PCVUE SCADA COMPLIANCE WITH ISA-18.2 ALARM MANAGEMENT STANDARD

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Content :	This document provides an assessment of PcVue SCADA's compliance with the ISA-18.2 standard for alarm management. It outlines how PcVue supports each key requirement of the ISA-18.2 standard, including the development of an alarm philosophy, identification and rationalization of alarms, detailed design, implementation, operation, maintenance, monitoring and assessment, and management of change. The document includes specific examples and references to the relevant sections of the ISA-18.2 standard, demonstrating how PcVue's features align with best practices for effective alarm management
Confidentiality :	C0

Content

1.1 INTRODUCTION

The ISA-18.2 standard, titled "Management of Alarm Systems for the Process Industries" provides a comprehensive framework for the effective management of alarm systems throughout their lifecycle. This document provides an overview of how PcVue SCADA aligns with the ISA-18.2 standard for alarm management. By leveraging PcVue's comprehensive alarm management features, organizations can ensure effective and compliant alarm systems.

1.2 ALARM PHILOSOPHY

ISA-18.2 Requirement: Develop an alarm philosophy document that outlines the principles and practices for alarm management (Section 6.1).
PcVue Compliance: PcVue supports the creation of an alarm philosophy document by providing customizable alarm settings and prioritization features. Users can define alarm priorities, categories, and response procedures, ensuring alignment with the organization's alarm management principles.

☑ *Example: PcVue allows users to set different priority levels for alarms, such as critical, high, medium, and low, based on the alarm philosophy*

1.3 IDENTIFICATION

ISA-18.2 Requirement: Identify potential alarms and determine their necessity (Section 8.2).
PcVue Compliance: PcVue enables the identification of alarms through its comprehensive alarm configuration tools. Users can define alarms based on various conditions and parameters, ensuring that only necessary alarms are configured.

☑ *Example: Users can configure alarms for specific process variables, such as temperature exceeding a certain threshold, ensuring that only relevant alarms are generated*

1.4 RATIONALIZATION

ISA-18.2 Requirement: Review and justify alarms to ensure they are meaningful and necessary (Section 8.3).
PcVue Compliance: PcVue supports alarm rationalization by allowing users to review and adjust alarm settings. The system provides tools for filtering and

prioritizing alarms, helping to eliminate nuisance alarms and ensure that alarms are meaningful.

- ***Example**: PcVue's alarm filtering feature allows users to exclude certain alarms from the main alarm list, focusing on critical alarms that require immediate attention. Several types of filtering are available : Mask of alarm, Alarm type (alarm on, alarm on acknowledged, on not acknowledged, off not acknowledged, off acknowledged), Alarm level (Level (from the 30 available priority levels) , Alarm location, Alarm by domain, Alarm by Station, Alarm by priority(range 0 to 29.)*

1.5 DETAILED DESIGN

ISA-18.2 Requirement: Design alarms with appropriate settings and priorities (Section 8.4).

PcVue Compliance: PcVue offers detailed design capabilities for alarms, including customizable settings for alarm thresholds, deadbands, and delays. Users can design alarms to meet specific operational requirements.

- **Example**: Users can set a delay for an alarm to prevent it from triggering immediately, reducing the likelihood of false alarms. PcVue provides a consistency check feature. To control the value returned following a command. After a time period (customizable) an alarm shall appear if the comparison between the command sent and the value returned is not consistent. PcVue can configure the activation of the alarm (Positive transition, Negative transition). PcVue can temporize the alarm, and set the thresholds with hysteresis values.

1.6 IMPLEMENTATION

ISA-18.2 Requirement: Install and configure alarms in the control system (Section 8.5).

PcVue Compliance: PcVue provides robust tools for implementing alarms in the control system. The software supports the configuration and deployment of alarms across various devices and systems.

- **Example**: PcVue's configuration interface allows users to deploy alarm settings to multiple controllers and HMIs, ensuring consistent alarm behavior across the system. Alarm acknowledgement is shared between PcVue stations offering a global alarm management system.

1.7 OPERATION

ISA-18.2 Requirement: : Use alarms effectively during normal operations (Section 8.6).

PcVue Compliance: PcVue's alarm viewer management features support effective alarm operation. The system provides real-time alarm monitoring, acknowledgment, and masking capabilities. PcVue architecture also allows for perfect management of possible alarm avalanches during critical phases to avoid losing alarms in a global control system like a control center. It also highlights priority alarms during these critical phases.

- **Example**: Operators can acknowledge alarms directly from the PcVue interface, ensuring that they are aware of and responding to critical alarms.

1.8 MAINTENANCE

ISA-18.2 Requirement: : Regularly maintain and test alarms to ensure they function correctly (Section 8.7).

PcVue Compliance: PcVue includes maintenance tools for testing and validating alarms. Users can perform regular checks to ensure that alarms are functioning as expected. During maintenance activities, alarms can be temporarily shelved or suppressed to prevent unnecessary alerts. This helps in managing alarm floods and ensures that only relevant alarms are active.

- **Example**: PcVue allows users to create simulate alarm conditions and verify that alarms are triggered and displayed correctly.

1.9 MONITORING and ASSESSMENT

ISA-18.2 Requirement: Continuously monitor alarm performance and make improvements as needed (Section 8.8).

PcVue Compliance: PcVue provides performance monitoring features, including alarm statistics and reports. Users can track alarm frequency, response times, and other metrics to assess alarm system performance.

- **Example**: PcVue's alarm reports generated with DataExport integrated tool provide insights into alarm trends, helping users identify and address issues such as alarm floods or chattering alarms.

1.10 MANAGEMENT of CHANGE

ISA-18.2 Requirement: : Manage changes to the alarm system to ensure they are properly documented and assessed (Section 8.9)

PcVue Compliance: PcVue supports the management of changes through its configuration management tools. Users can document and track changes to alarm settings, ensuring that all modifications are properly assessed and approved. User actions, logging in, logging out, acknowledging alarms and changing setpoints, can all be recorded in log files.The event file is protected from intentional modifications. An additional mechanism allowing other user actions to be recorded (generate a report, open a mimic, etc.) can be implemented by application. It is possible to trace operator actions such as modification of a setpoint (old and new value).All system events can be saved to log files.

- **Example**: PcVue's change management features allow users to log changes to alarm configurations, providing a clear audit trail for compliance purposes.

1.11 Conclusion and Best Practices for Implementing ISA-18.2 in a SCADA Project with PcVue

Implementing the ISA-18.2 standard in a SCADA project, particularly with PcVue, is a critical step towards ensuring effective alarm management and enhancing overall operational safety. Here are some key steps and best practices to guide you through this process:

1.11.1 Develop an Alarm Philosophy

Start by creating a comprehensive alarm philosophy document. This document should outline the objectives, principles, and guidelines for alarm management within your organization. It should cover aspects such as alarm prioritization, classification, and response procedures. PcVue provides tools to help you define and implement these guidelines effectively.

1.11.2 Alarm Rationalization

Rationalize your alarms to ensure that only meaningful and actionable alarms are configured. This involves reviewing and justifying each alarm based on its importance and potential impact. PcVue's alarm management features allow you to categorize and prioritize alarms, ensuring that operators are not overwhelmed by unnecessary alerts.

1.11.3 Alarm System Design

Design your alarm system to minimize nuisance alarms and alarm floods. Use PcVue's advanced alarm filtering and suppression capabilities to manage alarm conditions effectively. Implement features such as alarm filtering to adapt to changing operational conditions.

1.11.4 Implementation and Configuration

During the implementation phase, configure your SCADA system according to the alarm philosophy and rationalization outcomes. PcVue's intuitive interface and configuration tools make it easier to set up and manage alarms. Ensure that all alarms are properly documented, including their set points, causes, consequences, and required operator actions.

1.11.5 Training and Awareness

Provide comprehensive training to operators and maintenance personnel on the alarm system and its management. Ensure that they understand the importance of alarms, how to respond to them, and the procedures for handling alarm conditions. PcVue's user-friendly interface and training modules can facilitate this process. Visit PcVue Academy web site to perfectly master our Alarm Management System.

1.11.6 Regular Testing and Maintenance

Regularly test and maintain your alarm system to ensure its reliability and effectiveness. Schedule periodic reviews and audits to assess the performance of the alarm system and make necessary adjustments.

1.11.7 Continuous Improvement

Alarm management is an ongoing process. Continuously monitor and assess the performance of your alarm system. Use PcVue's reporting and analytics tools to gather data on alarm occurrences, operator responses, and system performance. Use this data to identify areas for improvement and implement changes as needed.

1.11.8 Compliance and Documentation

Ensure that your alarm management practices comply with ISA-18.2 requirements. Maintain thorough documentation of all alarm management activities, including rationalization records, configuration changes, and maintenance logs. PcVue's documentation features can help you keep track of these records and ensure compliance.

By following these best practices and leveraging the capabilities of PcVue, you can implement a robust and effective alarm management system that enhances operational safety and efficiency. Remember, successful alarm management is not a one-time task but a continuous journey towards improvement

Get more detailed information on our product documentation

1.12 Project example for Alarm Management System

The project

CERN (European Organization for Nuclear Research, one of the world's largest and most well-known centers for scientific research in the world) has the most ambitious scientific projects of our era with the creation of the greatest and most complex particle accelerator in the world, the Large Hadron Collider (LHC). With this tool, researchers intent to study the elementary particles that make up matter, but also anti-matter, by recreating the initial conditions of the Big Bang. Aiming to unearth the mysteries surrounding the creation of the universe.

The accelerator consists of a 27km (17 miles) ring in circumference at a depth of 100 meters (325 ft.) below the Franco-Swiss border. CERN launched a competition for a contract for a higher-performance safety system for the accelerator and selected PcVue for its flexibility to suit the specific requirements at CERN.

Dynamic supervision

The implementation of a supervisory system across such a geographically distributed site is complex and the degree of difficulty is heightened by the need for continuous development.
This requires an online database to be available to handle an increasing number of data variables. Thanks to the collaboration between ARC Informatique, CERN and our System Integrators in charge of the project, an innovative solution has been developed for a system able to be updated both dynamically and independently.
The applications extract the required information from a database of around 300,000 variables stored in Oracle.

Scientists working at CERN come from all round the world, hence another aspect that illustrates the dynamic nature of the supervisory system is the use of workstations with multilingual capability.
PcVue was able to meet the necessary specifications to reach Safety Integrity Level 2 (SIL2) for the IEC 61508 standard of secure operation.

Alarm Management

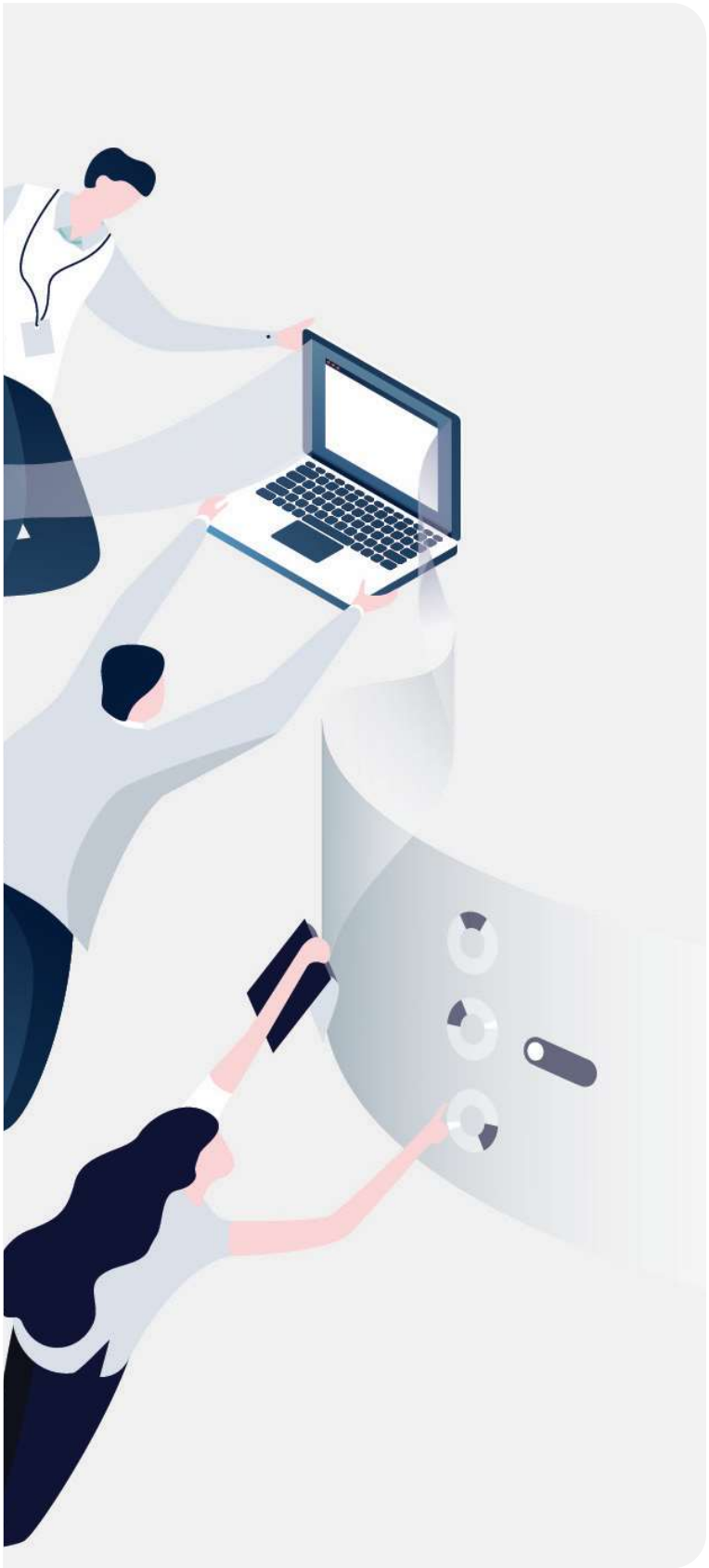
The LHC project required the implementation of a central control room such that all of the supervisory terminals for CERN's 3 accelerators are in one location and able to monitor all safety related alarms. The alarms, managed by 2 servers, are arranged in 4 levels of priority. Overall there are around 21,000 alarms that can be sent to the control room.

Management of the alarms results is particularly important due to the layout and dimensions of the whole installation, it is therefore seen as vital to implement the most efficient supervisory system possible.

The supervisory system is a fundamental element of the project but the most complex part to implement has been the redundant network for alarm management. This redundant TCP/IP network connects the various LSACs (Local Safety Alarm Controller) for automatic display of alarms in the 33 different safety zones and the SAMC (Safety Alarm Monitoring Center) with its data acquisition file server.

Each of the safety zones has 2 redundant PLCs for acquiring the alarms. These have been installed with touch-screen Panel PCs that act as PcVue clients with the same functionalities as the central stations. The alarm management system was already operational before the LHC system was activated.

Everything is measured, published and archived, from curves of gas detection in the buildings to transmission times for the alarms. The criticality of the system further requires no more than **100 minutes of downtime a year**. Given the importance of the application, everything has to be flawlessly under control.



PcVue SCADA Compliance with ISA-18.2 Alarm Management Standard

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