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V.I.E.W.S.

VIEWS & INFORMATION ON ENVIRONMENTAL & WORKPLACE SAFETY

Prepare Your Plant for an Arc Flash Hazard Study

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An arc flash hazard study is a complicated engineering survey and analysis. However, preparing for the study in advance can make the process easier and improve the accuracy of the survey. Although an art flash study places demands on staff time, a well-executed study improves plant safety by identifying where hazards are located and determining whether they can be corrected.

The arc flash hazard study will involve four phases:

1. Data gathering.
2. Engineering analysis of the data.
3. Report presentation, personal protective equipment (PPE) procurement, and labeling.
4. Training.

Of these four phases, only the engineering analysis is done off-site; the remainder of the process occurs within the plant.

Preparation

In addition to preparing the plant for the study, safety and facility management personnel need to prepare themselves for the process. Those performing the study should remember that they are not conducting an arc flash hazard study to identify places where personnel will have to wear special PPE because the use of PPE is a last resort.

Whenever possible, circuits should be put in an electrically safe condition before work begins; however, circuits cannot always be rendered safe, so an arc flash hazard study is necessary. The study is designed to identify the hazards so as many as possible can be removed. When hazards cannot be removed and where circuits cannot be shut down, personnel should wear special PPE while working on exposed live parts of the circuit. They also should wear PPE when they are verifying that a circuit is safe during lookout/tagout procedures.

Utilizing Personnel

The demands on plant personnel are greatest in phase one. In this phase, outside field technicians will come to a facility and collect data on the electrical distribution system. The safety or facility manager and other plant personnel will need to assist them. Field technicians will begin at connection point(s) to electric utility recording, transformer KVA, wire size, and wire length. From there , they will observe the main switchgear, where they will collect fuse

Inside this Issue

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and/or circuit breaker information as well as wire size and length, recording the information on the panels and equipment fed from the switchgear. They will then move to those loads and panels, repeating the process until they have gathered data on the entire system.

If a complete set of accurate on-line drawings of the plant's electrical distribution system are available, phase one could be eliminated, but very few plants retain accurate and updated drawings. Some facilities choose to do the data collection themselves, but allowing personnel who have not been trained in recognizing hazards presented by exposed conductors to perform this task can present significant safety risks. Allowing only trained professionals to collect data ensures that proper labels are created and appropriate safety procedures are followed.

Depending on the size of a facility, the data collection phase could take anywhere from half a day to several months, and someone from the plant should be available to assist the field personnel when needed.

Tips for an Efficient Study

Consider the following example of how your personnel could provide the field technicians with valuable and time-saving information. A circuit breaker in a panel is labeled "press #16." The field person needs to know the location of press #16 so conductor lengths can be recorded and the piece of equipment evaluated. In general the field technician will not be familiar with your plant and will have no idea where that machine is or how to find it. Your personnel will know where the machine is located and whether the company still owns it. Often, the assisting plant personnel will remember that the machine was removed two years ago and that now furnace #5 is sitting there. At that point, it must be determined what, if anything, this breaker is actually feeding and its location in the facility; otherwise the study will have inaccuracies.

The importance of confirming proper labeling prior to the start of the project cannot be emphasized enough. If panel labels are updated and confirmed prior to the arrival of the field technicians, the study will be much more accurate, and less rework will be needed.

Preparing Personnel

As the field technicians arrive at the facility, personnel will have questions. It is best to prepare for questions in advance as the field technicians likely will be wearing PPE when they open panels, and some of this PPE might be foreign to employees. One of the common questions from maintenance staff is, "Am I going to have to wear that gear?"

The answer is that the technicians are wearing the PPE to protect themselves as they identify hazard, so employees won't have to wear the same PPE on a regular basis. In general, let employees know what is happening and that there are changes coming.

Planning

When planning for the arc flash hazard study, it is important to consider what personnel will need to be present for each phase of the study. During phase one, the data gathering, an experienced plant electrician or someone with similar knowledge will need to escort the field personnel to help identify equipment.

Phase three, which involves report presentations, PPE procurement, and labeling, will require plant management, safety personnel, engineers, and select other personnel to be present, but this phase will last only a few hours.

Phase four, the training, will involve many people. Qualified and unqualified personnel both need to be trained. Remember, procedures developed as a result of the study are not only a major change for electrical staff but also for anyone working in the vicinity.

Removal of Hazards

The removal of unidentified hazards is the final step in the process. Although not part of the study, this step is the most important in protecting your personnel from an arc flash. Money and time will have to be budgeted for these changes, which might involve changing fuses or adjusting trip settings on breakers or relays. After the hazard removal recommendations have been carried out, new labels must be made and the study should be updated.

Safety Programs

Employers are required to have a written safety program, so make the arc flash study part of it. Also, write policies requiring that modifications to the distribution system be recorded and the study updated. Ensure that this policy goes into effect before the study begins so that the system does not change between data collection and labeling, which would create inaccuracies. Including this policy and making it common practice before the study is implemented can help to prevent undocumented changes from rendering your study inaccurate. Most companies are making annual updates a part of their policies. In the safety program, you must include information about how the modifications will be handled between the time they are made and recorded and when the study is updated.

Special Locations and Equipment

If the location of any panels or equipment will require special training, clearance, or equipment, it is important to make arrangements for field personnel to collect or obtain the necessary data. For example, during the course of an arc flash hazard study at a defense contractor, the technicians needed access to a panel that was in a clean room, but none of the technicians had training or clearance to enter. Another instance occurred at a medical equipment manufacturer where a rooftop panel serving air handlers for a clean room could not be opened without being shut down. In both cases, the plant personnel collected the data later and forwarded it to the technician. Plan for these events before the study to prevent delays.

Conclusion

An arc flash hazard study can be made less painful with proper planning and by preparing your plant and personnel before the study begins. By incorporating the study into the company's safety plan, arc flash hazards become an integrated part of general safety awareness.

How Well Do You Know D.E.P.'s Hot Work Policy?

Find out by answering these 7 questions!

1. Can the supervisor of the hot work also be the PAI?

2. Is there a temperature range that makes a job hot work or is it a question of an open flame? (Is soldering of electrical components considered hot work? Is the use of bearing heaters or heat guns considered hot work?)

3. How often is the PAI required to "monitor" the activity of hot work? (Frequency of inspections)

4. What is the required CFM airflow of ventilation or exhaust in a hot work area?

5. Is there any special PPE required of fireguards?

6. If means other than the use of extinguishers are used to put out incipient fires, how long does one attempt to put out the fire before calling the fire department?

7. Does the use of burners or hot plates in the lab require a hot work permit?

(Answers upside down below)

Hot Work Quiz/Answers

1. Response: The NYC DEP Hot Work policy states that the PAI must not be the person conducting hot work. Hence, if the supervisor is not conducting hot work, then this individual could be the PAI.

2. Response: A hot work job is not regulated by temperature, but by processes that generate sparks or a significant heat source such as welding, grinding, metal cutting, flame cutting, or flame-thawing pipe.

3. Response: There are no specific requirements for the frequency of inspection during the work. However, prior to Hot Work, the PAI is to conduct a site inspection to review the job, identify any special hazards and precautions required, and verify that conditions are safe to initiate work before issuing Hot Work permit. Under Section 5.3 of Agency Policy, where fire watch is not required, the PAI will also make a final check 30 minutes after the completion of the hot work operations to detect and extinguish smoldering fires. However, during torch work in NYC and when required otherwise by the permit, the Fire watch is ultimately responsible for maintaining constant observation of the hot work activities and of adjacent areas to detect the presence of fire or to detect the possibility of ignition sources.

4. Response: There are no requirements to maintain specific flow rates (cubic feet per minute) for fixed enclosures or freely movable hoods. However, the regulations require adequate ventilation be provided when there is potential for hazardous concentrations of airborne contaminants exceeding the permissible exposure levels (PEL) as specified in 29 CFR 1910.1000 In addition, ventilation requirements are determined by an assessment of the following circumstances:

EHS Employee Profiles: This new feature introduces employees currently involved in EHS work within DEP. Because we are such a busy agency, we often do not get a chance to meet everyone. This feature offers an opportunity for you to learn about who we are and what we do at DEP.

Allan Straker
OEHSC Trainer

Allan Straker joined the OEHSC Training Unit in October, 2005. Since then, he has become the unit's principal trainer. To date, he has trained over 1000+ employees in Right to Know/Hazard Communication.

" Right to Know training is important, " Allan says, " because it is a key factor in improving health and safety conditions in the workplace. My class is packed with information that helps employees to spot on the job hazards and lets them know what to do should they see any. It is every employee's right to have this information by State law, and I want to make sure they have it. "

" My classes are informed and informal. We discuss issues important to health—such as infectious agents, toxic substances, and the effects of exposure to hazardous materials. We discuss safety issues as well, such as office ergonomics, personal protective equipment, leaks and spills. I want DEP employees to leave my class with a heightened awareness of work place hazards and what to do should they encounter them. I enjoy my work because I meet employees at every level and because I believe I am helping them perform their jobs as safely as possible."

(Allan holds a B.S. from York College, City University of New York)

Hot Work Quiz Answers (continued)

7. Response: No.

6. Response: The fire watcher must attempt to extinguish an incipient fire with the available fire extinguishing equipment. The fire watch must also report the fire in accordance with the Facility Emergency Response Procedures.

5. Response: If the firewatchers are exposed to the hazards created by welding, cutting or brazing operation then the firewatchers must be protected by personal protective equipment in accordance with the requirements of OSHA 1910.132(a).

For general welding (no hazardous metals) where the dimensions don't meet the above criteria, provide either a minimum rate of 2,000 cubic feet (57 m3) per minute per welder, local exhaust hoods and booths meeting 29 CFR 1910.252(c)(3), or airline respirators (this requires respirator clearance and training). Also, it should be noted that natural ventilation may be adequate for some hot work designated areas. However, determining the ventilation requirements is the responsibility of the Bureau EHS for permanently designated areas and of the PAI for temporary designated areas and for work requiring a HWP.

- When welding or cutting on certain metals is done.
- In a space of less than 10,000 cubic feet (284 m^3) per welder.
- In a room having a ceiling height of less than 16 feet (5 m).
- In confined spaces or where the welding space contains partitions, balconies, or other structural barriers to the extent that they significantly obstruct cross ventilation.