

Member Information Reporting Application (MIRA)

User Guide

Monitoring Analytics, LLC

Version 3.2: February 2021

Table of Contents

Member Information Reporting Application (MIRA) User Guide	4
1 MIRA Administration.....	4
1.1 MIRA Account Setup and Access	4
1.2 Technical Guidance.....	13
1.3 Getting Help.....	15
1.4 Reporting Enforcement and Data Confidentiality	16
2 MIRA Cost Offer Assumptions (COA) User Guide	16
2.1 Getting Started with the COA Module	16
2.2 Cost Offer Assumptions Screen	17
2.3 Fuel Cost Data.....	18
2.4 Schedule Data.....	21
2.5 Start Data.....	21
2.6 Heat Input Data	22
2.7 VOM Data	23
2.8 Import/Export.....	24
2.9 Glossary	34
3 Power Plant Operations Report (PPOR) Monthly User Guide.....	39
3.1 Create a Monthly Report.....	39
3.2 Create a Plant Record	40
3.3 Importing/Exporting PPOR Monthly Data	42
3.4 PPOR Monthly Fuel Deliveries: Detail	44
3.5 PPOR Monthly Fuel Consumption: Details	53
3.6 PPOR Monthly Fuel Stocks: Details	58
4 Fuel Policy Module User Guide	62
4.1 Fuel Policy Editing.....	63

4.2	Fuel Policy Review Workflow	66
4.3	Custom Effective Date	68
4.4	Changes to Submitted Fuel Policy Contents.....	69
4.5	Extending a Fuel Policy’s Expiration Date.....	70
4.6	Viewing Fuel Policy Status for Previous Years	71
4.7	Fuel Policy Unit	72
5	MIRA Black Start User Guide	74
5.1	Getting Started with the Black Start Module	74
5.2	Black Start Data Management Screen.....	75
5.3	Black Start Resource Data Management (For a Specific Resource)	76
5.4	Workflow Status	80
5.5	Import/Export.....	83
5.6	Copy from Prior Delivery Year	84
6	MIRA Opportunity Cost Calculator User Guide	85
6.1	Opportunity Cost Adder Eligibility	85
6.2	Opportunity Cost Calculator Workflow	85
6.3	Opportunity Cost Calculator Inputs.....	86
6.4	Opportunity Cost Calculator Results	90
7	MIRA Secure Communications User Guide.....	90
7.1	Initiating a Secure Communication	91
7.2	Secure Communication Access Model	91
7.3	Accessing the Secure Communications Module	91
7.4	Contributing to a Secure Communication	92
7.5	Locked Secure Communication	93

Member Information Reporting Application (MIRA) User Guide

The MIRA system includes multiple data reporting functions:

- Black Start Data Management
- Cost Offer Assumptions
- Fuel Policy Editing
- Fuel Policy Unit
- OCC Inputs
- OCC Results
- PPOR Monthly
- RPM Offer Cap Confirmation
- RPM Requests
- RPM/ACR
- Secure Communications

This MIRA User Guide provides guidance on:

- 1) How to get started;
- 2) Technical instructions on the use of the MIRA system; and
- 3) Guidance on the format and content of the required data.

User Guides for the RPM related MIRA modules (RPM Offer Cap Confirmation, RPM Requests, and RPM/ACR) are documented separately in <http://www.monitoringanalytics.com/tools/tools.shtml>

1 MIRA Administration

1.1 MIRA Account Setup and Access

All Market Participant companies should have their PJM Customer Account Manager (CAM) log in to the MIRA system, and designate users for their accounts.

A single user can be given access to report data for all reporting functions, or the roles and access to the screens can be split among different users.

1.1.1 Getting Started

1.1.1.1 Login Procedures

To obtain an account, see the instructions in sections 1.1.2 Customer Account Manager (CAM) Access or 1.1.3 Regular User Access.

The User ID must be unique to the user and must be set up as the user's primary email address. When an account is created, a temporary password must be assigned. However, for security purposes, it is advised to have the user reset their password using the MIRA "Forgot Password?" function as described in section 1.1.5.

The password is suspended temporarily after three failed attempts to log into the system.

1.1.1.1 Security

MIRA has the following security restrictions in place:

- Users are tracked when they are logged into the system. The user's IP address and date and time of the last log-off are recorded.
- Passwords are encrypted by the system before storing them in the database. Since the password is encrypted in the database, no one, including the MIRA administrator, can discern the password simply by examining it.
- The password is suspended for a short period of time after three failed attempts to log into the system.

1.1.1.1.2 Launching the System

- Launch Microsoft Edge, Chrome, or other current browser
- From the Monitoring Analytics website, tools page¹, click on the MIRA button to take you to the MIRA website address URL.



- You will see a screen similar to the following:

¹ <http://www.monitoringanalytics.com/tools/tools.shtml>

Monitoring Analytics

MIRA
Member Information Reporting Application

Sign In Required

Username:

Password:

Sign In

[Forgot your password?](#)

WARNING: This system and the information processed or contained within is for the use of authorized users only. All activity on this computer system may be monitored and/or recorded by systems personnel. Collected information may be released to third parties including the federal government. Anyone using this system expressly consents to such monitoring. Individuals using this computer system without authority, or in excess of their authority, are advised that if monitoring reveals possible improper or criminal activity, system personnel may provide the evidence of such monitoring to management or law enforcement officials for disciplinary proceedings and/or criminal and civil proceedings under local and foreign laws.

Confidential

- Type your user name (your full email address) in the “User Name” box
- Type your password in the “Password” box
- Click the “Sign In” button or press the return key

If you don’t remember your password, or the system does not accept your credentials, please click on the “Forgot your password?” link to re-set a new password as detailed in section 1.1.5.

If you are unable to gain entry through the “Forgot your password?” utility, please contact the system administrator as described in section 1.3 Getting Help.

1.1.2 Customer Account Manager (CAM) Access

CAMs are associated with one or more market participant companies, and in MIRA, CAMs have the ability to create user accounts and assign reporting access rights for those companies for which they are CAM.

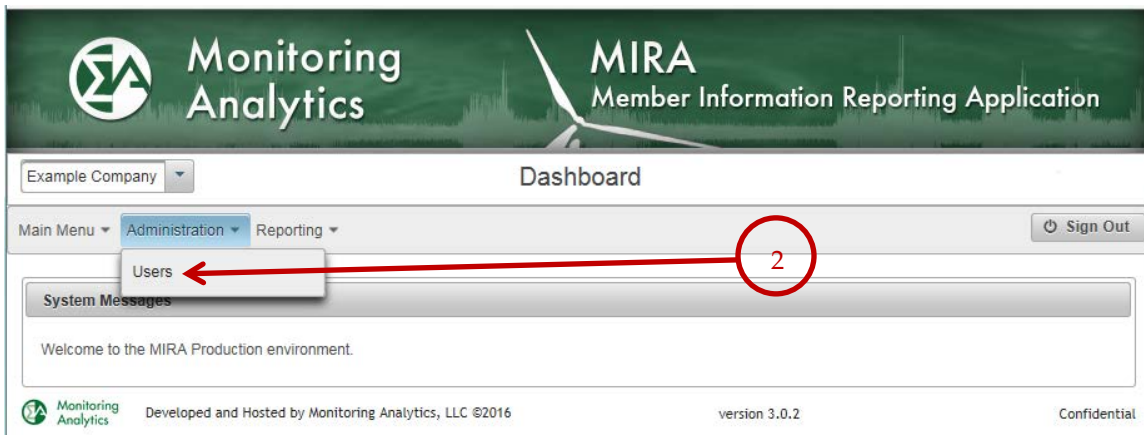
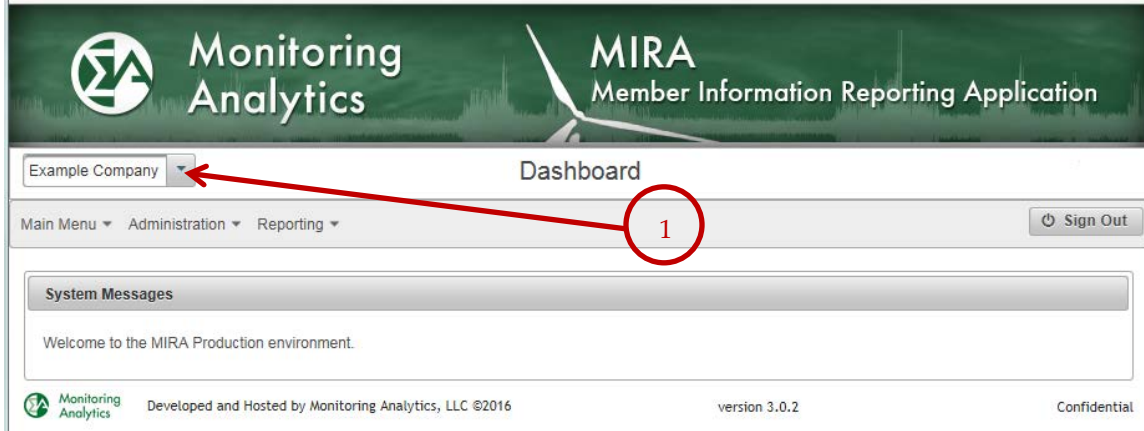
PJM maintains the list of credentialed CAMs. CAMs for companies with reporting responsibilities will be granted Account Manager access in MIRA.

1.1.2.1 CAM Creating User Accounts

When a CAM logs in to the MIRA system, their “Dashboard” screen will look like the screen shot below.

Step 1: Select the Company to Administer

Upon logging in, the CAM should select the company for which they are administering accounts. The drop down selector shown in item 1 below allows the CAM the choice of only those companies for which the CAM’s account has permissions. If the CAM only has permissions to one account, that company account will be selected by default.



Step 2: Administer Users

To administer user accounts, the CAM should click on “Administration”, then “Users” as indicated in item 2 above.

On the “User Maintenance” screen, follow the steps shown in the screenshot below:

Create a User	
Step 1	Select “Add User”(to create a new user, or proceed to step 3 to change an existing account);

Step 2	On the newly created User row, click on the arrow to the left of the row to expand the row and show the user input fields.
Step 3	Type in the new user's Login ID (this user name should be set = the user's email address), name, phone number, email address, and a temporary password;
Step 4	Remember to save the users credentials.

If you try to save the new user's record (Step 4) before populating the information in Step 3, you will get an error.

The screenshot shows the MIRA (Member Information Reporting Application) User Maintenance interface. The header includes the Monitoring Analytics logo and the text 'MIRA Member Information Reporting Application'. Below the header, there is a navigation bar with 'Example Company', 'User Maintenance', and 'Demo User'. A 'Sign Out' button is also present. The main content area has a message 'Expand rows to see detailed information.' and an '+ Add User' button. A table displays user records with columns for 'Login Id', 'Last Name', 'First Name', and 'Actions'. The first row is expanded, showing input fields for 'Login Id', 'Last Name', 'First Name', 'Telephone Number', 'Email Address', 'Password', and 'Confirm Password'. A 'Last password change date' field shows '02/04/2016 18:46:36'. Below the expanded form is a table for 'User Types' with 'No records found.' and a table for existing users with columns for 'Company', 'User Types', and 'Action'.

Numbered callouts in the image indicate the following elements:

- 1: Points to the '+ Add User' button.
- 2: Points to the expand/collapse arrow on the left of the first user row.
- 3: Points to the input fields for the expanded user record.
- 4: Points to the 'Actions' column of the first user row.

Step 3 shown above is where the new user’s credentials are assigned. When the CAM clicks on the arrow in Step 2, to expand the new user record, the CAM will see the screen above.

The CAM will enter the user’s telephone number, email address, and a temporary password that will have to be changed on first instance of logging in. The temporary password can be communicated by the CAM to the user, or the user can simply set a new password using the “Forgot your password?” functionality (this is the recommended method).

Note: it is critical that the CAM use the correct email address in the “Email Address” field. This is the unique key that allows the user to use the “Forgot your password?” functionality.

If the system indicates that a user with the desired email address already exists in the system, the CAM cannot grant new access rights to that user. To grant these access rights, the CAM should contact Monitoring Analytics (mira@monitoringanalytics.com), and arrangements will be made to provide the appropriate access.

To specify a company and assign access to a reporting function for a user, the CAM will:

Assign User Access	
Step 1	Click the arrow to the left of the row to expand the row prior to adding company access.
Step 2	Click on the “+” sign to add a company access.
Step 3	Start to type in (and select from the generated drop-down list) the name of the company to assign access. The CAM can only assign access to the Market Participant company the CAM has access to.
Step 4	Check off the reporting functions for which the user should have access for that company.
Step 5	Save the user record.

The screenshot shows the 'User Maintenance' page for 'Example Company' as a 'Demo User'. It features a table with user records. The first record is selected, showing a detailed form for 'demo.user3@company.com'. The form includes fields for Login Id, Last Name, First Name, Telephone Number, Email Address, Password, and Confirm Password. Below the form is a 'User Types' section with checkboxes for 'Company User', 'Fuel Policy User', 'Power Plant Operations User (continuous)', and 'RPM/ACR User'. The 'Company' dropdown is set to 'Example Company'. Red annotations highlight: 1. The Login ID field, 2. The trash icon in the Actions menu, 3. The Password field, 4. The User Types section, and 5. The plus icon in the Actions menu.

In Step 4 above, if a CAM wishes to create a user account, but doesn't want to provide access to any functions for that company at the time of account creation, the CAM can assign the user access to the "Company User" role, which has no reporting ability. (See item #1 below).

In Step 4 above, if a CAM wishes to delete access to a company, use the "trash can" icon to delete the company access record from the user's account. (See item #2 below).

This close-up shows the 'User Types' section for the user 'demo.user3@company.com'. The 'Company User' checkbox is checked, and the 'Power Plant Operations User (continuous)' checkbox is unchecked. Red annotations highlight: 1. The checked 'Company User' checkbox, and 2. The unchecked 'Power Plant Operations User (continuous)' checkbox.

1.1.3 Regular User Access

When a CAM sets up a user account, the CAM should communicate the following information to the new user:

- 1) That their account ID is their email address.
- 2) The URL for the Monitoring Analytics “Tools” page (<http://www.monitoringanalytics.com/tools/tools.shtml>) and how to connect to the MIRA system.
- 3) To establish a new password, use the “Forgot your password?” function, as described in section 1.1.5.

1.1.4 Password Rules

Passwords are encrypted by the system before storing them in the database. Since the password is encrypted in the database, no one, including the MIRA administrator can discern the password simply by examining it.

- Password must be at least 10 characters long.
- Password must contain characters from at least 3 of the following 4 categories; {ABCDEFGHIJKLMNOPQRSTUVWXYZ}, {abcdefghijklmnopqrstuvwxyz}, {0123456789}, {~!@#\$%^&* _-+=`|\(){}[]:;'"<>,.?/}

1.1.5 Forgot Your Password?

When first logging in, or whenever a CAM or a User forgets their password, they can reset their password with the “Forgot your password?” function. On the log in screen, click on “Forgot your password?”:

Monitoring Analytics

MIRA
Member Information Reporting Application

Sign In Required

Username:

Password:

Sign In

[Forgot your password?](#)

WARNING: This system and the information processed or contained within is for the use of authorized users only. All activity on this computer system may be monitored and/or recorded by systems personnel. Collected information may be released to third parties including the federal government. Anyone using this system expressly consents to such monitoring. Individuals using this computer system without authority, or in excess of their authority, are advised that if monitoring reveals possible improper or criminal activity, system personnel may provide the evidence of such monitoring to management or law enforcement officials for disciplinary proceedings and/or criminal and civil proceedings under local and foreign laws.

Confidential

The user will be prompted to enter their email address. If the email address matches the email of a user in the system, that user will be emailed a link. Clicking on the link will take the user to a change password prompt. Clicking on “Submit” lets the user return to the log in screen, where the new password will be effective.

If the user never receives the email link, it usually means that the email address is not set up correctly in the user profile in the system, or it means that the user’s company firewall/spam filter is rejecting the email with the link. In either case, please contact the Monitoring Analytics system administrator as described in Section 1.3.

Monitoring Analytics

MIRA
Member Information Reporting Application

Reset Password

Reset Password

Password

Confirm Password

Submit

Confidential

1.2 Technical Guidance

1.2.1 System Requirements

The following minimum system requirements should be met before attempting to access the MIRA system:

- You must have a personal computer with access to the MIRA website using current versions of Microsoft Edge or Google Chrome browsers.
- If you are experiencing poor browser performance in the application, try clearing your browser's cache. To do so in Edge, click on (**⋮**) >> History >> Clear History.

In Chrome, click on "Customize and control (**⋮**) >> More tools >> Clear browsing data >> Clear data.

- If your browser continues to perform poorly, contact the Monitoring Analytics system administrator as described in Section 1.3.

1.2.2 Menu Bar

Once the user has successfully logged into the system, the main system "Dashboard" screen appears with a menu bar under the main banner. This menu bar allows the user to access user tools and reporting functionality in the MIRA system. The menu bar remains beneath the MIRA banner, no matter which screen in MIRA you navigate to.

Options in the menu bar include:

- **Company selection:** for accounts with access for more than one company, this drop down in the upper left corner lets the user select which company they are reporting for, or if the user is a CAM, which company they wish to administer accounts for.
- **Sign Out:** Users should always click on "Sign Out", in the upper right corner, under the user's name to end their session.
- **Main Menu**
 - **Change Password:** Click here to change your password.
 - **Contact Administrator:** Opens a web browser window connecting to the Monitoring Analytics web page, with contact information.
 - **Dashboard:** during any session, this returns the user to the dashboard screen. The dashboard is the login landing page, and may include system messages about upcoming outages.
 - **Export Fuel Index List:** Some MIRA reporting functions require the user to specify a fuel. This export file allows MIRA users to review all the available fuel indices in MIRA.
 - **MIRA PJM Portal:** Opens a web browser window with information about the MIRA system.
- Administration

- **Users:** If the user has Account Manager privileges, the Users link will go to the Users list, allowing administration of user access to the selected company.
- Reporting: each of the reporting modules that the user has access to for the selected company is accessed under this menu item.
 - Black Start Data Management
 - Cost Offer Assumptions
 - Fuel Policy Editing
 - Fuel Policy Unit
 - OCC Inputs
 - OCC Results
 - PPOR Monthly
 - RPM Offer Cap Confirmation
 - RPM Requests
 - RPM/ACR
 - Secure Communications



1.2.3 Ending a Session in MIRA

- Clicking on the “Sign Out” button in the upper left corner will bring the user back to the initial login screen.
- If a user is inactive for a set period of time, a session time-out process will be initiated. A warning will be presented to the user that session time out is about to occur. If the user does not respond to the warning within one minute (or within a timeframe established by the Monitoring Analytics system administrator) the session










will be terminated, and the user will have to log back in to resume activity in the system.

- It is not recommended that a user terminate a session by closing the browser window while logged in. Using the “Sign Out” link will terminate the session.

Note: Before going to a different web site or closing the browser, the user should logout from the system. Abrupt termination (closing the browser while the application is running) may cause the user account to remain connected for a period of time until the session times out. Attempts to connect to any page in the MIRA system during this period of time will return the user to their active session.

1.2.4 User Interface Operators

The following describes some of the buttons available to users to navigate the MIRA system.

Open	
Save	
Discard Changes	
Delete an item	
Expand an item	
Add a record	
Sort	
Filter: filters the contents of the column based on entered text	
Drop down box with the possible values for the field	

1.3 Getting Help

To get technical help with the MIRA system, please contact the Monitoring Analytics system administrator:

- Help Desk Email: mira@monitoringanalytics.com

- For additional information, the system administrator's MIRA web page is: <http://www.monitoringanalytics.com/tools/tools.shtml>
- *Never give the system administrator or any other help desk support staff your passwords for any accounts.*

1.4 Reporting Enforcement and Data Confidentiality

Monitoring Analytics will review and enforce participation requirements.

Monitoring Analytics will use the data for verification and analysis of generator costs.

Monitoring Analytics treats all submitted data as confidential in accordance with the PJM Tariff and applicable non-disclosure agreements.

2 MIRA Cost Offer Assumptions (COA) User Guide

The Cost Offer Assumptions (COA) module in MIRA collects inputs used in the development of cost-based offers in the PJM Energy Market.

The COA module allows market participants to report offer components for multiple schedules per unit, and provides more detail than its predecessor module, the Power Plant Operations Report (Continuous).

The data are required for the IMM to reconstruct and verify market participants' cost-based offers, so it is expected that market participants will update the data in COA whenever the underlying input assumptions to their cost-based offers change.

This User Guide describes the functionality in the MIRA COA module. For information about the Member Information Reporting Application (MIRA), please see the MIRA Users Guide on the Monitoring Analytics Tools page:

<http://www.monitoringanalytics.com/tools/tools.shtml>.

2.1 Getting Started with the COA Module

2.1.1 COA User Permissions

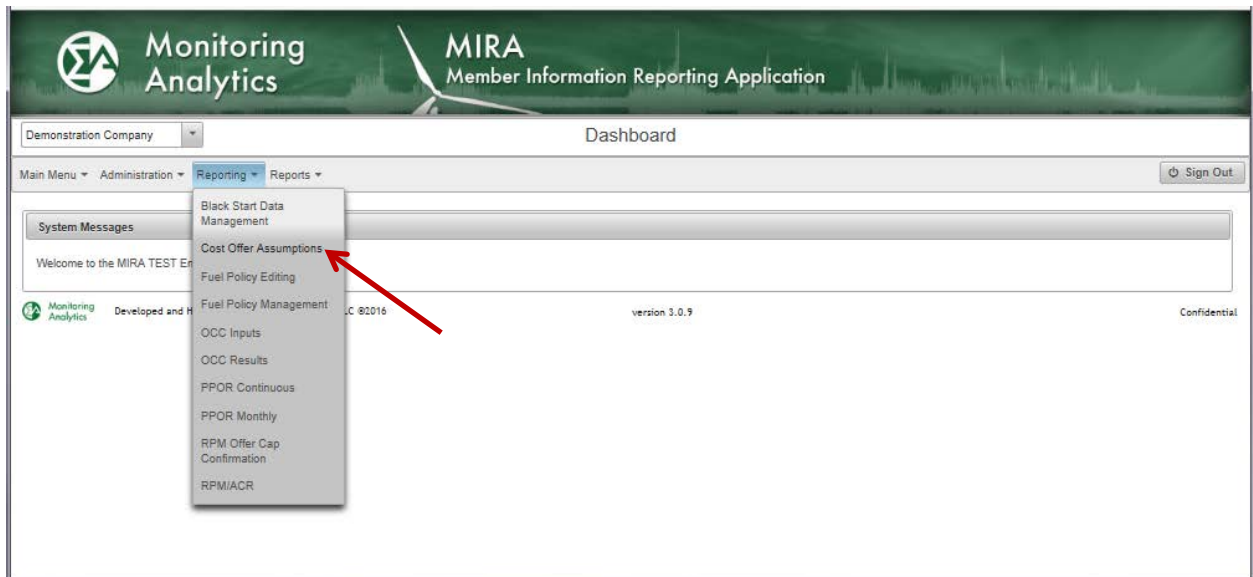
To get access to the COA module in MIRA, have your company's Customer Account Manager (CAM) create a MIRA account, and grant you the Cost Offer Assumptions User role. For details on CAM responsibilities, please see the CAM Quick Start Reference on the "Tools" page.

The Cost Offer Assumptions User role can be assigned by checking the Cost Offer Assumptions User box in the user profile:

Company	User Types				Actions
Demon Company	<input type="checkbox"/> Black Start User	<input type="checkbox"/> Company User	<input checked="" type="checkbox"/> Cost Offer Assumptions User	<input type="checkbox"/> Power Plant Operations User (continuous)	
	<input type="checkbox"/> Fuel Policy User	<input type="checkbox"/> Opportunity Cost Calculator User			
	<input type="checkbox"/> Power Plant Operations User (monthly)	<input type="checkbox"/> RPM/ACR User			

2.1.2 Access to MIRA COA Module

When logged in to the MIRA system, with Cost Offer Assumptions User account permissions, access the COA module by clicking on the Cost Offer Assumptions link under Reporting in the Menu Bar.



2.2 Cost Offer Assumptions Screen

The main Cost Offer Assumptions screen includes: 1) all generating units listed under the reporting company; 2) a button to report Fuel Cost data for the unit; 3) a button to access the list of schedules for each unit; and 4) Export and Import buttons to create and upload spreadsheets with the complete COA record for the company.

Unit Name	Unit ID	Schedules	Fuel Cost Data
Demo Unit 1	DEMO111	8 <input type="button" value="Q"/>	2 <input type="button" value="Q"/>
Demo Unit 2	DEMO222	0 <input type="button" value="Q"/>	0 <input type="button" value="Q"/>
Demo Unit 3	DEMO333	0 <input type="button" value="Q"/>	0 <input type="button" value="Q"/>
Demo Unit 4a	DEMO456	0 <input type="button" value="Q"/>	0 <input type="button" value="Q"/>
DEMO Unit 5	DEMO507	0 <input type="button" value="Q"/>	0 <input type="button" value="Q"/>
DEMO Unit A1	9292929292	0 <input type="button" value="Q"/>	0 <input type="button" value="Q"/>
DEMO Unit A2	93939393	0 <input type="button" value="Q"/>	0 <input type="button" value="Q"/>
DEMO Unit A3	94949494	0 <input type="button" value="Q"/>	0 <input type="button" value="Q"/>
DeMo Unit a4	95959595	0 <input type="button" value="Q"/>	0 <input type="button" value="Q"/>
DEMO UNIT a7	98989898	0 <input type="button" value="Q"/>	0 <input type="button" value="Q"/>
DEMO-Unit	DEMO-Unit	0 <input type="button" value="Q"/>	0 <input type="button" value="Q"/>
DEMONSTRATION UNIT A8	97979797	0 <input type="button" value="Q"/>	0 <input type="button" value="Q"/>

2.3 Fuel Cost Data

When the user clicks the Open Fuel Cost button in item (2) above, the Fuel Cost Data screen is presented. For each unit, for each Energy Source indicated as a primary, secondary, co-fire, or start fuel for any offer schedule, the market participant will use the Add an Energy Source button to create a Fuel Cost Data record.

Energy Source Type	Energy Source	Actions
NATURAL GAS AND OTHER GAS	NG	<input type="button" value="Q"/> <input type="button" value="X"/>
PETROLEUM PRODUCT	DFO	<input type="button" value="Q"/> <input type="button" value="X"/>

Clicking the Add an Energy Source button will open the Fuel Cost Data Detail screen, which must be completed for each Energy Source consumed by the generating unit.

- 1) When the Fuel Cost Data Detail screen is first opened, select the Energy Source from the dropdown selector.
- 2) If the generating unit is offered using one or multiple contract prices, the contracts for this Energy Source may be combined and averaged, and data may be reported on this screen using the Average of Contracts column.
- 3) If the generating unit is offered using a spot market index, use the three Fuel Index columns to report fuel cost data. If the source of the fuel cost can be described with only one fuel index, one column is sufficient.
- 4) If the generating unit is offered using more than three Fuel Indices, answer Yes on the More than 3 Fuel Indices? question, and only report the top three by volume.
- 5) Only if your Energy Source is Natural Gas should you report the eight rows for Natural Gas Replacement Calculation.
- 6) Emissions data is not broken out by Fuel Index, but must be reported for each Energy Source.
- 7) Report only those data fields that are relevant to your cost-based offer.

Fuel Cost Data Detail Screen:



Energy Source	NG			
Inventory Replacement Cost Method	Fixed			
Fixed Fuel Cost (\$/MMBtu)				
Pumped Hydro Efficiency Factor (%)				
Production Tax Credit Opportunity Cost (\$/MWh)				
Renewable Energy Credit Opportunity Cost (\$/MWh)				
More than 3 Fuel Indices?	No			


Fuel Related Costs	Average of Contracts	Fuel Index 1	Fuel Index 2	Fuel Index 3
Fuel Index		[Select One]	[Select One]	[Select One]
Fuel Index / Contract Share (row must add to 100%)				
Basis / Transportation (\$/MMBtu)				
Non-Transportation Charges (\$/MMBtu)				
Pipeline Fuel Retainage %				
Non-Transportation % Charges				
First Upstream Transportation Charge (\$/MMBtu)				
First Upstream Pipeline Fuel Retainage Charge				
Second Upstream Transportation Charge (\$/MMBtu)				
Second Upstream Pipeline Fuel Retainage Charge				

Natural Gas Replacement Cost Calculation (Only Required for Natural Gas Energy Source)	Average of Contracts	Fuel Index 1	Fuel Index 2	Fuel Index 3
Market Source	[Select One]	[Select One]	[Select One]	[Select One]
Primary Method	[Select One]	[Select One]	[Select One]	[Select One]
Secondary Method	[Select One]	[Select One]	[Select One]	[Select One]
Tertiary Method	[Select One]	[Select One]	[Select One]	[Select One]
ICE Traded Volume Needed for Primary Method (MMBtu)				
Time for ICE Day Ahead Cost Capture (24hr time)				
Intraday Method	[Select One]	[Select One]	[Select One]	[Select One]
Day Ahead / Intraday Historic Differential				



Emissions Data	
SO2 Allowance Price Index Source	[Select One]
NOx Annual Allowance Price Index Source	[Select One]
NOx Seasonal Allowance Price Index Source	[Select One]
CO2 Allowance Price Index Source	[Select One]
Other Emissions Allowance Cost (\$/ton)	
Base SO2 Emissions Rate (lbs/MMBtu)	
Base NOx Emissions Rate (lbs/MMBtu)	
Base CO2 Emissions Rate (lbs/MMBtu)	
Volatile Organic Compounds Emissions Rate (lbs/MMBtu)	
Other Emissions Rate (lbs/MMBtu)	

2.4 Schedule Data

In the Cost Offer Assumptions screen, when the user clicks on the Schedules  button, the (1) list of available schedules for this unit (Demo Unit 1) will be presented in the Schedules screen. Monitoring Analytics will keep the list of active schedules consistent with the list of active schedules in PJM's Markets Gateway database. If a new schedule is being introduced that day by the market participant, they may (2) create it in MIRA with the + Add a Schedule button. To (3) change the Schedule ID, Schedule Name, Schedule Description, or Energy Source for a schedule, use the  button. The Schedule Name and Schedule Description will be automatically updated to maintain consistency with PJM Markets Gateway.

For each of the unit's schedules, the market participant should (4) click on the  buttons to report Start Data, Heat Input, and VOM records. (5) When any of these data records are updated, the last update date is displayed.



Schedule ID	Schedule Name	Schedule Description	Energy Source Type	Energy Source	Start Data	Heat Input	VOM	Actions
1	2X1 Gas	2 CTs and 1 ST gas fired	NATURAL GAS AND OTHER GAS	NG	 12/14/2016	 12/14/2016	 12/14/2016	 
11	1X1 Gas	1 CT and 1 ST gas fired	NATURAL GAS AND OTHER GAS	NG				 
21	1X1 Oil	1 CT and 1 ST oil fired	PETROLEUM PRODUCT	DFO				 
31	2X1 Oil	2 CT and 1 ST oil fired	PETROLEUM PRODUCT	DFO				 
41	1X0 Gas	1 CT gas fired	NATURAL GAS AND OTHER GAS	NG				 
51	2X0 Gas	2 CTs gas fired	NATURAL GAS AND OTHER GAS	NG				 
61	1X0 Oil	1 CT oil fired	PETROLEUM PRODUCT	DFO				 
65	2X0 Oil	2 CTs oil fired	PETROLEUM PRODUCT	DFO				 

2.5 Start Data

In the Start Input Assumptions record, there is flexibility for reporting start and shutdown heat input data for up to three Start Energy Sources for Hot, Intermediate, and Cold starts. If a single fuel is used for start, data for only one Energy Source needs to be reported in this screen. Market participants should also report the Start Performance Factor, Station Service During Start, Starting Operating Cost, Starting Maintenance Cost, Additional Labor Cost, and Emissions Data during starts.

Schedule ID	1
Schedule Name	2X1 Gas
Schedule Description	2 CTs and 1 ST gas fired
Start Performance Factor	<input type="text"/>

Start First Energy Source	[Select One] ▼		
	Equipment Temperature Status		
	Hot	Intermediate	Cold
Start First Energy Source Heat Input (MMBtu/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Shutdown First Energy Source Heat Input (MMBtu/shutdown)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Start Second Energy Source	[Select One] ▼		
	Equipment Temperature Status		
	Hot	Intermediate	Cold
Start Second Energy Source Heat Input (MMBtu/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Shutdown Second Energy Source Heat Input (MMBtu/shutdown)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Start Third Energy Source	[Select One] ▼		
	Equipment Temperature Status		
	Hot	Intermediate	Cold
Start Third Energy Source Heat Input (MMBtu/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Shutdown Third Energy Source Heat Input (MMBtu/shutdown)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Only required if multiple energy sources consumed for start for this schedule

	Equipment Temperature Status		
	Hot	Intermediate	Cold
Station Service During Start (MWh)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Starting Operating Cost (\$/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Starting Maintenance Cost (\$/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Additional Labor Cost (\$/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Emissions Data	
Start SO2 Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start CO2 Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start NOX Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start Volatile Organic Compounds Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start Other Emissions Rate (lbs/MMBtu)	<input type="text"/>

2.6 Heat Input Data

In the heat input screen, market participants have the flexibility to define different polynomial curves over different MW output ranges.

The X^0 term is the No Load (MMBtu/Hour) and it is only needed in the first MW output range. The X^1 , X^2 and X^3 represent the coefficients of the first, second and third (if needed) degree terms of the polynomial heat input curve. Generating units offered using step incremental heat rate must complete the X^1 term as the Segment Incremental Heat Rate (MMBtu/MWh) which is the average incremental heat rate over the given output range.

If the generating unit uses a single heat input polynomial, only one MW output range is needed.

Schedule ID	1
Schedule Name	2X1 Gas
Schedule Description	2 CTs and 1 ST gas fired

Performance Factor	1.0000000000	+ Add Output Range
--------------------	--------------	------------------------------------

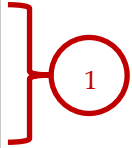
Output Range (MW)		Heat Input Polynomial Coefficients	Fuel Shares		Actions
From	To		Energy Source	Share	
0.0	100.0	X^0 <input type="text"/> X^1 <input type="text"/> X^2 <input type="text"/> X^3 <input type="text"/>	Fuel 1: NG <input type="text"/> Fuel 2: [Select One] <input type="text"/> Fuel 3: [Select One] <input type="text"/>	<input type="text"/>	
100.1	200.0	X^0 <input type="text"/> X^1 <input type="text"/> X^2 <input type="text"/> X^3 <input type="text"/>	Fuel 1: NG <input type="text"/> Fuel 2: [Select One] <input type="text"/> Fuel 3: [Select One] <input type="text"/>	<input type="text"/>	
200.1	210.0	X^0 <input type="text"/> X^1 <input type="text"/> X^2 <input type="text"/> X^3 <input type="text"/>	Fuel 1: NG <input type="text"/> Fuel 2: [Select One] <input type="text"/> Fuel 3: [Select One] <input type="text"/>	<input type="text"/>	

2.7 VOM Data

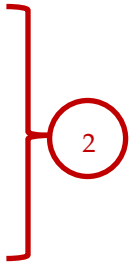
For each schedule, market participants must enter (1) Base Load Operating and Maintenance Costs. These can be reported per MMBtu, per Hour, or per MWh. Market participants may also report (2) Peak Incremental Operating Costs, Maintenance Costs, and Cycling Factor data for at most five output ranges.

Schedule ID	1
Schedule Name	2X1 Gas
Schedule Description	2 CTs and 1 ST gas fired

	Operating Cost	Maintenance Cost
Cost per MMBtu	<input type="text"/>	<input type="text"/>
Cost per Hour	<input type="text"/>	<input type="text"/>
Cost per MWh	<input type="text"/>	<input type="text"/>



Peak Incremental VOM Rate				
Output Range (MW)		Operating Cost	Maintenance Cost	Peaking Cyclic Factor
From	To	(\$/MWh)	(\$/MWh)	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>



2.8 Import/Export

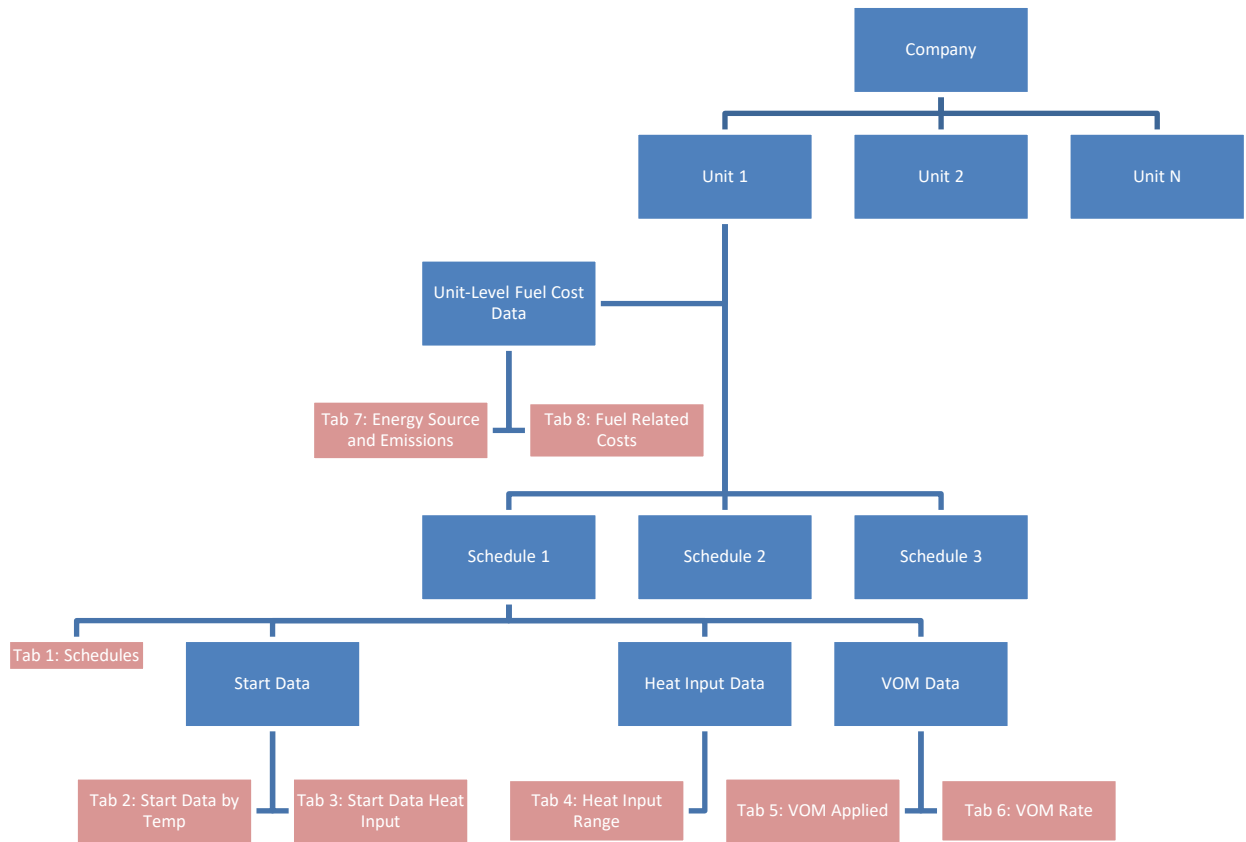
The Cost Offer Assumption module in MIRA has the ability to export a single file with a complete COA data set for all units. Similar to other MIRA modules, the export file can be used as a template, updated, and then re-imported as a method of updating the company's COA data. Because of the level of detail and complexity of the COA data, it may be easier to populate the COA data through the user interface the first time. Then use the export function to build a working import template.

To Export or Import these data files from the COA module, use the Export or Import button on the Cost Offer Assumptions screen.

The screenshot displays the 'Cost Offer Assumptions' page in the MIRA application. It features a table with the following data:

Unit Name	Unit ID	Schedules	Fuel Cost Data
Demo Unit 1	DEMO111	8	2
Demo Unit 2	DEMO222	0	0
Demo Unit 3	DEMO333	0	0
Demo Unit 4a	DEMO456	0	0
DEMO Unit 5	DEMO507	0	0
DEMO Unit A1	9292929292	0	0
DEMO Unit A2	93939393	0	0
DEMO Unit A3	94949494	0	0
DeMo Unit a4	95959595	0	0
DEMO UNIT a7	98989898	0	0
DEMO-Unit	DEMO-Unit	0	0
DEMONSTRATION UNIT A8	97979797	0	0

The following schematic represents the company/unit/schedule model, and the different data screens in the COA module in blue, and it shows the associated Import/Export file tabs in red. The Export file contains all COA data for all units modelled for that company. The market participant may import separate files for each unit if desired.



2.8.1 Tab: Schedules

The first tab in the Export/Import spreadsheet defines the schedules for each unit, and specifies the primary energy source and performance factor associated with each schedule. The Schedules worksheet includes the following column headings:

Unit ID
Unit Name
Schedule ID
Schedule Name
Schedule Description
Energy Source Type
Energy Source
Heat Input Performance Factor

2.8.2 Tab: Start Data by Temp

This worksheet reports data for (1) Performance Factor (during start); (2) Station Service, Operating Cost, Maintenance Cost, and Additional Labor during a start; and (3) Emissions data during the unit start.

Schedule ID	1
Schedule Name	2X1 Gas
Schedule Description	2 CTs and 1 ST gas fired
Start Performance Factor	<input type="text"/>

1

Start First Energy Source	[Select One]		
	Equipment Temperature Status		
	Hot	Intermediate	Cold
Start First Energy Source Heat Input (MMBtu/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Shutdown First Energy Source Heat Input (MMBtu/shutdown)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Start Second Energy Source	[Select One]		
	Equipment Temperature Status		
	Hot	Intermediate	Cold
Start Second Energy Source Heat Input (MMBtu/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Shutdown Second Energy Source Heat Input (MMBtu/shutdown)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Start Third Energy Source	[Select One]		
	Equipment Temperature Status		
	Hot	Intermediate	Cold
Start Third Energy Source Heat Input (MMBtu/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Shutdown Third Energy Source Heat Input (MMBtu/shutdown)	<input type="text"/>	<input type="text"/>	<input type="text"/>

	Equipment Temperature Status		
	Hot	Intermediate	Cold
Station Service During Start (MWh)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Starting Operating Cost (\$/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Starting Maintenance Cost (\$/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Additional Labor Cost (\$/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>

2

Emissions Data	
Start SO2 Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start CO2 Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start NOX Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start Volatile Organic Compounds Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start Other Emissions Rate (lbs/MMBtu)	<input type="text"/>

3

The Start Data by Temp worksheet includes the following column headings:

- Unit ID**
- Unit Name**
- Schedule ID**
- Schedule Name**
- Start Performance Factor**
- Start SO2 Emissions Rate (lbs/MMBtu)**
- Start CO2 Emissions Rate (lbs/MMBtu)**
- Start NOX Emissions Rate (lbs/MMBtu)**
- Start Volatile Organic Compounds Emissions Rate (lbs/MMBtu)**
- Start Other Emissions Rate (lbs/MMBtu)**
- Station Service Hot (MWh)**
- Station Service Intermediate (MWh)**
- Station Service Cold (MWh)**
- Starting Operating Cost Hot (\$/start)**
- Starting Operating Cost Intermediate (\$/start)**
- Starting Operating Cost Cold (\$/start)**
- Starting Maintenance Cost Hot (\$/start)**
- Starting Maintenance Cost Intermediate (\$/start)**
- Starting Maintenance Cost Cold (\$/start)**
- Additional Labor Cost Hot (\$/start)**
- Additional Labor Cost Intermediate (\$/start)**
- Additional Labor Cost Cold (\$/start)**

2.8.3 Tab: Start Data Heat Input

This worksheet reports heat input data for start and shutdown for hot, intermediate, and cold operating states. It can accommodate up to three energy sources (First, Second, Third) if multiple fuels are consumed during start or shutdown.

Schedule ID	1
Schedule Name	2X1 Gas
Schedule Description	2 CTs and 1 ST gas fired
Start Performance Factor	<input type="text"/>

Start First Energy Source	[Select One] ▼		
	Equipment Temperature Status		
	Hot	Intermediate	Cold
Start First Energy Source Heat Input (MMBtu/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Shutdown First Energy Source Heat Input (MMBtu/shutdown)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Start Second Energy Source	[Select One] ▼		
	Equipment Temperature Status		
	Hot	Intermediate	Cold
Start Second Energy Source Heat Input (MMBtu/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Shutdown Second Energy Source Heat Input (MMBtu/shutdown)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Start Third Energy Source	[Select One] ▼		
	Equipment Temperature Status		
	Hot	Intermediate	Cold
Start Third Energy Source Heat Input (MMBtu/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Shutdown Third Energy Source Heat Input (MMBtu/shutdown)	<input type="text"/>	<input type="text"/>	<input type="text"/>

	Equipment Temperature Status		
	Hot	Intermediate	Cold
Station Service During Start (MWh)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Starting Operating Cost (\$/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Starting Maintenance Cost (\$/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Additional Labor Cost (\$/start)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Emissions Data	
Start SO2 Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start CO2 Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start NOX Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start Volatile Organic Compounds Emissions Rate (lbs/MMBtu)	<input type="text"/>
Start Other Emissions Rate (lbs/MMBtu)	<input type="text"/>

1

The Start Data Heat Input worksheet includes the following column headings:

- Unit ID**
- Unit Name**
- Schedule ID**
- Schedule Name**
- Energy Source Sequence**
- Energy Source Type**
- Energy Source**
- Start Energy Source Heat Input Hot (MMBtu/start)**

- Start Energy Source Heat Input Intermediate (MMBtu/start)
- Start Energy Source Heat Input Cold (MMBtu/start)
- Shutdown Energy Source Heat Input Hot (MMBtu/shutdown)
- Shutdown Energy Source Heat Input Intermediate (MMBtu/shutdown)
- Shutdown Energy Source Heat Input Cold (MMBtu/shutdown)

2.8.4 Tab: Heat Input Range

This worksheet reports heat input data for normal operating ranges other than start and shutdown. This screen has the flexibility to define multiple output ranges, and to specify different Heat Input Polynomials to define the performance for different operating ranges, if necessary. The operating ranges are defined by the To column, and the system displays the From value as 0.1 MW above the previous To value in numerical order. For the following user interface inputs, the Heat Input Range worksheet is presented below.

Output Range (MW)		Heat Input Polynomial Coefficients		Fuel Shares		Actions
From	To	X ⁰	X ¹	Energy Source	Share	
0.0	100.0	X ⁰	<input type="text" value="0.0000000000"/>	Fuel 1	<input type="text" value="NG"/>	<input type="text" value="100.0%"/>
		X ¹	<input type="text" value="1.1000000000"/>	Fuel 2	<input type="text" value="[Select One]"/>	<input type="text" value=""/>
		X ²	<input type="text" value="2.2000000000"/>	Fuel 3	<input type="text" value="[Select One]"/>	<input type="text" value=""/>
		X ³	<input type="text" value="3.3000000000"/>			<input type="button" value="D"/>

Unit ID	Unit Name	Schedule ID	Schedule Name	To	X0	X1	X2	X3	Fuel 1 Energy Source Type	Fuel 1 Energy Source	Fuel 1 Share
DEMO111	Demo Unit 1	1	2X1 Gas	100.0	0.0000000000	1.1000000000	2.2000000000	3.3000000000	NATURAL GAS ANQ	NG	100.0%

The Heat Input Range worksheet includes the following column headings:

- Unit ID
- Unit Name
- Schedule ID
- Schedule Name
- To
- X0
- X1
- X2
- X3
- Fuel 1 Energy Source Type
- Fuel 1 Energy Source
- Fuel 1 Share
- Fuel 2 Energy Source Type
- Fuel 2 Energy Source
- Fuel 2 Share

Fuel 3 Energy Source Type
 Fuel 3 Energy Source
 Fuel 3 Share

2.8.5 Tab: VOM Applied

This worksheet captures the Base Load Operating and Maintenance Costs.. For the following user interface inputs, the VOM Applied worksheet is presented below.

	Operating Cost	Maintenance Cost
Cost per MMBtu	\$1.00	\$1.00
Cost per Hour	\$1.00	\$1.00
Cost per MWh	\$1.00	\$1.00

Unit ID	Unit Name	Schedule ID	Schedule Name	Operating Cost per MMBtu	Maintenance Cost per MMBtu	Operating Cost per Hour	Maintenance Cost per Hour	Operating Cost per MWh	Maintenance Cost per MWh
example	Example Unit	1	2X1 Gas	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00

2.8.6 Tab: VOM Rate

This worksheet captures the Peak Incremental VOM Rate for at most five output range segments. For the following user interface inputs, the VOM Rate worksheet is presented below. On this worksheet, the From and To values should both be supplied. The From is not inferred as it is in the Heat Input Range worksheet.

Peak Incremental VOM Rate				
Output Range (MW)		Operating Cost	Maintenance Cost	Peaking Cyclic Factor
From	To	(\$/MWh)	(\$/MWh)	
0.0	100.0	\$2.00	\$2.00	2.000
100.1	200.0	\$2.00	\$2.00	2.000
200.1	300.0	\$2.00	\$2.00	2.000

Unit ID	Unit Name	Schedule ID	Schedule Name	From (MW)	To (MW)	Peak Operating Cost (\$/MWh)	Peak Maintenance Cost (\$/MWh)	Peaking Cyclic Factor
example	Example Unit	1	2X1 Gas	0.0	100.0	\$2.00	\$2.00	2.000
example	Example Unit	1	2X1 Gas	100.1	200.0	\$2.00	\$2.00	2.000
example	Example Unit	1	2X1 Gas	200.1	300.0	\$2.00	\$2.00	2.000

2.8.7 Tab: Energy Source and Emissions

This worksheet captures the data from the Fuel Cost Data Detail screen that is reported at the total Energy Source level, not broken out by Contract or Fuel Index. The data that

is reported based on contract and fuel index are reported in the final worksheet, Fuel Related Costs.

Energy Source	NG
Inventory Replacement Cost Method	[Select One]
Fixed Fuel Cost (\$/MMBtu)	
Pumped Hydro Efficiency Factor (%)	
Production Tax Credit Opportunity Cost (\$/MWh)	
Renewable Energy Credit Opportunity Cost (\$/MWh)	
More than 3 Fuel Indices?	No

And

Emissions Data	
SO2 Allowance Price Index Source	[Select One]
NOx Annual Allowance Price Index Source	[Select One]
NOx Seasonal Allowance Price Index Source	[Select One]
CO2 Allowance Price Index Source	[Select One]
Other Emissions Allowance Cost (\$/ton)	
Base SO2 Emissions Rate (lbs/MMBtu)	
Base NOx Emissions Rate (lbs/MMBtu)	
Base CO2 Emissions Rate (lbs/MMBtu)	
Volatile Organic Compounds Emissions Rate (lbs/MMBtu)	
Other Emissions Rate (lbs/MMBtu)	

The Energy Source and Emissions worksheet contains the following column headings:

- Unit ID**
- Unit Name**
- Energy Source Type**
- Energy Source**
- Inventory Replacement Cost Method**
- Fixed Fuel Cost (\$/MMBtu)**
- Pumped Hydro Efficiency Factor**
- Production Tax Credit Opportunity Cost (\$/MWh)**
- Renewable Energy Credit Opportunity Cost (\$/MWh)**
- More than 3 Fuel Indices**
- SO2 Allowance Price Index Source**
- NOx Annual Allowance Price Index Source**
- NOx Seasonal Allowance Price Index Source**
- CO2 Allowance Price Index Source**
- Other Emissions Allowance Cost (\$/ton)**
- Base SO2 Emissions Rate (lbs/MMBtu)**
- Base NOx Emissions Rate (lbs/MMBtu)**

Base CO2 Emissions Rate (lbs/MMBtu)
Volatile Organic Compounds Emissions Rate (ppm/MMBtu)
Other Emissions Rate (lbs/MMBtu)

2.8.8 Tab: Fuel Related Costs

This worksheet captures the costs of acquiring fuel. It also captures the inputs to the natural gas replacement cost calculation. The data can be reported as the average values for all of a market participant's bilateral contracts or it can be reported for up to three fuel indices. The Fuel Index / Contract Share values must sum to 100 percent across the four Fuel Index Type rows for Fuel Index 1, Fuel Index 2, Fuel Index 3, and Average of Contracts.

Fuel Related Costs	Average of Contracts	Fuel Index 1	Fuel Index 2	Fuel Index 3
Fuel Index		[Select One] ▾	[Select One] ▾	[Select One] ▾
Fuel Index / Contract Share (row must add to 100%)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Basis / Transportation (\$/MMBtu)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Non-Transportation Charges (\$/MMBtu)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pipeline Fuel Retainage %	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Non-Transportation % Charges	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
First Upstream Transportation Charge (\$/MMBtu)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
First Upstream Pipeline Fuel Retainage Charge	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Second Upstream Transportation Charge (\$/MMBtu)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Second Upstream Pipeline Fuel Retainage Charge	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Natural Gas Replacement Cost Calculation (Only Required for Natural Gas Energy Source)	Average of Contracts	Fuel Index 1	Fuel Index 2	Fuel Index 3
Market Source	[Select One] ▾	[Select One] ▾	[Select One] ▾	[Select One] ▾
Primary Method	[Select One] ▾	[Select One] ▾	[Select One] ▾	[Select One] ▾
Secondary Method	[Select One] ▾	[Select One] ▾	[Select One] ▾	[Select One] ▾
Tertiary Method	[Select One] ▾	[Select One] ▾	[Select One] ▾	[Select One] ▾
ICE Traded Volume Needed for Primary Method (MMBtu)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Time for ICE Day Ahead Cost Capture (24hr time)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Intraday Method	[Select One] ▾	[Select One] ▾	[Select One] ▾	[Select One] ▾
Day Ahead / Intraday Historic Differential	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

The Fuel Related Costs worksheet contains the following column headings:

Unit ID
Unit Name
Energy Source Type
Energy Source
Fuel Index Type
Fuel Index
Fuel Index / Contract Share
Basis / Transportation (\$/MMBtu)
Non-Transportation Charges (\$/MMBtu)
Pipeline Fuel Retainage %

Non-Transportation % Charges
First Upstream Transportation Charge (\$/MMBtu)
First Upstream Pipeline Fuel Retainage %
Second Upstream Transportation Charge (\$/MMBtu)
Second Upstream Pipeline Fuel Retainage %
Market Source
Primary Method
Secondary Method
Tertiary Method
ICE Traded Volume Needed for Primary Method (MMBtu)
Time for ICE Day Ahead Cost Capture
Intraday Method
Day Ahead / Intraday Historic Differential

2.9 Glossary

2.9.1 Schedule Data

Contains details about the Markets Gateway schedule.

- Schedule ID: Last two digits of the PJM cost-based energy offer schedule. For example, if schedule is 1234567801, the schedule ID is 01.
- Schedule Name: Short name of the unit's schedule, defined by the operating company.
- Schedule Description: Description of the unit's schedule, defined by the operating company.
- Energy Source Type: Category of the fuel or one of the fuels used by the unit.
- Energy Source: Sub-Category of the fuel or one of the fuels used by the unit.
- The Energy Source Type to PJM Markets Gateway Fuel Type mapping and the Energy Source to PJM Markets Gateway Fuel Type mapping can be found here: http://www.monitoringanalytics.com/tools/docs/PJMFuelType_MIRAEnergySource_Mapping.xls.

Market Sellers will have to create new cost schedules in MIRA if new cost schedules are created in Markets Gateway, and complete all the fields needed. If Market Sellers modify any of the schedule fields in Markets Gateway, they will have to update the same fields in MIRA.

2.9.2 Start Data

Contains inputs needed to calculate the start cost for each equipment temperature status (hot, intermediate and cold).

The first three fields: Schedule ID, Schedule Name and Schedule Description cannot be modified in this screen. These fields are presented from the offer schedule data for reference.

- Start Performance Factor: Distinct performance factor for Market Sellers that calculate different start performance factor and operating performance factor. Market Sellers using one performance factor for start and operation should complete this field with such factor. If the unit uses a start performance factor of one, the number one (1) should be entered in this field.
- Start First / Second / Third Energy Source: MIRA allows including up to three fuels used during starts.
- Start Heat Input (MMBtu/start): Amount of MMBtu used during start for the applicable energy source. Market Sellers should not include in this field the amount of fuel used during shutdown.
- Shutdown Heat Input (MMBtu/shutdown): Amount of MMBtu used during shutdown for the applicable energy source.
- Station Service During Start (MWh): Amount of MWh used during start.
- Start Operating Cost (\$/start): Operating costs calculated on a per start basis. This value should not include any Operating costs allocated on a per MMBtu basis.
- Start Maintenance Cost (\$/start): Maintenance costs calculated on a per start basis. This value should not include any Maintenance costs allocated on a per MMBtu basis.
- Additional Labor Cost (\$/start).
- Emissions Data: Emission rates (in lbs per MMBtu) during start and shutdown for SO₂, CO₂, NO_x, VOC and an additional pollutant. These fields take into account distinct start emission rates and operating emission rates. If the unit has the same emission rates for start and operation, these fields should be completed with operation emission rates. If the cost-based start offer does not include emission costs, these fields can be left empty.

2.9.3 Heat Input

Contains operating heat input data needed to calculate the no load and the incremental energy curve.

The first three fields: Schedule ID, Schedule Name and Schedule Descriptions cannot be modified in this screen. These fields are presented from the schedule data for reference.

- Performance Factor: Operating performance factor. Market Sellers that do not calculate performance factors should enter the number one (1) in this field.
- Output Range (MW) From / To: Range of the output of the unit to which the defined heat input polynomial applies. This is needed for generation units that have different heat input functions along their output range. A typical example is a combined cycle with duct burners. The To (MW) level should be the most

accurate level for the month or season. More output ranges can be added by clicking + Add Output Range

- Heat Input Polynomial Coefficients: These fields should be completed with the coefficients of the heat input function. X^0 applies to the constant, X^1 to the first degree term, X^2 to the second degree term and X^3 to the third degree term. Units not using heat input functions should complete these fields using the following criteria:
 - Units with a specified no load heat should complete X^0 and X^1 for the first output range segment. X^0 should be the no load heat, if available. X^1 should be the average incremental heat rate from no load to the defined To range. This should be equal to the difference in heat input From 0 MWh to the To MWh range, divided by the To MWh range.
 - For any output range segment beyond the first one, only X^1 should be completed and X^1 should be the average incremental heat rate from the defined From range to the defined To range. This should be equal to the difference in heat input from the From MWh range to the To MWh range, divided by the difference between the From MWh range and the To MWh range.
 - Units offered with average heat rates (not with incremental heat rates and a separate no load heat) should complete only the X^1 coefficient. X^1 should be the average heat rate at the To range. This should be equal to the total heat input at the To MWh range, divided by the To MWh range.
- Fuel Shares / Energy Source: MIRA allows including up to three fuels used during operation. The share rows must add to 100 percent. These fields also allow specifying the range at which co-fired units switch from one fuel type to another. For example, a unit can specify that from 0 to 100 MWh, the unit uses coal and from 100 MWh to 150 MWh, the unit uses natural gas. In that case, if the heat input assumptions do not change, the X^0 , X^1 , X^2 and X^3 should be the same between the two output ranges.

2.9.4 VOM

Contains VOM data needed to calculate the no load and the incremental energy curve.

- The first three fields: Schedule ID, Schedule Name and Schedule Descriptions cannot be modified in this screen. These fields are presented from the schedule data for reference.
- Base Load Operating and Maintenance Costs: MIRA allows defining these values in \$ per MMBtu, \$ per hour or \$ per MWh.
- Peak Incremental VOM Rate: Operating and Maintenance costs in \$ per MWh applied to peak operating range in addition Peak Cycling Factor.

2.9.5 Fuel Cost Data

Contains inputs needed to reconstruct cost-based offers. Market Sellers should complete fuel cost data for every fuel type used in the cost-based offer calculation based on the methods documented in fuel cost policies. For example, if a coal fired steam unit uses coal, natural gas and oil during start and/or normal operation, the Market Seller should complete three fuel cost data sets.

- Energy Source: Sub-Category of the fuel or one of the fuels used by the unit. Fuel source descriptions can be found here: http://www.monitoringanalytics.com/tools/docs/PJMFuelType_MIRAEnergySource Mapping.xls.
- Inventory Replacement Cost Method: MIRA allows three different methods: Fixed, Inventory (weighted average, FIFO, LIFO) and Replacement.
- Fixed: Market Sellers should select this method when the fuel cost is known for an extended period (a month or longer).
- Inventory: Market Sellers should select the inventory method that they use to develop the fuel cost.
- Replacement: Market Sellers should select this method when they are using contract prices for future delivery or market prices to develop the fuel cost.
- Fixed Fuel Cost (\$/MMBtu): This field should be completed by Market Sellers when the fuel cost is known for an extended period (a month or longer). This applies for all Inventory Replacement Cost Methods.
- Pumped Hydro Efficiency Factor (%): Pumping efficiency used by pumped hydro resources.
- Production Tax Credit Opportunity Cost (\$/MWh): PTC in \$ per MWh after taxes. This value should be positive.
- Renewable Energy Credit Opportunity Cost (\$/MWh): REC in \$ per MWh. This value should be positive.
- More than 3 Fuel Indices?: Yes or no field that identifies that the unit uses more than three indices (also known as hubs or pricing locations).

2.9.6 Fuel Related Costs

Contains inputs needed to reconstruct cost-based offers. These fields should match the information provided in the fuel cost policy.

- Fuel Index: Index, hub, pricing point applicable to the Energy Source.
- Fuel Index / Contract Share: Share between indices or between indices and contract.
- Basis / Transportation (\$/MMBtu): Total transportation charges added to the commodity cost in \$ per MMBtu, excluding any charges that can be specified in the non-transportation charges (in \$ per MMBtu and in percentage), pipeline fuel retainage percentage, first and second upstream pipeline charges fields. For

natural gas fired units connected to an LDC, this field should include the transportation charges, in \$ per MMBtu, of the LDC.

- Non-Transportation Charges (\$/MMBtu): Charges that are not from transportation, such as supplier fees or taxes.
- Pipeline Fuel Retainage %: For natural gas fired units connected to an LDC, this field should include the retainage percentage of the LDC. For natural gas fired units not connected to an LDC, this field should include the retainage percentage of the interstate or intrastate pipeline connected to the unit.
- Non-Transportation % Charges: Charges that are not from transportation charged as a percentage of the fuel cost, such as taxes.
- First Upstream Transportation Charge (\$/MMBtu): For natural gas fired units that source their fuel from multiple pipelines, this field can be used to specify the additional pipeline transportation charges.
- First Upstream Pipeline Fuel Retainage Charge: For natural gas fired units that source their fuel from multiple pipelines, this field can be used to specify the additional pipeline retainage.
- Second Upstream Transportation Charge (\$/MMBtu): For natural gas fired units that source their fuel from multiple pipelines, this field can be used to specify the additional pipeline transportation charges.
- Second Upstream Pipeline Fuel Retainage Charge: For natural gas fired units that source their fuel from multiple pipelines, this field can be used to specify the additional pipeline retainage.
- Average of Contracts: This column was developed for units not fired with natural gas that know their contract replacement cost ahead of time. For these unit types, the relevant fields under this column are share, basis/transportation and non-transportation charges. The rest of the fields were developed for the natural gas fired units.

2.9.7 Natural Gas Replacement Cost Calculation

Contains inputs needed to reconstruct cost-based offers of natural gas fired units. These fields should match the information provided in the fuel cost policy.

- Market Source: ICE, NYMEX, Platts.
- Primary / Secondary / Tertiary Method: This field should be completed with the method specified in the fuel cost policy, e.g. ICE WAP, ICE midpoint and third party quotes.
- ICE Traded Volume Needed for Primary Method (MMBtu): Threshold in MMBtu defined in the fuel cost policy.
- Time for ICE Day Ahead Cost Capture (24hr time): Most common time at which the natural gas cost is selected from ICE.
- Intraday Method: Intraday natural gas cost estimation method specified in the fuel cost policy.

- Day Ahead / Intraday Historic Differential: Value in \$ per MMBtu used to estimate the intraday natural gas cost based on the day-ahead natural gas cost.
- The average of contracts column is not applicable to this section.

2.9.8 Emissions Data

Contains inputs needed to reconstruct cost-based offers. These fields should match the information provided in the fuel cost policy. Market Sellers can leave these fields empty if they do not calculate emission costs for their cost-based offers.

- SO₂ Allowance Price Index Source: SO₂ Allowance price market source, e.g. Argus, Evolution Markets.
- NO_x Annual Allowance Price Index Source: NO_x Annual Allowance price market source, e.g. Argus, Evolution Markets.
- NO_x Seasonal Allowance Price Index Source: NO_x Seasonal Allowance price market source, e.g. Argus, Evolution Markets.
- CO₂ Allowance Price Index Source: CO₂ Allowance price market source, e.g. Argus, Evolution Markets.
- Other Emissions Allowance Cost (\$/ton): Emission cost in \$ per ton other than SO₂, NO_x or CO₂. If this field is completed, the VOC rate below or the other emission rate field should be completed. This cost should be specified in the emissions policy.
- Base SO₂ Emissions Rate (lbs/MMBtu).
- Base NO_x Emissions Rate (lbs/MMBtu).
- Base CO₂ Emissions Rate (lbs/MMBtu).
- Volatile Organic Compounds Emissions Rate (lbs/MMBtu).
- Other Emissions Rate (lbs/MMBtu): Field for pollutant other than SO₂, NO_x, CO₂ or VOC.

3 Power Plant Operations Report (PPOR) Monthly User Guide

3.1 Create a Monthly Report

This section of the MIRA User Guide describes the data that is required in the Monthly Power Plant Operations Report. Detailed steps for reporting monthly data are explained below.

Step 1: Add a monthly report

The PPOR Monthly function requires a new record to be created for each plant, each month. In the PPOR Monthly screen, to create a new monthly record, click on “Add Monthly Report”, as shown in item #1 below. A new row will appear, showing the

current month and year. If you wish to report for a prior month that is not locked, you can click on the month name, and select a different month. If the month is locked, you won't be able to save a monthly record for that month. You can contact Monitoring Analytics to request approval to unlock prior months.

Step 2: Save the monthly report

Once a monthly report has been initiated, save the month, as shown in item #2 below. Saving now creates a record in the database for the desired month. **NOTE:** The monthly report cannot be opened for reporting until it is saved.

Step 3: Drill into the monthly report to provide the required detailed data, as shown in item #3 below.

Once the monthly report has been created and saved, click on the "Magnifying glass" icon to open the monthly report and add data for each plant.

The screenshot shows the MIRA Member Information Reporting Application interface. At the top, there is a header with the Monitoring Analytics logo and the text "MIRA Member Information Reporting Application". Below the header, there is a navigation bar with "Example Company" and "Demo User" on the right. The main content area is titled "PPOR Months" and contains a table with columns for "Month", "Year", and "Actions". The table lists months from February 2016 to October 2015. Red circles and arrows highlight specific elements: circle 1 points to the "Add Monthly Report" button, circle 2 points to the "Sign Out" button, and circle 3 points to the magnifying glass icon in the Actions column for the January 2016 row.

Month	Year	Actions
February	2016	[Magnifying Glass] [Print] [Refresh] [Delete]
January	2016	[Magnifying Glass] [Print] [Refresh] [Delete]
December	2015	[Magnifying Glass] [Print] [Refresh] [Delete]
November	2015	[Magnifying Glass] [Print] [Refresh] [Delete]
October	2015	[Magnifying Glass] [Print] [Refresh] [Delete]

3.2 Create a Plant Record

The PPOR Monthly reporting function requires data for each plant. When the user drills into their monthly report, they can create a record for each plant, then drill in and report their fuel deliveries, consumption, and stocks.

Step 1: Add a plant report (or Add All Plants)

For each monthly report, the user must create records for each of the plants owned by the Asset Owner the user is reporting for. To add a plant, the user should click on “Add Plant” as shown in item #1 below. The user may also click on “Add All Plants” to create records for each plant owned by the reporting company.

Step 2: Select the plant to report

When a new plant record has been added, the plant name in the Plant column will say “No plant selected”, as shown in item #2 below. When the user clicks on this text, the field becomes editable, and the user can begin to enter the name of the plant. The system will provide a list of plant names that contain the characters typed in, and the user can select the intended plant from that list.

Note: this process of manually adding the list of plants can be avoided in future months by exporting the completed monthly report for a prior month, and then updating the data for the current month, and re-importing the file, or the user can reimport the prior months export file into the current month, and manually edit the values that have changed. See Section 3.3 Importing/Exporting PPOR Monthly Data for details on importing and exporting data records.

Step 3: Save the plant report

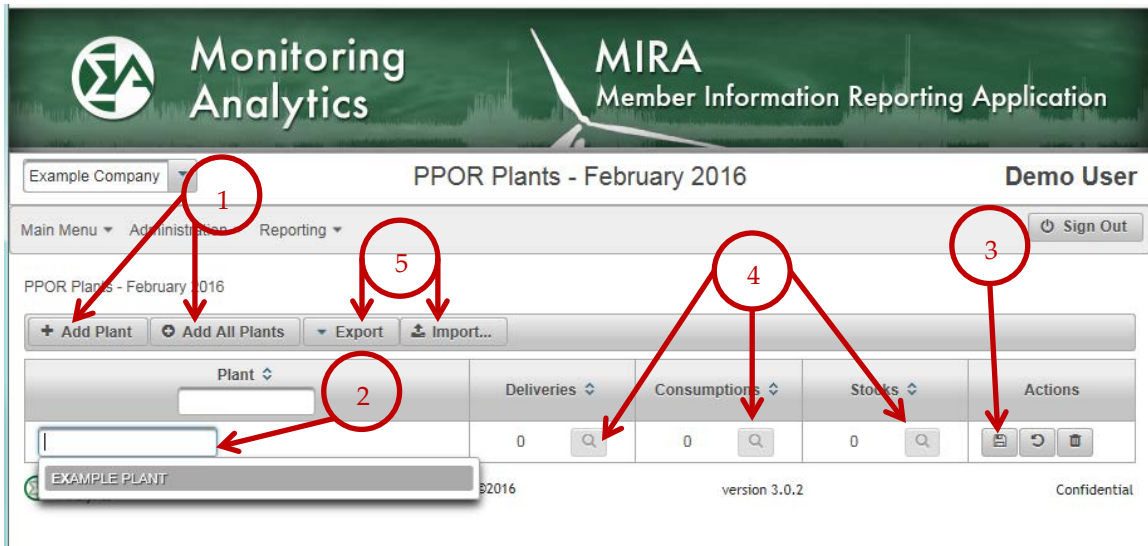
Once the plant has been selected, and before you drill into the details of the plant report, the user should save the plant record, as shown in item #3 below.

Step 4: Drill into the details

The PPOR Monthly reporting function has three reporting screens for each plant:

- Fuel Deliveries
- Fuel Consumption
- Fuel Stocks

These three reporting screens can be opened by clicking on the magnifying glass icon under each of the three columns shown in item #4.



3.3 Importing/Exporting PPOR Monthly Data

Users can import or export a PPOR Monthly record into XML, XLS, or XLSX format. This process can be started by clicking on the Import or Export buttons in the PPOR Plants screen within a monthly record, as shown in item #5 above.

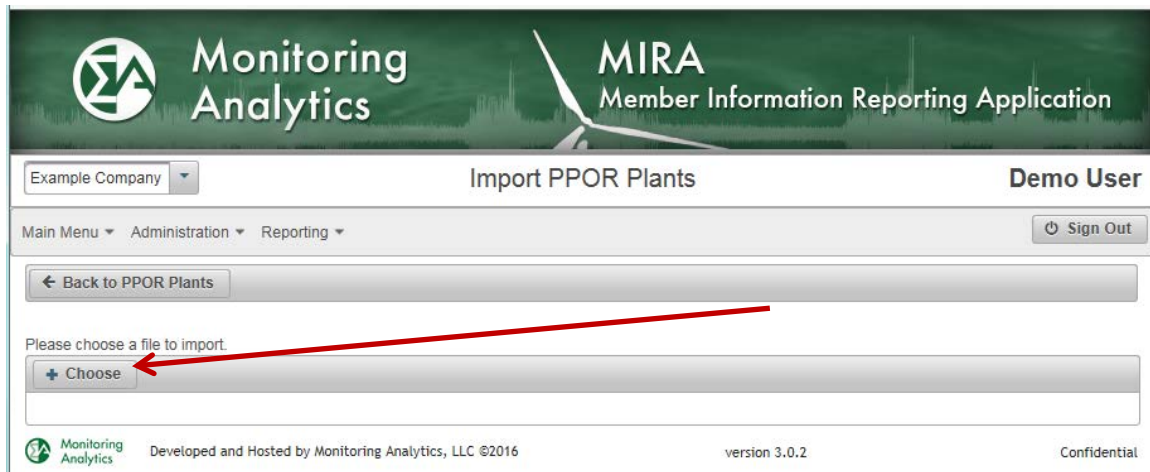
3.3.1 Exporting a PPOR Monthly Record

To Export a PPOR Monthly record, the user clicks on “Export” as shown above and must select the desired export file type (XML, XLS, XLSX).

Excel spreadsheet output files provide an output with four tabs: Plants, Deliveries, Consumptions, and Stocks. For XML output, a single output file is created with nested data tags to capture the entire PPOR Monthly report.

3.3.2 Importing a PPOR Monthly Record

To Import a PPOR Monthly record, the user clicks on “Import” as shown above, then uses the “Choose” button to navigate to and select the desired input file.



Note, if you are trying to import a file based on the export of an existing record, you will need to delete the contents of the “Delivery Code” column on the “Deliveries” tab, and delete the contents of the “Consumption Code” on the “Consumptions” tab. (The same rule applies to the equivalent codes for XML imports). Trying to re-import with a pre-existing Delivery Code or Consumption Code will result in a validation error (Delivery Code already exists) if you are importing for a new month, or it will overwrite the existing record if you are importing for the same month you exported the data from. Importing a record with null Delivery Codes or Consumption Codes will create new records.

Fields requiring selection of physical units (Type of Physical Units) must match the allowable values from the drop-down, which include (note the case of these items):

- barrels
- Mcf
- short tons
- MWh

Also note that the PPOR Monthly (Deliveries screen) values for the “No Receipts” and “Fuel Tolling Agreement” binary check boxes are to be formatted as “True/False” in the XML version, and as “Yes/No” in the XLS and XLSX versions of the input file for import.

Debugging Upload Errors

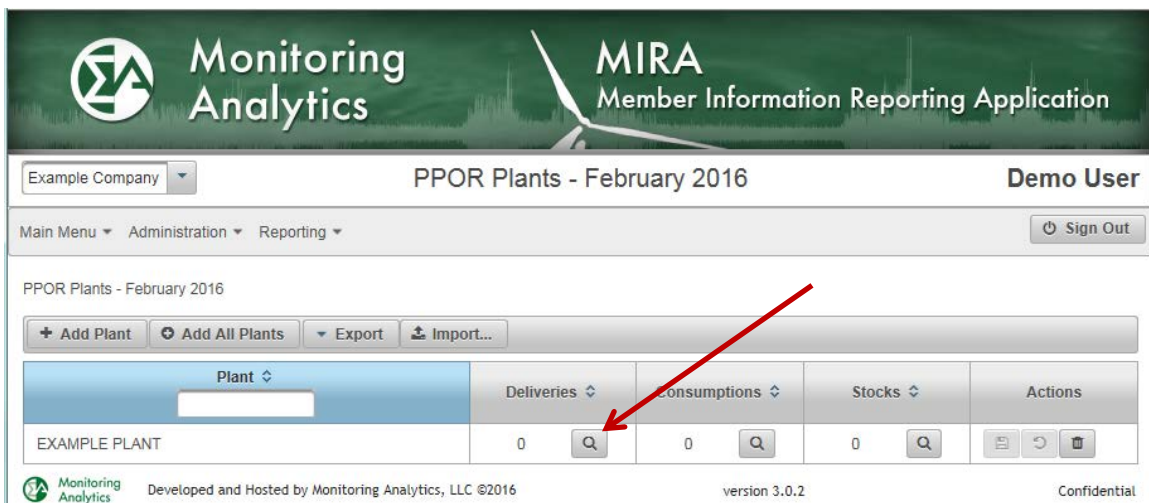
If the XML, XLS, or XLSX upload process encounters any errors, the entire upload is abandoned, and no MIRA records are updated. The entire file must be updated to fix any errors, and re-loaded. When an upload error is detected, a validation error message will appear, explaining the error. In the event that the error message does not provide adequate information about the nature of the error, please email the Monitoring Analytics system administrator, and include the error message that was encountered. The system administrator will assist in identifying the error and making corrections.

If additional debugging is necessary, you may be asked to provide a copy of the file that is failing the upload validation process.

3.4 PPOR Monthly Fuel Deliveries: Detail

Market Participants are required to report the data for every fuel delivery received at each plant. If a plant receives numerous deliveries of the same fuel from the same supplier, these similar delivery records can be consolidated into a single delivery record. Please contact Monitoring Analytics for guidance on an acceptable level of consolidation.

To report Monthly Fuel Deliveries for the selected plant, click on the magnifying glass as shown below.



The PPOR Deliveries Screen will appear, giving the user the ability to report multiple fuel deliveries for the selected plant for the reporting month.

3.4.1 Creating a Delivery Record

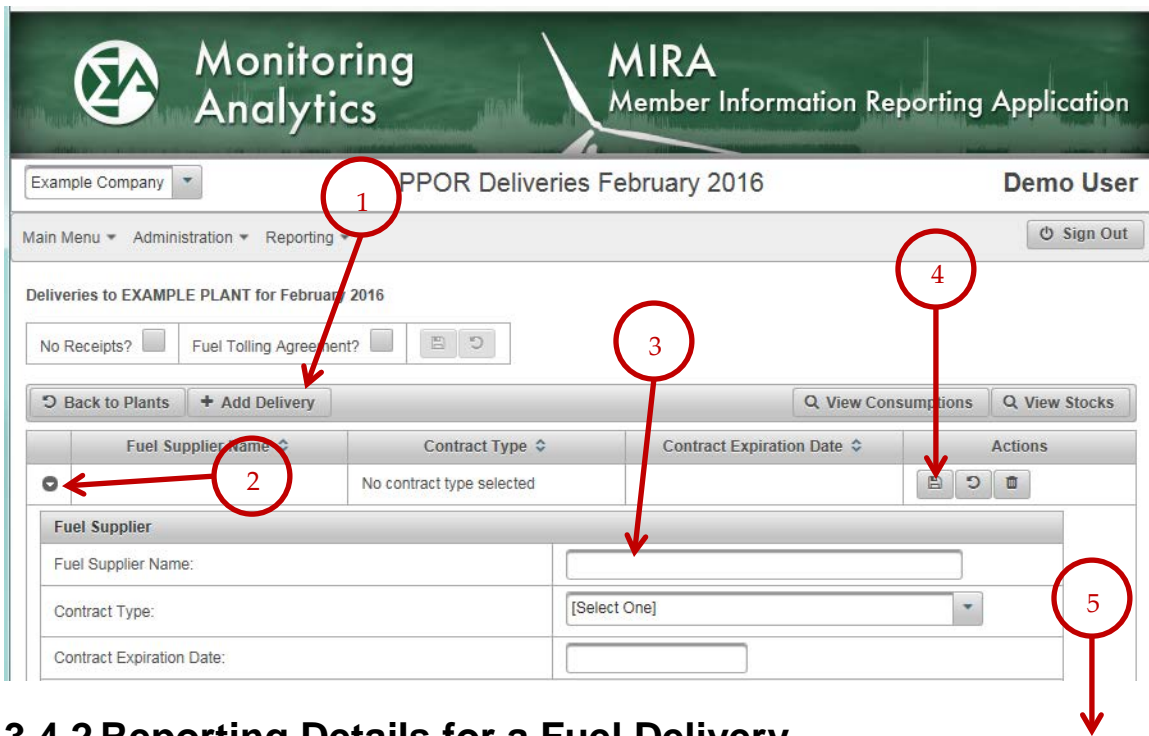
To create a record of a delivery:

Create a Fuel Delivery Record	
Step 1	Select "Add Delivery"
Step 2	Click on the arrow to the left of the row to expand the row and reveal the data entry fields
Step 3	Enter the Fuel Supplier Name, the "Contract Type" for that delivery, and enter the

	Contract Expiration Date for that delivery.
Step 4	Save the new fuel delivery record.
Step 5	Scroll down within the delivery record and report the details for that fuel delivery.

Note: if a plant does not receive any fuel deliveries for that month, no delivery records are required, but the user should select the “No Receipts?” check box.

Note: if the plant has a fuel tolling agreement in place and doesn’t have the fuel delivery detail, please check the “Fuel Tolling Agreement?” check box. Monitoring Analytics may follow up to gather additional information.



3.4.2 Reporting Details for a Fuel Delivery

When the Fuel Delivery row is expanded, the user sees the following screen. The user should enter the requested data prior to leaving the screen.

The details for each of the required data fields are documented in Sections 3.4.3 and 3.4.4.

Receipt	
Energy Source:	[Select One] ▼
Fuel Index:	[Select One] ▼
Quantity Purchased:	<input type="text"/>
Cost per Unit	
Total Delivered Cost:	<input type="text"/>
Commodity Cost:	<input type="text"/>
Quality of Fuel as Received	
Heat Content:	<input type="text"/>
Sulfur Content:	<input type="text"/>
Ash Content:	<input type="text"/>
Mercury Content:	<input type="text"/>
Fuel Transportation	
Natural Gas:	[Select One] ▼
Predominant Mode:	[Select One] ▼
Secondary Mode:	[Select One] ▼
Coal Mine Information	
Coal Mine State:	[Select One] ▼
Coal Mine MSHA ID:	<input type="text"/>
Coal Mine Type:	[Select One] ▼
Coal Mine Name:	<input type="text"/>
Coal Mine County:	<input type="text"/>

3.4.3 Data Detail: Delivery Contract Information, Receipts, and Costs

The required data in the PPOR Monthly records uses the same definitions as that for the EIA Form 923. Market Participants should report data in a consistent format with how they report to EIA.

3.4.3.1 Contract Information

1. Fuel Supplier Name:

Coal Receipts: Report data by supplier and mine source. (Purchased coal which will be converted to synthetic gas should be reported as it is received, i.e. as a coal product.) Coal received from spot-market purchases and from contract purchases should be aggregated separately. Data on coal received under each purchase order or contract with a supplier must be reported separately. Coal purchases cannot be aggregated unless

supplier, purchase type, contract date, coal rank, transportation mode, costs, fuel quality, and all mine information are identical. If coal received under a purchase order or contract originates in more than one State/county/mine and the mines are known as well as the amount received from each mine, split the amount received accordingly between the number of different mines and report identical quality and prices (unless the actual quality and prices are known).

Petroleum Receipts: Report data by fuel type, supplier or broker, or refinery and, if applicable, port of entry. Oil received from spot-market purchases and from contract purchases must be reported separately. Report individual shipments as separate line items.

Gas Receipts (monthly and annual respondents): Report data by fuel type and supplier. Aggregation of gas deliveries from various suppliers is allowed only if 1) the deliveries are spot purchases, 2) the type of gas is the same (either NG, OG, or PG), and 3) the transportation contracts are identical (either firm or interruptible). For aggregated deliveries, report the pipeline or distributor in the supplier column and the weighted average cost and quality of the fuel. Contract purchases must be reported as separate line items and should never be aggregated. For gas produced by the plant (e.g., BFG), list the supplier as “self-produced”. Do not report land fill gas (LFG) in the category of other gases (OG) because LFG is not a fossil fuel. Do not report gas injected into storage. Report it when it is delivered to the plant. Do not report any costs associated with storage.

For fuel purchased via a hedging contract, report the actual fuel supplier, not the hedge contract. Report the cost net of gains/losses as a result of the contract.

2. Contract Type: Use the following codes for coal, petroleum and natural gas purchases:

C – Contract Purchase – Fuel received under a purchase order or contract with a term of one year or longer. Contracts with a shorter term are considered spot purchases. (See below.)

NC – New Contract or Renegotiated Contract Purchase – Fuel received under a purchase order or contract with duration of one year or longer, under which deliveries were first made during the reporting month.

S – Spot-Market Purchase – Fuel received under a purchase order or contract with duration of less than one year.

3. Contract Expiration Date: Use the date picker to select a year, month and day for the contract expiration date. If Contract Type contains an “S” for spot-market purchase, please include the current data month for Contract Expiration Date.

3.4.3.1.1 Receipts

4. Energy Source: Identify purchased fossil fuels (including start-up and flame stabilization fuel) using the energy source codes posted at <http://www.monitoringanalytics.com/tools/tools.shtml> for coal, petroleum products, and natural gas and other gases.

5. Fuel Index: Select from a provided drop down list of available fuel indices, based on the Energy Source selected in (6).

See the list of Fuel Indices posted at <http://www.monitoringanalytics.com/tools/tools.shtml>. Reporting in MIRA requires additional detail on the source, quality, and transportation of the fuel, in the form of common fuel indices.² In the event that none of the indices applies, please contact Monitoring Analytics to discuss the addition of new indices.

6. Quantity Received: Enter quantities in tons for coal and other solid fuels, barrels for oil and other liquid fuels, and thousands of cubic feet for gas. The receipts reported should pertain to the fuel that will ultimately be used only in the electric power plant for the generation of electricity and at combined heat and power plants for useful thermal output (process steam, district heating/cooling, space heating, or steam delivered to other end users). As far as possible, do not include fuel that will be used in boilers with no connection to an electric power generator and are not part of the electric power station.

If these fuels cannot be separated, please provide a comment in the “Stocks” screen. Start-up and flame-stabilization fuels should be reported. When fuel is purchased by and received at the plant and is resold, report the total receipts minus the amount sold. See the below instruction regarding how to report the costs.

7. Type of physical units

Solids (Tons)

Liquids (Barrels)

Gases (Mcf – thousands of cubic feet)

Pumped Storage (MWh)

Compressed Air (MWh)

² The choices available to populate the drop-down menu for Fuel Index are defined in: <http://platts.com/MethodologyAndSpecifications.aspx>.

3.4.3.1.2 Cost of Fuel

1. Total Delivered Cost (all fuels): Enter the delivered cost of the fuel in cents per million Btu to the nearest 0.1 cent. This cost should include all costs incurred in the purchase and delivery of the fuel to the plant. It should not include unloading costs. Do not include adjustments associated with prior months' fuel costs. The delivered price for fuel shipped under contract should include any penalties/premiums paid or expected to be paid on the fuel delivered during the month. These adjustments should be made only by revising the appropriate prior months' submissions. The current month fuel costs should reflect only costs associated with the current month fuel deliveries. If fuel received at the plant is resold, report the commodity cost and the total delivered cost as the cents per MMBtu paid for the original receipt. Do not discount the costs by the revenue received for the sale of the fuel.

For natural gas, include the following pipeline charges: fuel losses, transportation reservation charges, balancing costs, and distribution system costs outside of the plant. Because these types of fees can skew the cost of the fuel per MMBtu, please provide an explanation in a Schedule 9 comment, e.g. "This price includes a reservation fee of X dollars."

2. Commodity Cost (Coal and Natural Gas Only): The commodity cost is the price of that fuel (in cents per million Btu) at the point of first loading (free on board mine/transportation pipeline (FOB)) including taxes and any quality-related charges or credits. The commodity cost does not include: loading and unloading charges, dust proofing, freeze conditioning, switching charges, diesel fuel surcharges, pipeline charges, or any other charges relating to the movement of the fuel to the point of use. In the case of natural gas this is typically the price of the gas FOB the transmission pipeline.

3.4.4 Data Detail: Quality of Fuel and Transportation Information

3.4.4.1 Quality of Fuel

1. Heat Content: Enter the actual (not contractual) average Btu content for each fuel purchase in terms of million (MMBtu) per ton for solid fuel, MMBtu per barrel for liquid fuel, and MMBtu per thousand cubic feet for gas. Show to the nearest 0.001 MMBtu.

2. Sulfur Content: For all fuels except gas, enter the sulfur content of the fuel in terms of percent sulfur by weight. Show to the nearest 0.01 percent. Refer to Table 1 for approximate ranges.

3. Ash Content: For coal only, enter the ash content of the fuel in terms of percent ash by weight. Show to the nearest 0.1 percent. Comment if the reported ash content for coal is an estimate. Refer to Table 1 for approximate ranges.

4. Mercury Content: For coal only, enter the mercury content in parts per million (ppm). Show to the nearest 0.001 parts per million (ppm). If lab tests of the coal receipts do not include the mercury content, enter the amount specified in the contract with the supplier. Refer to Table 1 for approximate ranges. If mercury content is unknown, enter 9.

Table 1 Fuel quality metric ranges

Fuel Type	% Sulfur	% Ash	PPM Mercury
BIT	0.4 - 6.0	4.0 – 30.0	2.000 – 0.001
LIG	0.4 - 3.0	5.0 – 35.0	2.000 – 0.001
SUB	0.2 - 1.5	3.0 – 15.0	2.000 – 0.001
WC	0.3 - 6.0	5.0 – 50.0	2.000 – 0.001
DFO	0.0 - 1.0		
JF	0.0 - 1.0		
KER	0.0 - 1.0		
PC	1.0 - 7.0		
RFO	0.2 – 4.5		
WO	0.0 – 4.5		

3.4.4.2 Fuel Transportation

1. Natural Gas: Use the following codes for natural gas transportation service:

F – Firm – Gas transportation service provided on a firm basis using facilities that were designed, installed, and dedicated to a certified quantity of service. The contract with the gas transportation company anticipates no interruption of gas transportation service. Firm transportation service takes priority over interruptible service.

I – Interruptible – Gas transportation service (usually low-priority service) provided under schedules or contracts which anticipate and permit interruption on short notice, generally in peak-load seasons, by reason of the claim of firm service customers and higher priority users.

(Note: Natural Gas received under firm contracts must be aggregated separately from interruptible contracts.)

2. Predominant Mode: The method used to transport the fuel over the longest distance from point of origin to consumer. If the shipment involves only one mode of transportation, that is the Predominant Mode. If the shipment involves more than one mode of transportation, see Secondary Mode below.

3. Secondary Mode: If more than one method of transportation is used in a single shipment, the Secondary Mode of transportation is the second longest method used to

transport the fuel to consumer. If more than two methods are used in a single shipment, only the Predominant and Secondary Modes should be reported.

Do not report “truck” as a transportation mode if trucks are used to transport coal exclusively on private roads between the mine and rail load-out or barge terminal.

Do not report the transportation modes used entirely within a mine, terminal, or power plant (e.g., trucks used to move coal from a mine pit to the mine load-out; conveyors at a power plant used to move coal from the plant storage pile to the plant).

For mine mouth coal plants, report “Conveyor” as the Predominant Mode if the conveyor feeding coal to the plant site originates at the mine. Otherwise report the Predominant Mode (typically truck or rail) used to move the coal to the plant site.

Report Transportation Modes using the following codes:

RR – Rail: Shipments of fuel moved to consumers by rail (private or public/commercial). Included is coal hauled to or away from a railroad siding by truck if the truck did not use public roads.

RV – River: Shipments of fuel moved to consumers via river by barge. Not included are shipments to Great Lakes coal loading docks, tidewater piers, or coastal ports.

GL – Great Lakes: Shipments of coal moved to consumers via the Great Lakes. These shipments are moved via the Great Lakes coal loading docks, which are identified by name and location as follows:

Conneaut Coal Storage & Transfer, Conneaut, Ohio

NS Coal Dock (Ashtabula Coal Dock), Ashtabula, Ohio

Sandusky Coal Pier, Sandusky, Ohio

Toledo Docks, Toledo, Ohio

KCBX Terminals Inc., Chicago, Illinois

Superior Midwest Energy Terminal, Superior, Wisconsin

TP – Tidewater Piers and Coastal Ports: Shipments of coal moved to Tidewater Piers and Coastal Ports for further shipments to consumers via coastal water or ocean. The Tidewater Piers and Coastal Ports are identified by name and location as follows:

Dominion Terminal Associates, Newport News, Virginia

McDuffie Coal Terminal, Mobile, Alabama

IC Railmarine Terminal, Convent, Louisiana
International Marine Terminals, Myrtle Grove, Louisiana
Cooper/T. Smith Stevedoring Co. Inc., Darrow, Louisiana
Seward Terminal Inc., Seward, Alaska
Los Angeles Export Terminal, Inc., Los Angeles, California
Levin-Richmond Terminal Corp., Richmond, California
Baltimore Terminal, Baltimore, Maryland
Norfolk Southern Lamberts Point P-6, Norfolk, Virginia
Chesapeake Bay Piers, Baltimore, Maryland
Pier IX Terminal Company, Newport News, Virginia
Electro-Coal Transport Corp., Davant, Louisiana

TR – Truck: Shipments of fuel moved to consumers by truck. Not included is fuel hauled to or away from a railroad siding by truck on non-public roads.

TC – Tramway/Conveyor: Shipments of fuel moved to consumers by tramway or conveyor.

SP – Slurry Pipeline: Shipments of coal moved to consumers by slurry pipeline.

PL – Pipeline: Shipments of fuel moved to consumers by pipeline.

WT – Water: Shipments of fuel moved to consumers by other waterways.

3.4.4.3 COAL MINE INFORMATION

1. Mine Information: If you enter the MSHA ID Number, the remaining mine information is not necessary.

If you don't have the MSHA ID Number, the following mine information is required:

- a. Name of Mine or Tipple
- b. Mine Type:

Surface: Surface Mined;

Underground: Underground mined;

Surface/Underground: Surface/Underground mixture;

Unknown;

- c. State or Country of Origin: Choose the two-letter U.S. Postal Service abbreviation or country code from the drop down list of coal producing states (countries).

For imported coal, insert the two-letter country code shown here.

AS – Australia; CN – Canada; CL – Colombia; ID – Indonesia; PL – Poland; RS– Russia; VZ – Venezuela; OT – Other.

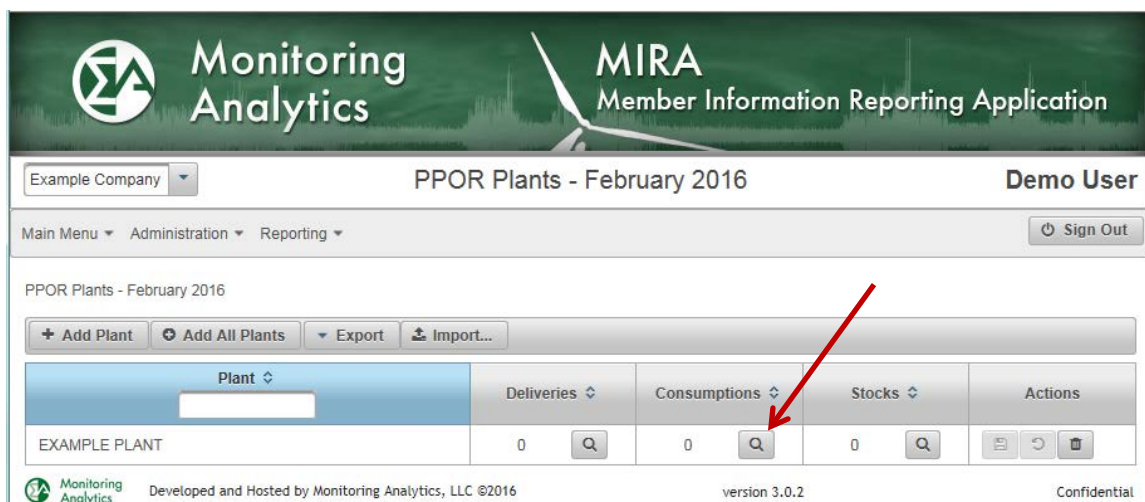
The State of Origin is mandatory. If purchases originate from a broker, barge site or other third party, you must contact the broker, barge site or other party and find out the State(s) where the coal originates.

If coal received under a purchase order or contract originates in more than one State, determine from the supplier the most dominant or probable State(s) of origin for the coal. If the amount of coal from each State/Mine is known, allocate the purchase among multiple States, or report the State where the majority of the coal originates and report identical quality and cost data (unless the actual quality and costs are known).

3.5 PPOR Monthly Fuel Consumption: Details

Market Participants are required to report the data for the fuel consumed at each plant. A consumption record is required for each type of fuel consumed (categorized by Energy Source, as detailed in the Fuel Indices list posted at <http://www.monitoringanalytics.com/tools/tools.shtml>.)

To report Monthly Fuel Consumptions for the selected plant, click on the magnifying glass as shown below.



The PPOR Consumptions screen will appear, giving the user the ability to report multiple fuel consumptions (one record for each Energy Source consumed) for the selected plant for the reporting month.

3.5.1 Creating a Consumption Record

To create a fuel consumption record:

Create a Fuel Consumption Record	
Step 1	Select "Add Consumption"
Step 2	Click on the arrow beside the consumption row to expand the row and report the details for that consumption record.
Step 3	Select the Prime Mover Code from the drop down list. Prime Mover Codes are detailed in Table 2 Prime Mover Codes below. Enter a Boiler ID and Boiler Status
Step 4	Enter data in the Consumption and Quality of Fuel Consumed fields.
Step 5	Save the new fuel consumption record.

The screenshot displays the MIRA application interface. At the top, it shows the Monitoring Analytics logo and the MIRA Member Information Reporting Application title. Below this, there's a navigation bar with 'Example Company', 'PPOR Consumptions - February 2016', and 'Demo User'. A 'Sign Out' button is also present. The main content area is titled 'Consumptions at EXAMPLE PLANT for February 2016'. It features a table with columns for 'Prime Mover Code', 'Boiler ID', 'Boiler Status', and 'Actions'. A red circle labeled '2' highlights the 'Add Consumption' button. Below the table is a form for adding a new consumption record, divided into sections: 'Prime Mover', 'Consumption', and 'Quality of Fuel Consumed'. Red circles and arrows highlight specific form elements: '1' points to the 'Reporting' menu, '3' points to the 'Prime Mover Code' dropdown, and '4' points to the 'Consumption' section. A red circle labeled '5' highlights the 'View Deliveries' button.

3.5.2 Data Detail: Fuel Consumption – Prime Mover Level

Do not report for each individual unit. For example, report natural gas consumed in all combustion turbines at the plant as one value and report distillate fuel oil consumed by all IC engines as one value. Combined-cycle plants should report the fuel consumed by the combustion turbines on this schedule.

1. **Prime Mover Code:** Prime movers are devices that convert one energy form (such as heat from fuels or the motion of water or wind) into mechanical energy. Examples include steam turbines, combustion turbines, reciprocating engines, and water turbines. For a complete list of prime mover codes, please refer to Table 2 Prime Mover Codes.

Table 2 Prime Mover Codes

Code	Prime Mover
BT	Turbines Used in a Binary Cycle (such as used for geothermal applications)
CA	Combined Cycle – Steam Part
CE	Compressed Air Energy Storage
CP	Energy Storage, Concentrated Solar Power
CS	Combined-Cycle Single-Shaft Combustion turbine and steam turbine share a single generator
CT	Combined-Cycle Combustion Turbine Part
FC	Fuel Cell
GT	Combustion (Gas) Turbine (including jet engine design)
HA	Hydrokinetic, Axial Flow Turbine
HB	Hydrokinetic, Wave Buoy
HK	Hydrokinetic, Other
HY	Hydraulic turbine (including turbines associated with delivery of water by pipeline)
IC	Internal Combustion (diesel, piston) Engine
OT	Other
PS	Hydraulic Turbine – Reversible (pumped storage)
PV	Photovoltaic
ST	Steam Turbine (including nuclear, geothermal and solar steam, excluding combined-cycle)
WT	Wind Turbine, Onshore
WS	Wind Turbine, Offshore

2. **Boiler ID:** Use your company’s EIA Boiler ID number.
3. **Boiler Status:** Enter one of the codes listed below in Table 3:

Table 3 Boiler Status Codes

Code	Boiler Status
OP	Operating (in commercial service or out of service less than 365 days)
OS	Out of service (365 days or longer)
RE	Retired (no longer in service and not expected to be returned to service)
SB	Standby (or inactive reserve); i.e., not normally used, but available for service

SC	Cold Standby (Reserve); deactivated (usually requires 3 to 6 months to reactivate)
----	------------------------------------------------------------------------------------

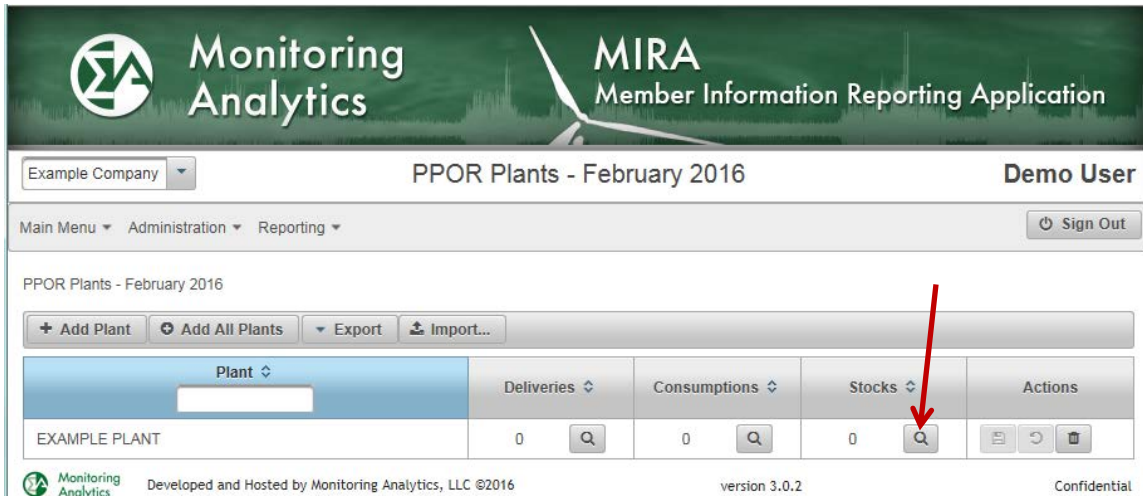
4. **Energy Source:** Use the Energy Source codes in the Fuel Indices list posted at <http://www.monitoringanalytics.com/tools/tools.shtml>. For bituminous and sub-bituminous coal that is blended, where possible report each coal rank consumed separately. If no allocation can be determined, report the fuel that is predominant in quantity. An estimated allocation between coal ranks is acceptable.
5. **Quantity Consumed:** For each month, report the amount of fuel consumed for electric power generation and, at combined heat and power stations, for useful thermal output. Combined-cycle units should report only the auxiliary firing fuel associated with the HRSG.
6. **Type of Physical Units:** Fuel consumption must be reported in the following units:
 - Solids – Tons
 - Liquids – Barrels (one barrel equals 42 U.S. gallons)
 - Gases – Thousands of cubic feet (Mcf)
 - Pumped Storage and Compressed Storage -- MWh
7. **Average Heat Content:** For each month, report the heat content of the fuels burned to the nearest 0.001 million Btu (MMBtu) per physical unit. The heat content of the fuel should be reported as the gross or “higher heating value” (rather than the net or lower heating value). The higher heating value exceeds the lower heating value by the latent heat of vaporization of the water. The heating value of fuels generally used and reported in a fuel analysis, unless otherwise specified, is the higher heating value. If the fuel heat content cannot be reported “as burned,” data may be obtained from the fuel supplier on an “as received” basis. Report the value in the following units: solids in million Btu (MMBtu) per ton; liquids in MMBtu per barrel; and gases in MMBtu per thousand cubic feet (Mcf).
8. **Sulfur Content (petroleum, petroleum coke, and coal):** For each month, enter sulfur content to nearest 0.01 percent. Sulfur content should be reported for the following Energy Source codes: BIT, LIG, SUB, WC, PC, RFO, and WO. Refer to Table 1 Fuel quality metric ranges for approximate ranges.
9. **Ash Content (coal and petroleum coke only):** For each month, enter ash content to the nearest 0.1 percent. Ash content should be reported for the following Energy Source codes: BIT, LIG, SUB, WC, and PC. Refer to Table 1 for approximate ranges.

Report actual values. ENTER ZERO when an energy source was not consumed for the reporting period. Do not leave blank.

3.6 PPOR Monthly Fuel Stocks: Details

Market Participants are required to report the data for the fuel stocks at the plant at the end of the month. A stock record is required for each type of fuel stored at the plant (categorized by Energy Source, as detailed in the Fuel Indices list posted at <http://www.monitoringanalytics.com/tools/tools.shtml>.)

To report Monthly Fuel Stocks for the selected plant, click on the magnifying glass as shown below.

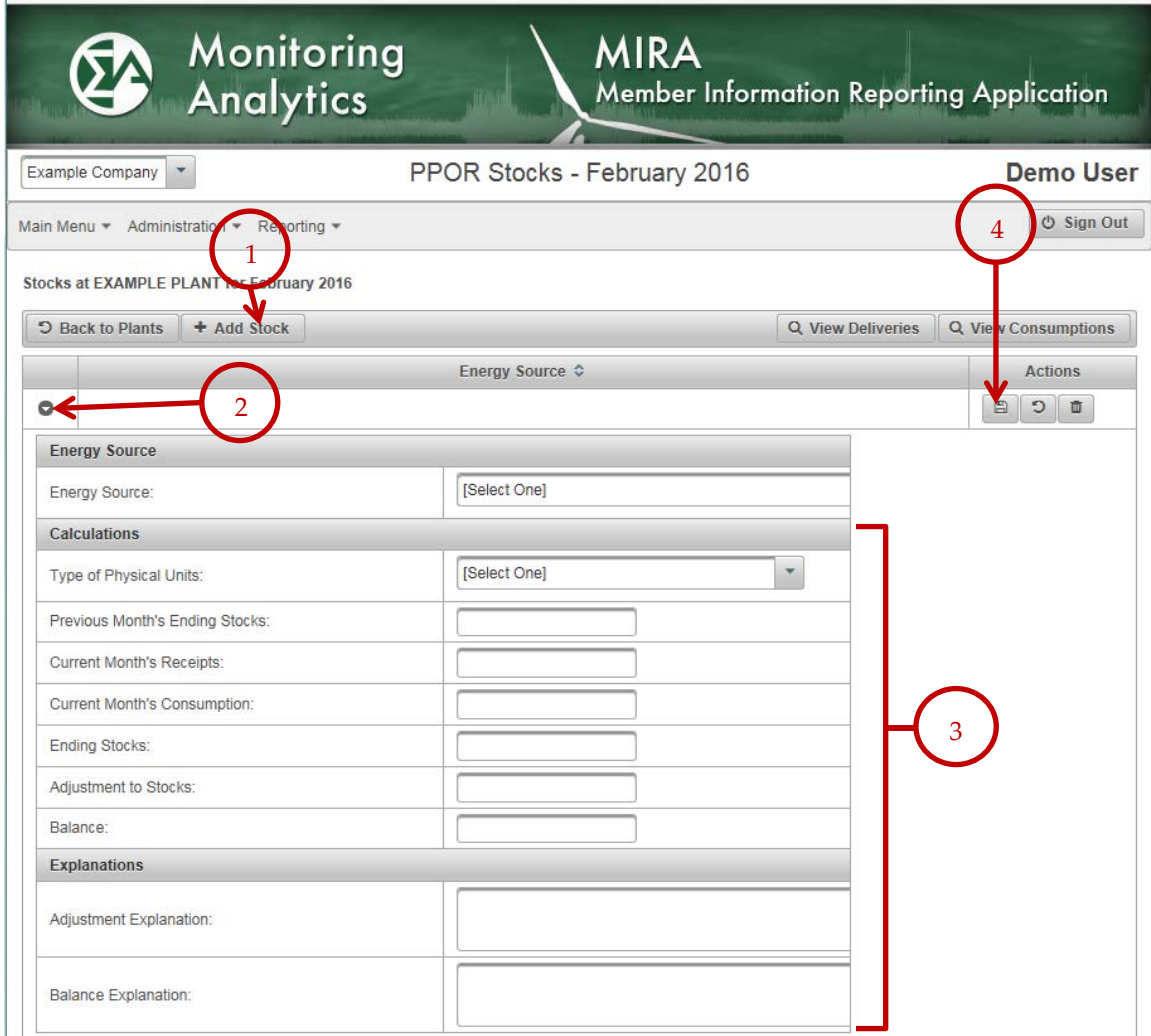


The PPOR Stocks screen will appear, giving the user the ability to report multiple fuel stocks (one record for each Energy Source with stocks) for the selected plant for the reporting month.

3.6.1 Creating a Fuel Stock Record

To create a fuel consumption record:

Create a Fuel Stock Record	
Step 1	Select "Add Stock"
Step 2	Click on the arrow beside the stock row to expand the row and report the details for that fuel inventory stock record.
Step 3	Click on the "Energy Source" drop-down, and select the Energy Source from the list. Report the stocks information as defined in section 3.6.2 below.
Step 4	Save the new fuel consumption record.



3.6.2 Reporting Details for a Fuel Inventory Stock Record

When the Fuel Stock row is expanded, the user sees the above screen. The user should enter the requested data, and be sure to select “Save” as shown above, prior to leaving the screen.

The details for each of the required data fields are documented in Section 3.6.3.

The user can input text under “Explanations” to explain any discrepancy or imbalance.

3.6.3 Data Detail: Fossil Fuel Stocks at the End of the Reporting Period

ENTER ZERO in the Ending Stocks column if a plant has no stocks. Do not leave the field blank.

Energy Source: Add the Energy Source code from the list of Fuel Indices posted at <http://www.monitoringanalytics.com/tools/tools.shtml>.

Type of Physical Units: Report coal and petroleum coke in tons and distillate and residual oils in barrels.

1. Previous Month's Ending Stocks: Should be consistent with ending stocks reported in previous month.
2. Current Month's Receipts: Should be consistent with the sum by Energy Source reported in the "Deliveries" screen.
3. Current Month's Consumption: Should be consistent with the consumption data reported in the "Consumptions" screen.
4. Ending Stocks: Report this month's ending stocks. Include all on-site stocks held for eventual use in the electric power plant regardless of actual ownership of the fuel.
5. Adjustment to Stocks: Report adjustments to end-of-month stocks. Adjustments may include stocks transferred or sold offsite and revisions to account for adjustments to previous months' stocks.

Adjustments can be positive or negative. Enter the reason for the adjustment in a comment.

Balance: The data balance verifies the quality of the data. The balance is the difference between Reported Ending Stocks (4) and an expected value for ending stocks calculated by the following equation:

Previous Month's Ending Stocks plus Current Month's Receipts minus Current Month's Consumption plus (or minus) Adjustment to Stocks [(4) = (1) + (2) - (3) + (5)]. If the balance is a non-zero value, please review the data entered for stocks, receipts, consumption, and adjustments. Enter a comment to explain any discrepancy. Fuel receipts that are not used for the production of electricity but for other purposes at the plant (e.g. as a feed material to produce chemical byproducts such as fertilizers, etc.) may cause an imbalance in the equation. Likewise, fuel that is sold during the month may cause an imbalance. Enter adjustments to balance the equation and enter comments to explain the adjustments or other situations that result in an imbalance.

Table 4 Generator Status Codes

Status Code	Status Code Description
OP	Operating - in service (commercial operation) and producing some electricity. Includes peaking units that are run on an as needed (intermittent or seasonal) basis.
OA	Out of service – was not used for some or all of the reporting period but was either returned to service on December 31 or will be returned to service in the next calendar year.
OS	Out of service – was not used for some or all of the reporting period and is NOT expected to be returned to service in the next calendar year.
RE	Retired - no longer in service and not expected to be returned to service.

4 Fuel Policy Module User Guide

The purpose of a fuel cost policy is to document the process by which market sellers calculate the fuel cost component of their cost-based energy offers for various unit types conforming to the guidelines in PJM Manual 15 and Schedule 2 of the Operating Agreement. The fuel cost policy shall describe all components of the fuel cost and how they are derived with particular attention to the pricing point source, the timing of its determination and the process and timing of any revisions to the fuel price. Similar information is required for the development of Emission Credit Allowance price assumptions. The goal is to allow the IMM and PJM to verify the reasonableness and consistency of cost-based energy offers.


The Fuel Policy modules in MIRA, Fuel Policy Editing and Fuel Policy Unit, consist of document repository tools that allow the submittal, review and approval of fuel cost policies.

The modules support the following workflow:

- Market participant creates, edits, and saves, fuel policy documents.
- Market participant chooses which units to assign the fuel policy to, and submits for IMM and PJM review.
- The IMM and PJM review submitted fuel policy documents and the units they are assigned to.
 - The IMM will assign a status of Pass or Fail to the Fuel Policy/Unit assignment.
 - PJM will assign a status of Under Review, Customer Input Required, Approved, Rejected, or Expired.
-
-
- PJM approval of fuel policy assignment to a unit includes an expiration date specified by PJM. Prior to the expiration date, market participants may submit a new fuel policy unit assignment or request an extension to an existing approved fuel policy unit assignment.
- Both screens (Fuel Policy Editing and Fuel Policy Unit) present the IMM Status and the PJM Status of the company's fuel policies that have been submitted into the workflow.
- The Fuel Policy Editing module allows the user to create, edit and submit fuel cost policies. In this module, fuel cost policies can be assigned to units. Users can see the status of the IMM and PJM reviews for each fuel policy.
- The Fuel Policy Unit module allows the user to see the status of the IMM and PJM fuel cost policy reviews for each unit and it allows the user to assign fuel cost policies created in the Fuel Policy Editing module to units.

4.1 Fuel Policy Editing

4.1.1 Create a New Fuel Policy

Create a new Fuel Policy	
Step 1	Click on Fuel Policy Editing to open the Fuel Policy Editing screen.
Step 2	Click on Add Fuel Policy to create a new fuel policy row
Step 3	Click on the  to the left of the row to expand the Fuel Policy row to add a Fuel Policy document.
Step 4	When the fuel policy shell has been created, click on Add File and navigate to your document. Selecting the file to add automatically saves the fuel policy. Multiple documents may be included in each fuel policy.
Step 5	To open/view the fuel policy document attachment, click the Download button.

Monitoring Analytics MIRA Member Information Reporting Application

Example Company Edit Fuel Policies Sign Out

Main Menu Reporting

Expand rows to Fuel Policy Fuel Policy Unit

+ Add Fuel Policy Points of Contact: Name, Email and Phone Enter POC data here Edit POC

Records Per Page: 15 (1 of 1)

Fuel Policy Name	Policy ID	IMM Status	PJM Status	Approved Effective Date	Expiration Date	Actions
Example Fuel Policy 1	004444	No Units Assigned	No Units Assigned			
Example Fuel Policy 2	004448	No Units Assigned	No Units Assigned			

Attachments

+ Add File

File Name	Actions
TEST FUEL POLICY DOCUMENT.pdf	

Records Per Page: 15 (1 of 1)

Monitoring Analytics Developed and Hosted by Monitoring Analytics, LLC ©2021 version 3.0.46 Confidential

4.1.2 Submit a Fuel Policy for Units

After the fuel policy has been saved, the market participant can submit the fuel policy for the IMM and PJM review by assigning it to the applicable generating units. The Status columns show if the fuel policy has been assigned to any units, and if so, it shows the IMM and PJM workflow status of those assignments.

To submit the unit assignment for a new or existing fuel policy, make sure the “Fuel Policy Year” field is set to Current Status, then click on the View Units button:

Monitoring Analytics MIRA Member Information Reporting Application

Example Company Edit Fuel Policies

Main Menu Administration Reporting Reports Sign Out

Expand rows to see detailed information.

Fuel Policy Year: Current Status Add Fuel Policy Points of Contact: Name, Email and Phone Enter POC data here Edit POC

Records Per Page: 15 (1 of 1)							Actions
Fuel Policy Name	Policy ID	IMM Status	PJM Status	Approved Effective Date	Expiration Date		
Example Fuel Policy 1	004444	Submitted (4)	Approved (4)	11/01/2020	11/01/2023	View Units	
Example Fuel Policy 2	004448	No Units Assigned	No Units Assigned			View Units	

Records Per Page: 15 (1 of 1)

Monitoring Analytics Developed and Hosted by Monitoring Analytics, LLC ©2021 version 3.0.46 Confidential

The View Units button will open the Submit Units screen, which displays all of the company's units as rows, as well as the name of the fuel policy that each unit has in the IMM and PJM approval workflows, and the current approved fuel policy. For a newly created fuel policy, and for generating units that have not had a fuel policy assigned, the screen will appear as follows, below. In this example, the market participant has (1) checked the check boxes for three of the four example units, to assign this fuel policy to those three units. After checking the check boxes, the market participant (2) submits the unit assignment by clicking on Save Changes.

Monitoring Analytics MIRA Member Information Reporting Application

Example Company Submit Units for "4448-Example Fuel Policy 2"

Main Menu Administration Reporting Reports Sign Out

Back To Fuel Policies Fuel Policy Year Current Status Display Options IMM Fields PJM Fields All Fields Display Effective and Expiration Dates Save Changes Revert Changes

Unit Name	Check To Submit	Customer Requested Custom Effective Date	IMM Workflow			PJM Workflow					Actions		
			Latest Fuel Policy in IMM Workflow	IMM Workflow Status	Last IMM Workflow Status Date	Current IMM Passed Fuel Policy	Latest Fuel Policy in PJM Workflow	PJM Workflow Status	Last PJM Workflow Status Date	PJM - Customer Requested Custom Effective Date		PJM - Approved Effective Date	Current PJM Approved Fuel Policy
Example Unit 1	<input checked="" type="checkbox"/>		4444-Example Fuel Policy 1	Submitted	02/03/2021		4444-Example Fuel Policy 1	Approved	02/03/2021		11/01/2020	4444-Example Fuel Policy 1	Withdraw
Example Unit 2	<input checked="" type="checkbox"/>		4444-Example Fuel Policy 1	Submitted	02/03/2021		4444-Example Fuel Policy 1	Approved	02/03/2021		11/01/2020	4444-Example Fuel Policy 1	Withdraw
Example Unit 3	<input checked="" type="checkbox"/>		4444-Example Fuel Policy 1	Submitted	02/03/2021		4444-Example Fuel Policy 1	Approved	02/03/2021		11/01/2020	4444-Example Fuel Policy 1	Withdraw
Example Unit 4	<input type="checkbox"/>		4444-Example Fuel Policy 1	Submitted	02/03/2021		4444-Example Fuel Policy 1	Approved	02/03/2021		11/01/2020	4444-Example Fuel Policy 1	Withdraw

Records Per Page: 15 (1 of 1)

Monitoring Analytics Developed and Hosted by Monitoring Analytics, LLC ©2021 version 3.0.46 Confidential

When the market participant clicks on Save Changes to submit the unit assignments for Example Fuel Policy 2, this fuel policy becomes the Latest Fuel Policy in Workflow for PJM and IMM review for those three units, with a status of Submitted. When the fuel policy to unit assignment is in the Submitted status, then the market participant can no longer select those check boxes and cannot add new documents to that fuel policy, as the fuel policy to unit assignment is in the IMM and PJM queues to review. See section 4.4 for making changes to a submitted fuel cost policy.

Monitoring Analytics MIRA Member Information Reporting Application

Example Company Submit Units for "4448-Example Fuel Policy 2"

Main Menu Administration Reporting Reports Sign Out

Back To Fuel Policies Fuel Policy Year Current Status Display Options IMM Fields PJM Fields All Fields Display Effective and Expiration Dates Save Changes Revert Changes

Unit Name	Check To Submit	Customer Requested Custom Effective Date	IMM Workflow			PJM Workflow					Actions		
			Latest Fuel Policy in IMM Workflow	IMM Workflow Status	Last IMM Workflow Status Date	Current IMM Passed Fuel Policy	Latest Fuel Policy in PJM Workflow	PJM Workflow Status	Last PJM Workflow Status Date	PJM - Customer Requested Custom Effective Date		PJM - Approved Effective Date	Current PJM Approved Fuel Policy
Example Unit 1	<input type="checkbox"/>		4448-Example Fuel Policy 2	Submitted	02/09/2021		4448-Example Fuel Policy 2	Submitted	02/09/2021			4448-Example Fuel Policy 2	Withdraw
Example Unit 2	<input type="checkbox"/>		4448-Example Fuel Policy 2	Submitted	02/09/2021		4448-Example Fuel Policy 2	Submitted	02/09/2021			4448-Example Fuel Policy 2	Withdraw
Example Unit 3	<input type="checkbox"/>		4448-Example Fuel Policy 2	Submitted	02/09/2021		4448-Example Fuel Policy 2	Submitted	02/09/2021			4448-Example Fuel Policy 2	Withdraw
Example Unit 4	<input type="checkbox"/>												Withdraw

Records Per Page: 15 (1 of 1)

Monitoring Analytics Developed and Hosted by Monitoring Analytics, LLC ©2021 version 3.0.46 Confidential

The grid to the right of the unit list contains information about the IMM and PJM review workflows, including: (1) the name of the current approved (approved by PJM or passed by IMM) fuel policy, (2) the name of the latest fuel policy in the workflow, (3) the status of the most recent fuel policy in the workflow, (4) the latest status change date of the most recent fuel policy in the workflow, (5) a customer requested effective date, in the event that the market participant wishes to have the fuel policy become effective at a specific future date, and (6) the effective date approved by PJM.

To simplify the view of fuel policy status, click on (7) the IMM Fields or PJM Fields buttons to view only the IMM or PJM workflow status. Click on the All Fields button to present all columns, including the IMM and PJM workflow.

In the Submit Units screen, the rows for any unit that has a workflow relationship to the subject Fuel Policy are (8) shaded green and sorted to the top of the screen. Units that have no workflow relationship to the displayed fuel policy remain unshaded but available to be selected to submit into the workflow.

4.1.3 After Fuel Policy Submittal

After the market participant has submitted the fuel policy (assigned to units) for IMM and PJM review, no changes can be made to the contents of the fuel policy while it is in the review queue. Market participants can expect to be contacted by IMM or PJM reviewers if additional clarification is required.

If the market participant intends to make edits to the fuel policy, they must withdraw the fuel policy submittal (see section 4.4.2.) Edits cannot be made to any fuel policy that is in any workflow state.

Detailed status of the IMM and PJM review will be displayed in the “Submit Units” screen.

4.2 Fuel Policy Review Workflow

When a fuel policy assignment to a unit has been submitted, it will be reviewed by the IMM and by PJM. The status of the IMM and PJM review workflows is displayed in the Submit Units grid, shown above.

When the fuel policy has been submitted, it is assigned a PJM and IMM workflow status of Submitted.

Submitted: The review process is started when the market participant sets the status of the fuel policy to unit assignment to Submitted. PJM and the IMM may revert their review status from another state back to Submitted to indicate that the fuel policy must be reviewed. If the market participant wishes to change a submitted fuel policy, the submitted fuel policy can be withdrawn and changed, then re-submitted.

4.2.1 IMM Review

The IMM will review submitted fuel policies, and assign a status of Pass or Fail.

- **Pass:** If the IMM passes a fuel policy, it indicates that the fuel policy does not raise market power concerns and that it contains a method that is algorithmic, verifiable and systematic for calculating an accurate cost-based offer for the unit(s) to which the policy was assigned. When passed, the new fuel policy would replace the prior passed fuel policy.
- **Fail:** If the IMM fails a fuel policy for a unit, it indicates that the fuel policy raises market power concerns and it contains a method that is not algorithmic, not verifiable or not systematic or it does not calculate an accurate cost-based offer for the unit(s) to which the policy was assigned.

If circumstances change (e.g. new information obtained by the IMM) the IMM may change the status from Pass to Fail or revert to Submitted.

4.2.2 PJM Review

PJM will update the PJM workflow status for each fuel policy to unit assignment. Submitted fuel policies (and each of their assigned units) enter PJM's review process, and can have their status set by the PJM to the following states:

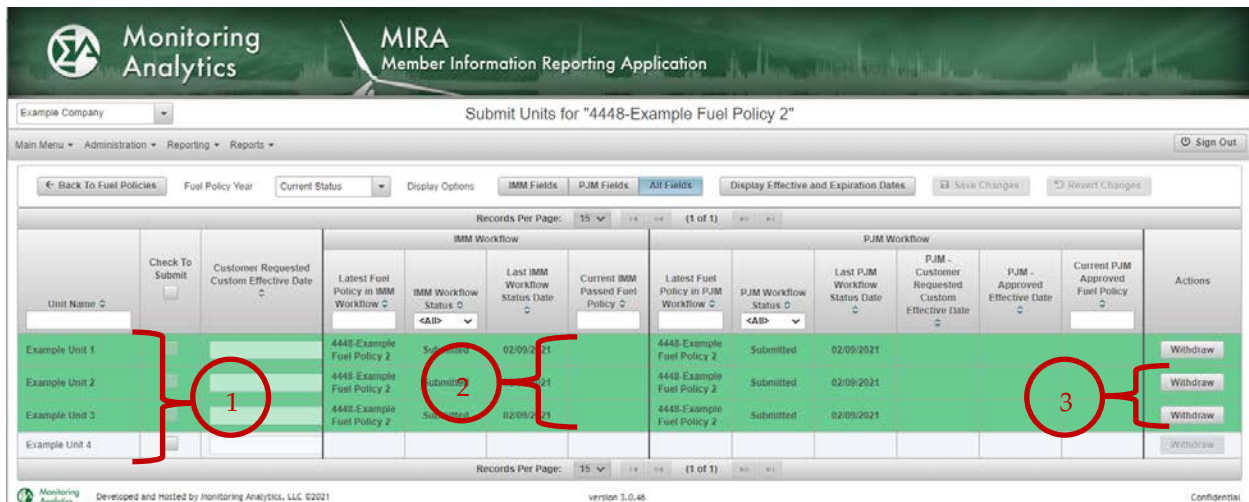
- **Under Review:** After the fuel policy has been submitted by the market participant, PJM will set the state to "Under Review" to notify the market participant that the document is actively being considered.
- **Customer Input Required:** After the fuel policy has been reviewed, PJM will set the status to "Customer Input Required" to notify the market participant that PJM has provided feedback to the market participant and it is waiting for the market participant to address the feedback from PJM.
- **Revoked:** PJM may revoke a fuel policy at any point in the fuel policy review. A revoked fuel policy indicates to the market participant that an updated fuel policy should be submitted.
- **Approved:** If PJM approves a fuel policy, it indicates that the fuel policy adequately captures the method for calculating cost based offers for that unit. If circumstances change, PJM may change the status from Approved to any of the other states. Market participants may also submit a new fuel policy assignment to that unit for PJM to review. If approved, the new fuel policy unit assignment would replace the prior approved fuel policy assignment.
- **Rejected:** Fuel Cost Policies that fail to meet PJM requirements and that do not accurately reflect the applicable costs, such as the fuel source, transportation cost, procurement process used, applicable adders, commodity cost, or provide sufficient information for PJM to verify the Market Seller's fuel cost at the time of the Market Seller's cost-based offer.

- **Expired:** Fuel Cost Policies that have a PJM approved expiration date prior to the current date will automatically have their status changed from Approved to Expired.

The below screen shows the market participant’s view of the Submit Units screen with the workflow states for the fuel policy named Example Fuel Policy 2.

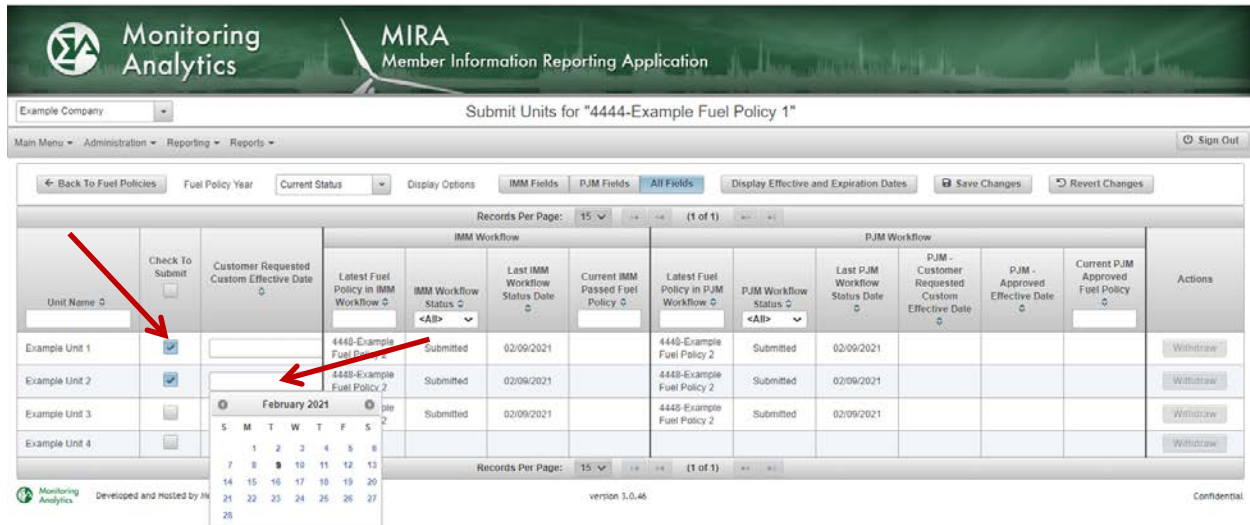
Note the following for Example Fuel Policy 2:

- 1) This company Example Company, LLC has 4 units (the complete list of units is displayed on the Submit Units screen.)
- 2) The Market Participant submitted Example Fuel Policy 2 to units Example Unit 1, Example Unit 2, and Example Unit 3. Because this is the Submit Units screen for Example Fuel Policy 2, the three units associated with Example Fuel Policy 2 are shaded green and presented as the top rows of the screen.
- 3) If the Market Participant wishes to withdraw the submittal of Example Fuel Policy 2 from Example Unit 2 and Example Unit 3, they can do so by clicking on the Withdraw button. Withdrawing a submitted fuel policy removes the fuel policy association with the unit, unless the fuel policy to unit assignment has IMM status of Pass or PJM status of Approved, which can’t be changed by withdrawing the fuel policy.



4.3 Custom Effective Date

The Custom Effective Date displayed on the Submit Units screen shows a date selected by the market participant indicating when they want the fuel policy approval to take effect, if not at the date of PJM Approval. To submit a fuel policy with a Custom Effective Date, open the Submit Units screen for that fuel policy, check the Check To Submit boxes to submit that fuel policy to the desired units, and then click on the Custom Effective Date for each selected unit to define the custom effective date.



4.3.1 Customer Requested and PJM Approved Effective Dates

For example, if a market participant has a fuel policy approved, but they want to submit another fuel policy for that unit, which would become the effective fuel policy on August 1, 2021, they could set the Customer Requested Effective Date to August 1, 2021 when they Submit the Fuel Policy-Unit assignment. If the Fuel Policy is approved by PJM and PJM approves an Effective Date of August 1, 2021, this fuel policy becomes the PJM Current Approved Fuel Policy on August 1, 2021, supplanting the previous Current Approved Fuel Policy. In their review of the fuel policy and the custom effective date, PJM will provide a PJM Approved Effective Date in MIRA.

4.4 Changes to Submitted Fuel Policy Contents

4.4.1 Deleting a Fuel Policy

Once a fuel policy has been submitted into the review workflow, the fuel policy can no longer be deleted. Fuel policies that have been in the workflow for prior Fuel Policy Years will continue to be maintained in the company’s list of fuel policies.

4.4.2 Editing a Fuel Policy

If the fuel policy has IMM status or PJM status in the workflow, the fuel policy can’t be edited (documents can’t be added or deleted.) To make changes to a fuel policy with these workflow states, contact the IMM and have them revert the fuel policy to Submitted or Failed, and contact PJM to have them revert the workflow to Submitted, or Customer Input Required, then Withdraw the fuel policy from the workflow. After a fuel policy has been withdrawn from the PJM and IMM workflows, it can be edited.

4.4.3 Withdrawing a Fuel Policy from Workflow

Market participants may withdraw a fuel policy from the workflow if the fuel policy has IMM status of Submitted or Fail, or PJM status of Submitted or Customer Input Required.

To Withdraw a fuel policy from the workflow, go to the Submit Units screen for that fuel policy. The screen shows the workflow status of all the company's units, and it has enabled the Withdraw button to the right of the screen for any unit that has the fuel policy in a workflow state eligible to withdraw.

Unit Name	Check To Submit	Customer Requested Custom Effective Date	IMM Workflow			PJM Workflow				Actions	
			Latest Fuel Policy in IMM Workflow	IMM Workflow Status	Last IMM Workflow Status Date	Current IMM Passed Fuel Policy	Latest Fuel Policy in PJM Workflow	PJM Workflow Status	Last PJM Workflow Status Date		PJM - Customer Requested Custom Effective Date
Example Unit 1	<input type="checkbox"/>		4448-Example Fuel Policy 2	Submitted	02/09/2021	4448-Example Fuel Policy 2	Submitted	02/09/2021	08/01/2021		Withdraw
Example Unit 3	<input type="checkbox"/>		4448-Example Fuel Policy 2	Submitted	02/09/2021	4448-Example Fuel Policy 2	Submitted	02/09/2021	08/01/2021		Withdraw
Example Unit 2	<input type="checkbox"/>										Withdraw
Example Unit 4	<input type="checkbox"/>										Withdraw

4.4.4 Submitting a New Fuel Policy When There Is a Current Approved Fuel Policy


If a market participant has an approved fuel policy for a specific unit, they may submit another fuel policy into the review workflow. If the new submitted fuel policy is approved, it will supplant the previous approved fuel policy as the Current Approved Fuel Policy. If the newly submitted fuel policy is approved with a future PJM Approved Custom Effective Date, it will become the Current Approved Fuel Policy on that PJM approved custom date.

4.5 Extending a Fuel Policy's Expiration Date

There will be periods of time when market participants are invited to request extension of the Expiration Date for their PJM Approved Fuel Policy. When a PJM Approved Fuel Policy is eligible for an Expiration Date extension, the "Request Extension" check box will be presented on the Edit Fuel Policies screen.

This check box will inform the IMM and PJM that an extension to the Expiration Date has been requested. The IMM and PJM will review the fuel policy and determine if the Expiration Date should be extended. The Expiration Date will be presented in the Expiration Date column.



PJM may also include a PJM Extend Flag Reason and a PJM Extend Flag Comment, which can be seen by clicking on the Fuel Policy Extension Info button  in the Actions column for the Fuel Policy.

Fuel Policy Extension Info

PJM Extend Flag Reason	PJM reason for extending
PJM Extend Flag Comment	Additional information about extension

4.6 Viewing Fuel Policy Status for Previous Years

Prior versions of MIRA had Fuel Policy-Unit assignments and review status organized by review periods called Fuel Policy Years. The Fuel Policy Year construct has been replaced in MIRA by customized expiration dates. When a user enters the Fuel Policy Editing or Fuel Policy Unit modules in MIRA, the period defaults to Current Status. However, users can review history by setting the “Fuel Policy Year” drop down to a previous Fuel Policy Year period to view the review status of fuel policies during that time frame. Historically, the 2019/2020 Fuel Policy Year ran from November 1, 2019, through October 31, 2020, for example.

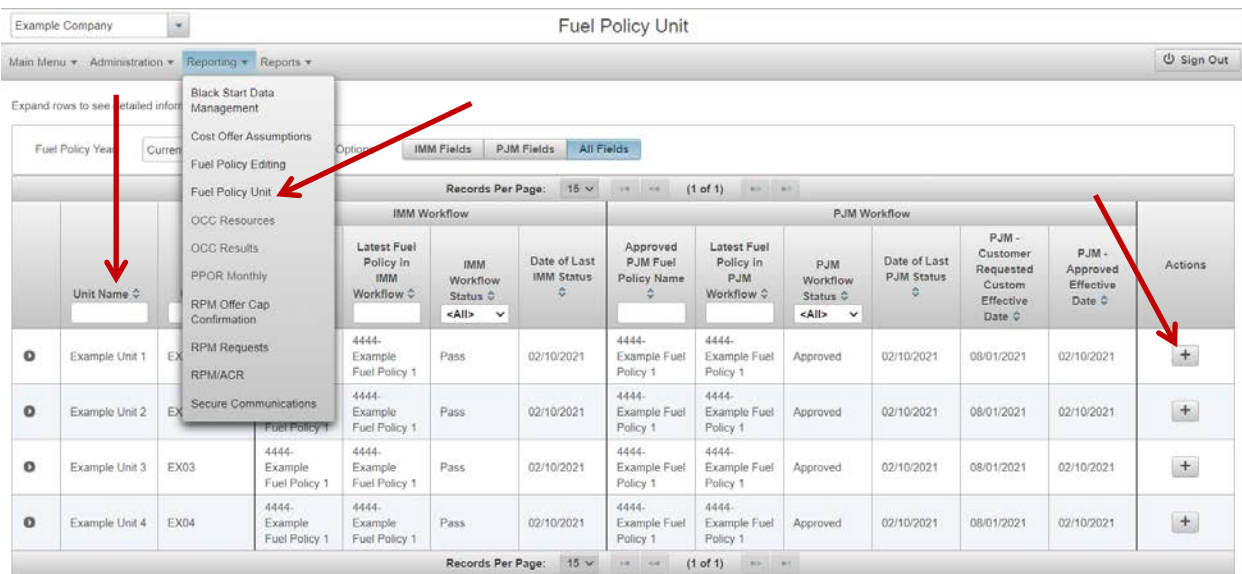


4.7 Fuel Policy Unit

The Fuel Policy Unit screen provides a view of all of the company's units, the fuel policies assigned to them, and the fuel policies currently in the review workflow. This screen also allows market participants to select a fuel policy to assign to the unit.

To get to the Fuel Policy Unit screen in MIRA, under Reporting, select Fuel Policy Unit. The screen displays a list of all units owned by the market participant for any part of the selected Fuel Policy Year. To select a fuel policy to submit to a unit, click on the + (Submit Fuel Policy) button to the right of the screen.

The columns in the Fuel Policy Management screen duplicate the columns in the Fuel Policy Editing -- Submit Units screen described above.



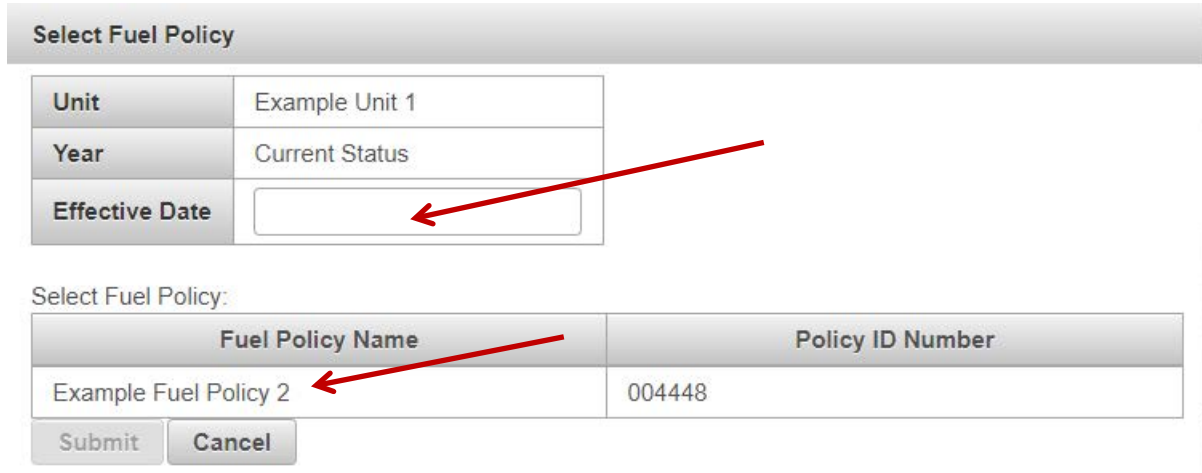
The Submit Fuel Policy button opens a dialogue screen which prompts the market participant to select a fuel policy (click on it) to submit for the unit, and allows the market participant to specify a custom effective date. Submitting a fuel policy for a unit in this screen has the same effect as submitting the fuel policy in the Edit Fuel Policy – Submit Fuel Policy screen.

Select Fuel Policy

Unit	Example Unit 1
Year	Current Status
Effective Date	<input type="text"/>

Select Fuel Policy:

Fuel Policy Name	Policy ID Number
Example Fuel Policy 2	004448



5 MIRA Black Start User Guide

The Black Start module in MIRA calculates the black start revenue requirements for qualified black start resources, and supports communication between the IMM and Market Participants (MP) to reach agreement on the appropriate levels of calculation inputs.

Black start revenue requirements for black start units consist of fixed black start service costs, variable black start service costs, training costs, fuel storage costs, and an incentive factor. Section 18 of Schedule 6A of the OATT specifies how to calculate each component of the revenue requirement formula. Black start resources can choose to recover fixed costs under a formula rate based on zonal Net CONE and unit ICAP rating, a cost recovery rate based on incremental black start NERC-CIP compliance capital costs, or a cost recovery rate based on incremental black start equipment capital costs.

This User Guide describes the functionality and workflow in the MIRA Black Start module. For information about the Member Information Reporting Application (MIRA), please see the MIRA Users Guide on the Monitoring Analytics “Tools” page:


<http://www.monitoringanalytics.com/tools/tools.shtml>.

5.1 Getting Started with the Black Start Module

5.1.1 Black Start User Permissions

To get access to the Black Start module in MIRA, have your company’s Customer Account Manager (CAM) create a MIRA account, and grant you the Black Start User role. For details on CAM responsibilities, please see the CAM Quick Start Reference on the “Tools” page.

The Black Start User role can be assigned by checking the “Black Start User” box in the user profile:

Company	User Types				Actions
Demo Company	<input type="checkbox"/> Account Manager	<input checked="" type="checkbox"/> Black Start User	<input type="checkbox"/> Company User	<input type="checkbox"/> Power Plant Operations User (monthly)	
	<input type="checkbox"/> Fuel Policy User	<input type="checkbox"/> Power Plant Operations User (continuous)	<input type="checkbox"/> Power Plant Operations User (monthly)		
	<input type="checkbox"/> RPM/ACR User				

To submit black start revenue requirement data for a qualified black start resource in the Black Start module in MIRA, please contact the IMM at mira@monitoringanalytics.com.

5.1.2 Access to MIRA Black Start Module

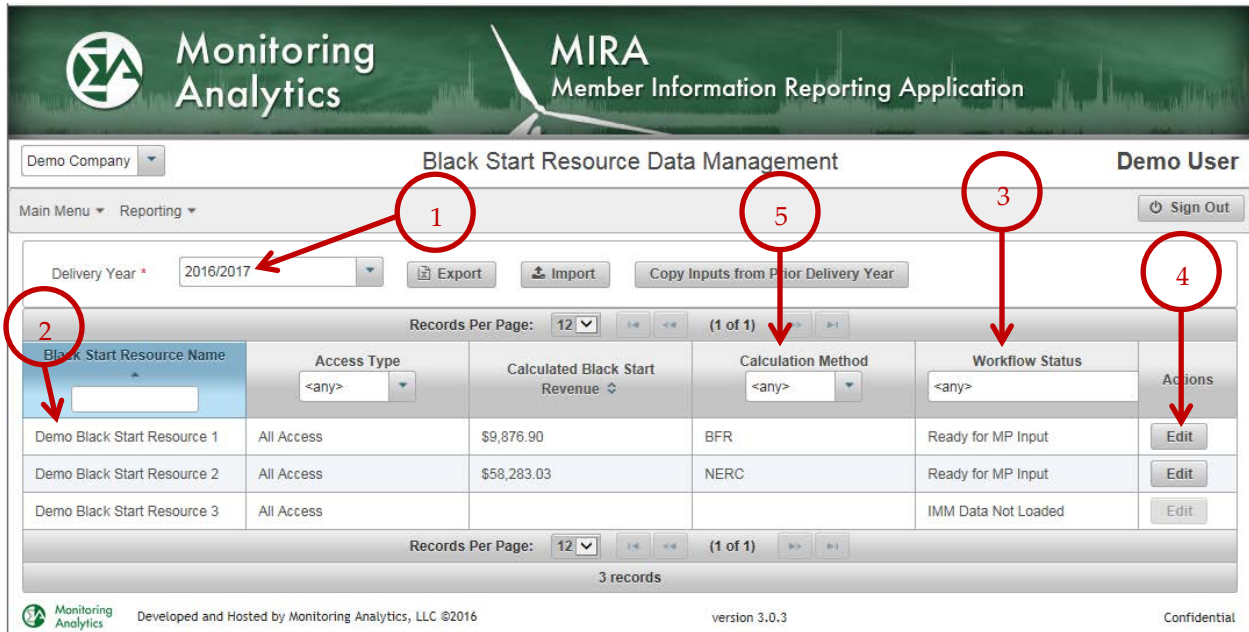
When logged in to the MIRA system, with Black Start User account permissions, access the Black Start module by clicking on the “Black Start Data Management” link under “Reporting” in the Menu Bar.



5.2 Black Start Data Management Screen

When a user arrives at the Black Start Resource Data Management screen, they should: (1) confirm that the Delivery Year is displaying the correct delivery year, and (2) confirm that all expected Black Start Resources for the selected company are displayed. If any resources are missing, please contact the IMM at mira@monitoringanalytics.com. Next, observe the workflow status (3). If the workflow status is “IMM Data Not Loaded”, the record is not yet ready for a user to edit the record, and the “Edit” button (4) will be inactive. When the “Edit” button is activated for a resource, the user can open the record and submit Black Start input data, or change the workflow status, which will be described in the following sections.

Market participants can use the user interface in the Black Start Resource Data Management screen to enter their data individually for each unit, or upload an Excel file with data for multiple black start resources (see Section 5.5 Import/Export.)



5.3 Black Start Resource Data Management (For a Specific Resource)

When the user clicks the “Edit” button in item (4), a variation of the following screen is presented. The different variations of the screen will depend on the calculation method input by the IMM (See item (5).) To change the calculation method for a given resource, contact the IMM at mira@monitoringanalytics.com.

5.3.1 Black Start Revenue Requirement Calculation Methods

The following are screen shots of what the Black Start Resource Data Management screen will look like for each of the calculation methods. For details and data definitions of each of the calculation methods, see Section 18 of Schedule 6A of the OATT.

The IMM may contact the market participant to request supporting information.

5.3.1.1 Base Formula Rate (BFR)

Most Black Start resources revenue requirements are calculated with the Base Formula Rate (BFR) method. Note:

- 1) Confirm that you are editing the correct resource by checking the name in the screen header. In the screen shot, it is editing the resource named “Demo Black Start Resource 1.”
- 2) The calculation method is set as “BFR” and the workflow status is currently at “Ready for MP Input.” For more information on the workflow, please see section 5.4, Workflow Status.

- 3) Note the coloring of the cells. Green cells are populated with IMM data. White cells, displayed with “Enter Value” are where market participant users should enter data inputs. Yellow fields are calculated subtotals and totals, based on the IMM and user inputs.

The screenshot displays the 'Black Start Resource Data Management' interface for 'Demo Black Start Resource 1'. The interface includes a navigation bar with 'Demo Company', 'Main Menu', and 'Reporting'. The current calculation method is 'BFR' and the workflow status is 'Ready for MP Input'. The data is organized into several sections:

- Unit Information:** Zone (COMED), Unit Type (CT), Unit ID (DEMO1), Unit Name (Demo Black Start Resou).
- Variable Costs:** Y (Allocation Factor) (0.01), O & M (\$/year) (Enter Value), VBSSCC (\$) (\$0.00).
- Training Costs:** Training Costs (\$) (\$123,456.00), Resources per Plant (Enter Value), TBSSCC (\$) (\$0.00).
- Fuel Storage Costs:** Run Hours (2,000.00), MTSL (Minimum Tank Suction Level) (Enter Value), Bond Rate (%) (7.00%), Fuel Burn Rate (Enter Value), Fuel Cost (Commodity Fwd)(\$/gal) (Enter Value), Fuel Handling (Basis)(\$/gal) (Enter Value), FBSBSCC (\$) (\$0.00).
- Fixed Costs:** Net CONE Area, Net CONE (\$/MW-day) (\$123.00), Delivery Year Days (0-365) (365), Capacity (MW) (10.00), X (Allocation Factor) (0.02), FBSSCC (\$) (\$8,976.00).
- Adjusted Final:** IMM Adjustment (\$), IMM Adjustment Description, Final Cost Per Unit (\$/year) (\$6,876.00).

Red annotations highlight key features: '1' points to the resource name, '2' points to the 'BFR' calculation method and 'Ready for MP Input' status, and '3' points to the 'Enter Value' input fields for O & M, Resources per Plant, MTSL, Fuel Burn Rate, Fuel Cost, and Fuel Handling.

5.3.1.2 Capital Recovery Factor (CRF)

The CRF calculation method differs from the BFR calculation method in that fixed costs are based on a capital cost and capital recovery factor instead of a net CONE allocation.

Demo Company		Black Start Resource Data Management for (Demo Black Start Resource 2)			Demo User	
Main Menu		Reporting			Sign Out	
Back to Resources	Delivery Year	20162017	Calculation Method	CRF	Workflow Status	Ready for MP Input
				Confirm	Acknowledge Disagreement	Save Submit Undo
Unit Information						
Zone	COMED	Unit Type	CT			
Unit ID	DEMO2	Unit Name	Demo Black Start Resou			
Variable Costs						
Y (Allocation Factor)	0.01	O & M (\$/year)	Enter Value			
VBSSCC (\$)	\$0.00					
Training Costs						
Training Costs (\$)	\$12,345.00	Resources per Plant	Enter Value			
TBSSCC (\$)	\$0.00					
Fuel Storage Costs						
Run Hours	2,600.00	MTSL (Minimum Tank Suction Level)	Enter Value			
Bond Rate (%)	0.07%	Fuel Burn Rate	Enter Value			
		Fuel Cost (Commodity Fwd) (\$/gal)	Enter Value			
		Fuel Handling (Basis)/(\$/gal)	Enter Value			
FSBSSCC (\$)	\$0.00					
Fixed Costs						
		Capital Costs	}			
		CRF	}			
		FBSSCC (\$)	\$0.00			
Adjusted Final						
IMM Adjustment (\$)						
IMM Adjustment Description						
Final Cost Per Unit (\$/year)	\$0.00					

5.3.1.3 NERC

The NERC calculation method differs from the BFR and CRF calculation methods in that fixed costs are based on both the net CONE allocation as well as a NERC-CIP capital cost and capital recovery factor.

Demo Company | Black Start Resource Data Management for (Demo Black Start Resource 2) | Demo User

Main Menu | Reporting | Sign Out

Back to Resources | Delivery Year: 20162017 | Calculation Method: NERC | Workflow Status: Ready for MP Input | Confirm | Acknowledge Disagreement | Save | Submit | Undo

Unit Information			
Zone	COMED	Unit Type	CT
Unit ID	DEMO2	Unit Name	Demo Black Start Resou
Variable Costs			
Y (Allocation Factor)	0.01	O & M (\$/year)	Enter Value
VBSSCC (\$)	\$0.00		
Training Costs			
Training Costs (\$)	\$12,345.00	Resources per Plant	Enter Value
TBSSCC (\$)	\$0.00		
Fuel Storage Costs			
Run Hours	2,500.00	MTSL (Minimum Tank Suction Level)	Enter Value
Bond Rate (%)	0.07%	Fuel Burn Rate	Enter Value
		Fuel Cost (Commodity Fwd)(\$/gal)	Enter Value
		Fuel Handling (Basis)(\$/gal)	Enter Value
FSBSSCC (\$)	\$0.00		
Fixed Costs			
Net CONE Area		NERC-CIP Capital Costs	\$123,456.00
Net CONE (\$/MW-day)	\$123.00	NERC-CIP CRF	0.3830
Delivery Year Days (0-366)	365	Yearly NERC-CIP	\$44,514.53
Capacity (MW)	15.00		
X (Allocation Factor)	0.02		
FBSSCC (\$)	\$13,488.50		
Adjusted Final			
IMM Adjustment (\$)			
IMM Adjustment Description			
Final Cost Per Unit (\$/year)	\$69,293.03		

5.3.1.4 FERC

The FERC calculation method is a black start revenue requirement value that has been approved specifically for this resource by FERC.

Demo Company | Black Start Resource Data Management for (Demo Black Start Resource 2) | Demo User

Main Menu | Reporting | Sign Out

Back to Resources | Delivery Year: 20162017 | Calculation Method: FERC | Workflow Status: Ready for MP Input | Confirm | Acknowledge Disagreement | Save | Submit | Undo

Unit Information			
Zone	COMED	Unit Type	CT
Unit ID	DEMO2	Unit Name	Demo Black Start Resou
		FERC Rate (\$/year)	
Adjusted Final			
IMM Adjustment (\$)			
IMM Adjustment Description			
Final Cost Per Unit (\$/year)	\$0.00		

5.3.2 IMM Alternative Values

The IMM will review the data submitted by market participants and may request supporting documentation or explanation. When the IMM disagrees with a market participant on the value of one of the user inputs, the IMM will use an IMM alternative value field to communicate the IMM value. These fields only display in the screens when the IMM has populated them.

Note that the IMM alternative values are also accompanied by subtotals and a final fixed cost value (IMM Calculated Final Cost), which are based on the IMM data and the market participant input data, and only use the IMM alternative data as an alternative to the market participant input data where the IMM alternative data exists.

The screenshot displays the 'Black Start Resource Data Management' interface for 'Demo Black Start Resource 2'. The interface includes a navigation menu, a reporting dropdown, and a 'Sign Out' button. The main content area is divided into several sections:

- Unit Information:** Zone (COMED), Unit Type (CT), Unit ID (DEMO2), Unit Name (Demo Black Start Resou).
- Variable Costs:** Y (Allocation Factor) (0.01), O & M (\$/year) (Enter Value), IMM O & M Value (\$1,111.00), VBSSCC (\$) (\$0.00), IMM Calculated VBSSCC (\$) (\$11.11).
- Training Costs:** Training Costs (\$) (\$12,345.00), Resources per Plant (Enter Value), IMM Resources per Plant Value (2), TBSSCC (\$) (\$0.00), IMM Calculated TBSSCC (\$) (\$6,172.50).
- Fuel Storage Costs:** Run Hours (2,500.00), MTSL (Minimum Tank Suction Level) (Enter Value), IMM MTSL Value (3,333.0), Bond Rate (%) (0.07%), Fuel Burn Rate (Enter Value), IMM Fuel Burn Rate Value (4.0), Fuel Cost (Commodity Fwd)(\$/gal) (Enter Value), IMM Fuel Cost Value (\$5.550), Fuel Handling (Basis)(\$/gal) (Enter Value), IMM Fuel Handling Value (\$0.060), FSBSSCC (\$) (\$0.00), IMM Calculated FSBSSCC (\$) (\$57.98).
- Fixed Costs:** Net CONE Area, Net CONE (\$/MW-day) (\$123.00), Delivery Year Days (0-365) (365), Capacity (MW) (15.00), X (Allocation Factor) (0.02), FBSSCC (\$) (\$13,498.50).
- Adjusted Final:** IMM Adjustment (\$), IMM Adjustment Description, Final Cost Per Unit (\$/year) (\$14,815.35), IMM Calculated Final Cost (\$/year) (\$21,051.08).

Red brackets in the image highlight the 'IMM Calculated' values for Variable Costs, Fuel Storage Costs, and Final Cost.

5.4 Workflow Status

The purpose of the Black Start module workflow is to support communications that allow the market participant and IMM to confirm a final value. The workflow status is changed throughout the process by the IMM or market participant clicking on buttons, which are enabled and disabled depending on the current workflow status. At any time in the process, the

workflow status can be seen on the “Black Start Resource Data Management” screen (see item 1).

The different statuses of the Black Start workflow are:

- **IMM Data Not Loaded:** Before the IMM has loaded the calculation method and the IMM data, the market participant input screen for the resource cannot be opened.
- **Ready for MP Input:** When the IMM has selected and saved the calculation method for the resource, the market participant can open the Black Start Resource Data Management screen and enter and save their input data for that resource. At any step in the process, if the market participant determines that they wish to change any of their inputs, they can contact the IMM at mira@monitoringanalytics.com, and request that a resource workflow be reset to **Ready for MP Input**.
- **MP Inputs Saved:** When the market participant has changed any data, they must click on the **Save** button to commit those changes to the database (see item 2). When the market participant saves data changes before submitting, the workflow status changes to **MP Inputs Saved**.
- **MP Revenue Requirements Submitted:**³ When the market participant has saved their input data, and wishes to submit the calculated revenue requirement cost to the IMM, the market participant clicks **Submit** (see item 3) and the workflow status changes to **MP Revenue Requirements Submitted**. When the inputs have been submitted, the record is locked to market participant edits pending IMM review.
- **IMM Reviewed - No Disagreement:** When the market participant submits their black start revenue requirement inputs, the workflow shifts to the IMM to review the submitted inputs. The IMM will review and may contact the market participant user who submitted the inputs to request supporting information. If, after reviewing the input and supporting data, the IMM does not disagree with any of the inputs, the IMM will so indicate, and the workflow status will be changed to **IMM Reviewed – No Disagreement**.
- **MP Confirmed:** When the IMM has set the status to **IMM Reviewed – No Disagreement**, the market participant can close the process for the resource by clicking on the **Confirm** button, which sets the status to **MP Confirmed** and locks the record to further editing by the market participant or IMM.⁴
- **IMM Reviewed – Disagreement:** When the market participant submits their black start revenue requirement inputs, the workflow shifts to the IMM to review the submitted inputs. The IMM will review and may contact the market participant user who

³ If the market participant believes that there are errors in any of the IMM data or the revenue requirement calculation, the market participant should contact the IMM at mira@monitoringanalytics.com.

⁴ If, after the market participant confirms, the IMM or the market participant wish to make changes, the IMM can reset the status to **Ready for MP Inputs** and restart the process.

submitted the inputs to request supporting information. If, after reviewing the input and supporting data, the IMM disagrees with any of the inputs, the IMM may contact the market participant directly to discuss the disagreement. The IMM may use the IMM Alternative fields in the Black Start Resource Data Management screen to communicate what the IMM believes are the appropriate values for any of the MP inputs. If the IMM and market participant cannot come to an agreement on the appropriate value for any of the inputs, the IMM will so indicate, and the workflow status will be actioned to **IMM Reviewed – Disagreement**.

- **MP Acknowledges Disagreement:** When the IMM has set the status to **IMM Reviewed – Disagreement**, the market participant can close the process for the resource by clicking on the **Acknowledge Disagreement** button, which sets the status to **MP Acknowledges Disagreement** and locks the record to further editing by the market participant or IMM.⁵ PJM will conduct its tariff compliance review, and if PJM approves the contested value as compliant with the tariff, the value will be included in rates as provided in the tariff and market rules. PJM’s tariff compliance review is not a review of market power and PJM’s acceptance of the value does not constitute a determination that the level of the value is acceptable. The participant shall continue to have exclusive responsibility for the cost input. The IMM may take action, including filing a FERC complaint under Section 206 or a referral as defined in the Market Monitoring Plan, in order to get a final determination on the IMM’s market power concerns related the level of the submitted value.

⁵ If, after the market participant acknowledges the disagreement, the IMM or the market participant wish to make changes, the IMM can reset the status to **Ready for MP Inputs** and restart the process.

Unit Information	
Zone	COMED
Unit ID	DEMO1
Unit Type	CT
Unit Name	Demo Black Start Res
Variable Costs	
Y (Allocation Factor)	0.01
O & M (\$/year)	\$12,345.00
VBSSCC (\$)	\$123.45
Training Costs	
Training Costs (\$)	\$123,456.00
Resources per Plant	2
TBSSCC (\$)	\$81,728.00
Fuel Storage Costs	
Run Hours	2,000.00
MTSL (Minimum Tank Suction Level)	12,345.0
Bond Rate (%)	7.00%
Fuel Burn Rate	123.0
Fuel Cost (Commodity Fwd) (\$/gal)	\$1.234
Fuel Handling (Basis)/(\$gal)	\$1.234
FSBSSCC (\$)	\$44,831.88
Fixed Costs	
Net CONE Area	
Net CONE (\$/MW-day)	\$123.00
Delivery Year Days (0-365)	365
Capacity (MW)	10.00
X (Allocation Factor)	0.02
FBSSCC (\$)	\$8,979.00
Adjusted Final	
IMM Adjustment (\$)	
IMM Adjustment Description	
Final Cost Per Unit (\$/year)	\$127,008.35

5.5 Import/Export

From the Black Start Resource Data Management screen, market participants can export and import Excel files that contain all of the IMM and market participant data. The exported file also contains the calculation logic. If a market participant intends to use a batch import of black start data, it is recommended that they generate the import file by using the Export function to create the template.

The columns of the export file are color coded to match the colors of the fields in the Black Start Resource Data Management user interface screen. Dark gray columns are used as section dividers (dividing variable costs from training costs from fuel storage costs from fixed costs.) Green columns are used for IMM data. Yellow columns are used for subtotal and total fields that are calculated by the spreadsheet. White columns with black border are used for market participant data entry.

The exported file includes five worksheet tabs, one for each calculation method (BFR, CRF, NERC, FERC, and Override.) The black start revenue requirement for each black start resource

will only appear on the worksheet for the calculation method that is currently assigned to that resource.

When importing, the import process only imports the data in the white market participant input fields. The IMM data and calculated data in the spreadsheet are not uploaded from this file. The calculation uses the IMM data that resides in the database, and calculates the subtotal and total fields based on the IMM data in the database.

5.6 Copy from Prior Delivery Year

If a market participant wishes to copy their black start revenue requirement input data from the prior delivery year to the current delivery year, they can use the “Copy Inputs from Prior Delivery Year” function.

Black Start Resource Name	Access Type	Calculated Black Start Revenue	Calculation Method	Workflow Status	Actions
Demo Black Start Resource 1	All Access	\$127,008.35	BFR	Ready for MP Input	Edit
Demo Black Start Resource 2	All Access	\$14,815.35	BFR	Ready for MP Input	Edit
Demo Black Start Resource 3	All Access			IMM Data Not Loaded	Edit

Clicking on the button presents a dialogue box from which the market participant selects the source delivery year from which to copy. Clicking on “Copy Inputs” completes the copy process.

Copy Inputs from Prior Delivery Year

2016/2017 [v] [Copy Inputs]

The data will be copied from the prior delivery year if the workflow status for the resource is “Ready for MP Input” and if the calculation method from the source prior delivery year is the same as the calculation method for the target current delivery year. Resources that meet these criteria have their inputs copied. Resources that fail these criteria receive a message that the copy function for those resources has failed. If some resources pass the criteria and some fail,

the copy will succeed for those resources that pass and the copy will not be completed for those that trigger a warning.

6 MIRA Opportunity Cost Calculator User Guide

6.1 Opportunity Cost Adder Eligibility

PJM market rules allow for an opportunity cost adder to be included in cost based generator offers if there are physical or regulatory limits on the output of the generator. PJM Manual 15 explains the conditions under which PJM generating units are eligible to include opportunity costs in their energy offers: energy market opportunity costs; nonregulatory physical equipment limitations; and nonregulatory fuel limitations resulting from an event of force majeure.⁶

PJM Manual 15 also explains the mechanics of the opportunity cost calculation. The logic of the calculation performed by the IMM Opportunity Cost Calculator is described in PJM Manual 15.

To designate a generation resource as eligible to include opportunity costs in generation cost offers, contact the IMM at at mira@monitoringanalytics.com.

6.2 Opportunity Cost Calculator Workflow

Opportunity cost adders in cost-based offers should be recalculated once every seven days. The IMM may enforce a weekly schedule of OCC availability to allocate computational resources.

Market participants will log into MIRA, update their OCC inputs to reflect the current status of the resource, and Submit the OCC Inputs for calculation.

The IMM will review the submitted OCC Inputs, and if the submitted inputs are consistent with the opportunity cost requirements in PJM Manual 15 and acceptable to the IMM, the inputs will be approved for calculation.

If the submitted inputs are not acceptable to the IMM, the IMM will contact the market participant to discuss the inputs, and revert the status of the OCC Resource to Saved, thereby allowing additional edits to the input data.

If the submitted inputs are acceptable to the IMM, an adder will be calculated and the results will be posted to the secure OCC Results screen in MIRA.

⁶ See PJM Manual 15: Cost Development Guidelines, at Section 12: Energy Market Opportunity Cost and Non-Regulatory Opportunity Cost Guidelines. <<<https://pjm.com/-/media/documents/manuals/m15.ashx>>>

6.3 Opportunity Cost Calculator Inputs

To initiate the OCC process, market participants will log into MIRA with OCC User access permission. Under the Reporting menu, navigate to the OCC Resources screen. The OCC Resources screen will present a list of all the market participant company's OCC Resources, as well as their workflow status (Saved or Submitted) and three Action buttons: Enter Inputs, Manage Outages, and Manage Documents.



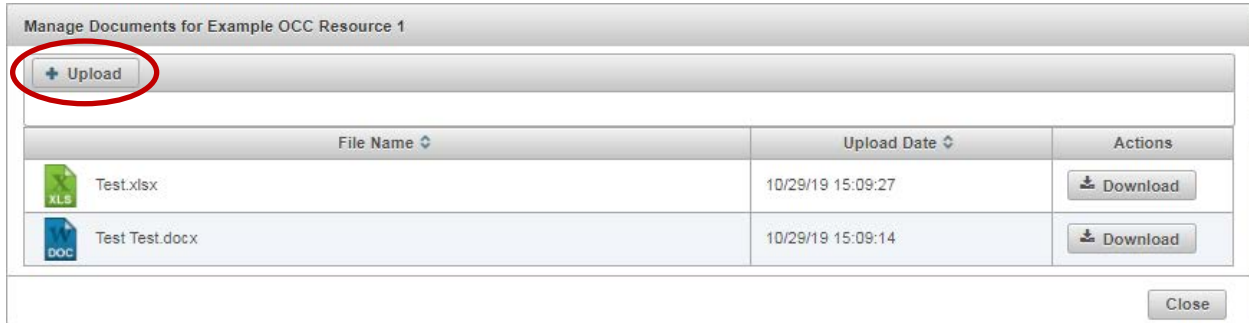
6.3.1 Manage Documents: OCC Constraint Documentation

PJM market participants with generating resources eligible for opportunity cost adders in their cost offers must provide the IMM with documentation which confirms the limiting constraints, such as air permits or documentation of other regulatory or physical restrictions.

Market participants should contact the IMM at mira@monitoringanalytics.com to request OCC Resource status. The IMM administrator will create the OCC Resource in the MIRA OCC module, and the market participant can upload supporting documentation by clicking on the Manage Documents button in the OCC Resources screen:



Clicking the Manage Resources button navigates to the Manage Documents dialogue box, which lists all submitted documents for this resource. Clicking on the +Upload button allows the user to navigate to a document and upload it.



6.3.2 Enter Inputs: OCC Resource Operating Parameters

If the market participant and the IMM agree that the resource is eligible for an opportunity cost adder, the IMM will model the resource in the MIRA OCC module. A modeled OCC Resource will create a record for the market participant to enter data for the operating parameters that are needed for the opportunity cost calculation.

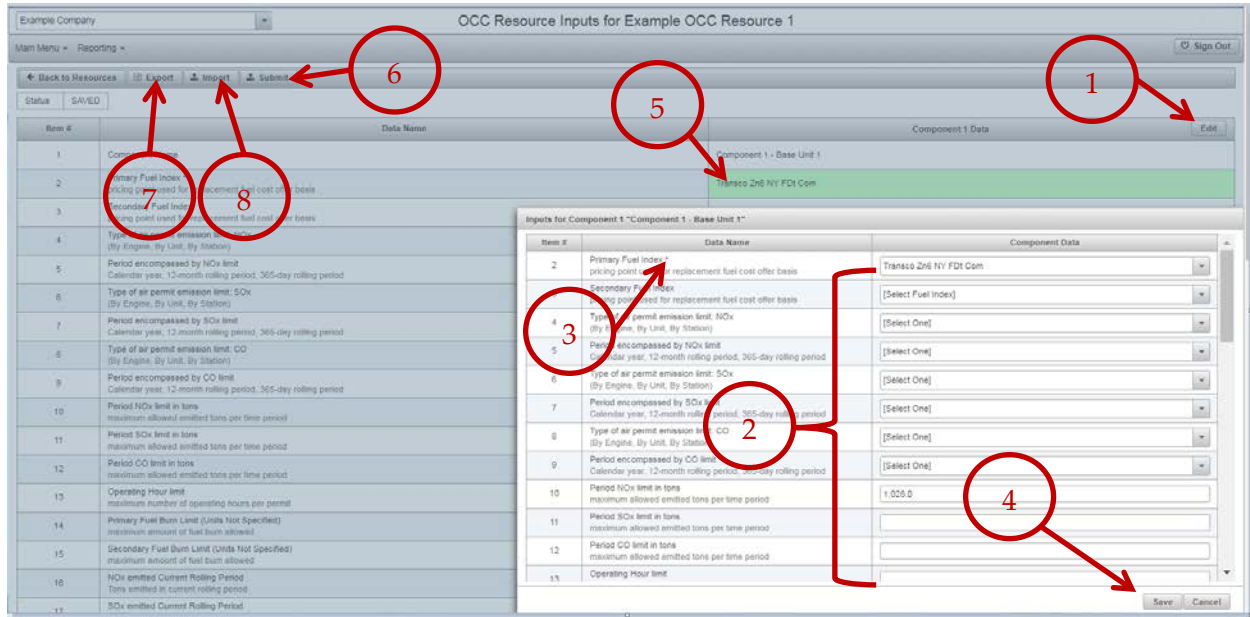
From the OCC Resources screen, click on the Enter Inputs button to navigate to the OCC Inputs screen



In the OCC Inputs screen, the user will be presented with a numbered list of data elements. Depending on the type of resource, and the type of constraints, the list of data elements may be different. To complete the OCC Resource Inputs, market participants should:

1. Click the Edit button to bring up the Inputs data entry dialogue;
2. In the Inputs dialogue, enter values in the Component Data column;
3. Note that data elements labeled with a red star are required;
4. When all data has been input, click on the Save button;
5. In the OCC Resource Inputs screen, note that any data elements that have changed since the prior opportunity cost results will be displayed with a green background; and
6. When the OCC Inputs represent the current operating state of the resource, click on Submit to start the opportunity calculation process.

As an alternative to using the user interface to manually enter data, users can use the (7) Export button to export an Excel file, edit it to add the input data, and then (8) Import the Excel file before (6) Submitting.



The standard set of OCC Inputs may include some or all of the following parameters. Other input data may also be required to model the OCC Resource’s operations.

Data Name	Data Description
Component Name	Name of Components of OCC Resource
Primary Fuel Index	pricing point used for replacement fuel cost offer basis
Secondary Fuel Index	pricing point used for replacement fuel cost offer basis
Type of air permit emission limit: NOx	(By Engine, By Unit, By Station)
Period encompassed by NOx limit	Calendar year, 12-month rolling period, 365-day rolling period
Type of air permit emission limit: SOx	(By Engine, By Unit, By Station)
Period encompassed by SOx limit	Calendar year, 12-month rolling period, 365-day rolling period
Type of air permit emission limit: CO	(By Engine, By Unit, By Station)
Period encompassed by CO limit	Calendar year, 12-month rolling period, 365-day rolling period
Period NOx limit in tons	maximum allowed emitted tons per time period
Period SOx limit in tons	maximum allowed emitted tons per time period
Period CO limit in tons	maximum allowed emitted tons per time period
Operating Hour limit	maximum number of operating hours per permit
Primary Fuel Burn Limit (Units Not Specified)	maximum amount of fuel burn allowed
Secondary Fuel Burn Limit (Units Not Specified)	maximum amount of fuel burn allowed
NOx emitted Current Rolling Period	Tons emitted in current rolling period
SOx emitted Current Rolling Period	Tons emitted in current rolling period
CO emitted Current Rolling Period	Tons emitted in current rolling period
Fuel Throughput in Current Period	Volume of fuel consumed in current period (mcf, gallons, tons)
Economic Minimum (MW)	expected average EcoMin in next 12 months
Economic Maximum (MW)	expected average EcoMax in next 12 months
NOx emission rate (lbs/MBtu)	as a function of fuel used

SO2 emission rate (lbs/MBtu)	as a function of fuel used
CO emission rate (lbs/MBtu)	as a function of fuel used
NOx emitted starting (lbs/start)	as a function of fuel used
SOx emitted starting (lbs/start)	as a function of fuel used
CO emitted starting (lbs/start)	as a function of fuel used
Summer Heat Rate at EcoMin (MBtu/MWh)	average expected in next 12 months
Summer Heat Rate at EcoMax (MBtu/MWh)	average expected in next 12 months
Winter Heat Rate at EcoMin (MBtu/MWh)	average expected in next 12 months
Winter Heat Rate at EcoMax (MBtu/MWh)	average expected in next 12 months
Start-up Cost	average expected in next 12 months
Variable O&M adder	as currently assumed in offers in \$/Mbtu
Variable O&M adder	as currently assumed in offers in \$/hour
Variable O&M adder	as currently assumed in offers in \$/MWh
Other adders	as currently assumed in offers in \$/Mbtu
Other adders	as currently assumed in offers in \$/hour
Other adders	as currently assumed in offers in \$/MWh
Fuel Delivery Charge (\$/MBtu)	average expected in next 12 months
Lead time (notification + start-up)	in hours (HHHHH:MM)
Min. Run Time (hours)	as currently assumed for offers (HHHHH:MM)
Min. Down Time (hours)	as currently assumed for offers (HHHHH:MM)

6.3.3 Manage Outages: OCC Resource Outages

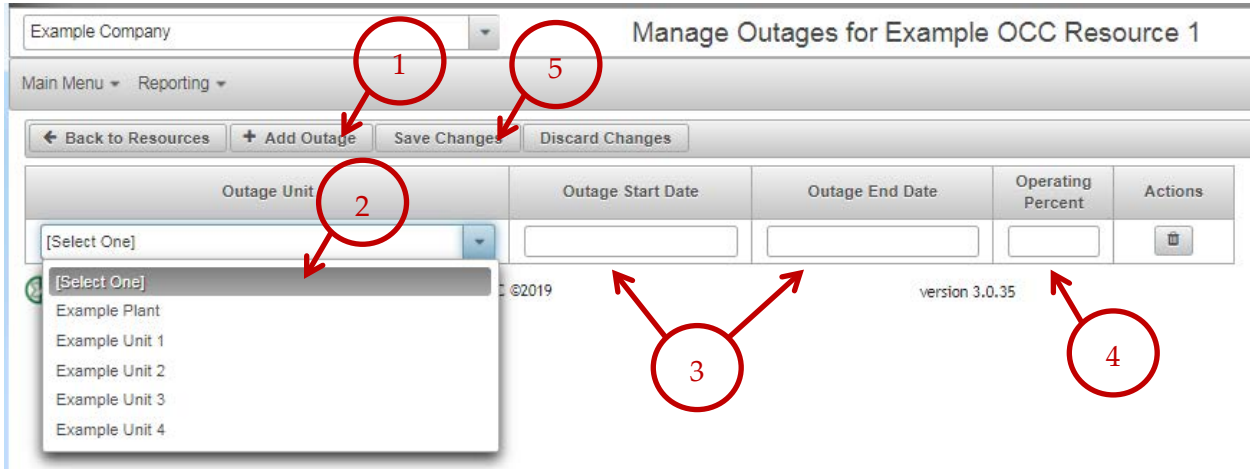
The Opportunity Cost Calculator simulates a forward dispatch of the resource to estimate the value of the resource’s optimal set of run hours. Accurate dispatch modeling requires knowledge of the planned outages for the constrained resources. The OCC module allows market participants to provide the details of resource outages.

From the OCC Resources screen, click on Manage Outages for the OCC resource:



The Manage Outages screen allows market participants to report their resource outages by:

1. Selecting + Add Outage;
2. Choosing a Plant or Unit associated with the OCC Resource to report an outage;
3. Entering the outage Start and End dates;
4. Inputting the Operating Percent (0% means complete outage, 60% would mean the plant or unit is reduced to 60% operating capacity.)
5. Save the changes to the outage information for this OCC Resource.



The outages reported in the MIRA OCC module should be consistent with the outages reported in the Generating Availability Data System (GADS).

6.4 Opportunity Cost Calculator Results

After the OCC Inputs have been submitted by the user and reviewed by the IMM, the Opportunity Cost Calculation will run. The results of the OCC run will be posted on the OCC Results screen, accessible by navigating to Reporting > OCC Results.

The OCC Results screen will display the history of calculated opportunity cost adders for each OCC Resource owned by the selected company. The display will consist of the OCC Resource name, the date on which the OCC Inputs were submitted, the calculated OCC adder, in \$/MWh, and a comment that may provide additional detail about the calculation or the resulting adder.

The use of the Opportunity Cost Calculator results is the responsibility of the user. Users assume sole responsibility for offers submitted in PJM markets. Monitoring Analytics makes no guarantee of the accuracy of the Opportunity Cost calculation or of the appropriateness of its use in any market. Market Participants should only use or rely on the Opportunity Cost Calculator results in any market if the Market Participant agrees with the calculated results, and waives all claims of liability against Monitoring Analytics associated with the use of or reliance on the results.

7 MIRA Secure Communications User Guide

The MIRA Secure Communications module provides a means of securely exchanging data, documents, and comments between Monitoring Analytics and PJM market participants.

A separate Secure Communication may be created for each unique subject or topic.

A Secure Communication in MIRA resembles an email thread, consisting of separate time stamped rows of documents and comments, presented with the most recent message at the top.

The user name of the MIRA user who contributed each row is also displayed with each row of comments or documents.

7.1 Initiating a Secure Communication

Only a Monitoring Analytics MIRA administrator can initiate a Secure Communication in MIRA. If a PJM market participant wants to request the creation of a Secure Communication, contact Monitoring Analytics at mira@monitoringanalytics.com and a MIRA administrator will create the Secure Communication and provide access.

Include the following information in the request:

- The subject of the Secure Communication.
- The company name and ORG ID of the market participant company.
- The name and MIRA user name of any market participant staff that should have access to the Secure Communication.
- The name of any Monitoring Analytics staff members to whom you are directing the Secure Communication.
 - If you do not specify a staff member, Monitoring Analytics will make available to the appropriate staff member(s).

7.2 Secure Communication Access Model

Only MIRA users with Secure Communication User access type can be granted access to a Secure Communication.

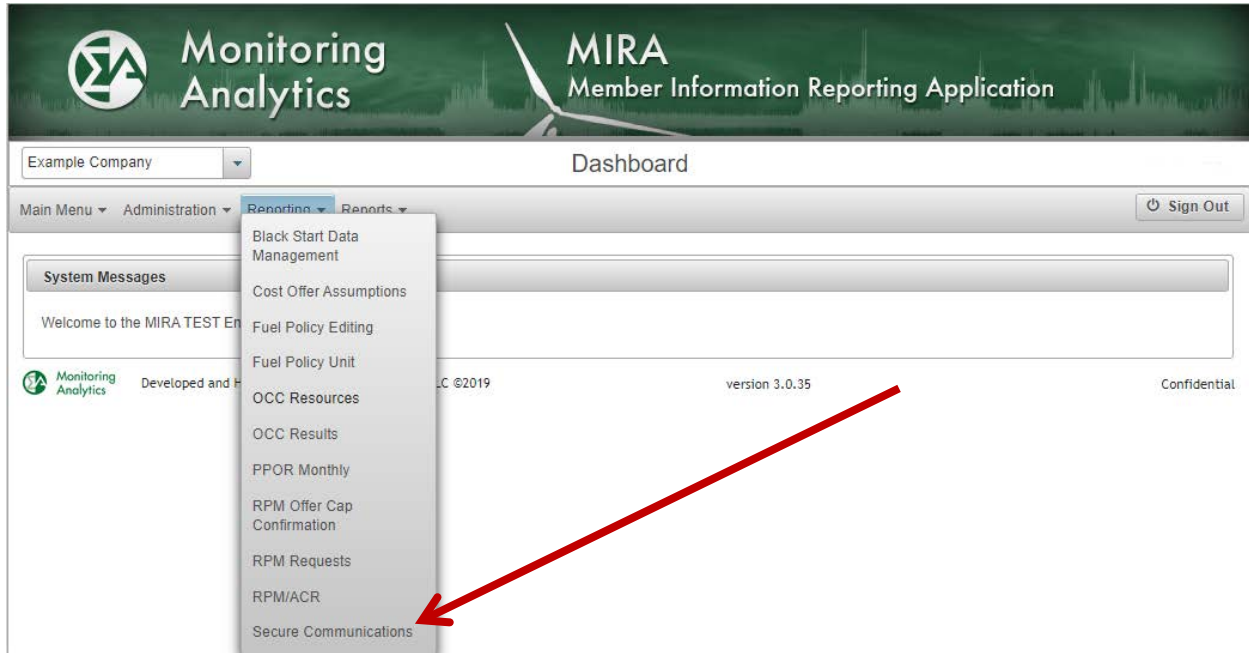
The MIRA administrator will:

- Create the Secure Communication;
- Associate the Secure Communication with a company account in MIRA;
- Grant access to users with Secure Communications User access for the associated company;
- Contact users to notify them of the existence of the Secure Communication.

Only MIRA users with Secure Communication User access who have been granted access to the specific Secure Communication can see or contribute to the Secure Communication.

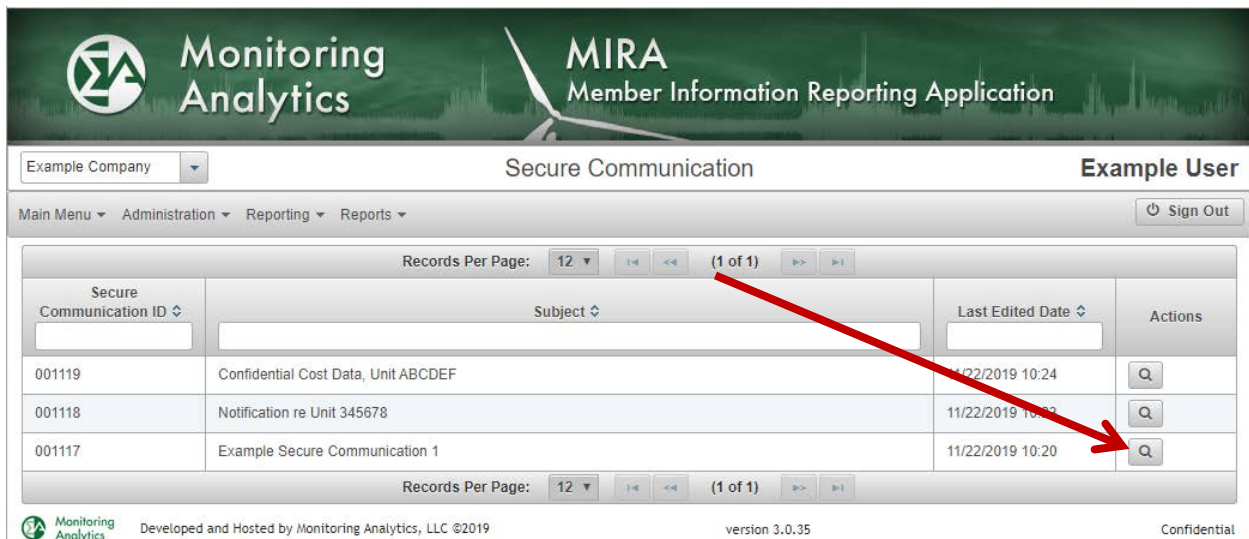
7.3 Accessing the Secure Communications Module

Secure Communication Users in MIRA can access a Secure Communication to which they have been granted access by selecting Secure Communications under the Reporting menu:



7.4 Contributing to a Secure Communication

On the Secure Communication page, a list of Secure Communications to which you have been granted access will be presented. Click on the “Manage Communication” magnifying glass icon to open a communication.



The opened Secure Communication displays a header with the Secure Communication ID, the company name, and the subject. Below the header are the rows of comments and documents in reverse chronological order, showing the date, saved by user name, the comment, and the document.

To add a new row of content at the top, click on the +Add Document/Comment button.

Monitoring Analytics MIRA Member Information Reporting Application

Example Company Secure Communication Example User

Main Menu Administration Reporting Reports Sign Out

Back + Add Document/Comment

Communication ID	Company	Subject
001117	Example Company	Example Secure Communication 1

Saved Date	Saved By	Comment	Document	Actions
11/22/2019 10:28	example@user.cor	Here is the data you requested. Please see worksheet 3, cell B7 though G55 for the data you have requested.	Test.xlsx	Download
11/22/2019 10:20	example@admin.c	Please find attached a Test document for your review. Please respond before December 15.	Test Test.docx	Download

Monitoring Analytics Developed and Hosted by Monitoring Analytics, LLC ©2019 version 3.0.35 Confidential

Clicking on the +Add Document/Comment button will present a dialogue box which allows the user to add a document, add a comment, and save a new row to the Secure Communication.

Add Document/Comment to Communication for Example Secure Communication 1

+ Upload

Add a comment

1000 characters remaining.

Save Cancel

7.5 Locked Secure Communication

When the market participant and Monitoring Analytics are no longer adding material to the Secure Communication, a MIRA administrator may lock the Secure Communication. A locked Secure Communication will still be visible to those with access, but changes can no longer be made.

