Standard Microsoft Solutions for EHS Compliance Management Needs

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ABSTRACT

Since the mid-1990's, companies have implemented various Environmental Health and Safety (EHS) management information system (EMIS) software programs for compliance demonstration. There have been few successful cases and many failed attempts. As a result, engineers continue to use spreadsheets to address daily compliance needs because a software solution that meets EHS needs across all functional areas is rare. A better understanding of already installed software can take engineers beyond spreadsheets and help build compliance solutions that can streamline the data collection and reporting functions

Almost all business organizations use Microsoft® standard products including Office (Word, Excel, Access, Visio, InfoPath, etc) for content creation, editing, and organization; SQL Server Suite for data reporting, analysis, and integration; SharePoint for web-based sharing and collaboration; and Exchange for e-mail communication. By utilizing these Microsoft programs, a company can build a compliance management system to centralize data collection, track compliance tasks, e-mail notifications, and manage recordkeeping. Such a system is much more powerful and can be expanded to cover more functions that can make compliance demonstration easier. This paper will present how to apply these standard programs to build a compliance management system with little or no programming skills required. With the basic understandings of these applications and platforms, EHS engineers can talk intelligently with company IT professionals to configure a system for day to day compliance tracking needs.

INTRODUCTION

Environmental compliance requirements at refineries and petrochemical plants involve extensive data collection, review, validation, documentation, communication, and reporting. Environmental staff members are often overwhelmed with daily scheduled and unplanned events. It is not uncommon to learn that a plant has developed numerous spreadsheets, each with multiple checklists for various types of tasks in different schedules. These checklists must be updated for compliance certification on a regular basis. Since the mid-1990's, as part of Title V operating permit compliance certification requirements, many companies have implemented expensive EMIS software solutions to management and streamline the daunting compliance management process.

With the improvement of computer software technology, more and more commercial-off-the-shelf (COTS) software applications have been developed specifically for EHS compliance giving EHS compliance managers more options in selecting and adopting information technologies (IT) solutions for their specific needs. One readily available but lesser known solution to EHS professionals is integrating Microsoft's standard software suite on a SharePoint platform.

This paper introduces the concept of building a complete compliance management system based on the standard Microsoft platform with little to no computer programming requirements. Almost all business organizations use Microsoft® standard products including Office (Word, Excel, Access, Visio, InfoPath, etc) for content creation, editing, and organization; SQL Server Suite for data reporting, analysis, and integration; SharePoint for web-based sharing and collaboration; and Exchange for e-mail communication. Most companies already own and provide user licenses of these software programs to their employees under companywide Microsoft enterprise license agreements. By integrating these standard programs, a solution can be developed to address many of the needs of both small and large compliance programs in a customizable, scalable, and "cost-effective" way.

ENVIRONMENTAL COMPLIANCE NEEDS

To get started in considering or reconsidering IT solutions for compliance management, the following functionalities are commonly requested for a system to streamline the process:

- Centralized system (typically via an internal web-based portal)
- User friendly interface for collecting compliance data (i.e., data entered by operations personnel)
- Clearly defined compliance tasks for the responsible person(s)
- Easy reference to permit conditions and regulatory requirements
- Centralized compliance documents and records library
- Comprehensive compliance tacking calendar for assigned tasks
- Compliance reporting functions
- Interface with the plant process data historian to retrieve hourly process data required for emission calculations
- Data quality validation to avoid bad results
- Centralized emission calculation tool(s)
- Calculate emissions for specified averaging periods and at predefined schedule
- Dashboard to display critical compliance limits
- E-mail notification/warning to operations managers for open action items
- E-mail notifications to the environmental department for deviations
- Reporting results for required emission reports

The list may extend further for complicated compliance demonstration requirements. To meet all the requirements with COTS software applications can be costly; however, many of the tasks tracking process can be achieved using the workflow system provided in the Microsoft SharePoint system.

SOFTWARE TECHNOLOGY OVERVIEW

An Internet search for Microsoft SharePoint will return many technical documents that provide an overview of its functions and features as well as some commercial systems built on the platform.

SharePoint is a set of web-based development and management technologies that drives collaboration between workgroups. SharePoint can be tightly integrated with Microsoft Office (i.e., Word, Excel, Visio, Project, and Access) so that multiple users can simultaneously work in SharePoint-hosted documents, forms, and databases and handle tasks such as the collection, review, and approval of data, documents, and forms. The following features are most often used for managing compliance requirements.

A. Control and Share Regulatory Documents

Document management is the foremost feature provided by SharePoint identifying it as the best document management system on the market today. SharePoint document management provides "life-cycle" control of documents. This includes how documents are created, reviewed, and published, and how they are ultimately disposed of or retained. Regulatory documents often require such capability. Instead of using SharePoint's collaboration tools, most users create and forward documents via e-mail. An effective document management system will allow users across the plant site to control documents with the following features:

- Who can to create and upload documents
- How to store documents at each stage of its life cycle
- How to control access to a document
- How to move documents within a team of reviewers through the document creation, review, approval, publication, and disposition process
- How to handle documents as corporate records, which must be retained according to legal requirements and corporate guidelines

Figure 1 shows a typical document sharing page in SharePoint with folders and controls very similar to Window Explore process. However, user can easily search and control the document in SharePoint.

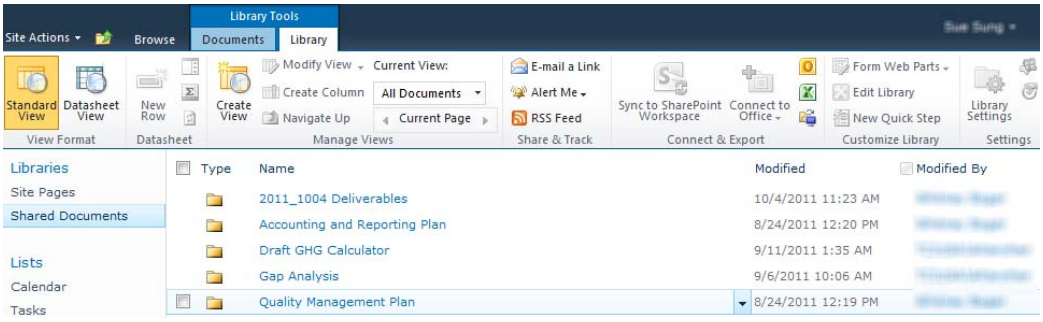

Figure 1. Example Document Sharing Site

B. Manage Compliance Tasks

Managing the numerous EHS compliance tasks is a daunting responsibility at every refinery and petrochemical plant. There is a continuum of tools that have been used to manage these tasks from paper to tables, and lists in Word or Excel to centralized COTS systems. Within this universe of options, SharePoint task lists offer those unfamiliar with formal task management system with a relatively simple and cost effective solution. The power of SharePoint task lists lie in their simplicity as

well as the ability to share and edit them via SharePoint or Outlook. This means that all members, environmental and operations, involved in compliance tasks can monitor the status. Task lists include the following features:

- Add, edit, or delete tasks through either a web page (SharePoint) or desktop application (Outlook)
- Take tasks offline (via Outlook)
- Automate notifications of task assignments and updates
- Attach documents to any given task
- Add specifics and instructions to any task
- Create simple, web-based reports
- Publish basic Gantt chart
- Schedule and monitor tasks in calendar view

Figure 2 shows an example compliance task list page using the SharePoint "List" feature. Under the List tool, user can easily filter tasks such as by "my tasks", by due date, or other filter criteria.

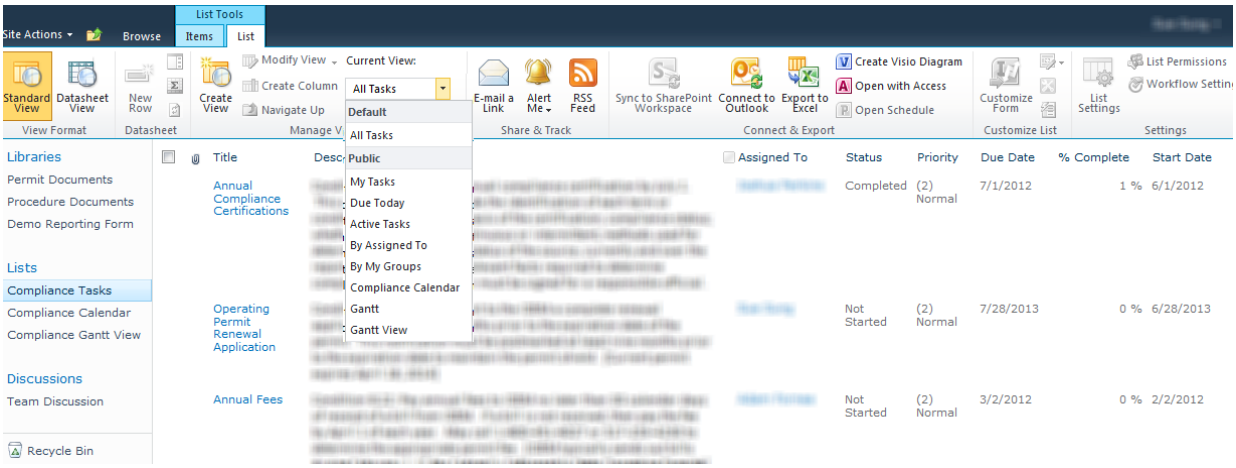

Figure 2. Example "List" for compliance tasks

C. Collect Operational Activity Data

Microsoft offers a powerful web-based form builder, InfoPath, as a tool for designing and creating forms that can be integrated with all web-based software. InfoPath is included in the professional version of Microsoft Office. This application allows nontechnical users to build and deliver methods to collect and manage data. Although a common perception is that these tasks can be accomplished with Word or Excel, InfoPath provides greater functionality and better control of the data collection process. In fact, you can easily convert Word and Excel files to InfoPath for more robust data-collection forms. InfoPath uses an XML-based data format that is extremely useful for additional applications to read and process the form data. The form can easily be published on SharePoint to collect and send data in readable formats via e-mail to SharePoint. Most of these tasks can be accomplished with no compiled coding.

Two significant features of InfoPath development are the rich rules and validation components. The application lets the form designer view and manage common interface controls. For example, one can

design data fields with rules to check the contents, process simple calculations, and compare with limits to immediately let users know if rules passed or failed. One can also build forms to collapse sections of the forms for repetitive data or conditional review for different users.

InfoPath connects natively to SharePoint in multiple ways. It can read data from SharePoint lists quickly and easily, query live SharePoint data, and return results to the form to process a variety of options for the designer or end user. InfoPath forms can be stored locally in SharePoint document libraries in the same way as any other type of document. They can also be made the default template for a given content type. Users can start a new form on a list to automatically create a new record using these custom forms to open, fill out, and save locally in the library for record processing. Via SharePoint, the EHS department can centralize data collection forms. All the data collected can be stored with databases, typically a SQL database, that can be used for compliance demostration process.

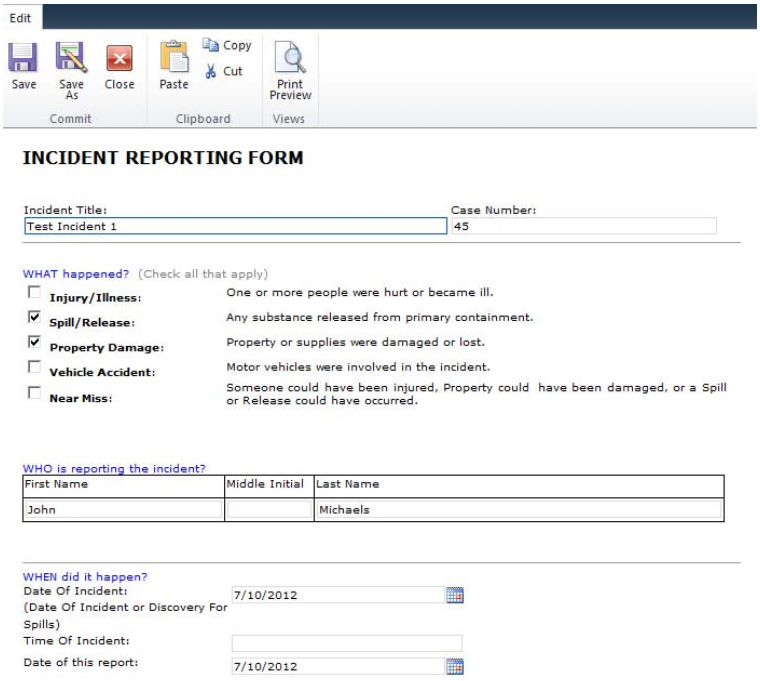

Figure 3. Example data collection form built with InfoPath Tool

Figure 3 ppresents an example data collection form built with InfoPath and publised in SharePoint. The example shows that a company has converted a previous paper form to an InfoPath form that can be accessed via SharePoint to collect incident related data for recordkeeping and reporting purposes.

D. Calculate and Manage Emission Source

SharePoint can include all standard calculation tools build in Excel and Access. The web platform system is also ideal to host and/or connect with emission calculation systems that are developed to integrate with the process data historian. The most common approach is to publish Excel workbooks to SharePoint. Users can publish an Excel workbook to a SharePoint site so that other users can view its data in a web browser without having Excel installed on their computers. In addition, by setting some publish options, users can emphasize specific parts of the workbook in the browser. All Excel calculation functions can be performed as normal when users update input data via the web. This is also a great way to display Excel charts and tables on a SharePoint page.

E. Build Site Portal and Dashboards

SharePoint provides many design templates for organizations to build/customize their own sites without any programming. Within the site portal, companies can add logo(s) and select features from SharePoint's standard software package.

Many COTS solutions offer great dashboard features for management to monitoring important EHS indicators. SharePoint enables user to create and use dashboards that provide up-to-date information in a centrally managed, easily accessed location. Dashboards can be customized for an individual (e.g., environmental manager), the environmental department, or the entire site. SharePoint offers several easy to build tools for users to configure dashboards. Typical functions such as charts, calendars, open action items can all be built on the portal from data collected from lists, library, and other integrated tools. One can also embed Google map functions for an area view of the sources and interested locations.

Figure 4. Example Dashboard information

CONCLUSIONS

This paper provides a general overview of how EHS managers can build compliance solutions to streamline data collection and reporting functions. Many companies have already standardized their IT solutions using Microsoft products. Integrating these Microsoft programs offers a customizable, scalable, and "cost-effective" alternative to large, expensive EMIS solutions.

Microsoft software dominates business IT solutions, therefore SharePoint naturally has become more and more widely used by business to centralize documents, records, and reports. Using SharePoint for EHS compliance management is a logical choice and could soon be the standard tool for compliance demonstration. For this reason, EHS managers should gain more understanding of these technology solutions.

KEYWORDS

Microsoft, SharePoint, EHS, Compliance Management, EMIS, InfoPath