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# Electrical room Fire protection

*Fire protection is a key element to ensure safety and reliability of our plants. Fire protection starts with the selection of the right building materials. In case of a fire, a key element to limit the damage is the earliest possible detection, a quick reaction and the possibility to de-energize the electrical room. The following section describes the requirements for fire protection of the electrical room:*

* *Fire protection shall follow the recommendations as laid down by the Cargill insurance company in document 203J and local code requirements for Electrical Rooms. This requires in particular to have a highly sensitive fire/smoke detection system.*
* *A camera to allow a remote monitoring of the electrical room should be considered if the required emergency response time as laid down by document 203J cannot be met. This will provide secondary verification of a fire when the fire alarm system goes into alarm.*
* *The room shall be equipped with the possibility to de-energize the room either remotely (on site) or locally (outside of the room) for non-electricians. The de-energization does not need to be limited to the equipment inside the specific room (e.g. it is possible to de-energizes all transformers in a specific plant area instead). This will provide a method to turn off power before firefighting starts.*
* *The facility shall have a written response procedure on what to do in case of a fire alarm, which includes criteria when and how to turn off power to the room.*

*The following installations are generally not recommended and should only be allowed after separate, written approval:*

* *Installation of fire suppression system – this is because electrical arcing will continue until the power is turned off.  After power is turned off and the fire is detected in time, local portable fire extinguishers should be able to extinguish the fire quickly.*
* *Interlock of the fire detection system with the electrical feeder to the room – this is because Cargill has experienced multiple nuisance alarms of fire detection systems and the impact to the production could be very high.*

1. FAQ

**Do you want to install in all electrical rooms, so also transformer rooms?**

* No, only for the rooms that meet the requirements. (critical electrical room and not capable of making an unmanned response within 3 mins).  So, first off it would only be considered for rooms where we had fire suppression to start with or were considering it.  Second, it would only be for these rooms if someone cannot respond in a timely fashion to determine if there is a real fire.

**Is an oil transformer installed outside also an electrical room?**

* No.  Purpose of the camera is to help verify the conditions of a fire based on a smoke alarm.  We wouldn’t have smoke alarms outside.

**For a large electrical room, only one camera? Or per row?**

* Just enough to help verify if a smoke alarm is real or false.

**Should CCTV and monitors be connected to a UPS system?**

* Not defined but UPS power is preferred.

**Quality of the camera, 480/720/1080p?**

* Not defined.

**Where to install monitors? Control room, guard house?**

* Not defined but recommend where the fire alarm is monitored.

**Should each camera have its own monitor?**

* I see one monitor paging through the different cameras.  The operator/guard and go to the appropriate camera based on an alarm.  (Again, not defined so up to the design engineer).

**24 hours recording of CCTV?**

* Not defined, but I think 24 would be the minimum and would prefer 72.

1. Background info

*See below as background information a discussing this with Tony Buchl with Cargill insurance.  A summary of his feedback is:*

* *When we look at the MCC fires across Cargill there have not been very many compared to the number of MCC rooms that we have.  Even when there was fire suppression available, the fires continued to burn down the electrical gear until the power was turned off.  The fire suppression systems are expensive to install and require maintenance and testing that is also expensive.  One of the more expensive tests is the requirement to do the fan test that checks the rooms ability maintain pressure or contain the fire suppression agent.  So, when we combine the costs to install and maintain fire suppression across all the MCC’s worldwide compared to the cost to repair fire damage, it is much more economical to do repairs.  FM will report not having fire suppression as a gap because that is their standard but that does not mean that we are required to install it.*

*Therefore, our focus should be on:*

* *Fire prevention*
  + *Performing IR scans of all of our switchgear (leading practice is quarterly and minimum requirement is annually).*
  + *Performing maintenance on all of our switchgear (breakers, switches, cables, bus bars, connections, relays, etc) per the Cargill electrical maintenance matrix or more often based on equipment condition.*
* *Early fire detection through smoke detectors and cameras for verification if needed.*
* *Turning off the power*
* *Putting out any remaining flames with local fire extinguishers after the system is electrically safe to do so.*
* *Having a disaster recovery plan that helps us move through the process of finding and procuring parts or entire enclosures quickly.  This may include on-site spares or contacts for local companies that can provide parts (e.g. bus bar, cables, new or rebuilt breakers, relays).  The plan should address every breaker, relay, cable, etc.*

*Recommend the following:*

* *Follow the GRC document 203J requirements. (assume you’ve seen it, but it is attached.)*
* *Install VESDA smoke detection to a 24hr manned site for all sizes of rooms.* 
  + ***VESDA****(an abbreviation of Very Early Smoke Detection Apparatus) is a laser-based smoke detection****system****. The name****VESDA****has become a generic name for most air sampling applications. The name****VESDA****is a trade mark of Xtralis.*
  + *PM plans to clean filters and controlling dust is critical to avoid nuisance alarms.*
  + *Tony recommends the spot detector over the VESDA units because of cost and maintenance of the VESDA.  I have not investigated their reliability in our MCC rooms which seem to see dust issues from construction and cleaning.*
* *Camera monitoring for* 
  + *remote rooms*
  + *critical rooms*
  + *rooms where a manned response to investigate a smoke alarm would take more than 3 minutes on average.*
  + *This will provide secondary verification of a fire when the VESDA goes into alarm.*
* *Either remote or local (outside of the room) pushbuttons to turn off power to the room (assuming we have breakers and not switches).  This will provide a method to turn off power before firefighting starts. If switches are used than a procedure needs to be written and posted outside the MCC room so that a properly trained person can turn the power off to the room.*
* *Time is of the essence in responding to a fire or smoke alarm.  Therefore, we need a well thought out procedure that people are very familiar with on how to respond to a fire so that they do not get injured and so that we minimize property damage.*

*I do not recommend smoke detection being interlocked to the power supply because of the nuisance trips that we’ve seen from VESDA systems.*