

RTEA Arc Flash Program

WHY?

- Rio Tinto implemented major changes to the Electrical Standard in 2005 in response to high number of electrical incidents that have occurred since 2000 and a fatality that occurred in May of 2005.
- Arc Flash was added to the standard. Rio Tinto used services of AVO to facilitate process
- Incident energy calculations can be found throughout internet. Recommendation was to go to a recognized source. NFPA 70E or IEEE1584
- RTEA has chosen to use the NFPA 70E for incident energy calculation

RTEA STRUCTURE

- Jim Andrews, Manager Health and Safety at Cordero Rojo Mine, reports to the town office
- Jim Van Emmerick, RTEA Manager Electric
- Site Electrical Planners

- **General Prioritized List of Tasks Required for NFPA 70E Compliance**
- 1 – Site Assessment
- 2 – Create / Update One-lines
- 3 – Short Circuit Study
- 4 – Coordination Study
- 5 – Design Review
- 6 – Arc Flash Analysis
- 7 – Arc Flash Hazard Labeling Plan
- 8 – PPE Selection Plan
- 9 – Electrical Safety Program Review
- 10 – Training
- 11 – Documentation
- 12 – Preventative Maintenance Schedule
- 13 – Recertification Schedule

- **PROCESS**
- Review one-line diagrams for changes
- Submit to contractor changes to diagrams
- One Lines are sent to site for further updates and approval of changes
- Incident energies are calculated, category levels added to one-lines and resubmitted to sites for approval
- Labels displaying incident energy, PPE, etc. need agreed upon and submitted to contractor for printing

WARNING!
ARC FLASH and SHOCK HAZARD
APPROPRIATE PPE REQUIRED

VOLTAGE 4160 VAC

MAX SHORT CIRCUIT KA 14.2

Flash Protection Boundary	Door Open	18.25 feet
PPE Level	Door Open	Flash Hazard Category 2 Plus Class 00 Gloves
Shock Hazard Limited Approach	Door Open	10 feet
Operate Breaker/Disconnect	Door Closed	Flash Hazard Category 2 Plus Class 00 Gloves
Hearing Protection Required		YES
Equipment		44S54

WHAT TO DO UNTIL ONE LINES UP TO DATE AND PROGRAM READY

- Distribute PPE.
 - All employees issued category 2 coveralls through existing coverall program
- Implement training for electrical personnel
- Electricians will also receive 1000 volt rated gloves, face shield and hard hat
- Electricians will get category 4 rated coveralls and hood
- Plant personnel will use category 4 gear to be stored in mcc rooms for switching.
- Implement interim arc flash program

INTERIM FLASH PROTECTION SAFETY MATRIX

Item	Task Description	Hazard Category
1	Switching - Covers On/Off 50 - 240V	0
2	Switching - Doors Closed >240V - 660V	0
3	Switching - Doors Open >240V - 660V	2
4	Switching - Doors Closed 661V and Above	2
5	Insert/Remove Starter Buckets >240V - 660V	4
6	Insert/Remove Breaker > 240V-660V - Doors Closed	2
7	Insert/Remove Breaker >240V-660V - Doors Open	4
8	Racking Breaker 661V & Above - Doors Closed	2
9	Racking Breaker 661V & Above - Doors Open	4
10	Application Safety Grounds < 660V	2
11	Application Safety Grounds > 660V	4
12	Testing/Troubleshooting 50V - 240V	1
13	Testing/Troubleshooting >240V - 660V	2
14	Testing/Troubleshooting 661V and Above	4

Note: Anyone performing circuit breaker or fused switch operation, even with the covers on, may not wear synthetic clothing of any kind. For tasks not specifically listed please see Table 130.71C(9)(a) NFPA 70E.

Hazard Category	Required PPE	Min Arc Rating
0	Longsleeve Shirt & Long Pants (Natural Fibers)	n/a
1	FR Shirt & Pants/Coverall	4
2	FR Shirt & Pants/Coverall Arc-Rated Face Shield Leather or Voltage Rated Gloves As Required	8
3	FR Shirt & Pants Plus Coverall Flash Suit Hood Leather or Voltage Rated Gloves As Required	25
4	FR Shirt & Pants/Coverall Full Flash Suit With Hood Leather or Voltage Rated Gloves As Required	40

Issues To Be Completed

- System for addressing DC
 - RTEA will use the AC calculations to determine DC incident energy until NFPA70E updated
- Implement arc flash program for mobile equipment
- How to address MG sets on draglines
- Develop training for non-electrical personnel to the level they need for the job tasks they perform
- System for contractors

**RIO
TINTO**

ENERGY
AMERICA



**RIO
TINTO**

ENERGY
AMERICA



**RIO
TINTO**

ENERGY
AMERICA



Things to Keep in Mind

- PPE lead times can be very long
 - Order as soon as decision made on PPE
- Size employees with pre-washed coveralls
- Lighting maybe a problem with the tinted arc shields
- Evaluate those job tasks that will keep people in level 4 gear for long periods of time