MidAmerican Energy Company
Energy Isolation Program
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Energy Isolation Programs need to:
– Be compliant
– Be usable
– Above all, **KEEP PEOPLE SAFE!**
Compliance

OSHA Perception of a Successful Program

- Detailed Energy Control Procedures
- Extensive Employee Training Programs
- Periodic Reinforcement of Training
- Sufficient Discipline Regarding Implementation
MidAmerican Approach

– Wind has a separate program from other generation facilities
– Program development was led by an experienced wind supervisor
– A consultant supported and fine-tuned the program
– Separate and specific procedures each turbine type:
  • GE “S” turbines, GE SLE turbines, Mitsubishi turbines and Siemens turbines.
– Procedures posted on wind-only portal site with printed copies at each reporting center
– Lock out / tag out devices that fit the equipment
Procedure Requirements:

- Statement of Intended Use
- Steps for Shut-Down and Energy Control
- Steps for LOTO Device Placement, Transfer and Removal
- Determination of Responsibility
- Steps for Testing LOTO
Typical MidAmerican Procedure

MACHINE SPECIFIC ENERGY CONTROL PROCEDURE SUPPLEMENT
DEPARTMENT: MidAmerican Energy DATE: November 21, 2009
EQUIPMENT DESCRIPTION: Pitch Slip Ring
EQUIPMENT NUMBER(s): 53.

The following machine specific procedure is intended to cover the equipment listed above. This energy
control procedure is to be used as a supplement to MidAmerican Energy Wind Farm Machine &
Equipment Lockout Warning Program and the policy on use of lockout devices. This supplement is not
intended to be used alone. This procedure differs slightly due to the specific point of intermittent and instant
energy. The company procedure and supplement was developed in compliance with 29 CFR 1910.147.

1. Notify all affected employees and if necessary departmental supervisors of your intent to
   lockout the Wind Tower Generator (WTG).
2. Call the Operations Control Center (OCC) requesting clearance number for WTG
3. Receive and record Clearance Number From OCC
4. Report Clearance Number Back to OCC to confirm accuracy.
5. Ensure equipment is in Maintenance or Repair before following the procedures below.
6. Following is the essential information necessary for the lockout and tagout of this
equipment.

   1. Type(s), magnitude(s), location of energy hazard, and isolating means:

   *Electrical:* (-50 Vac / 5 phase, 230 Vac / 1 phase, 120 Vac) Shut off breaker labeled as 1Q) and
   1Q7, located in the Top Box and apply lockout tagout to the door of the Top Box cabinet. Breaker 1Q will
des-energize the 480 Vac to the Slip Ring. Breaker 1Q7 will
des-energize the 230 Vac to the Slip Ring. In the Main Cabinet, shut off breaker 5Q7 and
and apply lockout tagout to cabinet door. Breaker 5Q7 will des-energize the 120Vac to the
Slip Ring.
   Remove 10K5 Relay. 10K5 Relay will des-energize the 24 Vdc to the Slip Ring. Employees in
   responsible for the relay must re-energize it to re-enable.
   Verify re-energization with voltage meter on the lead sides of breakers 1Q1, 1Q7, and 5Q7.

   2. Verify at Breaker Labeled

   3. LOTO at Door to Main Cabinet

   4. LOTO at Door to Top Box
MidAmerican GE SLE Wind Turbine Procedures

- Main Tower AC Tower Breaker
- 575 VAC to LVMD; Control Voltage
- 50 kVA Transformer
- Converter
- Pitch Slip Ring
- Gearbox Lubrication Pump
- Gear Box Cooler Fan
- Yaw Drive System
- Hydraulic Brake Unit

And 10 other systems...
Ensure remote actions are prevented

Switch in MAINTENANCE / REPAIR / LOCAL
LOTO Devices
LOTO Devices
LOTO Devices
Questions?