PROMS Versus Traditional Word Processors

Executive Summary

The purpose of this Whitepaper is to compare the capabilities between the Volian Enterprises, Inc. PROcedure Maintenance System called PROMS and the use of typical Word Processors such as Microsoft WORD. PROMS is an advanced document management system specifically designed by procedure writers to address the complex maintenance requirements of nuclear power plant procedures. It is far superior to all other procedure authoring tools and is used by over 60% of the commercial Westinghouse nuclear power plants in the United States as well as an international nuclear facility. It allows the customer to operate with a reduced procedure writer staff, due to gained efficiency from the use of PROMS and at the same time improve overall procedure quality. Key features of PROMS include:

- Full-featured text editing capabilities: PROMS allows efficient editing of procedure documents.

- Consistent procedure structure and format: Ensures uniformity across all procedures.

- The PROMS printed output is a fully searchable PDF using "intelligent pagination" rules centered around standard human factor practices.

- Tracking of procedure modifications: Keeps a record of changes made over time.

- Automated procedure approval system: Streamlines the approval process.

- Security and Multi-User Network functionality: Ensures controlled access and collaboration.

- Global search capability: Enables quick retrieval of information within procedure sets.

- Maintenance of multiple similar procedures: Uses a parent procedure to generate child procedures.

This document provides a detailed discussion of the features in PROMS that proves it is far superior to standard word processors for the creation and maintenance of complex procedures.

Introduction

PROMS was initially developed in the 1980's to support the unique authoring challenges of two column Emergency Operating Procedures (EOPs) developed after the TMI-2 accident. Over time, several PROMS customers have expanded its use to other procedures such as Administrative, Maintenance, Operations and Testing. With the advent of digital control rooms, PROMS has also been successfully integrated into the production of procedure files to support automated Electronic Procedure Systems and Alarm Response Procedures.

PROMS is a time proven procedure authoring system that is nuclear power plant industrial grade. Nuclear power plant procedures can be very complex and require a specially designed platform such as PROMS. No other platform has proven to adequately provide the nuclear power plant requirements to create and maintain procedures over an extended period of time i.e. decades.

Historically, organizations have used standalone word processing tools such as Microsoft Word and Adobe FrameMaker. To be effective, these tools require a procedure writer to not only be knowledgeable of the technical aspects of the plant and the associate procedure content, but also the word processing techniques required to correctly format procedures per applicable writer's guide requirements. This is an extremely inefficient use of technical expert's time, prone to error, and maximizes procedure related man-power requirements.

To address these concerns, many organizations have built or purchased word processing templates which help standardize the procedure writing process. These templates are typically expensive to develop and lack the robust editing and document management features provided by PROMS. Some have tried to copy PROMS features with abysmal results. Once developed, these templates must be maintained and modified to meet the specific needs of the procedure writers. In addition, when new versions of Microsoft Word or Windows are released, the template typically needs to be updated to perform as needed in the new environment. The organization may need to hire personnel specifically for this purpose.

Finally, the population of individual procedure files produced by these alternate tools make global changes to procedure content and format very time consuming and expensive.

PROMS Unmatched Method of Procedure Maintenance

PROMS is structured from the ground up to provide several unique features to enhance the productivity of procedure writers that result in cost savings and in improved accuracy. Instead of using individual procedure files, PROMS stores procedure information in an SQL database. Typically, a utility will have one production database for all of their PROMS procedures. Each database can contain as many procedure sets, formats, and supporting data as desired. This structure allows for rapid access to all procedures within a given database for global searching and editing.

PROMS separates procedure content from procedure format/structure. Technical experts can concentrate on writing each procedure element with minimal regard to format. Format attributes are automatically applied during printing to produce a finished procedure. Global changes to format definition such as key word emphasis, step numbering, page layout, and others can be implemented by a simple editing, by Volian, of the associated format file. Each format definition helps to enforce the proper format and structure of all procedure elements.

Referenced Objects (ROs) are user defined databases typically used to contain such things as equipment lists, EOP setpoints, alarm points, standard text, etc. The use of ROs allows for a single source of information to be linked to multiple locations within procedures thus providing easier editing and improved consistency of this information. Data fields and the resulting values returned to the procedure are fully configurable and defined by the customer.

PROMS has the unique ability to establish a parent procedure which is then used to produce unit specific copies or children of the parent procedure. This feature, called Parent/Child Publishing Capability (P/C PC), allows the PROMS user to designate an appropriate applicability to procedure elements such as ROs, steps, sections, or entire procedures. The appropriate elements are then used when child procedures to be printed. P/C PC has been in use for over 30 years by several PROMS customers to significantly reduce the need to maintain essentially duplicate procedure files for unit specific or channel/train specific procedures.

Through its PROMS Maintenance and Upgrade Program (MUP), Volian provides continued maintenance of the executables and format definition files, fixing bugs, keeping up with Windows updates, third party application version updates, minor enhancements and other customer service items along with continuously upgrading the code with generic enhancements, cyber security and other infrastructure improvements.

Detailed PROMS Features

- Format files are used to define the various elements of a given procedure. These definitions are applied when a procedure is being written and also when the same procedure is printed.

  o While editing, the format definition provides a list of all procedure elements available to create a given procedure. This includes the various types of sections, steps, cautions, notes, tables, transitions, etc. The format definition also determines which elements can be used in relation to other elements. For example, the format may allow cautions and notes before numbered high level steps but not for unnumbered sub-steps. These features ensure the writers can only use predefined procedure elements in a manner which complies with established writers guide requirements.

  o While printing, the format definition specifies how each procedure element will appear. This leads to automatic creation of section headers, footers, borders and page numbering as well as automatic numbering of procedure steps and sub-steps. Step definitions will define such things as margins, numbering, step spacing and font. Step definitions are also taken under consideration when deciding valid places to break a step and continue to the next page if needed.

- PROMS provides many automated features which help to remove the formatting burden from the procedure writer and improve consistency within and between procedures.

  o Links to another procedure location (i.e. step, section, attachment, other procedure) are called transitions in PROMS. Transitions are automatically updated when information about the transition destination changes (step number change, attachment title change, procedure number or title change, etc.)

  o If the title or number of a procedure or section is changed, all references and branching to that section or procedure are automatically updated when procedures are printed.

  o Table of Contents, including page numbering, can be automatically generated.

  o An action verb that is part of the action verb list will automatically be given bolding, underlining, capitalization, etc. as defined in the format definition

  o Conditional logic steps (IF/THEN, WHEN/THEN) are automatically given appropriate formatting.

- o Page breaks are automatically generated using human performance aspects. When steps are added or deleted, PROMS pagination rules are applied to generate the new version of the procedure. This eliminates the need for the procedure writer having to manually modify the procedure to address pagination impacts saving time and eliminating procedure inconsistencies.

- o Continuation headers and footers are generated automatically for steps that are continued on the next page.

- o Signoffs and Initials lines specific to individual positions (SRO/RO) or skills (I&C, Mech, RP) are available.

- The PROMS Global Search module is very robust and has the following features:

  - o A report can be generated for each procedure set with all steps sorted in alphabetical order so that the steps can be standardized.

  - o Many times, the procedure writer needs to change a step that appears in several different procedures and Global Search will create a list containing the procedure and step number of all items that needs to be changed. Selecting any of the items in the search results list will take the user directly to the procedure and step selected so that it can be modified.

  - o Global Search also allows for searching an entire procedure set(s) for specific components that may be affected by plant modification.

  - o Annotations can be searched by Annotation Types to identify the reasons for procedure changes e.g., procedure change request number or revision number.

  - o Referenced objects can be searched within the Global Search feature. PROMS can find places where a referenced object is used as well as find procedure text that could be linked to a referenced object.

  - o The various step types can be searched within the Global Search feature. This has proven to be helpful to the procedure writer to standardize specific procedure elements across all procedure sets.

- Annotations, which are synonymous with comments in Microsoft Word, are manually or automatically attached to various procedure elements such as High Level Steps, Substeps, Cautions, Notes, Warnings, Sections, or Procedures. Annotations can be organized by user defined types to facilitate locating and reviewing these comments. PROMS automatically creates annotations to alert the procedure writer to changes that were made during an automatic process such as updating Referenced Objects link information.

- As a Procedure Maintenance System, creating a procedure or modifying an existing procedure is one of the main functions in PROMS. Procedure changes are performed in a working draft folder of the applicable procedure set. Once a procedure, a group of procedures, or an entire procedure set reaches an intermediate work flow stage or is finalized, it can be "Approved" in PROMS. The intermediate Approval functions provide a means to preserve a historical PDF copy of the procedure in the SQL database. A final Approval will create a final PDF copy of the procedure with a defining watermark on each page. It will also preserve a copy of the Summary of Changes Report and remove change bars from the Working Draft version of the procedure. During the Approval process, the user has an option to check for transition and Referenced Object inconsistencies between the procedure(s) and other procedures with the same transitions and ROs. One of the main points in this comparison is that PROMS is capable of maintaining the various versions rather than the procedure writer manually performing this man power intensive and error prone task.

- The security feature in PROMS provides the capability to define the rights each user has to data and functions within PROMS. The general structure of the PROMS user interface is based on users, groups, roles, and permissions. There are a number of defined roles (e.g., Reviewer, Writer, RO Administrator, Procedure Set Administrator) and each role is associated with different permissions within PROMS. Each group contains users with the same role and users can be assigned to one or more groups.

- While the majority of a procedure's content will be written using the normal PROMS Editor, certain sections in a procedure can be created and maintained as a Microsoft Word Editor section. These Word sections may be unique to a single procedure or flagged as a Library Document and linked to numerous procedures as needed. Library Documents are typically used for Cover Pages, a figure or form, or free form text which are used in multiple locations.

These PROMS features take full advantage of computer processing capabilities to perform tasks normally done manually when using a standard word processor. While the computer processing takes time to complete these tasks, it is much faster and less expensive than doing the tasks manually. This man-power time savings allows the subject matter experts (SMEs) to concentrate on other aspects of their very important job.

How PROMS Benefits the Customer

The procedure writer can perform normal procedure writing tasks in a reduced time and with greater confidence than with traditional word processors. In general, the PROMS design has been recognized by its users to save between 25% to 50% of the costs associated with creating and maintaining procedures with traditional word processor applications.

PROMS Versus Traditional Word Processors

Volian has successfully helped customers to leverage the standard features of PROMS to support their specific procedure needs. Examples include:

- Alarm Response Procedures may have unique requirements, such as replicating I&C information, that the plant must adhere to so that these procedures can be properly displayed to the operator electronically. Volian developed an automated method that populates the Alarm Point RO database with information from the I&C database, ensuring alignment of procedure content with the official I&C designation.

- As previously mentioned, Referenced Objects can store a variety of information that can be used in the procedures. For example, equipment information, such as the equipment ID, label description, and location, can be stored in ROs and then linked so that equipment information is displayed in a consistent manner across all of the procedures. Volian has developed methods to populate an equipment RO database using information from plant data sources such as eSOMS or a Master Equipment List.

  In addition, engineering process values (such as flows, temperatures, levels, etc.) used in the procedures can be stored in a Setpoint RO database. The Setpoint RO database can also store information related to a setpoint value, such as its technical basis and references used to develop the setpoint value. This information would then be at the fingertips of the PROMS procedure writers when they are editing the procedures. Periodically, at the plant, a setpoint value will be modified for a number of reasons. When using a word processor for maintaining the procedures, it is difficult to find and replace all of the old values with the new value.

  Note that a global search and replace should not be performed since different setpoints could have the same value. For example, a level value of 5% could be a SG Narrow Range Level, a pressurizer level, or a tank level. Thus, extreme care must be taken if the procedure writer manually modified the setpoint using a word processor. Once a new setpoint value has been approved for use, all procedures using that value should be updated expeditiously. PROMS has several tools at the procedure writer's disposal to ensure that all locations of the modified setpoint are known so that those procedures can be approved. These tools help the procedure writers keep the procedures consistent and technically correct. Again, while all of this can be performed manually using a word processor, it would be more time consuming and prone to error.

- The data structure for RO Setpoints can be modified to contain multiple return values including both metric and imperial values for pressure and temperature. Using a simple change to the RO return value definition, all procedures for an entire plant can be instantly changed between metric or imperial units of measure. This strategy is important for vendors designing and building plants for both the United States and foreign customers.

- The P/C PC feature has been used by several customers to significantly reduce the effort needed to support multi-unit sites. With this feature, the user selects the appropriate plant unit and the procedure for that unit is printed along with the correct unit designators, procedure number and equipment ID numbers. If a plant modification is installed on one unit but not another, the procedure writer can write a new section or step for the plant modification and assign the appropriate unit applicability to both the original and new content. When the procedure is printed only the steps for the applicable unit are printed. When the plant modification is installed on all units, the parent procedure can be modified again to consolidate the previously unit specific portions. The P/C PC feature has been used for single unit applications to produce channel/train specific child procedures.

- Electronic Procedure Systems (EPS) require the merger of procedure content (the words contained in the procedure) with the metadata needed to support features of the electronic procedure system. In the past, third party tools have been developed and used to save metadata to PROMS and to extract procedure content and metadata from PROMS to create a procedure file compatible with the EPS. Volian is willing to partner with any EPS vendor to enable PROMS to function as their editing tool for EPS procedures. This can be a significant savings over developing and maintaining a standalone EPS editor that will be used redundantly with the required paper-generating procedure platform.

Summary

PROMS is a well-established and proven procedure authoring system. With its unique database architecture, separation of format and technical content, managed linking of data for ROs and transitions, and robust automation; PROMS remains far superior to any comparable alternatives. Through its Maintenance and Upgrade Program (MUP), Volian continues to improve PROMS and maintains an ongoing and active partnership with all its customers.