Report Writer Manual

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As part of our continuous product improvement policy, we are always pleased to receive your comments and suggestions about how we should develop our product range. We believe that the manual is an important part of the product and would welcome your feedback particularly relating to any omissions or inaccuracies you may discover.

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Contents

Section 1. **Introduction** 1

1.1. What Is Report Writer 1

1.2. Types of Report 2

1.2.1. Process Trend. 2

1.2.2. Baseline 3

1.2.3. Pump down 3

1.3. PC Requirements 4

1.3.1. Hard Disk 4

1.3.2. Memory (RAM) 4

1.3.3. Processor Speed 5

Section 2. **Report Creation** 7

2.1. Creating A New Report 7

2.2. Saving A Report 12

2.3. Closing Reports 12

2.4. Running Existing Reports 13

2.5. Modifying Existing Reports 13

2.6. Viewing Multiple Pages 13

Section 3. **Report Wizard** 15

3.1. Data Range Tab 15

3.1.1. Date and Time Range 15

3.1.2. Typical Data file 16

3.2. Data Grouping Tab 17

3.2.1. Group By 17

3.2.2. Show 1 in every 17

3.2.3. Number of 17
3.2.4. Data to include 17
3.2.5. Exclude scans for first 17
3.2.6. Exclude scans for last 18
3.2.7. Data Source 18
3.3. Data Series 18
3.3.1. Data invalid below 18
3.4. Appearance Tab 18
3.5. Automatic Tab 19

Section 4. **Report Scheduler** 21

4.1. Introducing Report Scheduler 21
4.2. Command Line Switch 21
4.3. Parameter Override 23
4.4. Parameter Descriptions 23
4.4.1. Chamber override 23
4.4.2. Time stamp .JPG, .HTM and .CSV output files. .. 24
4.4.3. Close ReportWriter. 24
4.5. Schedule File Example 24
4.6. Report Scheduling 25

Section 5. **Report Errors** 27

5.1. Report Generation Errors 27
5.2. Report Generation Warnings 29
Missing Event RGADataFileClose 29
5.3. Document Data 29

Errata and addenda

Section 1.
Introduction

1.1. What Is Report Writer

Report Writer is an application that will allow RGA data to be viewed in various summary formats. Process Eye 2000 with the ProcSECS add-in generates a database of the events received from the process tool via the SECS interface. It also logs Process eye events that occur as a result of events received from the Tool. Data events are stored in a database running on a Microsoft SQL server. This database contains all the indexing information required to correlate the data scans and summary information logged by Process Eye 2000 recipes to the specific events and conditions that prevailed on the Tool while the data was acquired.

Report Writer is designed to run in two ways. It can be run interactively where the user generates and views the results of reports on a PC running Report Writer. Generally Report Writer would be run in this way when you are starting to analyze a new process and attempting to select important control parameters that you will want to monitor routinely. You may also operate Report Writer in this mode if problems are found from reviewing routine reports and the data needs to be analyzed further. The second method is to get Report Writer to generate routine reports in HTML format and to view these reports with a web browser. Report Writer can be left running in the background producing reports according to a schedule. Normally reports would be scheduled to run at specific times and intervals. The reports can be scheduled so that output HTML files can automatically overwrite themselves or have a unique, time stamped, filenames which allows output files to accumulate. Using a combination of accumulating and overwriting, up to date summary information

can be available in some reports while others can contain historical data.

A “Report” is a file with a .rep extension that contains the information about how you would like to view the RGA data. It does not actually hold the Scan data itself but refers to a Database that has references to the RGA data files. This means that you need to have access to all the RGA data files and the database for the required data source, for the duration of the report. Reports are created using a Report Wizard that enables all relevant parameters for the various types of reports to be entered.

1.2. Types of Report

1.2.1. Process Trend.

This report displays data groups containing one or more data series from one data source.

On a Multi Headed installation each head is considered to be a Data Source. Normally Data Sources are identified by a meaningful name e.g. Chamber A or Degas etc. A report can display data from only one data source at a time. You could open multiple reports with identical parameters except for the data source and compare them visually.

The fundamental method for summarizing data is the Data Group. There are several criteria that can be used to specify the Data Groups. You can use an arbitrary time period, which may be useful in a continuous process. More specific criteria are Lots or Wafers. You can further qualify the data to be included in a Data Group by specifying whether to include just the data when the tool is processing a wafer or the data between wafers or the period following the last wafer in a lot. There is one final method for qualifying the Data Group. You can set a period at the start and end of the Data Group where scan data is excluded. This is very

useful where RGA data scans are not absolutely synchronized to the Tool events, it allows data scans spanning tool state transitions to be excluded allowing a much more meaningful high, low and average value to be calculated.

Within each Data Group you can select a number of Data Series. A data series refers to a specific Mass Number, Action Channel, Analog or Digital Input or to the Total Pressure. The Data Series can be summarized by three values, the maximum, minimum and average value. Data Groups are plotted along the X-Axis of the chart. At present all the Data Series for each Data Group are displayed at the same X-Axis position.

1.2.2. Baseline

The baseline report is similar to the Process Trend except that the Data groups are predefined to be Maximum value reported in each baseline period stored. Summary data is actually stored by the baseline recipe and at present only this data can be displayed on the baseline report. The raw data is stored in separate data files and records referencing these are stored in the baseline table.

1.2.3. Pump down

The pump down recipes store specific summary information about the time it took to complete the pump down and what the final pressure was actually achieved. A flag is also stored to indicate if the pump down was considered a “good” pump down or not. The pump down report has 3 charts associated with it. The first is a X-Y scatter diagram of all the pump downs completed in the specified period (good or bad) showing Pump down time verses End Pressure.

The second graph shows the pump down times for each pump down in the period specified. Good pump downs are shown as green bars and failed pump downs are shown in red. A

combination of the Date and Time can be used to label each bar along the X axis.

The third graph is a frequency plot of the successful pump down periods.

1.3. PC Requirements

The actual requirements of the PC you run ReportWriter on will vary depending how you use it. If you want to interactively create and view reports which span many Process Eye data files with many Data Groups and Data Series within those groups than you will want the most powerful PC you can get your hands on. If however you schedule your reports with more modest numbers of Data Groups and DataSeries than a lesser PC will do. Basically the PC Requirements depends on how long do you want to wait for your reports to be generated.

1.3.1. Hard Disk

Free Space requirements

The amount of disk space required to produce a report is about 30% of the size of the ASCII Data files that hold data for the report. Errors will occur if you run a report with insufficient disk space.

Speed requirements

Since ReportWriter potentially has to read enormous amounts of data from the hard drive, for best performance you should store the data on the fastest local drive available.

1.3.2. Memory (RAM)

ReportWriter can potentially use large amounts of memory to hold intermediate results used in creating the report. Adding memory will improve the performance of report writer if you are generating

reports over long periods of time with large numbers of Data Group and series.

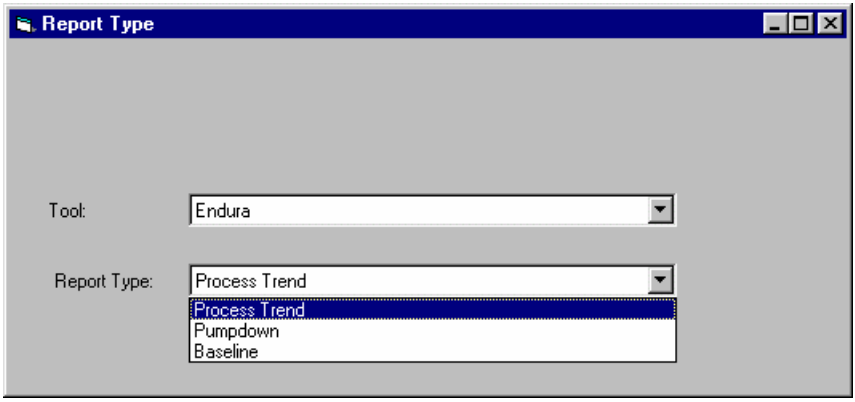
1.3.3. Processor Speed

ReportWriter is very processor intensive. Need I say any more?

Section 2.
Report Creation

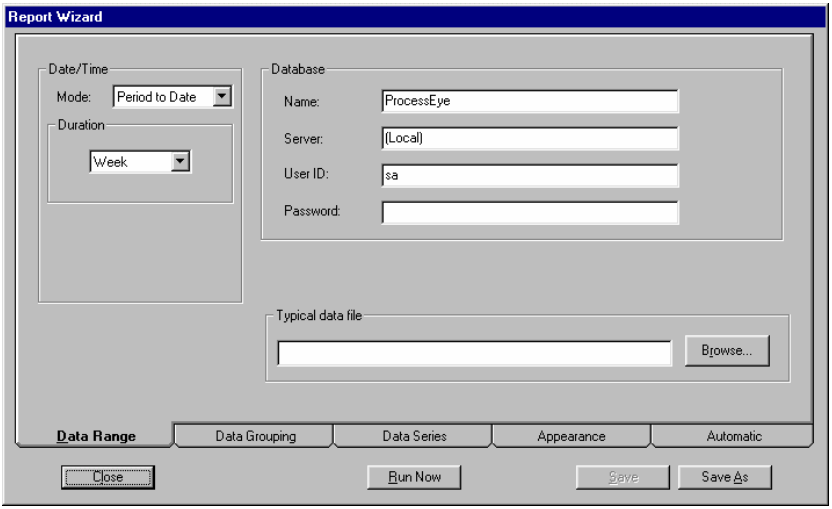
2.1. Creating A New Report

To create a new report select File | New from the menu bar. A new form will be displayed and the Report Type dialog box will be activated. The report Type dialog box with the Report Types available is shown below. For this application the only tool available is the Endura.



Select the report type you require and click the Ok button. The Report Wizard for the Report Type selected will then be displayed. The format of the Report Wizard will vary depending on the Report Type selected.

A typical report Wizard will be similar to that shown below.



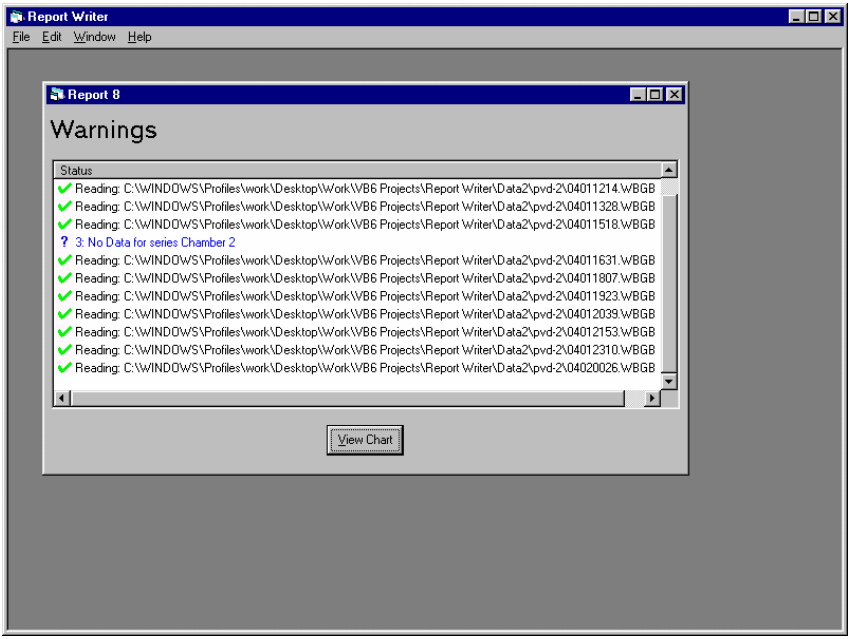
When all the parameters have been set on each Tab you can click the “Save As” button to save the contents of the wizard to a .rep file.
If you press “Close” the wizard will be closed. To view the results of the report press the “Run Now” button and the process of generating the report will begin.

The Report Wizard closes and the Report Window will indicate the report generation progress as shown below. The report generation could take anything from a few seconds to many 10’s of minutes depending on the quantity of data to process for the report. Items are added to the Status list as the report is generated. Clicking on the Cancel button can terminate the report generation process. This will be useful if you have made an error in Report Wizard and the report is taking much longer to generate than you expect. If you cancel the report generation you can edit the parameters in the Report Wizard and then regenerate the report.

Progress items in the list are identified by a green check mark.

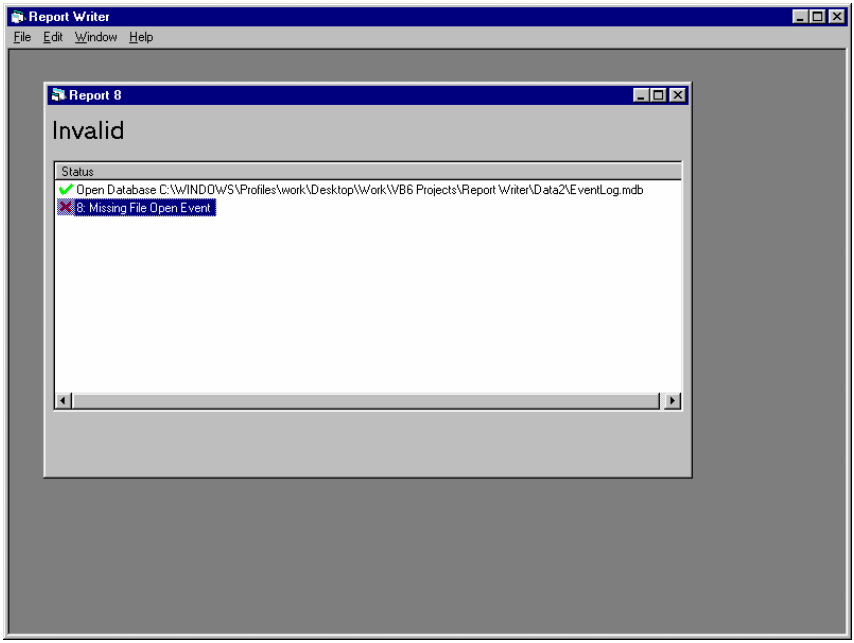
Sometimes warnings will be generated as the report generation progresses. These usually occur when some data is missing from the data files. It will be possible to view the report but some of the data requested will be missing. When a report has been generated but it contains warnings it will appear as shown below. You may click the View Chart button to see the results that are available.

A Blue Question Mark identifies warnings.

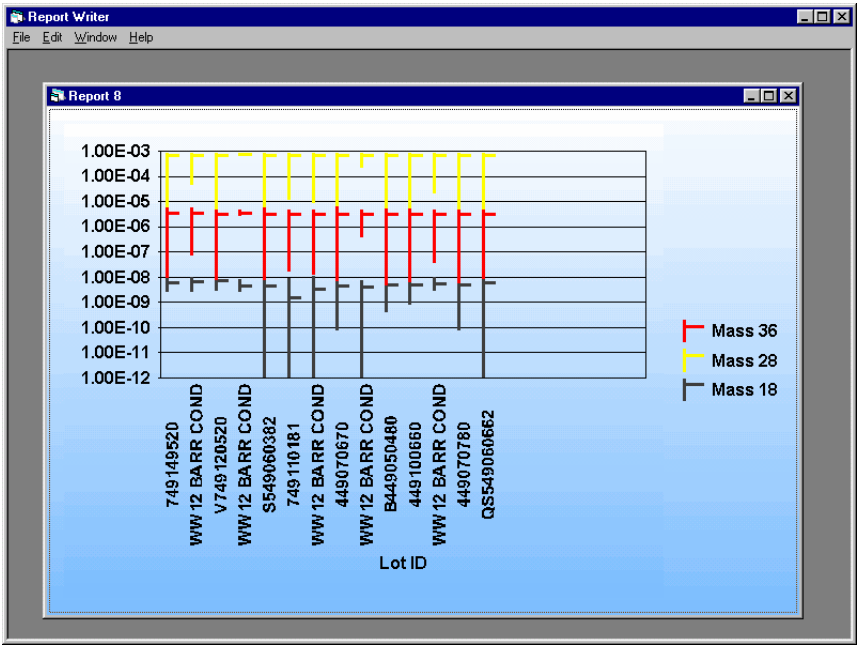


Errors may occur that prevents the Report Generation process. Sometimes the report generation may continue after an error is encountered so that the cause of several errors can be investigated and corrected rather than having to fix them one at a time. There are several errors that can occur that will terminate the Report Generation immediately. When these errors are corrected the Report can be Regenerated but other errors may still occur.

A Red Cross identifies errors.



If the Report Generation completes without any errors or warnings the report window will display the results in the appropriate format.



2.2. Saving A Report

You can use the File | Save as menu item to save a report to a given Path and Filename. If you use the File | Save menu item then the report will be saved using the reports default path and filename. See closing reports for more information about default settings.

2.3. Closing Reports

Reports can be closed by using the File | Close menu item or by clicking the Report Windows Close Button. If the program is closed then all the reports are closed.

If you have created a new report or have made changes to parameters in an existing report you will be asked if you want to save the changes when you close the report. If you closing a new

report then a default path and filename will have been generated. If you click OK the report will be saved using the default path and filename.

If you close an existing Report that you have altered the original path and filename will be used by default. If you wish to save the Report using a different path and/or filename you should click the cancel on the "Do you want to save…" dialog and use the File | Save As menu option.

2.4. Running Existing Reports

If you want to view an existing report then the File | Run Report menu item should be used. The report will be generated and the results displayed without entering the Report Writer Wizard.

2.5. Modifying Existing Reports

If you wish to modify an existing report or create a new report from an existing report then you should open the report. You can then use the Edit | Customize menu item to display the Report Wizard so that parameters can be modified. You can use the "Run Now" button on the Report Wizard to cause the report to be updated with the new parameter settings. You can Save the changes to a different .rep filename or location by using the "Save as" button.

2.6. Viewing Multiple Pages

In the report Wizard you can specify the maximum number of Data Groups you would like on the Report Window. If the actual number of Data Groups in the report exceed this then a status bar is displayed at the bottom of the Report Window that indicates the page you are currently viewing and the number of pages available.

You can move forward through the pages using the “>” button on the Status Panel or using the Edit | Next menu item. Use the “<” button or the Edit | Previous menu item to move backward.

In the pump down report each of the three charts are shown on a different page. Three icons are available on the Status panel to enable the required chart to be selected.

Section 3.
Report Wizard

3.1. Data Range Tab

Database Panel
All the controls required specifying the database to use are on this panel. The various parameters are described below.

Name.
This text box defines the Name of the database as it was attached to the SQL server. By default it will be called ProcessEye.

Server.
This text box will contain the name of the PC hosting the SQL server. Normally this will reside on the same, local, PC as ProcessEye and can be accessed using the text '(local)'. If the SQL Server is installed on another PC then the server name of that PC should be used.

UserID.
SQL server can be configured to limit access to certain users. At present no limits are imposed and the user must have system administrator access. They must use the 'sa' user to logon.

Password.
No password is currently used for the 'sa' user.

3.1.1. Date and Time Range

You can select the period of time to include in a report. There are several methods for selecting the time period to allow you to easily create reports that can be run at regular time periods or set absolute time periods if you are using Report Writer interactively.

Custom Dates allows you to specify an absolute start and end time and date.

Custom Period allows a start time and date to be specified and an absolute period of time e.g. Month, Week or Hour etc.

Period to date is useful when you want to run a report at regular periods e.g. a weekly report. The End Time and Date are taken from the real time clock when the report is opened and the Start Time is calculated by subtracting the period specified from the end time.

3.1.2. Typical Data file

The Process Eye 2000 data files have flexible internal format that allows data to be stored in Data Sets, Streams, Measurements and Channels. At present data files only contain one Data Set and One Stream that are called 'DataSet1' and 'Data' respectively. However there could be several Measurements within one file and each Measurements can have many channels assigned to it. The number of Measurements and Channels defined varies according to the Process Eye 2000 recipe running and how it was programmed to operate. This means that in the worst case each Process Eye Recipe could potentially have a unique data file structure. To make it easier to keep track of the all the Measurements and Channels a recipe can generate a typical data file can be selected that represents the structure of the data files that will be encountered by this report. When this typical file is specified the header information is read and the controls on the 'Data Series' tab are populated with the available Measurements and Channels. Once this file has been read it is possible to just pick the required items from the drop down lists on the 'Data Series' tab.

A report will fail in the future if it references a data file that no longer exists so care must be taken to ensure that the files specified

are not archived or deleted. If the file name is changed that any settings in the 'Data set' tab will be lost.

3.2. Data Grouping Tab

3.2.1. Group By

Select the require Data Grouping method from "Lot", "Wafer", "Time Period"

3.2.2. Show 1 in every

This only applies to Lot and Wafer Data Groups. It allows data from every n lots or n wafers to be displayed. It is useful if you want to look at a trend over a long period of time effectively letting you sample every nth. Wafer or lot.

3.2.3. Number of

This only applies to the time period Data Grouping. Here you set a time period as a number of Hours, Days, Weeks etc.

3.2.4. Data to include

The database holds information that can identify when the Tool runs a recipe on a specific chamber. Using this information the RGA data can be segregated into data acquired while the tool recipe is running and data acquired between tool recipes. You can select the data you wish to be included by selecting from the options: All Data, Processing Wafer, Change Wafer

3.2.5. Exclude scans for first

You can choose to ignore data acquired for a configurable number of seconds at the start of a tool recipe if you have selected "Processing Wafer" or the end of a tool recipe if you have selected Change Wafer. This allows you to filter out RGA data which span tool state transitions to give better results.

3.2.6. Exclude scans for last

This similar to the “Exclude scans for last” but works on the end of the period.

3.2.7. Data Source

The Data Source indicates which RGA head to use in a Multi Headed installation. Normally you select it by the Chamber Name.

3.3. Data Series

A list of the data series required will be created by using the Add, Insert and Delete buttons on this tab. Normally a typical data file will have been selected on the Data Range tab which will have populated the drop down list boxes for each of the four fields. To select the contents of each Data Series just click on the required items in the various list boxes. If a typical file was not specified then you can type in the text for the fields you require but you will need to know the names of all the Data Sets, Streams, Measurements and Channels you want to specify.

3.3.1. Data invalid below

Since the intensity of the RGA data can fall below the fundamental noise level of the instrument this parameter is provided so you can force any reading reported to be below the preset value to be automatically set to the preset value. This may prevent the y-Axis being extended to low levels which do not convey useful data.

3.4. Appearance Tab

Some of the parameters used to specify the report effect the fundamental data structures used to hold intermediate results. If these are changed then the report must be regenerated from the fundamental database and data file. Changing the Appearance parameters does not change the underling data structure they just effect the way the data is displayed.

Appearance parameters include Log/Lin Axis, Number of Data Groups to display on one page, Grid lines etc.

3.5. Automatic Tab

The parameters on the Automatic tab are only used when the Report is run from the command line. For information about the use of these parameters see the Report Scheduling section.

Section 4.
Report Scheduler

4.1. Introducing Report Scheduler

To run a schedule of routine reports a schedule file must be generated which includes references to all the report (.rep) files and any parameters to be overridden. It is possible to list the same report file many times but to set one or more parameters to different values so that a different report is generated. The most useful parameters to override are the Data Source (Chamber). This means a single report can be scheduled to run on multiple chambers.

When a report is opened using this option the functions listed in the "Automatic" settings section of the report file performed. This allows the Report to be printed or more usefully an HTML can be produced that can be viewed using a Web Browser. You also have the option to close the report file or Report Writer itself after the report has been generated. Note: Normally you should leave ReportWriter running and just close the report when running in this mode. You also have some options to select the paper orientation for the printout. You can use the current printer setting for the orientation or you can change it to either Portrait or Landscape. If you select Portrait or Landscape the orientation is changed for the duration of the printout and then restored to the original setting. This allows reports to be printed with a different orientation to your normal preference.

4.2. Command Line Switch

The schedule file must have the file extension SI-sch. To start the schedule ReportWriter is stared with the command line switch: /"*schedule filename*"

Where *schedule filename* is the full drive, path and filename to of the required .SI-sch file.

The Schedule file consists of one or more AddPeriodicReport commands described below:

```
AddPeriodicReport "ReportFilename", Period,
Optional "ScheduleTime", Optional
WhichOrdinal
```

Where:

ReportFilename	Any valid .rep filename (Fully qualified filename and extension)
Period	Frequency to run report. 3 = Day, 4 = Week, 5 = Month
ScheduleTime	Time of day schedule will run. Resolution = 1 Minute 'Default is 12:00 am
WhichOrdinal	Ordinal value within Period For Period = 4(Week) WhichOrdinal is day of week: 0 = Sunday to 7 = Saturday Default = 6 (Friaday) For Period = 5(Month) WhichOrdinal is day of month 1 - 31 or 0 = Last day, -1 day before last day etc. Default = 1 Note Report will not run in months if the Day of month specified dose not occur.

Note: The report will run with 1 minute of the PC clock reaching the scheduled time for the report. If more that one report is scheduled to run at the same time they will be queued up and run in the order in which they were scheduled. If the reports use the current time as one of the time parameters, the time when the report was scheduled to run will be used rather than the actual time when the report did finally get run. This should keep all the time spans for the reports correct.

4.3. Parameter Override

Commands can be added after a AddPeriodicReport command to override parameter that relate to that report. Any parameter available in the report file (.REP) can be used here. The full list of parameters is fairly extensive and most of them will not be overridden I the schedule file. Some of the more useful parameters are listed below. To determine the setting of other parameters you can generate a .rep file using the Report Writer Wizard and then examine the contents of the .rep file with a text editor.

Each report type has it's own parameter header. The list of header used for the reports is shown below.
The parameter header is appended to the remainder of the parameter string listed in the individual parameter descriptions.

Report Type	Parameter Header
Process Trend	Report.Endura.ProcessTrend
Baseline	Report.Endura.Baseline
Pumpdown	Report.Endura.Pumpdown

4.4.Parameter Descriptions

4.4.1. Chamber override

Parameter	Values
.Group.DataSource	0 – Chamber A 1 – Chamber B 2 – Chamber C 3 – Chamber D

	4 – Chamber E 5 – Chamber F 6 – Chamber 1 7 – Chamber 2 8 – Chamber 3 9 – Chamber 4 10 – Chamber 5 11 – Buffer Chamber 12 – Transfer Chamber 13 – Load Lock A 14 – Load Lock B

4.4.2. Time stamp .JPG, .HTM and .CSV output files.

Parameter	Values
. Automatic.IncludeTimeDate	True Or False

The setting of this parameter allows some report output files to be kept for historical trends when the timestamp is included. Others may hold only the latest up to date information which gets overwritten each time a more up to date report is generated.

4.4.3. Close ReportWriter.

Parameter	Values
. Automatic. CloseApp	True Or False

Note: It is a good idea to include this parameter set to False so that Report Writer dose not get closed inadvertently if the flag was set true in the .rep file.

4.5. Schedule File Example

ReportSchedule.AddPeriodicReport "c:\My Documents\Report 1.rep", 3, "11:55pm"

```
ReportSchedule.AddPeriodicReport "c:\My Documents\Report
1.rep", 3, "11:55pm"
Report.Endura.ProcessTrend.Group.DataSource = 6
ReportSchedule.AddPeriodicReport "c:\My Documents\Report
2.rep", 4
```

In this example Report 1.rep is scheduled to run daily at 11:55pm and dose not override any parameters specified in the .rep file. Report 1.rep is also scheduled to run daily at 11.55pm but it will override the Data Source and use Chamber 1 instead of the default value held in the .rep file. Report 2.rep will run weekly at 12.00am on a Friday. 12.00am and Friday are the default values for the AddPeriodicReport command.

4.6. Report Scheduling

To help the automatic and routine generation of reports you can use command line switches to open a specific report. If this is done from a scheduler application e.g. the Windows 98 Scheduler, you can automatically open and print reports regularly. The command line switch option to open a report is:-
/"*Filename*" where *filename* is the fully qualified report filename.
Errors and Warnings Messages

Section 5.
Report Errors

5.1. Report Generation Errors

X	Description
1	**No data groups for current criteria** No data groups were found in the database for the current report criteria. RGA may have been inactive or no RGA data logged for the period specified.
2	**The database file *full qualified filename* does not exist** This report may be valid when run on another computer which has the relevant RGA database (and data) or when the relevant files are copied to the computer generating he error.
3	**No data series have been selected for this report.** Use the report wizard to select Chambers and Data series.
4	**No data groups have been found using your selection criteria.** Check Start and end times and settings on the Data Grouping Tab.
5	**More than 2 billion data groups have been found using your selection criteria.** Check Start and end times and settings on the Data Grouping Tab.
6	**Too many pages.** There is a maximum limit of 32767 pages. Increase the 'Number of Groupings/Page' or decrease the number of groups.

7	**Missing one or more File Close and Open Events** This error should never occur! A RGADataFileClose event for the last RGADataFileOpen was not logged AND another RGADataFileClose event was logged before its RGADataFileOpen Event. Possible Cause: Errors in RGA Process, Database corruption

8	**Missing File Open Event.** This error should never occur! A RGADataFileClose event was logged without a corresponding RGADataFileOpen. Note: The RGADataFileOpen for first data file is assumed to exist if the start time for the report period occurs after the time when the RGADataFileOpen was logged. Possible Cause: Errors in RGA Process, Database corruption
9	**Missing Data File *DataFilename*** The data file specified is required to produce the report cannot be found. Copy this file to correct location or change Criteria in the Report Wizard to avoid this file.
10	**Aborted by user**
11	**Error reading *Data Filename*** The data file could not be read

5.2. Report Generation Warnings

?	Description
1	**Missing Event RGADataFileClose** A RGADataFileClose event is missing for a file that had a RGADataFileOpen Event. This could occur if RGA process was abnormally shutdown and may have resulted in loss of data.
2	**No Data files for source *Source***
3	**No Data for Series *series title*** The data files do not contain data for the requested series.

5.3. Document Data

Title: Report Writer Help Manual
Source: DellIt D:\HelpMans\RepWrite
Original: Revision 1.00 30 Oct. 2000
Current: Revision 1.00 30 Oct. 2000

History
Rev 1.00 30 Oct. 2000

Index

A

Appearance Tab 30
Automatic Tab 30

C

Closing Reports 24
Command Line Switch 32
Creating A New Report 15

D

Data Grouping Tab 28
Data Range Tab 26
Data Series 29
Document Data 38

G

Getting Help 3

I

Introducing Report Scheduler 31

M

Modifying Existing Reports 25

P

Parameter Descriptions 34
Parameter Override 33
PC Requirements 14

R

Report Generation Errors 36
Report Generation Warnings 37
Report Scheduling 35

Running Existing Reports 24

S

Saving A Report 23
Schedule File Example 35

T

Types of Report 12

U

Using the Help Manual 6

V

Viewing Existing Reports 25

W

Welcome 3
What Is Report Writer 11