

**WIKI-BASED O&M DOCUMENTATION SYSTEM INSTALLED AT THE  
MADISON METROPOLITAN SEWERAGE DISTRICT**

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**ABSTRACT**

The Madison Metropolitan Sewerage District (MMSD) has recently implemented a Wiki-based O&M documentation server for providing searchable and editable text and graphics for operator use. This system is replacing paper and other electronic means of storing information. For MMSD, this Wiki has provided a low-cost solution to the many other documentation media available while addressing a variety of drawbacks to these systems. Configuration and on-going maintenance of this system has been relatively simple.

The MMSD is a 57.5 MGD plant located in and serving the Madison metropolitan area. MMSD owns and operates the Nine Springs Waste Water Treatment Plant (NSWWTP). Original portions of the plant were constructed in 1928 and the plant has gone through ten major plant additions as well as a number of smaller upgrade projects. For each project, MMSD collects documentation from a variety of sources: internally generated, vendors, engineers, and consultants. Some of this documentation becomes critical information necessary for plant operations.

In the past, MMSD struggled with a variety of methods of presenting and making this information available for operators. Recently, these solutions have ranged from paper and electronic text files to drawings and a recent addition, an HTML based intranet documentation system. All of these systems have drawbacks which include version control, search function, file hierarchy, the inability to tie graphics to text, in some cases, and the ability to easily add to and edit documentation from a single source.

Beginning in January 2008, MMSD began moving operations documentation to Wiki-based application. This software, which operates much like the internet based Wikipedia, (an online encyclopedia) removes many of the previously mentioned drawbacks to previous systems.

The Wiki application is installed as a virtual machine on a “server” which falls under the SCADA domain and is accessible from all process workstations. Wiki pages can be called up from process displays. All information on the Wiki-based system is searchable. To edit or add information, a login is required to track changes. All “old” information is archived and in the event errors in changes are discovered, documents can be “reverted” to known good data. System backups can be copied off the active computer by copying the virtual machine files to another location. In the event the primary computer becomes inoperable, another virtual machine can be installed on a working computer and the Wiki system restored.

With the exception of the “server” computer, the operating system software, and setup, configuration, and management time, this application was installed at minimal cost and with little outside support.

The MMSD Wiki has addressed many of the existing downsides to other electronic documentation tools. It remains low cost for the District allowing the organization to preserve resources for other essential functions. Contribution of information to the wiki is on-going and for the foreseeable future, will not end. This system has been accepted internally as the information repository for operations documentation.

Full paper is available at [www.madsewer.org](http://www.madsewer.org); select publications...then presentations.

## **INTRODUCTION**

In early 2008, The Madison Metropolitan Sewerage District (MMSD) implemented an open-source Wiki-based software application for use in providing access to O&M documentation. In the past MMSD has struggled with finding methods to best provide information to treatment plant operators and others. MMSD collects a variety of documentation from many sources on all equipment it receives as part of maintenance work or for process upgrades. The goal of this implementation was to create an open system where editing and viewing ability was provided to all at a minimal cost. The desire was to have a system that provided multimedia capability and into which a variety of document formats could be loaded. Our original product search was for something "Wikipedia" like to contain and present information. After reviewing several products, we found a good candidate that met most of the needs we viewed as necessary.

## **TYPES OF DOCUMENTS**

Throughout the history of MMSD, a variety of documents have been collected that are the O&M documents for MMSD facilities. These have come in many different forms from the many different contributors to projects over the years.

There are facilities operated by MMSD that have been in service for fifty years and staff still relies on original documents at times, for problem resolution.

## **INFORMATION SOURCES**

In recent years, at least where written documentation is concerned, the District has attempted to standardize on PDF files for electronic storage and access for documentation. For nearly ten years MMSD has been working with vendors and contractors (and internal staff) to produce PDF compatible O&M documents. This pressure has had mixed success in providing better information access for users. Problems encountered here have included annotating documentation, locating the current file, and providing equal access to all. Also, occasionally, vendors will provide catalog information for their product lines. While only a small part of the whole catalog is relevant to the project that is underway and so, valuable information for future plant operations gets buried in much less valuable information about products that do not apply to our operation.

## **EARLY SOLUTIONS AT MMSD**

During the past ten years at MMSD, major efforts have been underway to make all operator O&M documents available in an electronic form only. During the first five years of this time-frame, Windows Wordpad (DOC format) documents were stored on a shared network hard drive of the Process Control System (PCS). This allowed all users to view and edit information. However there were limitations: no graphics, no version control, and no checkout. Backup routines were developed to protect information archiving.

During a more recent plant addition, an alternative O&M document format was developed essentially based on Windows Frontpage. All documentation was viewed using a browser and could include graphics and other special formatting. However, there was still a major limitation to editing using this system. All information stored in this system was kept in a complicated file structure and editing was intended to be performed only by a limited system management pool.

A new information storage format was needed!

## **REQUIREMENTS**

What was being required of this new system are the following:

- Viewing and editing by all
- Version control with backup scheme
- WYSIWYG editing with in-line graphics and tables
- Search capability

Essentially, the model of the Internet's Wikipedia was viewed as adequate.

## **PRODUCT AVAILABILITY**

Through searching the Internet during late 2007, it appeared that there were some Wiki-like products available. In trials though, some of these seemed cumbersome to configure, maintain, and use. There were limitations to the very functions highlighted above. Eventually, MMSD ran trials of MindTouch's Deki Wiki software. This software was developed rapidly during late 2006 and 2007. The MMSD trials were run in early 2008. By this time, Deki Wiki seemed to be reaching a reasonable level of development and maturity. Since this time, the software has improved dramatically with the addition of new features and the repair of old features.

## **ADDITIONAL FUNCTIONS**

There are many features available in Deki that MMSD does not use. Many of these are probably more available with paid versions of the software, and may in any case require MindTouch support to use optimally. These additional features are available through extensions to the software and require a very open (to the Internet) system. MMSD's system currently resides on a closed, firewalled, SCADA network.

## **BASIC FEATURES OF A WIKI**

The MMSD Wiki allows WYSIWYG editing, formatted viewing and printing of text, graphics, and tables, style and font selection, commenting on pages, file attachments, auto TOC generation, version control, page restrictions, linking between pages, page inserts, text search in pages and attachments, and more.

Essentially, the Wiki allows MMSD to meet the requirements listed above and also provides the basic features listed in this section.

## **MINIMAL HARDWARE, SOFTWARE, AND SUPPORT REQUIREMENTS**

### **Product download**

MindTouch Deki can be run under a variety of operating systems from Windows to Linux and several options between. The model that this discussion focuses on is a virtual computing solution that runs under a Windows operating system.

Beyond the operating system, the software used by MMSD involves two systems. The first software system that must be downloaded to mimic the MMSD installation is VM Ware Player from VMWare.Com. The actual Wiki software is obtained from MindTouch and is the VMWare version of Deki open-source software.

### **Open-source software**

VMWare Player is a free version of a wider line of software products. MindTouch Deki OpenCore is also, more or less, a free version of a wider range of offerings.

VMWare Player has upgrade versions called VMWare Workstation and VMWare Server, among others. While these other versions offer more features, MMSD has found its

installation of Deki under VMWare Player to work fine. VMWare Player is installed under Windows XP, though other combinations are possible.

The current version of Deki that is in use by MMSD is Deki Open Core. This software is under constant development through a community of programmers dedicated to problem solving. As a result of this open source nature of this product and the contribution of programmers, MindTouch does not sell this product. Through value added enhancements however, other versions of the software are available.

MMSD uses the developer version of the software with the idea in mind that through use, we may be able to contribute to the community. It is also rather likely that at some point we would be driven to purchase a support package to make the software whole.

### **Installation**

After obtaining the VMWare package and the MindTouch Deki package, the user must install these to a computer that has network access.

The VMWare software creates a virtual computing environment that runs within the operating system of the host computer. This "computer" sets up its own resources inside the host computer. After the VMWare software setup is complete (which takes perhaps five minutes), the user opens a designated VMWare configuration file from the Deki package and the remaining installation is handled by scripts within the virtual machine.

When software installation is complete, the user can setup Deki from within a browser. These two steps take about 15 minutes.

### **Browser Software**

Web browser software is the only special utility that needs to be installed on a user's machine to access Deki pages.

MMSD has used both Firefox and Internet Explorer to access the Wiki. Both browsers have advantages and disadvantages. Perhaps the most notable differences are in operating system support and the display of fonts for printing of Deki pages.

### **Support**

MMSD has not used MindTouch support, however we have used OpenGarden.org, the forum for Deki extensively. OpenGarden has been used mostly to find configuration methods for the Wiki. Changes were made to the PDF printing utility, editor, network interface, page banner, and spell checker configuration. All the information to make these changes was obtained either from the OpenGarden or from the Debian (Linux) open source operating system web site. MMSD has also indirectly accessed the web site for upgrades.

### **Maintenance**

MindTouch has provided update capability to even the open source versions of Deki. These are script functions – run a shell script in the Linux virtual machine and the script performs all the necessary modifications. This update has been done at MMSD to the open source version perhaps five times successfully.

There has been difficulty at MMSD, with attempts to backup data by saving configuration files and the database and restoring these functions to a new installation of the Wiki.

## **Backup**

At MMSD, the Wiki is backed up by simply shutting the system down and copying the files in the Wiki directory to an off line drive.

## **ADOPTION THROUGHOUT THE ORGANIZATION**

Beyond the technical hurdles of installing and configuring software, still larger issues remain. These issues are filling out the Wiki with information and gaining acceptance at the same time.

To fill out a Wiki with the type of semi-static data that makes up typical O&M may require the input of a number of people. These people may also be those that require access to information. It can be challenging to get input to the Wiki when there is no information present to seed additional contributions. An initial effort must be made to put fundamental information into a Wiki for basic processes. Greater acceptance will be achieved when users begin looking to the Wiki for information and then subsequently, contribute their own thoughts or knowledge.

## **TECHNICAL DETAILS**

MMSD's Wiki is installed on a Windows XP Professional computer that is networked on the SCADA domain. The Workstation runs VMWare Player and has the MindTouch Deki Open Core appliance installed. The virtual machine has a static IP address and the Wiki is accessed through this fixed address.

MMSD is in the process of moving information on to the Wiki and believes this will be an ongoing project for the foreseeable future. New information is placed in the Wiki as necessary.

## **CONSIDERATIONS FOR THIS PRESENTATION**

Minimal collaboration occurred between MMSD and MindTouch for the development of this discussion. MindTouch has provided no benefit to MMSD for this presentation beyond the availability of Open Core Deki and support information available to all.

MindTouch Deki may not be the solution for all, but hopefully this discussion will encourage its consideration when seeking O&M documentation software.

The Deki Wiki application work rather well for MMSD at this point, but there is some long-term concern for the product – no different than many others. MMSD is likely a low to mid-range user for this product – others in customer relations or web applications uses would be high-end users.

For MMSD, the risk of populating a Wiki database with large volumes of information and then later finding the software unviable is mitigated by the ability to cut and paste information out of the system in the same way it was inserted. We believe this ability will not be lost with any loss of software support.

The author was captivated by the search functions in Deki, the rather streamlined virtual machine setup, and the PDF output of page contents.

## **CONCLUSION**

In early 2008, MMSD installed the MindTouch Deki Open Core application to run within a VMWare Player virtual machine on a Windows XP Professional computer. MMSD continues to fill this Wiki with existing and new in-coming O&M information for use by plant operators in making treatment plant process decisions. The Wiki was installed at

minimal cost, continues to be maintained a little expense and serves the needs of plant operations rather well.

The MMSD Wiki continues to gain acceptance throughout Operations and beyond in the organization. Information beyond strict O&M type documents are more frequently placed in the Wiki. The Wiki application could very well become an organization-wide resource for information.

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<http://www.vmware.com/>

MindTouch Deki,  
<http://www.mindtouch.com/>

VMWare Player Download Registration page,  
[http://www.vmware.com/download/player/player\\_reg.html](http://www.vmware.com/download/player/player_reg.html)

MindTouch Deki Open Core VMWare application,  
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