose readings you want to use to create Production Data records automatically.	This field contains a ··· button, which you can click to select the desired Xi Tag record.

Production Target

Production Target records store information about planned production values for a given product within a given production plan. The following table provides an alphabetical list and description of the fields that exist for the Production Target family and appear on the Production Target datasheet. The information in the table reflects the baseline state and behavior of these fields.

Note: All fields on the Production Target datasheet are disabled and populated automatically based upon your selections in the **Production Plan Builder**. The **Behavior and Usage** column, therefore, is not displayed in this table.

Field	Data Type	Description
End Time	Date	The date and time on which production of the product ends.
Quantity	Number	The amount of product that should be produced during the start and end time.
Sequence	Number	The order in which the product will be produced during the production plan (represented by a number 1 through n).
Start Time	Date	The date and time on which production of the product begins.

Production Unit

Production Unit records store basic information about a single production unit. The following table provides an alphabetical list and description of the fields that exist for the Production Unit family and appear on the Production Unit datasheet. The information in the table reflects the baseline state and behavior of these fields.

Field	Data Type	Description	Behavior and Usage
Associated Unit	Character	A reference to a separate record that contains more information about the production unit.	This field contains a ··· button, which you can click to select the Functional Location record that contains more information about the production unit. When you save the Production Unit record, it will be linked automatically to the selected Functional Location record.
Event Code Selector	Character	The type of production event.	This field contains a ··· button, which you can click to associate the Production Event Code record with the Production Unit. When you select Production Event Code record (s) in this field, *only* the selected Production Event Code record (s) will appear on the Production Event datasheet.
Production Unit Description	Text	A description of the production unit.	You can define this field manually.
Production Unit Name	Character	The name of the production unit.	This field is required.
Time Zone	Character	The time zone that is associated with the production unit.	This value is associated with dates in Production Data records that were created automatically as part of the integration with Process Data Integration.

System Code Tables Used by PLA

The following System Code Tables are used by PLA.

Table ID	Table Description	Function
MI_IMPACT_CODE_COLOR	Impact Code Color	Populates the list of values in the **Color**list in Impact Code records.
MI_PLA_DATA_FREQ	PLA Data Entry Frequency	Populates the **Data Entry Frequency** list in Production Plan records.
MI_PLA_PLAN_BASIS	PLA Plan Basis	Populates the **Plan Basis** list in Production Plan records.
MI_PLA_PRODUCTION_MODEL	PLA Production Model	Populates the **Production Model** list in Production Plan records.
MI_PLA_RATE_UOM	PLA Production Rate UOM	Populates the **Production Rate UOM** list in Production Profile records.
PEST	Production Event Status	Populates the list of values in the **Status** list in Production Event records.

Parameters for the Production Loss Accounting URL

There is one root URL associated with Production Loss Accounting (PLA): **meridium://PLA**. A link constructed from the path alone will open the **PLA Start Page**. This URL accepts the parameters that are described in the following table.

Parameter Name	Description	Accepted Value(s)	Notes
Page	Specifies the page that you want to view.	Products UnitProfiles EventCodes ImpactCodes Events Plans Entry ProductionAnalysis	• **Products:** Displays the **Products** page. • **UnitProfiles:** Displays the **Production Units and Profiles** page. • **EventCodes:** Displays the **Production Event Coding** page. • **ImpactCodes:** Displays the **Impact Coding** page. • **Events:** Displays the **Production Event Management** page. • **Plans:** Displays the **Find Production Unit** window, where you can select the Production Unit record for which you want to create a production plan. If Page=Plans, you can also use the EntyKey and FamilyKey parameters to specify the Production Unit record for which you want to create a production plan, which will bypass the **Find Production Unit** window. • **Entry:** Displays the **Find Production Plan** window, where you can select the Production Plan record that will be used to compile the data that appears on the **Production Data Entry** page. If Page=Entry, you can also use the EntyKey and FamilyKey parameters to specify the Production Plan record that you want to see on the **Production Data Entry** page, which will bypass the **Find Production Plan** window. • **ProductionAnalysis:** Displays the **Production Analysis** page.

Parameter Name	Description	Accepted Value(s)	Notes
EntyKey	Specifies the record that you want to see on the specified page.	The Entity Key of the desired record.	You can use the EntyKey parameter if Page=Plans or Page=Entry. If you use the EntyKey parameter, you must also use the FamilyKey parameter.
FamilyKey	Specifies the family of the record that you want to see on the specified page.	The Family Key of the desired family.	You can use the FamilyKey parameter if Page=Plans or Page=Entry. If you use the FamilyKey parameter, you must also use the EntyKey parameter.

Examples of PLA URLs

- meridium://PLA

  Displays the **PLA Start Page**.

- meridium://PLA?**Page=Products**

  Displays the **Products** page.

- meridium://PLA?**Page=Plans**

  Displays the **Find Production Unit** window, where you can select the Production Unit record for which you want to create or open a production plan.

- meridium://PLA?**Page=Plans&EntyKey=123456&FamilyKey=987654**

  Displays the **Manage Production Plans** page, displaying production plans for the Production Unit record with the Entity Key 123456 in the family with the Family Key 987654.

- meridium://PLA?**Page=Entry**

  Displays the **Find Production Plan** window, where you can select the Production Plan record that will be used to compile the data that appears on the **Production Data Entry** page.

- meridium://PLA?**Page=Entry&EntyKey=123456&FamilyKey=987654**

  Displays the Production Data Entry page, where the data on the Production Data tab is compiled using the values in the Production Plan record with the Entity Key 123456 in the family with the Family Key 987654.

Impact Code

A short code that represents the impact of the production loss.

Overall Equipment Effectiveness Codes (OEE)

A short code that categorizes losses according to equipment availability, performance, and product quality. The losses associated with these categories are used to calculate an overall OEE percentage, which indicates the effectiveness of the production process.

Production Event

Any event that results in reduced production output.

Production Event Code

A short code that represents the type of event that caused production loss.

Production Plan

A plan that defines the time period for which you want to track production and the amount of product that you plan to produce during that time period.