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"Service Measured To The Standard"

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Newsletter ~ Drafting Documentation Solutions

In today's environment, business managers are faced with budget challenges. Reduced funds must be allocated among OSHA-mandated requirements, reliability needs, limited capital activities and routine maintenance.

Complicating these conditions, their companies are losing critical personnel due to downsizing or retiring: those remaining have heavier work loads and little time to gain experience needed to fill the gap. And these individuals are left with even less time to find or verify information about the equipment under their care. Without up-to-date and proper drawing documentation, time and money is lost.

As an example, throughout the life of an electrical motor control center, loads are added, changed or removed. What happens if records are incomplete? Inspections can deal with the obvious, but what about the unknowns? Is the company's file copy of the single-line drawings current for all the loads? Did the available arc flash energy change? Will shutting down a panel affect a critical load? Will a new load exceed the system's rating?

How about safety? Compliance with OSHA and NFPA 70E safety guidelines, concerning work on or within electrical equipment, and questionable documentation may challenge a staff unfamiliar with necessary procedures. The unknowns can injure personnel and damage equipment.

In a perfect world all information for these electrical devices would be in electronic and limited paper formats, and always up-to-date. The reality is that vital documentation is rarely complete. What solutions are there to weather the near-term dilemma and be ready for the future?

A cost-effective option is to use the resources of either a dedicated multi-disciplined company team and/or a third party resource to evaluate drawing and equipment documentation. The team should use a systematic approach of reviews and recommendation-based safety, reliability, and then general information by performing

an audit of comparing the documents with equipment in the field.

Potential OSHA, NEC, or NFPA 70E safety concerns should be noted and addressed first. NFPA 70-2012 Article 205.2 states: "A single-line diagram, where provided for the electrical system, shall be maintained in a legible condition and shall be kept current." Without a readable and up-to-date drawing showing all the loads and sources, a proper lockout might not be possible and a calculation for arc flash cannot be performed.

Another area of electrical safety concern deals with grounding and bonding. NFPA 70E-2012 Article 205.6 states: "Equipment, raceway, cable tray, and enclosure bonding and grounding shall be maintained to ensure electrical continuity." What is your present grounding maintenance assurance plan to minimize electrical shocks? An important part of any good plan should include drawings identifying and labeling each ground rod to be tested. When you are dealing with Step-Potential shocks, a 90% testing compliance might leave someone critically injured by that 10% untested.

The next step is to update the drawings. However many companies use raster images because expensive programs are not required to read raster-based images. The lack of CAD files is common with older facilities or new projects where the CAD files were not supplied by the vendors or engineering firms. These types of drawings are harder to correct or update, leaving "red-line" drawings in an engineer's office or craft's filing cabinet. Good luck trying to find the drawing in the middle of a crisis on a holiday night.

The conversion of raster images to CAD is made easier today by software companies like AutoDesk. Quick changes to single-line drawings, P&ID's, Block Diagrams, etc. can be accomplished and stored in a central data system for access to any personnel at any time.

With the use of a SCADA control and monitoring system within a switchgear center, these computer based devices can provide quick and current access of drawings or equipment manuals.

An assessment report will identify and prioritize all items. Working with key facility personnel, the review team can develop a correction plan. With a structured, proactive plan implemented, safety and reliability will improve, as well as the outcome of a safety audit. In addition, a well developed and executed plan could be more cost effective than a piecemealed or continuously interrupted plan.

The benefits of the review and updates of a facility's drawings and other documentation should not end here. New projects and system modifications should include a means through the Management of Change to ensure that the new equipment is properly recorded AND all the existing drawings are updated. Lessons learned and review of updated drawings should be integrated into the MOC process.

The most indispensable tool as part of your safety and reliability improvement plan very well may be the process used to manage your drawings.

Another valuable tool for any CAD activity is a standard for drawing layout and documentation. Without a standard, individuals within the owner's company will use their personal preferences for drawings leading to confusion and inconsistencies. Additional problems arise when third parties apply their

own drawing standards to the owner's drawings. Cornerstone's staff has provided comments and recommendations to existing or missing owner's standards founded on a broad based industrial standards and owners' preference.

See attached flyer below for service information.

DO YOU HAVE MARKED UP DRAWING CHANGES THAT NEED A PERSON OR TIME TO COMPLETE?

DO YOU NEED ASSISTANCE TO FIELD VERIFY OUT OF DATE DRAWINGS?

ARE YOUR OSHA REQUIRED DRAWINGS UP TO DATE?

DO YOU NEED HELP WITH DRAWING MANAGEMENT?

WE ARE YOUR SHORT TERM OR LONG TERM SOURCE FOR:

DESIGN / DRAFTING SOLUTIONS

- P&ID REVIEWS AND UPDATES - OSHA REQUIRED
- ELECTRICAL ONE-LINE REVIEWS AND UPDATES - OSHA REQUIRED
- FIELD INVESTIGATION AND VERIFICATION OF DRAWINGS
- MANHOLE AND CABLE VAULT DRAWING UPDATES
- DRAWING MANAGEMENT AND STANDARDS
- AUTOCAD DRAWING GENERATION OR UPDATING
- MANUAL AND RASTER DRAWING UPDATES
- BLOCK DEVELOPMENT
- FREE ESTIMATES

OUR TEAM EXPERIENCE AND SKILL CAN BE APPLIED TO CHANGE YOUR DRAWING PROBLEMS INTO SOLUTIONS!

OUR FIELDS OF EXPERIENCE INCLUDE:

PETROCHEMICAL STEEL POWER GENERATION COMMUNICATION

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Associated with IEEE, NFPA, NWIBRT, NETA, and BBB

Cornerstone Electrical Consultants, Inc.
Crown Point, IN 46307

DRAWING NO.		REFERENCE DRAWINGS		
0	ORIGINAL	CORNERSTONE-ELECTRICAL	CORNERSTONE	YOURS
REV	REVISION STATE	DOCUMENT NO.	CONTRACTOR	PROJECT

CORNERSTONE
ELECTRICAL
CONSULTANTS
DESIGN / DRAFTING SOLUTIONS

UNIT: -	SCALE: NTS	STATE: IN
DRAWN: CEC	DATE: 05-2009	SHEET NO. 1 OF 1
CHECKED: NJM	DRAWING NO.	REV.
ENG'R: GTM	CORNERSTONE	0

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VERSION: DATE: