BMFO User Guide

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General

1. Introduction

This document describes how to use the Bulk Meter Flow and Operations (BMFO) application version 1.2.4.

BMFO is a web-based application to record and analyze bulk meter readings, flow estimates and meter installations.

BMFO is available from *http://bmfo.sourceforge.net* It is free software released under the terms of the GNU General Public License (GPL).

The full BMFO source code is available and customizations are welcome.

BMFO user, administrators as well others interested in the BMFO application are the intended audience for this document.

This document is available in the following formats: HTML, PDF, HTML Help (CHM).

1.1. Requirements

In order to run the *BMFO* you need a web browser like *Firefox* or *Internet Explorer* and the address (URL) of a *BMFO* server. Contact your *BMFO* administrator if you need help.

As BMFO is a web-based application, no installation is required on the client side. However for small installations, client and server can reside on the same machine (standalone setup).

If you are running *BMFO* on a standalone system, you can start the *BMFO* application from the Start Menu or with a Shortcut on your Desktop.

A PDF viewer like Adobe Reader is required to view some of the reports.

Tip

If you have no BMFO installation available, contact the BMFO mailing list (`<bmfo-info@lists.sourceforge.net>`).

1.2. Quick Start

How to get started with an out of the box *BMFO* installation.

1. Open *BMFO* by clicking on the Desktop shortcut or by entering the URL *http://localhost/bmfo/* in the browser.

Note

The URL has to be adjusted if you are not working on the *BMFO* server.

2. Enter user name **`bmfo`** and password **`bmfo`** to log in.
3. Click on the Meter Selection link.
4. Select meter location *test*.
5. Click on the Meter Data Entry link.
6. Enter the Meter Reading **`1234`** and click on the Save button.

7. Congratulations! You've entered your first meter reading.

2. What's new?

A summary of changes in the different BMFO versions that are relevant to the users.

2.1. Versiono 1.2.4

Version 1.2.4 is a maintenance release with the following changes:

- New meter location report.
- The well production and summary well production reports only show meters where the `LifecycleStatus` is "Active".

2.2. Version 1.2.3

Version 1.2.3 is a maintenance release that adds the possibility to suppress empty pages in the well production reports.

2.3. Version 1.2.2

Version 1.2.2 is another maintenance release.

2.4. Version 1.2.1

Version 1.2.1 is another maintenance release.

2.5. Version 1.2.0

Version 1.2.0 is a maintenance and bug fix release that contains no new functionality that is visible to the users.

2.6. Version 1.1.0

The following changes in version 1.1.0 are relevant for the users:

- A new report was added: Water Balance.
- New meter types have been added.
- Several bugs have been fixed.
- Updated and improved documentation.

2.7. Version 1.0.8

Version 1.0.8 is a maintenance and bug fix release that also provides updated and improved documentation.

2.8. Version 1.0.7

Version 1.0.7 is a pure maintenance release that fixes installation problems.

2.9. Version 1.0.6

The following changes in version 1.0.6 are relevant to the users:

- The meter aggregation concept has been implemented (See Section 4.3).
- Partial access control is in place.
- The GMED Report has been added.
- Several bugs have been fixed.
- Revised and updated documentation.

3. User Interface

This section introduces important concepts of the *BMFO* user interface.

3.1. Navigation Elements

A consistent navigation structure guides through the application. Through the link in the bar at the top it is always possible to go back to the main menu (Section 1.2).

Logoff (Section 1.1) and help functions are available at the top of each page.

3.2. Languages

The *BMFO* application is fully internationalized. You can switch to the language of your choice at the top of the page.

To switch the language, do the following:

1. Select your language from the Language drop-down list.
2. Click on the Set button.

Additional languages can be easily added. If the language you are looking for is missing, please contact the *BMFO* developers.

3.3. Field Descriptions

The *BMFO* application helps you to fill in the forms correctly by providing an intuitive help: If you leave the mouse cursor without movement over a field, a help message will be displayed.

4. Concepts

Important *BMFO* concepts.

4.1. Units

Volumes are measured in cubic meters, flow rates in cubic meters per hour.

4.2. Terminology

- *Meter Clockover* - the event when a meter device reaches it's maximum count, clocks over and starts from 0 again. BMFO handles such events in order to provide correct volume calculations.
- *Meter Device* - a meter device that can be installed at a meter location or be stored in the warehouse. The meter device performs the actual measurement.
- *Meter Location* - the location where a meter device is installed. *BMFO* focuses on the meter location, water balances are based on water locations.
- *Unknown Meter* - a dummy meter device that is used if no identification of the installed meter is available. Unlike other meters, the unknown meter can be installed in different location at the same time.

4.3. Aggregation

Some BMFO reports allow to aggregate (sum up) meter readings. Currently the WIS export file (Section 5.3.1 and summary well production report (Section 5.1.2) support aggregation.

Use the meter properties page (Section 2.7) to edit the Aggregation field of a meter.

Example: If you would like to aggregate the two readings of meters A-1 and A-2 for well A, you should structure your data like this:

For meter A-1, use FacilityID A-1 and Aggregation A
For meter A-2, use FacililtyID A-2 and Aggregation A

4.4. Access Control

BMFO offers access control for data from different operational areas.

Contact your administrator if you are lacking access to data you have to work with.

4.5. Date/Time Format

BMFO expects timestamps formatted according to ISO standard: Date as defined in ISO 8601standard: YYYY-MM-DD HH:mm

For example:

Example 1. Date Format

```
2005-02-24
```

4.6. Pager Navigation

Where database queries return too many results to display on the screen, BMFO will offer a pager navigation that allows to browse through all the records. This concept is used for example in the meter history (Section 4.1) page.

A pager looks like the following:

```
Displaying [11  - 20 ] of 22
<< Back 1  2  3  Next >>
```

The number of the first displayed record.
The number of the last displayed record.
The total number of records than can be displayed using the pager.
A link to go to the previous set of records.
A link to go to the first set of records.
A text indicating that the second set of records is displayed.
A link to go to the third set of records.
A link to go to the next set of records.

4.7. Mailing Lists

Mailing lists are automated distribution systems for emails.

The majority of the software products mentioned in this document offer a multitude of mailing lists to keep users and administrators updates about the latest releases as well as potential security issues.

Tip

If you are not familiar with mailing lists yet, take the time to familiarize with the techniques to subscribe and to post to them.

5. Data Quality

Rigorous quality control is possible through review of the flow graphs that are displayed after each data entry (See Section 4.2). This system aggregates meter readings and estimates to bar charts that make data entry errors obvious. This system is much more powerful than simple upper/lower threshold values.

Furthermore, an email notification system can be used to notify the responsible managers if data is changed a later stage. See the administration guide for details.

Reference

1. Navigation Pages

Core navigation pages of *BMFO*.

1.1. Logon

On the logon page you have to enter your username and password in the respective fields.

Username and password should have been provided by your *BMFO* administrator.

the defult username should be bmfo

The Logon page is the page through which users enter the BMFO application. After successfull logon, the main page (Section 1.2) is opened.

Caution

Make sure that you are not using the default user name and password ("bmfo", "bmfo" because is poses a security risk.

1.2. Main page

The Bulk Meter Flow and Operations page contains the main menu of the *BMFO* application.

This page can be reached through the Logon page (Section 1.1) and by clicking on the Bulk Meter Flow and Operations link at the top of every *BMFO* page.

The following *BMFO* functions can be reached from here through links:

- Meter Selection - Select meter location by operational area, navigate to meter location related functionality (Section 1.3).
- Data Collection Field Forms - the form to collect meter readings for reference and printout (Section 6.1).
- Reports - allows to select from the available *BMFO* reports (Reports).
- SCADA Data Loader - allows to load SCADA data. Not implemented yet (Section 6.2).
- Meter Warehouse - everything related to meter devices (Section 2.5).
- About BMFO - copyright information for BMFO and related software packages (Section 6.3).

1.3. Meter Selection

Select a meter location and navigate to functionality related to this location.

This page can be reached through the main page (Section 1.2).

1.3.1. Select a Meter Location

To select a meter location, do the following:

1. Select the operational area of the meter location in the Operational Area drop-down list.

2. Click Select.

3. Select the meter location in the Meter Location drop-down list.

4. Click Select.

Once a meter location is selected, additional links and information related to this location will be displayed below.

1.3.2. Meter Information

If a meter device is installed at the selected location, the serial number of the device will be displayed as a link. Click on the link to see detailed information on the meter device (Section 2.5.1).

- Meter Data Entry - enter meter readings for the selected location (Section 2.1).
- Estimation Data Entry - enter flow estimates for the selected location if meter readings are unavailable or incorrect (Section 2.3).
- Meter Reading History - view all readings, estimates and installations for the selected location (Section 4.1).
- Meter Installation - install a meter device from the warehouse at the selected location (Section 2.6).
- Meter Graph - display a flowrate graph for the selected location (Section 4.2).
- Well Production Report - comprehensive report for the selected location. Available only for source meters (Section 5.1.3).

2. Data Entry

Data entry pages in *BMFO*.

2.1. Meter Data Entry

Enter meter readings for a selected meter location.

This page can be reached through the meter selection (Section 1.3).

- Meter Location This field shows you the meter location for the selected location to make sure that you select the right location you want,also you can click it to return back to the previous page.
- Location Description This field shows you the description for the selected location.
- Status Select the meter status from this select box.
- Reading Date Fill this field with correct date and time for the reading you are going to insert and time format you will see at when the meter was read first when you open the page.
- Meter reading This field allows you to insert the reading for the selected location.
- Estimate here you can insert the estimate reading for the selected location if there is estimate value for this location.
- Save After you insert the required information click this button to save it in the database .

2.2. Meter Data Validation

The meter data will be validated after data entry (Section 2.1) and correction (Section 3.1). This page cannot be reached directly

Validation problems will be displayed, allowing correction.

2.3. Estimation Data Entry

This page allows to make estimates. At least three meter readings have to be entered before an estimate can be made. This limitation exists because the estimate is checked against a previous period, the *reference period*.

2.3.1. Estimation and Reference Period

Estimations can only be made for periods of time.

The *estimation period* is the period in which the *estimated volume* is passing the meter location.

The date and time values offered in the select boxes on this page refer to previously entered meter readings.

- Reference Period Start Select the date and time of the reference period begin from this select box. This information is used to establish an estimate from the reference period data.
- Reference Period End Select the date and time of the reference period end from this select box.
- Reference Period Operation Days In this field you have to insert the operation days within the previous period you selected.
- Estimation Period Start This select box allows you to select the date and time for the estimation period.
- Estimation Period End This select box allows you to select the date and time for the estimation period to close the estimation period.
- Estimation Period Operation Days In this field you have to insert the operation days within the estimation period.

2.3.2. Validation

Estimate Production

Now after you submit the form you will see another screen which shows you :

- Estimation For Meter Location return back to the Meter selection page.
- Estimate from Shows you the estimation period selected.
- Reference Period From Shows you the reference period.
- Computer Estimated Production Shows you the computer estimated production which you can select to save by click save button below it.
- User Estimated Production Shows you the user estimated production which you can change it or insert a new one in this field then if you want to save this value just click the save button bellow to it.

2.4. Meter Clockover

Decide whether a meter has clocked over and started from 0 again otherwise negative flow.

2.5. Meter Warehouse

The meter warehouse gives an overview over all meter devices registered with the BMFO application.

This page can be reached from Section 1.2.

2.5.1. Meter Device Query

Displays information about a meter device.

This page can be reached from the meter warehouse page (Section 2.5 and from the meter selection page (Section 1.3).

2.6. Meter Installation

Install a meter device from the warehouse to a meter location.

This page can be reached from Section 1.3.

- Meter Location This field shows you the selected location to make sure that its the one you select and you can also click it to return back to the previous page.
- Location Description This field shows you the description for the selected location.
- Installation Date This field shows you for the first time the date and time format which you can change as you want.

Now after you adjust the date and time you have to click the submit button to see the next screen.

On this screen you will be able to install a new meter or replace the installed one with new one:

- Meter Location Shows you the meter location as a link.
- Installation Date Shows you the date and the time which you insert to install the new meter.

The Existing Installation Inform you that the following fields related to this label.

- Serial Number shows you the serial number of the existing meter as a link, which you can click it to see the information about this meter and enable you to change this information.
- Status This list box shows you the meter status of existing meter.
- Meter Reading Here you will insert the meter reading before replacement.

The New Installation inform you that the following fields related to this label.

- Serial Number This field where you can insert the new meter serial number you want to install.
- Status This list box allows you to select the meter status for the new meter you want to install.
- Meter Reading This field where you can insert the reading for the new meter.
- Install Meter This button which you have to click when you finish filling the previous fields to save it in our database.

The following pages are accessible from here:

- Meter Warehouse Report Click this link to see all the inforamtion about the warehouse (Section 5.2.2).
- Meter Installation Report Click this link to see all the information about the installation (Section 5.2.3).

Note

When reparing a meter, the meter should be removed and the unknown meter be installed. At least 1 minute difference should be between the removal and the reinstallation.

This approach is required if changes to the meter internals cause an offset in the meter readings while the serial number of the meter stays the same.

2.7. Meter Properties

View and edit properties of a meter location.

This page can be reached from Section 1.3 after a meter location has been selected.

3. Data Correction

Data corrections are automatically sent by email to the database administrator and manager for review.

3.1. Meter Data Correction

Correct errors in the meter reading data.

3.2. Estimation Data Correction

Correct errors in the estimation data.

4. Data Analysis

BMFO data analysis functions

4.1. Meter History

This page shows you all the information related to selected meter location also you can do many functions from this page:

- Meter Location This field shows you the meter location for the selected location to make sure that you select the right location you want,also you can click it to return back to the previous page.
- Location Description This field shows you the description for the selected location.
- Readings link By default you will see the screen related to this link , this screen display all the readings data for the selected meter location.
- Estimates link You can click this link to see the estimates data for the selected meter location.
- Installations link You can click this link to see the installations data for the selected location.
- Edit link You can see this link in each record displayed on the screen , and you can use it to edit any information in the record you clicked the link from.
- Delete link You can see this link in each record displayed on the screen , and you can use it to delete the record you clicked the link from .

- Back link When you click any link to see the data related to it the screen will shows you ten records at a time , so we add this link to allows you to explore all the exists record related to the selected meter location.
- Next link Also this link allows you to explore all the exists record related to the selected meter location. .
- Numbers link You can see how many screen you have to explore all the records , So we add these links to allows you select any screen number you want.

4.2. Meter Graph

On this page you will see the the flow for the selected meter:

- The flow This flow shows you the measured and the estimated reading within the period you want to see.
- Measured you will see the measured reading with green color.
- Estimated you will see the estimated reading with pink color.
- The X coordinate shows you the time period for the the selected meter flow.
- the Y coordinate shows you the reading in cubic meter per hour.
- The greater than buttom
- The less than button
- The + button
- The - button
- The two date fields
- The link

4.3. Volume Query

This page allows you to see the volume information of the selected meter.

- Meter Location Shows you the selected meter location as a link to allow you return back to the selection meter page.
- Period Start This field allows you amend or insert the start date you want with the date format you see at the first time you open the page.
- Period End This filed allows you amend or insert the end date with the same date format .

Now click the Query button to see the query information:

- Period From Shows you the period you insert to run the query.
- Measured Volume Shows you the measured volume for the selected meter within the inserted period.
- Estimated Volume Shows you the Estimated volume for the selected meter within the inserted period.
- Total Shows you the total value of the measured and the estimated values for the selected meter.

5. Reports

Allows to select different reports.

This page can be reached from Section 1.2.

5.1. PDF Reports

PDF which you need the Adobe Reader to create it

5.1.1. Summary Meter Report

Summary information of all measured and estimated volumes for a given period of time. Results are grouped by the operational area.

This page can be reached through Reports.

You can create this report simply when you click the Summary Meter Report link from the reports page,then you will see the related page of this report, here you will insert the date period you want to create the report within it,then simply click the Generate Report button to start create the report, you will wait to see the `report.pdf`.

5.1.2. Summary Well Production Report

Summarizes the well production for a selectable time period.

Note

This report only includes meters where the *`Subtype`* is "Source Meter" and the *`LifecycleStatus`* is "Active".

This page can be reached through Reports.

5.1.3. Well Production Report

Detailed information on well production and meter readings for a selectable time period. Includes a graph of the production.

The report can be generated for an individual well or all wells in an administrative area.

If the option "Suppress Wells Without Readings" is selected, pages for the wells that do not have operation records after the report start date will be omitted.

Note

This report only includes meters where the *`Subtype`* is "Source Meter" and the *`LifecycleStatus`* is "Active".

This page can be reached through Reports.

5.1.4. Meter Report

The meter report page allows to create a detailed PDF report, one page per meter, including graph.

5.2. HTML Reports

HTML which you just need the browser to create it.

- Meter Warehouse Report click this link to create the report.
- Meter Installation Report click this link to create the report.
- Reading Frequency Report click this link to create the report.
- Meter Warehouse Report click this link to create the report.
- Meter Location Report - A report listing all meter locations including administrative and operational areas (See Section 5.2.4).

5.2.1. Missing Readings Report

Report that lists all meters for which readings a missing in a given month.

This page can be reached through Reports.

5.2.2. Meter Warehouse Report

The meter warehouse report gives an overview over the currently registered meters

This page can be reached through Reports.

5.2.3. Meter Installation Report

This page lists all meters that are currently installed.

This page can be reached through Reports.

5.2.4. Meter Location Report

This page lists all meter locations including their administrative and operational areas.

This page can be reached through Reports.

5.2.5. Reading Frequency Report

The reading frequency report shows how often a meters in an operational area have been read during a time period.

This page can be reached through Reports.

This report can be used to find out for which meters the readings are still missing.

5.2.6. Consistency Report

This page can be reached through Reports

This report highlights inconsistencies in the database that might affect the volume calculations.

If the report indicates missing initial installations, you should insert a meter installation either through the application (see Section 2.6). You can also have your BMFO administrator add the installation record on the database level.

5.3. SQL Reports

SQL which you just need the browser to create it.

- WIS Export File click this link to create the report.

5.3.1. WIS Export File

The WIS export file is a SQL script that is used to transfer BMFO data to the Ministry of Water and Irrigation.

This page can be reached through Reports.

Tip

Your administrator can use the `wis2bmfo.sql` script to generate meter locations, administrative areas and operational areas from WIS. See the BMFO Administration Guide for details.

5.4. Excel Reports

Reports that can be opened in Excel for further processing.

5.4.1. GMED Report

A report in Excel format containing data that can be inserted to the GMED database.

5.4.2. Water Balance

A water balance according to IWA standards.

In order to generate the water balance, the user has to select the time period for which it should be generated. This can be either a month or an arbitrary time period.

Most of the data is generated by aggregating data of the individual meter types for each ROU. However, the following figures are calculated from other figures in the table:

- *System Input*: The sum of "Internal Production", "Import from Transmission", "Import from East Transmission", "Import from WAJ", "Import from Other Operational Area" and "Import from Private Source".
- *Billed Authorised Consumption*: The sum of "Billed Quantity", "Reductions", "Export to Transmission", "Export to East Transmission", "Export to Outside", "Export to Other Operational Area", "Irrigation" and "Tanker Filling".
- *Unbilled Authorised Consumption*: The sum of "Animal Feeding" and "Other Unbilled Authorised Consumption".
- *Authorised Consumption*: The sum of "Billed Authorised Consumption" and "Unbilled Authorised Consumption".
- *Water Losses*: The difference between "System Input" and "Authorised Consumption".
- *Non-Revenue Water*: The difference between "System Input" and "Billed Authorised Consumption".

6. Miscellaneous

Miscellaneous BMFO functions.

6.1. Data Collection Field Forms

Caution

Please install a *PDF* Viewer like *Adobe Reader* to open PDF files.

This page allows you to print the Data Collection Field Forms

When you click this link you will see the new page with PDF link

Click the PDF link to see the forms

- The NGWA Water Production Data Collection (WPDC) Sheet This form which we prepared to the users to print it and give it to the responsible person who will fill this form .
- The Water Production Estimation (WPE) Sheet This form which the responsible person will use to calculate the estimate value to fill it in the previous form .

6.2. SCADA Data Loader

Once implemented, the SCADA data loader will allow to load SCADA data e.g. from a tape drive.

This page can be reached from Section 1.2.

6.3. About Bulk Meter Flow and Operations

The about page displays the BMFO copyright information.

This page can be reached from Section 1.2.

7. Troubleshooting

This section shows ways to get support for *BMFO* problems.

7.1. BMFO Administrator

Contact your BMFO administrator if you have any problems.

7.2. BMFO Info Mailing List

The *BMFO* info mailing list may provide help to solve problems, either through the archives which are available under *http://sourceforge.net/mailarchive/forum.php?forum_id=32236*. or by sending an email to `<bmfo-info@lists.sourceforge.net>`.

7.3. Support Tracker

The bug and support trackers are available through the *BMFO* website, http://bmfo.sourceforge.net.

Caution

Please make sure that you look at all support requests, not only the open ones.

Frequently Asked Questions (FAQ)

1. BMFO is missing functionality I need. How can it be added?

You should contact the BMFO developers e.g. on the bmfo-devel mailing list: <bmfo-devel@lists.sourceforge.net>.

You can also file your requests in the RFE tracker which is publicly accessible through the BMFO website. You may also want to review the list of open RFEs and comment on them in order to raise their priority.

2. How can I get support for BMFO?

BMFO support is available in many different flavors. One option is the support tracker (See Section 7.3).

Commercial support for BMFO is available for example from DC Water and Environment.

3. Where can I find additional information about BMFO?

Additional information on BMFO is available in the other pieces of the BMFO documentation (Available through http://bmfo.sourceforge.net, any BMFO installation and the BMFO CD):

- BMFO Administration Guide
- BMFO Development Guide
- BMFO Data Model
- BMFO API Documentation

Additional information is available in the support tracker (See Section 7.3 and the archives of the bmfo-info and bmfo-devel mailing lists (See Section 7.2).

4. Our bulk meter readings are sensitive data. How is BMFO protecting them?

BMFO is offering an effective "defense in depth" system to protect the data integrity: Access control (See Section 4.4) is combined with the graphical review of data and email notifications for changes (See Section 5).

5. Data entry in BMFO is slow. Is there no way to speed it up?

Quality control and data integrity have been major design goals for the BMFO development. The graphical review is a key element for the quality control structure. If you feel that you can sacrifice data quality for data entry speed, please contact the BMFO developers on <bmfo-devel@lists.sourceforge.net> for a solution or file an RFE (See Section 1).

6. My SCADA system is recording the meter

readings. Why should I use BMFO?

SCADA systems typically focus on management and control of online data. They do not allow to add estimates for periods where metering equipment has failed or was not installed. They are also lacking the possibility to generate standard water balances.

7. I found a bug in BMFO. What should I do?

Please report any bugs in the BMFO bug tracker or write an email to <bmfo-devel@lists.sourceforge.net>.

Glossary

FAQ	Frequently Asked Questions
HTML	HyperText Markup Language.
IWA	The International Water Association. More information is available from www.iwahq.org.
NRW	Non-Revenue Water.
PDF	Portable Document Format.
RFE	Request for Enhancement
SCADA	Supervisory Control and Data Acquisition.
SQL	Structured Query Language.
WIS	Water Information System.

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