Alarm Help

This document provides instruction for using the Alarm Help feature in the DeltaV™ process control system.

Increase Operator alarm response effectiveness with instant access to in-context alarm help,eliminating dependency on pape documentation or off-line systems that require manual searches, may be out-of-date or are just unavailable.

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Introduction

This document provides general instruction for setting up Alarm Help in the DeltaV process control system. The Alarm Help system is a key tool for helping operators respond quicker and more accurately, particularly when presented with an unfamiliar alarm or multiple alarms.

Many readers will be familiar with ISA-18.2 – Management of Alarm Systems for the Process Industries1. This standard sets forth a lifecycle model for managing alarms and the overall alarm system. Creating an alarm philosophy document, which defines the principles and processes to be used for the design, implementation, operation and maintenance for the alarm system, is one of the first steps in creating an effective alarm management program. The DeltaV system can be easily configured to reflect aspects of the site's alarm philosophy, such as priority levels to be used, categorization of alarms for operational and change management, Operator response time expectations and many others.

DeltaV Alarm Help provides immediate in-context access to alarm information gathered in the identification, rationalization and design phases of the lifecycle. Industry standards (such as ISA-18.2) and guidelines (EEMUA191 – Alarm Systems2) recommend that key information documented during rationalization (such as cause, consequence, time to respond and corrective action) be made available to the Operator to improve their ability to diagnose and respond to abnormal situations. The goal of this document is to prepare the reader to configure the DeltaV system and its Alarm Help features to maximum advantage when pursuing compliance with ISA-18.2, or when just wanting to optimize the Operator's ability to respond quickly and correctly to alarms.

DeltaV Alarm Help was introduced in DeltaV V11, and may be configured and maintained in the engineering environment with a basic ProfessionalPlus Workstation license. Operator access to Alarm Help via DeltaV Live or DeltaV Operate requires a separate Operator Workstation license. For details see the DeltaV Alarm Help product datasheet.

For more information about other DeltaV system features and options that support an enhanced alarm system management program, refer to the whitepapers *DeltaV Alarm Management and DeltaV Alarm Sounds.*

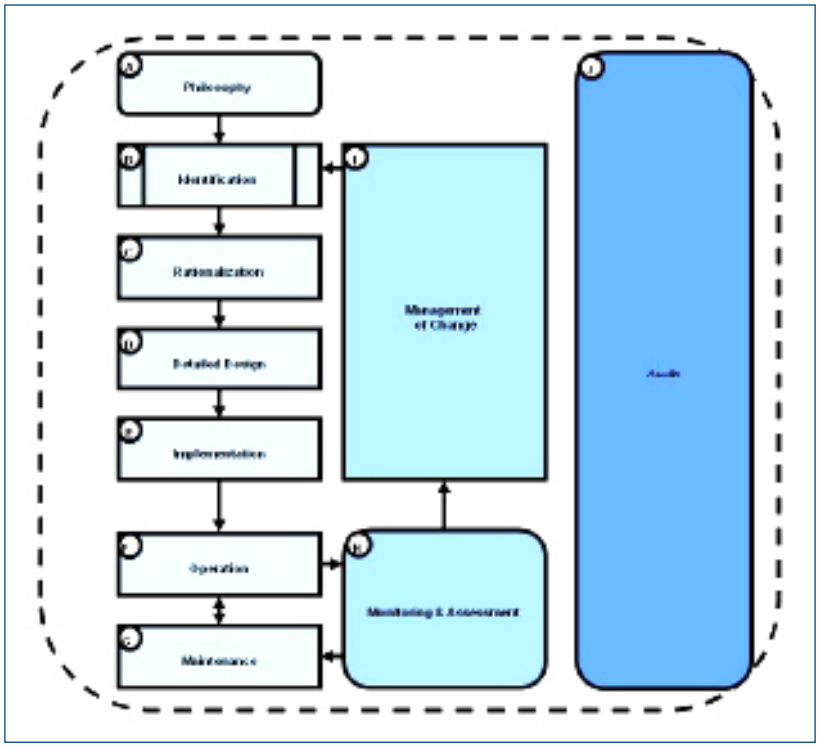


Figure 1 *ISA-18.2 Alarm System Lifecycle Model.*

Note 1: ANSI/ISA–18.2–2009 Management of Alarm Systems for the Process Industries (ISBN: 978-1-936007-19-6).
Note 2: EEMUA Publication 191 Alarm Systems, A Guide to Design, Management and Procurement, Second Edition (ISBN: 0 85931 155 4).

ISA-18.2 Lifecycle Stages

This section provides a very brief description of the ten alarm lifecycle stages defined in ISA-18.2, providing useful background for understanding the rationale behind DeltaV Alarm Help.

- **Philosophy** – The usual starting point in the alarm lifecycle is the development of an alarm philosophy. The philosophy provides guidance for all of the other lifecycle stages. It includes key definitions like the definition of an alarm, which by itself is a critical element to alarm management. It takes into account the alarm handling capabilities of the control system and other site specific considerations. The philosophy ensures the processes for other lifecycle stages are planned and documented.
- **Identification** – The identification stage of the alarm lifecycle includes activities like P&ID reviews, process hazard reviews, layer of protection analysis and environmental permits that identify potential alarms. ISA-18.2 does not prescribe requirements for alarm identification methods. These methods are already well documented. To ensure that the results are useful as an input to the alarm rationalization stage, it is helpful to document the cause, potential consequence, and the time to respond for each identified alarm.
- **Rationalization** – In the rationalization stage each potential alarm is tested against the criteria documented in the alarm philosophy to justify that it meets the requirements of being an alarm. The consequence, response time, and Operator action are documented. Alarms are analyzed to define their attributes (such as limit, priority, classification, and type). Alarm priority should be set based on the severity of the consequences and the time to respond. Classification identifies groups of alarms with similar characteristics (e.g. environmental or safety) and common requirements for training, testing, documentation, or data retention. The results of the rationalization are documented in a Master Alarm Database.
- **Detailed Design** – In the detailed design stage of the alarm lifecycle, an alarm is designed to meet the requirements documented in the alarm philosophy and the rationalization. Poor design and configuration practices are a leading cause of alarm management issues. Alarm design includes the basic alarm design, setting parameters like the alarm deadband or off-delay time, advanced alarm design, like using process or equipment state to automatically suppress an alarm, and HMI design, displaying the alarm to the Operator so that they can effectively detect, diagnose, and respond to it. During the detailed design phase, the information contained in the Master Alarm Database (such as alarm limit and priority) is used to configure the system.
- **Implementation** – The implementation stage of the alarm lifecycle addresses putting the alarms into operation. It includes the activities of training, testing, and commissioning. Testing and training are ongoing activities, particularly as new instrumentation and alarms are added to the system over time or process designs changes are made.
- **Operation** – During the operation stage of the alarm lifecycle, an alarm performs its function of notifying the Operator of the presence of an abnormal situation. Key activities in this stage include exercising the tools the Operator may use to deal with alarms, including shelving (suppression in DeltaV terminology) and mechanisms for Operator access to information fleshed out during rationalization such as an alarm's cause, potential consequence, corrective action, and the time to respond.
- **Maintenance** – The process of placing an alarm out-of-service transitions the alarm from the operation stage to the maintenance stage. In the maintenance stage the alarm does not perform its function of indicating the need for the Operator to take action. The standard describes the recommended elements of the procedure to remove an alarm from service and return an alarm to service. The state of out-of-service is not a function of the process equipment, but describes an administrative process of suppressing (bypassing) an alarm using a permit system.
- **Monitoring and Assessment** – Monitoring and assessment of the alarm system is a separate stage of the alarm lifecycle because it encompasses data gathered from the operation and maintenance stages. Assessment is the comparison of the alarm system performance against the stated performance goals in the philosophy. One of the key metrics is the rate alarms are presented to the Operator. In order to provide adequate time to respond effectively, an Operator should be presented with no more than one to two alarms every ten minutes. A key activity during this stage is identifying "nuisance" alarms - which are alarms that annunciate excessively, unnecessarily, or do not return to normal after the correct response is taken (e.g., chattering, fleeting, or stale alarms).

- **Management of Change** – The management of change stage of the alarm lifecycle includes the activity of authorization for all changes to the alarm system, including the addition of alarms, changes to alarms, and the deletion of alarms. Once the change is approved, the modified alarm is treated as identified and processed through the stages of rationalization, detailed design and implementation again. Documentation like the Master Alarm Database is updated and the operators are trained on all changes since they must take the actions.
- **Audit** – The audit stage of the alarm lifecycle is primarily focused on the periodic review of the work processes and performance of the alarm system. The goal is to maintain the integrity of the alarm system throughout its lifecycle and to identify areas of improvement. The alarm philosophy document may need to be modified to reflect any changes resulting from the audit process.

Alarm Definition and Rationalization

The definition of an 'alarm' is of central importance, and while site alarm philosophy documents may vary, the typical distinction relates to normality of the initiating event and the expectation of an Operator response. Figure 2 is a common segmentation of alarms vs. non alarms.

Notification Type	Condition	Action Required By	Example
Alarm	Arises from an abnormal process or equipment situation	Operator	High Temperature in Reactor. Operator must start flow of coolant in jacket
Alert	Arises from an abnormal process or equipment situation	Maintenance	Plant Web Alerts, Device Alerts (Smart Transmitter out of Calibration, Valve stiction detected)
Prompt	Arises from a normal situation	Operator	A sequence is paused waiting for the Operator to add material and confirm
Status / Message	Arises from a normal situation	None – Informative Only	A phase has completed in a batch recipe

Figure 2 *Typical Operator notification distinctions in a site alarm philosophy.*

The rationalization process is where all of the potential Operator notifications gathered in the identification process are systematically evaluated to determine notification type. A wealth of useful information is gathered in the rationalization process, to be used in the design and prioritization of those notifications deemed to be an alarm.

- What is the consequence of the Operator not taking the action?
- How much time is available for the Operator to take the expected action?
- What is the probable cause, i.e. abnormal condition(s), the alarm is designed to detect?
- What is the expected Operator action to verify and correct the condition?
- How to classify the alarm for appropriate change management, shelving restrictions, training and testing?

Clearly the answers to these questions represent highly valuable information for the Operator, training for or responding to an actual alarm. In fact making this information available to an Operator is a key recommendation of ISA-18.2 and EEMUA-191. DeltaV Alarm Help provides highly reliable access to this information, in-context to eliminate any lost time accessing and locating it in a paper or non-integrated system.

Alarm Priority

Before delving into Alarm Help it is useful to review the DeltaV system's basic features for defining alarm priorities and how they relate to the site alarm philosophy.

In the DeltaV system, alarm priority is represented by a numeric value from 3 through 15, where 15 is the highest possible level of criticality. Numeric values 0 – 2 are unused, artifacts from early releases of the DeltaV system. Priority 3 is by definition a LOG only classification. The event is recorded in the Event Chronicle, but without Operator annunciation or presentation in any alarm lists or process graphics… essentially a non-alarm.

The site alarm philosophy specifies the number of alarm levels to be used, typically three or four as recommended by ISA-18.2 and EEMUA-191. By default the DeltaV system has three alarm levels: Advisory (7), Warning (11) and Critical (15).

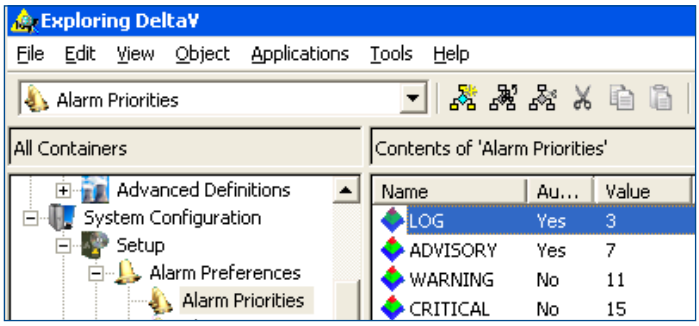


Figure 3 *Default alarm priority names and numeric values.*

Alarm properties such as horn sound, alarm name, need for acknowledgement and alarm banner consolidation by module or process unit are defined for each priority. These behaviors are typically specified in the site alarm philosophy.

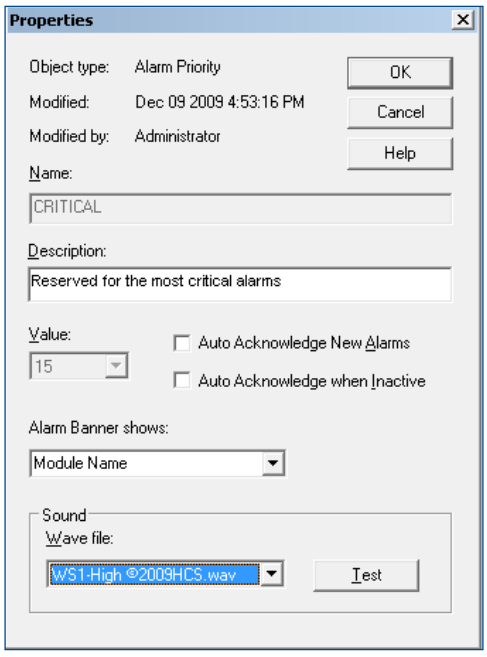


Figure 4 *Default properties for alarm priority 15 - Critical.*

The site alarm philosophy establishes the boundary between alerts and alarms, and what severity of alert warrants annunciation to the Operator. In the DeltaV system, the combination of alarm level (4-15) and alarm source (Process, System or Device and their SIS equivalents) are used to easily separate alarms and alerts for operators and maintenance staff respectively. Some customers specify multiple lower alarm levels (4-6) for alerts to implement a priority scheme for system and device maintenance. See the whitepaper Configuring PlantWeb Alerts in a DeltaV System for an extensive discussion of this topic. The following figure summarizes the DeltaV system default behavior for Operator Workstations.

Alarm / Alert Source	Advisory Priority (7)	Warning Priority (11)	Critical Priority (15)
Process	Annunciate		
Device (PlantWeb Alerts)	Report Only[1]	Annunciate	
System Hardware		Annunciate	
SIS	Annunciate		
SIS Device (PlantWeb Alert)	Report Only[1]	Annunciate	
SIS Hardware	Annunciate		

Figure 5 *Default DeltaV Operator workstation settings for alarm annunciation.*

Alarm Help Objectives

Alarm Help setup begins with knowing your overall objective. The most common objectives are one or a combination of the following:

- **For use as an Operator response tool:** The Alarm Help feature can be used to make key information from the rationalization process (such as cause, consequence, time to respond and Operator action) available to the Operator to help them diagnose the problem and determine the best corrective action. It can be setup as an online Operator alarm response manual, taking the place of and improving upon written documents.
- **For use as a basic stand-alone ISA-18.2 compliant Master Alarm Database:** ISA-18.2 sets out minimum requirements for a master alarm database, which is by definition the authorized list of rationalized alarms and associated attributes. By default the six configurable Alarm Help properties in the DeltaV system are preconfigured for this purpose, corresponding to the minimum required attributes.
- **Complimentary to an external ISA-18.2 Master Alarm Database or other local alarm response policy:** There are many reasons for a site to deploy an external master alarm database. There may be multiple or pre version 11 DeltaV control systems, non-DeltaV control systems or other alarm sources, making a single site-wide database supported by a common external set of management processes ideal. Alarm Help is tightly integrated into the DeltaV Operator interface, so it may be most beneficial to selectively populate it from the external database, with just the information that has the greatest 'in-context' value to the operators, optimizing the other fields of the external database to serve a wider audience of alarm system stakeholders.

  Bulk import/export features facilitate easy transfer of information between an external database and DeltaV Alarm Help.
- **For use as an Operator-knowledge capture system:** Alarm causes and Operator responses determined previous to system commissioning may be incomplete or need modification based on real-world operating conditions. For these and other reasons some sites may allow knowledgeable operators to add/edit Alarm Help properties directly from the operating environment, and enable them (or not) to distribute these changes throughout the system. Parameter level granularity allows some fields to be used for Operator-knowledge capture, reserving others for 'authorized' read-only use.

  For example an Alarm Help text field could be designated and enable for use as a "Reason for Suppression" or as "Lead Operator Action Advice". The DeltaV Event Chronicle captures edit and distribution (download) actions made from the runtime, including the log-in identity of the Operator and which fields were changed.

Note 1: No horn and no presentation in the alarm banner or standard alarm list. The alarm is logged in the Event Chronicle. The alarm is optionally identified in process graphics or alarm summaries other than the standard alarm list.

Alarm Help Setup

The DeltaV system provides six configurable Alarm Help properties, which may be individually assigned to any alarms from any source: Functional Classification, Consequence of Inaction, Time-To-Respond, and three text fields.

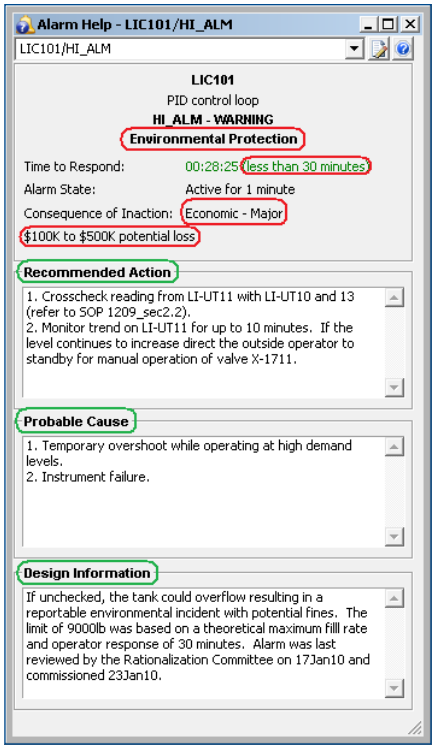


Figure 6 *The content of the Alarm Help Operator Interface is highly configurable.*

The above figure illustrates Operator Alarm Help presentation. The available selections for the fields with red callouts are configurable, as are the text box labels in green, accomplished by simple changes to their respective named sets. The ability to define the dropdown lists and text field labels provides significant flexibility to adapt Alarm Help to your objectives. The information is stored in the DeltaV system configuration (no different than a setpoint or alarm limit) providing highly dependability.

Functional Classification

Each alarm can be optionally assigned a functional classification. In the DeltaV system, this field may be used to sort and filter alarm lists via the System Alarm Manager (SAM) or in the Event Chronicle. ISA-18.2 calls for the classification of alarms such for identification of alarms with common requirements for management of change, testing, etc.

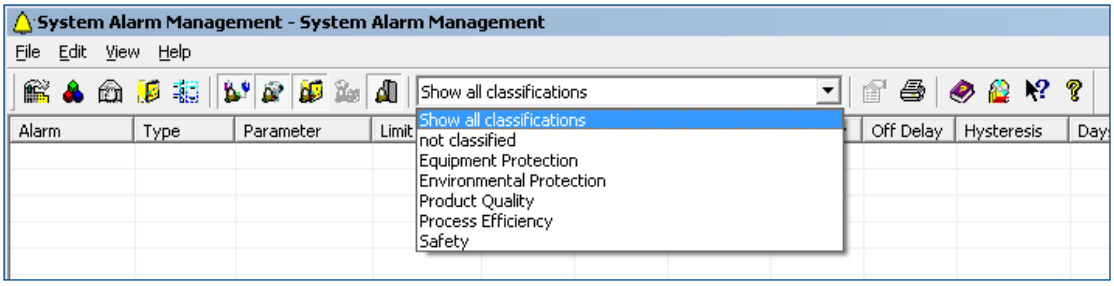


Figure 7 *Alarms can be easily sorted by Functional Classification.*

There may be from 0 to 10 Functional Classifications defined. Default values are: (0) not classified, (1) Equipment Protection, (2) Environmental Protection, (3) Product Quality, (4) Process Efficiency, and (5) Safety. Adding a new classification, for example "Economic" is easy, as is editing the defaults, because they are user-defined using a named set.

If the objective is to construct a basic stand-alone Master Alarm Database it may be useful to designate a couple of administrative type classifications such as "Unrationalized Alarm" or "Non-Alarm" to separate statistics and facilitate rationalization and management of change processes.

Future DeltaV product direction includes plans to use this field as one of several alarm parameters to filter alarms for logic-based alarm modification. The field can be effectively eliminated by specifying zero values in the named set.

Consequence of Inaction

Each alarm can be optionally assigned a Consequence of Inaction, which describes the direct (proximate) results from the alarm condition. The intent for the Consequence of Inaction parameter is to record a measure of the impact and the severity, for example 'Public Safety and Health – Major Severity' instead of describing an alarm's specific consequence as in 'Tank 104 overflow'. Specific consequence of inaction would typically be captured as part of the alarm's design information or basis.

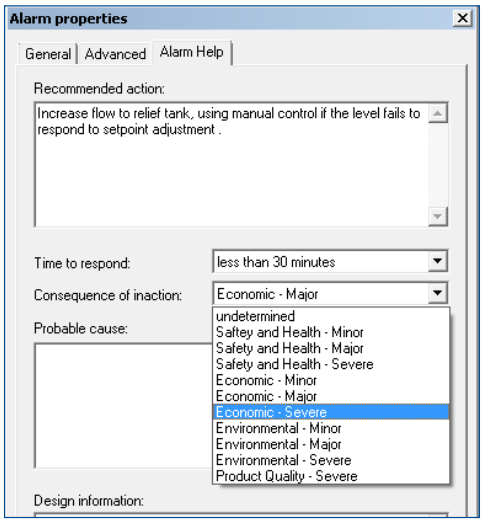


Figure 8 *Consequence of Inaction Selection.*

Default values are: (0) undetermined, (1) Minor, (2) Serious, and (3) Severe. The selections are user defined using two named sets, one for the name and another for a short associated description.

Time to Respond

Each alarm can be optionally assigned a time to respond. Selections can be created corresponding to 1 through 244 minutes; however most alarm philosophy documents specify a very small number of defined response times, which are mapped against consequence of inaction to arrive at priority assignments. The desired choices for time to respond are created in Alarm Help using a named set. System default values are 10 minutes and 30 minutes. When used, a selection of 255 is presented to the Operator as having no limit for the time to respond.

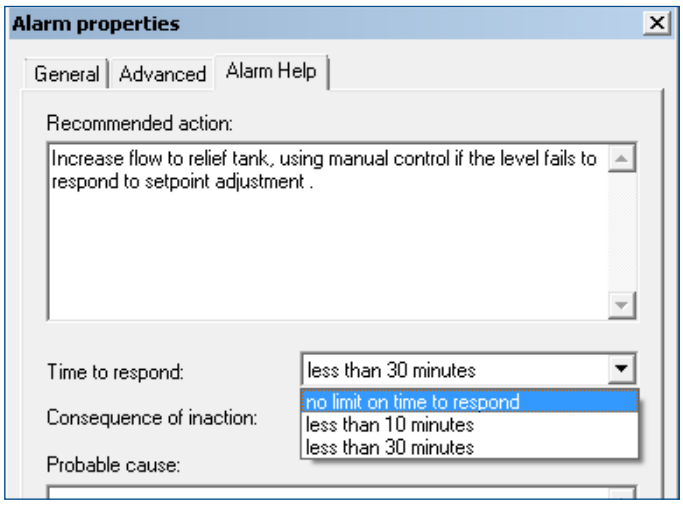


Figure 9 *Time to Respond Selection.*

When an alarm is active and has a defined time to respond, the difference between alarm activation and current time is computed and presented to the Operator in Alarm Help as seen in the following figure.

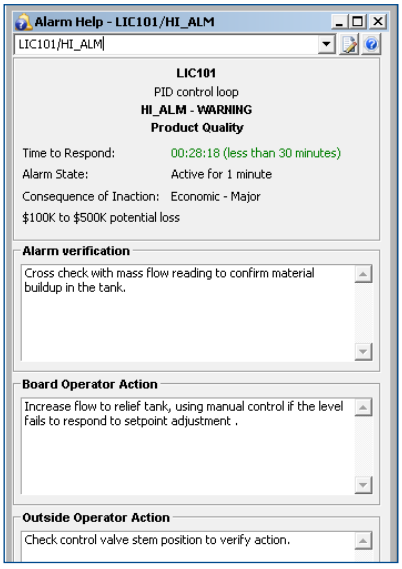


Figure 10 *Operator presentation of remaining time to respond.*

ISA-18.2 defines Time-To-Respond as the maximum allowable time between annunciation of the alarm and when the Operator must takes corrective action (Operator response delay). It must be short enough that the process has time to react to the corrections made, considering the process deadtime and response delay, so the process variable does not exceed the consequence threshold.

Help Text

Three 500 character length simple text fields are optionally available for use. A named set is used to give each of the three fields a name, providing meaning/context for each. By default they are: (1) Recommended Action, (2) Probable Cause and (3) Design Information.

If the objective for alarm help is to create a basic stand-alone ISA-18.2 compliant Master Alarm Database, these default uses for help text should suffice, where the Design Information field captures the basis for the alarm. Note that design information can be especially useful to the Operator when the alarm trip logic is complex or multivariate or there are associated interlocks.

If the Master Alarm Database is external, the three text fields can be potentially put to different purpose. For example the three fields might be (1) Alarm Verification, (2) Board Operator Action, and (3) Outside Operator Action.

If the objective for alarm help is Operator knowledge capture, each of the fields except Functional Classification can be set up with a security key granting expert operators the ability to modify or add comments. Alternatively, one of the text fields might be dedicated to this, for example (3) Operator Alarm Notes.

Any or all of the text fields can be effectively eliminated by deleting it from the named set.

Named Sets

As previously discussed, named sets dictate selections for functional classification, consequence of inaction, time to respond, and context for the three help text fields.

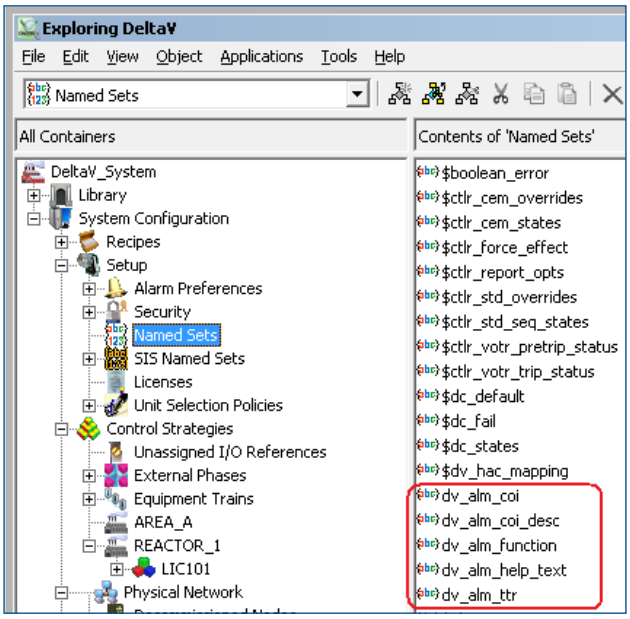


Figure 11 *Named Sets allow easy alarm help customization.*

In the bulk edit export/import file, the named states in the named sets are represented by their state values (0, 1, 2, etc,). The following table lists the alarm help bulk edit fields that correspond to named sets.

Field name in Bulk Edit	Corresponding Named Set
functional_classification	dv_alm_function
consequence_of_inaction	dv_alm_coi dv_alm_coi_desc
time_to_respond	dv_alm_ttr
help_text1, help_text2 and help_text3	Dv_alm_help_text

Figure 12 *Alarm help field names in bulk edit and corresponding named sets.*

State values (0, 1, 2, etc.) are all that is recorded per alarm in the configuration database for functional classification, consequence of inaction and time to respond, so changes to previously defined/used state names should be avoided once the system is set up.

Alarm Help Operation

Alarm Help is immediately accessible to the Operator from any workstation, regardless of connection status to the ProfessionalPlus or any other Workstation or Application Station.

Operators can immediately recognize if Alarm Help is populated for an active alarm by observing the associated icon, eliminated lost time and frustration looking for content that does not exist.

The question mark ( ) icon denotes Alarm Help is populated.

A pad & pencil icon ( ) denotes it is not populated but that some fields are available to the Operator for entry.

The absence of an icon denotes no alarm help content for the alarm.

Alarm Help can be accessed for active and suppressed alarms (red callout below) via the alarm list, module faceplate, the alarm banner and (not show) by right mouse click on an alarm in the alarm list.

For purposes of training and knowledge capture, inactive alarms can be accessed for review, or modification if permitted, by accessing the Alarm Help (green callout) window via the DeltaV submenu followed by direct entry of the path/alarm name in the alarm selection control (green callout) in the Alarm Help window.

The Alarm Help window remembers the last ten alarms displayed for quick Operator movement between help for multiple active alarms, and recalls the last Operator positioning and size for convenience.

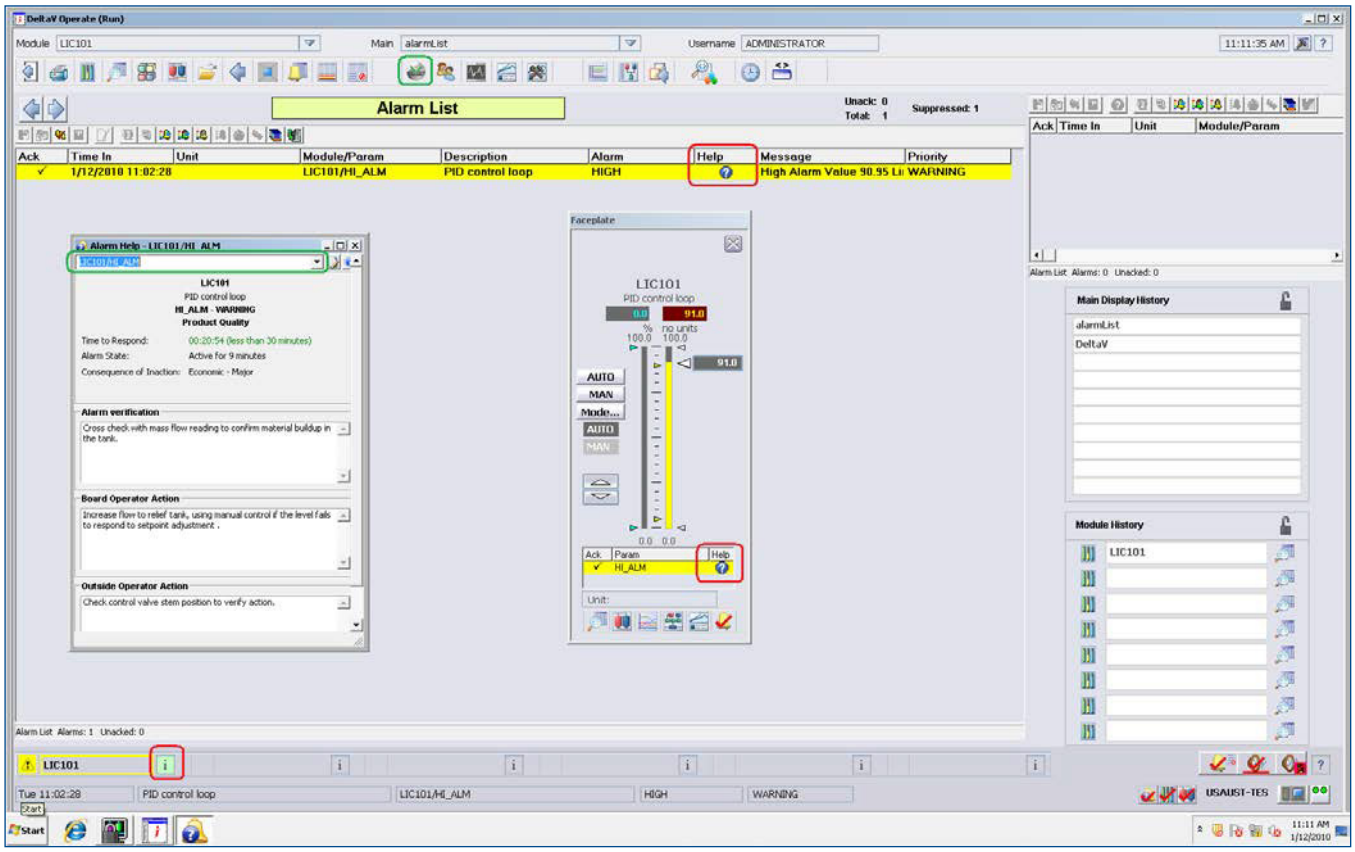


Figure 13 *Operators may access Alarm Help via multiple paths.*

Bulk Editing Alarm Help

Introduction

User-defined import/export (Bulk Edit) is generally used to speed up the configuration of database objects that are normally created in large quantities, such as I/O cards, field devices, control modules, etc. Using Bulk Edit helps to make the more tedious aspects of the configuration process more efficient. Because Alarm Help parameters are part of the system configuration database, standard DeltaV Bulk Edit methods apply.

The bulk data is transferred into or out of the database via the user-defined import/export interfaces. The menus to drive these interfaces are accessed from the DeltaV Explorer. Bulk data format can be either a TAB delimited text file or an ODBC data source.

Important points when bulk editing alarm help:

- Alarms can originate from different sources: user-defined process alarms, field device alerts, system hardware alarms and their SIS counterparts. These different sources equate to different objects / containers in the configuration database, necessitating the use of different interfaces. (Requiring different .fmt format files for readers familiar with DeltaV Bulk Edit.)
- Bulk edit of alarm help parameters is highly dependent on consistent alarm parameter naming. For most systems the alarm names will be consistent; for example HI_HI_ALM.user_help_text1.
- Alarm Help parameters are configurable, so actual meaning derives from the corresponding configured name set. For example the parameter HI_HI_ALM.functional_classification is imported/exported as an integer where 0 might be “not classified” and 1 might be “Equipment protection”.
- Because there are multiple alarm containers and naming dependencies, the recommended strategy for populating Alarm Help is to bulk export the alarms of a particular source type, populate the help fields, then bulk import. Adding new alarms via bulk import is not recommended.

Printing Alarm Help to XML

There is a fast and easy alternative to bulk edit if the requirement is to simply export alarm help and information. The DeltaV System Alarm Management (SAM) application provides a print to XML option, illustrated below.

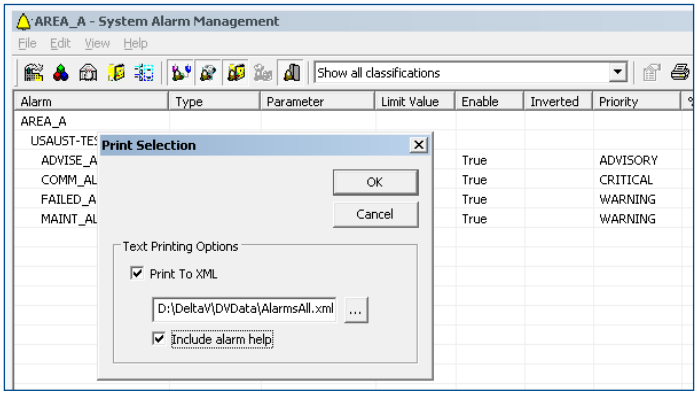


Figure 14 *Printing Alarm Information to XML from SAM.*

SAM is an engineering tool, accessible from the Applications menu of the DeltaV explorer and elsewhere. There are several advantages to using SAM vs. Bulk Edit. SAM identifies alarms regardless of alarm name, results are easier to read because integer representations of values are converted to text based on named sets and it is possible to editing alarm properties and help directly.

Typical uses for SAM and its XML print output are:

- Gathering statistics for percentages of alarms configured for different priorities or populated with help; filterable by source, classification or process area as illustrated below.
- Checking for unusual alarm names that could be missed using default bulk export definition (fmt) files.
- Identifying priority assignments that are misaligned with the site alarm philosophy when compared to time to respond and consequence of inaction.
- Easy efficient export of as-configured alarm information to an external master alarm database or spreadsheet.

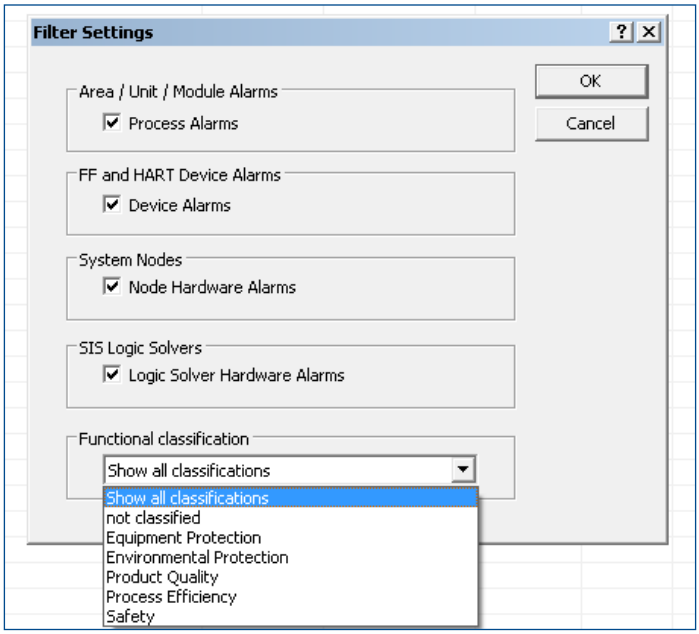


Figure 15 *Filtering Alarm Information in SAM.*

```
- <Alarm>
    <Attribute>DV_HI_ALM</Attribute>
    <Path>BOILER_1/LIC_101/DV_HI_ALM</Path>
    <Type>Deviation Alarm</Type>
    <Parameter>PID1/DV_HI_ACT</Parameter>
    <LimitValue>0</LimitValue>
    <Enable>True</Enable>
    <Inverted>False</Inverted>
    <Priority>ADVISORY</Priority>
    <P1Parameter>PID1/PV</P1Parameter>
    <P2Parameter>PID1/SP</P2Parameter>
    <EnableDelay />
    <OnDelay />
    <OffDelay />
    <Hysteresis />
    <DaysTimeout>999</DaysTimeout>
    <HoursTimeout>0</HoursTimeout>
    <MinutesTimeout>0</MinutesTimeout>
    <FunctionalClassification>1</FunctionalClassification>
    <FunctionalClassificationName>Equipment Protection</FunctionalClassificationName>
    <HasAlarmHelp>Yes</HasAlarmHelp>
    <AlarmHelpText1>1. Have outside operator verify level at Drum 1. 2, If verified and
      control action is required, make manual adjustments to inlet valve VX1712-1output in
      10% increments as required.</AlarmHelpText1>
    <AlarmHelpText2>1. Temporary overshoot while operating at high demand. 2. Level
      transmitter fouling or failure 3. Sudden change in demand.</AlarmHelpText2>
    <AlarmHelpText3>Approved for distribution: 17 Jan 2010. Reviewed by: Gunter Stoffels
      Last alarm change: 5 second on-delay added to eliminate fleeting
      behavior.</AlarmHelpText3>
    <TimeToRespond>30</TimeToRespond>
    <TimeToRespondName>less than 30 minutes</TimeToRespondName>
    <ConsequenceOfInaction>1</ConsequenceOfInaction>
    <ConsequenceOfInactionName>Minor</ConsequenceOfInactionName>
  </Alarm>
```


Figure 16 *Sample XML Print Output from SAM.*

Bulk Import/Export

Bulk export is launched from the DeltaV Explorer as illustrated below.

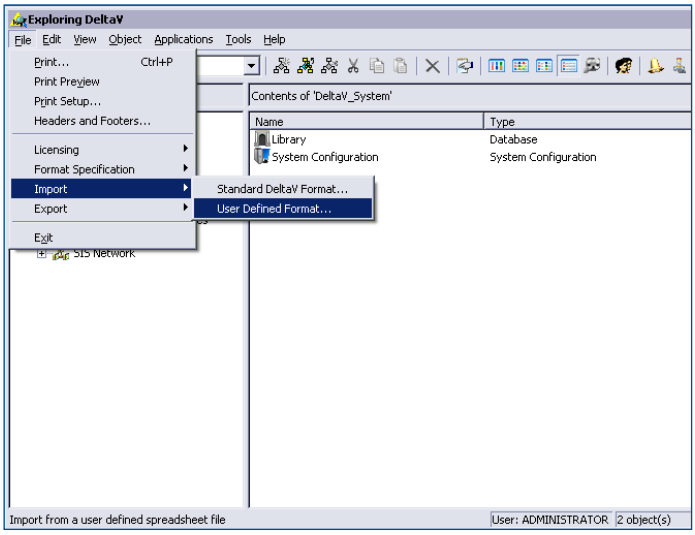


Figure 17 *Launching Bulk Edit from DeltaV Explorer.*

The user-defined import/export menus differ from the standard DeltaV import/export in that they allow control over the data fields. Specifying the data fields is done via format specification files (*.FMT). Format files for the most common import/export opearations are supplied with DeltaV. These files are located in the "...\DeltaV\DVData\BulkEdit" folder.

There are several predefined format files provided for alarm help as illustrated in the following figure.

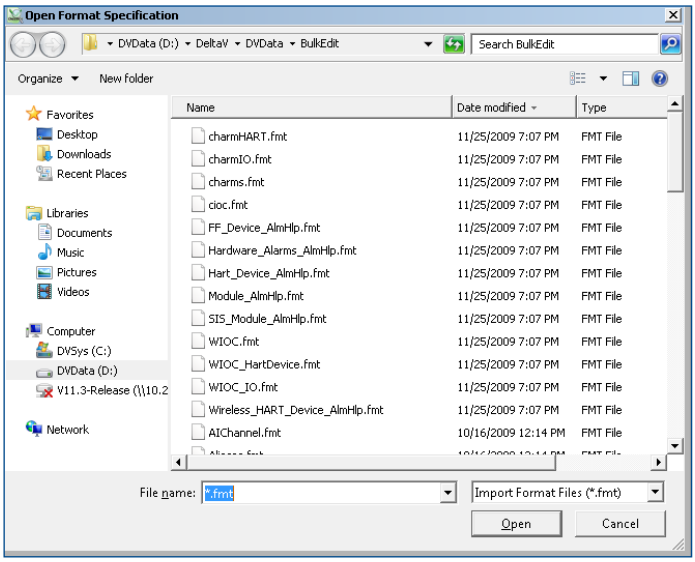


Figure 18 *Predefined format files for import/export of Alarm Help.*

The format file defines the data fields (and their order) that are exported or the fields that the import should expect to find in the import data source. The following table summarizes the intended use and covered alarm names for each of these predefined alarm help format files. It is easy to create customized format files to collect more or less alarm information, using these files as the starting point. For example the Module_ALMHLP.fmt file captures all six alarm help fields, the alarm help enabled flag, alarm type, priority, alarm enabled flag, alarm limit, and the PV's engineering units and range. Pay particular attention to alarm names. Note that bulk edit is not adversly affected when an alarm name is not present in the actual module.

Format File	Intended For	Covered Alarm Names
Module_AlmHlp.fmt	User-defined process alarms	DV_HI_ALM, DV_LO_ALM, HI_ALM, HI_HI_ALM, LO_ALM, LO_LO_ALM, PVBAD_ALM, FAIL_ALM, ADVISE_ALM, COMM_ALM, FAILED_ALM, and MAINT_ALM.
SIS_Module_AlmHlp.fmt	User-defined SIS alarms	BYPASS_ALM, and IO_ALM
Hardware_Alarms_AlmHlp.fmt	System hardware alarms	ADVISE_ALM, COMM_ALM, MAINT_ALM, and FAILED_ALM
FF_Device_AlmHlp.fmt	Foundation Fieldbus Device Alarms	ABNORM_ALM, ADVISE_ALM, COMM_ALM, MAINT_ALM and FAILED_ALM
Hart_Device_AlmHlp.fmt	Hart Device Alarms	ADVISE_ALM, COMM_ALM, MAINT_ALM, and FAILED_ALM
Wireless_HART_Device_AlmHlp.fmt	Wireless Hart device Alarms	ADVISE_ALM, COMM_ALM, MAINT_ALM, and FAILED_ALM

Figure 19 *Application of predefined format files for import/export of Alarm Help.*

<NULL> Field Values

It is possible to have a large number of fields in an alarm help bulk edit file that are <NULL>. This is not a problem. In most cases it indicates that a particular alarm is not in the object. For example, if you use the Module_AlmHlp.fmt file to export alarm information, not every module has every alarm. Each line (module) in the bulk edit file contains <NULL> values for the alarms that the module does not contain. <NULL> allows import to proceed without error when the target parameter is not present in the configuration.

Editing Bulk Import/Export Data Using Excel

When using Excel to perform bulk editing, the data is exchanged by means of TAB delimited UNICODE text files.

The Excel template supplied with the DeltaV system (...\DeltaV\DVData\BulkEdit\BulkEditTemplate.xlt) makes editing bulk data easier. The template introduces a "Bulk Edit" toolbar, illustrated below. When opening and saving the TXT files generated in the bulk edit export, the Bulk Edit toolbar must be used. Do not use the Excel "File->Open" or "File->Save" menus. The "Bulk Edit -> File Open" menu converts the UNICODE text to ASCII text before reading it into Excel.

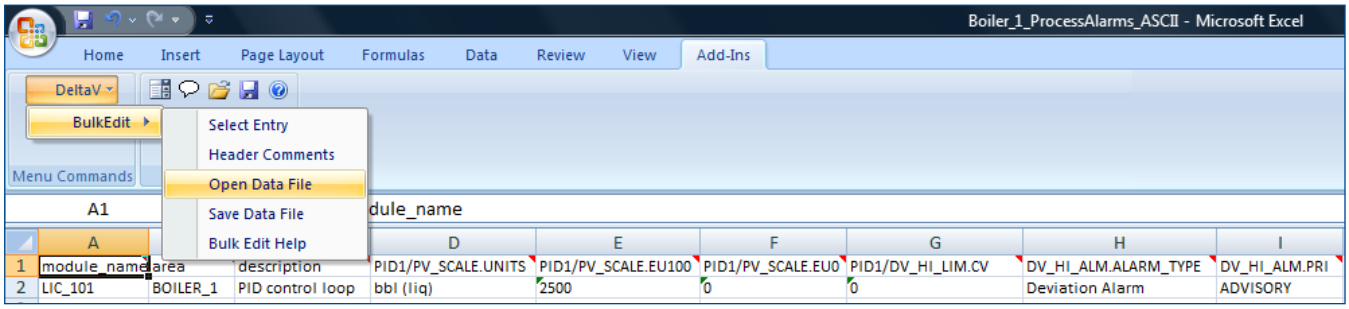


Figure 20 *Use the Emerson Excel Add-In to import/export and modify Alarm Help.*

Bulk edit also supports an ODBC interface to other databases. In this case there is no intermediate data file. The data is transferred directly to/from the DeltaV configuration database. For more information on this topic see the whitepaper DeltaV Bulk Edit.

Operator Entry of Alarm Help

By default Operators are not allowed to modify Alarm Help. However, the DeltaV security system provides granular control over functions to edit the consequence of inaction, time to respond and three help text fields. The most common reason to enable alarm help editing from the Operator run-time (DeltaV Live or DeltaV Operate) is for expert operator knowledge capture.

The basic method is to rename one of the general purpose user locks to something like “Senior Operate”, assign the lock to functions associated with editing or downloading alarm help fields, and then assign the key (lock) to a new user or user group such as Senior Operator.

Note that these function locks are used specifically for enabling edit/download features in both DeltaV Live and DeltaV Operate Alarm Help user interface and have no affect on the ability of system engineers or others with the CAN_CONFIGURE key to edit alarm help in engineering tools like DeltaV Explorer, Configuration Studio and SAM.

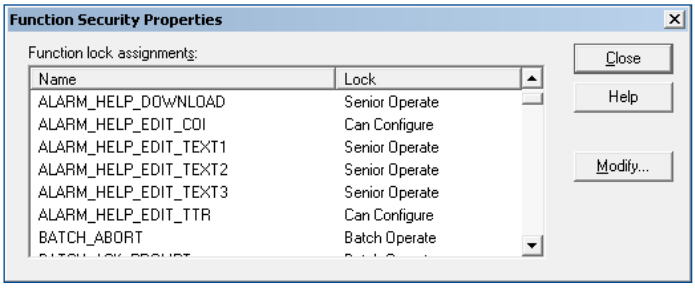


Figure 21 *Individual Alarm Help fields can be selectively enabled for Operators to edit or distribute.*

Alarm Help for Hardware and Field Devices

In addition to process and SIS alarms, Alarm Help is available for alarms based on hardware alerts from control system hardware and intelligent field devices. Note that for many systems the maintenance organization is responsibility for system and device alarms. As previously discussed in the section Alarm Definition and Rationalization, the DeltaV system allows easy separation of alarm lists for operators and maintenance based on the combination of source and priority. When specifying Alarm Help, the author should always consider who the intended reader is.

Certain significant system and device alarms may be appropriate to annunciate to the Operator. In conforming to the ISA-18.2 concept that an alarm is always actionable for the Operator, it is important that Operators are never in doubt about what is the expected action. For example, the second shift Operator at a small plant where after-hours maintenance is minimal should not be left to wonder if they should activate the maintenance after-hours call-in process, write up a routine work order or just ignore the alarm. Thus the principal use of Alarm Help for system hardware and device alarms for operators will in many cases be to declare the action as either:

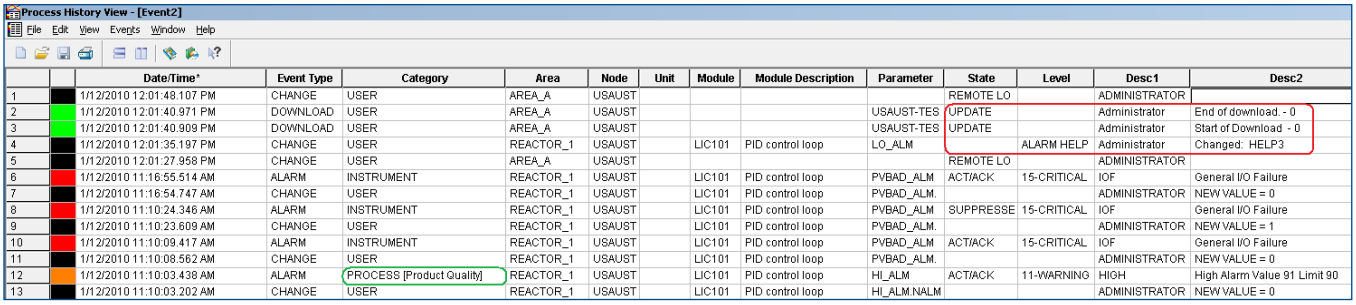
- Urgent, requiring immediate verification by an outside Operator, investigation by maintenance, etc.
- Routine, requiring work order initiation, etc., or,
- A cognitive switch, requiring elevated attentiveness to a specified process, instruction to give a head’s up to the outside Operator, etc.

Other Alarm Help uses for system hardware and device alarms can be to documents physical equipment location or cross-reference the equipment to associated control units or modules.

Auditing Alarm Help

The alarm help fields are contained within the native DeltaV system configuration database, subject to Configuration Version Control for systems that have it.

The Event Chronicle records any changes made to Alarm Help by Operators (red callout). Also note that the Functional Classification is captured parenthetically (green callout) for alarms. No parentheses are recorded for alarms without an assigned classification. Event Chronicle filtering options allow easy identification of Alarm Help changes and segmentation of alarms by Functional Classification.



		Date/Time*	Event Type	Category	Area	Node	Unit	Module	Module Description	Parameter	State	Level	Desc1	Desc2
1		1/12/2010 12:01:48.107 PM	CHANGE	USER	AREA_A	USAUST					REMOTE LO		ADMINISTRATOR	
2		1/12/2010 12:01:40.971 PM	DOWNLOAD	USER	AREA_A	USAUST				USAUST-TES	UPDATE		Administrator	End of download. - 0
3		1/12/2010 12:01:40.909 PM	DOWNLOAD	USER	AREA_A	USAUST				USAUST-TES	UPDATE		Administrator	Start of Download - 0
4		1/12/2010 12:01:35.197 PM	CHANGE	USER	REACTOR_1	USAUST		LIC101	PID control loop	LO_ALM		ALARM HELP	Administrator	Changed: HELP3
5		1/12/2010 12:01:27.958 PM	CHANGE	USER	AREA_A	USAUST					REMOTE LO		ADMINISTRATOR	
6		1/12/2010 11:16:55.514 AM	ALARM	INSTRUMENT	REACTOR_1	USAUST		LIC101	PID control loop	PVBAD_ALM	ACT/ACK	15-CRITICAL	IOF	General I/O Failure
7		1/12/2010 11:16:54.747 AM	CHANGE	USER	REACTOR_1	USAUST		LIC101	PID control loop	PVBAD_ALM.			ADMINISTRATOR	NEW VALUE = 0
8		1/12/2010 11:10:24.346 AM	ALARM	INSTRUMENT	REACTOR_1	USAUST		LIC101	PID control loop	PVBAD_ALM	SUPPRESSE	15-CRITICAL	IOF	General I/O Failure
9		1/12/2010 11:10:23.609 AM	CHANGE	USER	REACTOR_1	USAUST		LIC101	PID control loop	PVBAD_ALM.			ADMINISTRATOR	NEW VALUE = 1
10		1/12/2010 11:10:09.417 AM	ALARM	INSTRUMENT	REACTOR_1	USAUST		LIC101	PID control loop	PVBAD_ALM	ACT/ACK	15-CRITICAL	IOF	General I/O Failure
11		1/12/2010 11:10:08.562 AM	CHANGE	USER	REACTOR_1	USAUST		LIC101	PID control loop	PVBAD_ALM.			ADMINISTRATOR	NEW VALUE = 0
12		1/12/2010 11:10:03.438 AM	ALARM	PROCESS [Product Quality]	REACTOR_1	USAUST		LIC101	PID control loop	HI_ALM	ACT/ACK	11-WARNING	HIGH	High Alarm Value 91 Limit 90
13		1/12/2010 11:10:03.202 AM	CHANGE	USER	REACTOR_1	USAUST		LIC101	PID control loop	HI_ALM.NALM			ADMINISTRATOR	NEW VALUE = 0

Figure 22 *The Event Chronicle captures Operator modifications to Alarm Help.*

Alarm Descriptions

Starting with Deltav v12 you can optionally specifiy an alarm description of up to 255 unicode characters, to better describe the alarm to operators. Carefully consider its use because the alarm description replaces the module description in the Alarm List and the Event Chronicle's alarm entries and is appended to the module description in the Alarm Banner's information line and in the Alarm Help window.

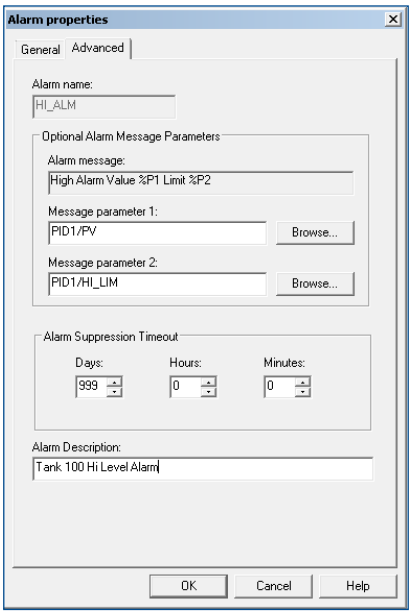


Figure 23 *An optional alarm description can be specified as an advanced alarm property.*

For users of DeltaV v12 and v13, alarm descriptions are particularly useful for SIS modules. Unlike most process control modules, SIS modules typically reference multiple process variables and the module description alone may not convey enough information to allow operators to quickly locate the source of an individual alarm within the module. DeltaV v14 introduces SIS alarm groups allowing to identify SIS alarms associated with a defined group of function blocks within a single module.

An alarm description is optional. If the alarm description is empty, the module description is presented for the alarm. If the module description is empty, only the alarm description is presented for the alarm.

Alarm descriptions can be imported and exported using bulk edit. Alarm descriptions are distributed to all system workstations using the alarm help download system.

SIS Alarm Groups

Starting v14, SIS alarms can optionally be grouped in user-defined alarm groups for improved identification. You can create several alarm groups within a SIS module and assign function blocks and user-defined parameters within the SIS module to an appropriate SIS alarm group. For example, you might create an alarm group that includes all the function blocks associated with a voter (such as an analog voter block and multiple analog input blocks). You might also create a different alarm group for all the function blocks associated with a valve (for example, a discrete output block for the solenoid and a DVC block for the positioner). For each alarm group, you are able to specify an description and set of displays (primary control, detail and faceplate).

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