

May 5, 2016 - Gillette, Wyoming

WMEA Group Discussion Notes: Group 6 & 7

Group Members:

Michael Uliana – TMEIC (Toshiba Mitsubishi Electric Industrial Systems Corp)

Jason Isaak – Coteau – Freedom Mine – Beulah, North Dakota

Eric Lindborg – Coteau – Freedom Mine – Beulah, North Dakota

Brad Johnson – TMEIC (Toshiba Mitsubishi Electric Industrial Systems Corp)

David Erisman – Drives & Controls Services, Inc (DCS) – Gillette, Wyoming

Rob Neuman – Cloud Peak Energy – Spring Creek Coal Mine – North of Decker, Mt.

Rob Marnell – Drives & Controls Services, Inc. (DCS) – Casper, Wyoming

Safety Share: Rob Marnell with DCS spoke of an incident with a motor control center in which the auxiliary transformers feed to the unit was terminated on bare bolted connections below the main breaker. While pulling cables through the lower cable race in the unit, an electrician came into contact with the bare 480 vac connections receiving an electrical shock. The electrician was treated and released at the local hospital emergency room with no injuries.

The takeaway from this safety share is always check all compartments for energized equipment.

Safety Topics:

Jason Isaak – Coteau discussed bottom fed breaker installations in which the incoming power is connected to the bottom side of the breaker instead of the top. He recommended we make sure any applications of this type in our installations be properly labeled.

Michael Uliana – TMEIC talked about the feeder from the auxiliary transformer in the safety share is usually only protected on the primary side. He recommended caution working around any feeder of this type.

Michael also talked about problems with area lighting, drives on LED lighting equipment. Jason mentioned that his mine is applying LED to High Mast Light applications, and have had a lot of good experience with this type of lighting.

Jayson Isaak also spoke of a safety issue with checking rotation on three phase AC Motors. Rob Neuman suggested that historically, to “Bump” a three phase AC Motor an electrician would

manually operate the motor starter contactor with a screwdriver. Working in this area of a motor starter puts the electrician at risk from exposure to such hazards as Arc Flash.

Jason said they installed a “Hand-Off-Auto” switch scheme to allow the MCC buckets to be remotely operated.

We also discussed the fact that some of the on board excavator systems do not have Motor Control Center Applications. Motor starters consist of breakers, contactors and overloads mounted in an open architecture on a control room wall. These units are being protected with chain link fences or sliding glass doors.

Jason Isaak mentioned that they are installing glass and plexiglass barriers in front of these panels. They are also modifying some of their equipment to move some of their 480 vac distribution equipment to remote, protected locations.

Michael spoke of the safety hazards in our history, he referenced the TV program “Men who Built America” which stated that the accidental death rate in the early steel industry was 1 in 11 workers.

Coteau had an incident in which a tempered glass door barrier slid on its’ mounting rail, hitting the end stop hard enough to shatter the glass. These doors are being replaced with plexiglass units.

Eric Lindborg – Coteau. Eric has recently joined the Mining Industry. He discussed his experience with safety procedures in the Construction and Oil Production Industries, and how it differs with his experience in Mining. He noted that in the Mining Industry, the work is less rushed, with much greater emphasis placed on working safely.

Rob Neuman – Spring Creek Coal Mine discussed his efforts to identify Arc Flash exposure on some of his mining equipment, and the challenges he is facing such as identifying power transformer specifications such as unit impedance. A local engineering firm is assisting him with these issues.

Jason Isaak discussed his mine’s approach to Arc Flash protective clothing. They are equipped with Protective Face Shields, and FR rated Coveralls. Rob Neuman added his electricians are equipped with protective clothing rated to the 40 calorie level.

Jason discussed the engineering changes being made to reduce personnel exposure to Arc Flash Hazards by isolating exposure areas.

Rob Neuman talked about an incident in which an electrician entered an energized cubical with a key ring hanging out of his shirt pocket. The keys contacted and shorted out an energized circuit causing equipment damage, no personnel injuries were experienced.

## New Innovations and Technology.

Brad Johnson – TMEIC would like to share a video presentation for a piece of Arc Flash protective equipment.

Michael Uliana discussed a product line from TMEIC for an IGBT Regenerative Drive with applications to about 2300 HP, soon to be expanded to 3500 HP. He also spoke of his experience in steel mill applications with power quality stabilization equipment.

Jason Isaak and Eric Lindborg talked about changing their 8 kv pit distribution cable connections from PLC type connectors to Cam Loc connectors. They are seeing better service from the Cam Loc applications. The units are sized differently for each of the cable three power phases to assure proper phase rotation is maintained to the pit equipment.

David Erisman – Drives & Controls Services, talked about his application of the recently released Siemens Digital Drive (Model 6RA80) His company had applied two earlier versions of this drive equipment which were discontinued by the manufacturer because of the lack of availability of the electronic components. The obsolescence of some of the control components in a fast changing electronic industry forced him to re-engineer his control systems to stay current with the latest drive applications. DCS has over 150 applications of this latest equipment. Rob Neuman echoed his experience with equipment obsolescence in this fast paced industry.

Eric Lindborg outlined a project at his mine in which mechanical gear case lube pump control schemes were re-designed to include Allen Bradley Variable Speed Drives. He has found the drive product very user friendly, and the new system is operating well. The project was initiated because the original system was experiencing nuisance oil flow faults.

Jason and Eric talked about a modification to their Coal Handling Conveyor Motor Controls in which VFDs were used to control the Conveyor Motors. The issue with long runs of Variable Frequency Drive Electrical Cable between the Drive and Motor. Their design moved the drive compartment closer to the motor installation to minimize the cable application challenges.

During the initial startup and testing phase of the project, the VFD drives interfered with the system conveyor belt metal detector, resulting in false trips. Reworking the cable shielding and grounding resolved the problem.

Michael also spoke of interference problems encountered when equipment cables are co-mingled.

## Problems and Solutions:

Jason and Eric talked about the ventilation system in their shop facilities. The maintenance bays are equipped with BA Fans, much like those we see on the ceiling of the gathering area outside this meeting room. Their application with VFD drives was experiencing multiple motor and

drive failures. In the first year of operation, all the system motors and drives failed, and were replaced. Working with the OEM suppliers, filter reactors installed in front of the drives resolved the problem.

Michael discussed the problems with VFD drive cable length to loads, and the fact that longer runs can damage motor bearings with reflected distortion waves.

Future Topics:

Arc Flash event dissipation and mitigation

DC Motor and Generator Application and Operation. Maintenance and Troubleshooting.

Future Meeting Locations: