SAND2013-1943P

Sandia National Laboratories


Electrical SAFETY
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# Electrical Safety Performance Improvements: Lessons Learned

Sandia National Laboratories

U.S. DEPARTMENT OF ENERGY
NNSA
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LOCKHEED MARTIN

# Objectives

- Describe the improvements in electrical safety implemented by Sandia to correct a significant number of electrical events

- Demonstrate tracking methods used to evaluate electrical safety performance over time

# History: 2005 - 2008

- Electrical safety was a corporate concern.
  - 2005 – 2006 – Several events with significant severity scores were noted by program
  - 2007 – minor “arc flash” revealed serious concerns with line implementation of electrical safety – Electrical Safety Committee developed an Electrical Safety Improvement Plan (ESIP) – Corporate Corrective Action
  - 2008 – ESIP was effective in R&D areas, but a rise in facility-related electrical events prompted additional actions

# Electrical Safety Improvement Plan

- 26 separate actions incorporated into corporate policy, in several areas:
  - Training Improvements
  - Policy Clarification
  - Communications
  - Implementation
  - Facility maintenance targeted improvements to address additional concerns

# What Worked

- FMOC Partnering
  - During period, 84% of all identified deficiencies were associated with “non-partner” contractors, while 87% of the construction budget went to “partner” contractors – increased use of partner contractors to drive events down
- Electrical Safety Advisors
  - Line-embedded Subject Matter Experts with extensive understanding of electrical safety requirements as well as specific tasks/organizational mission
- Training
  - Specific training for managers approving energized work activities to ensure that they understood what they were approving

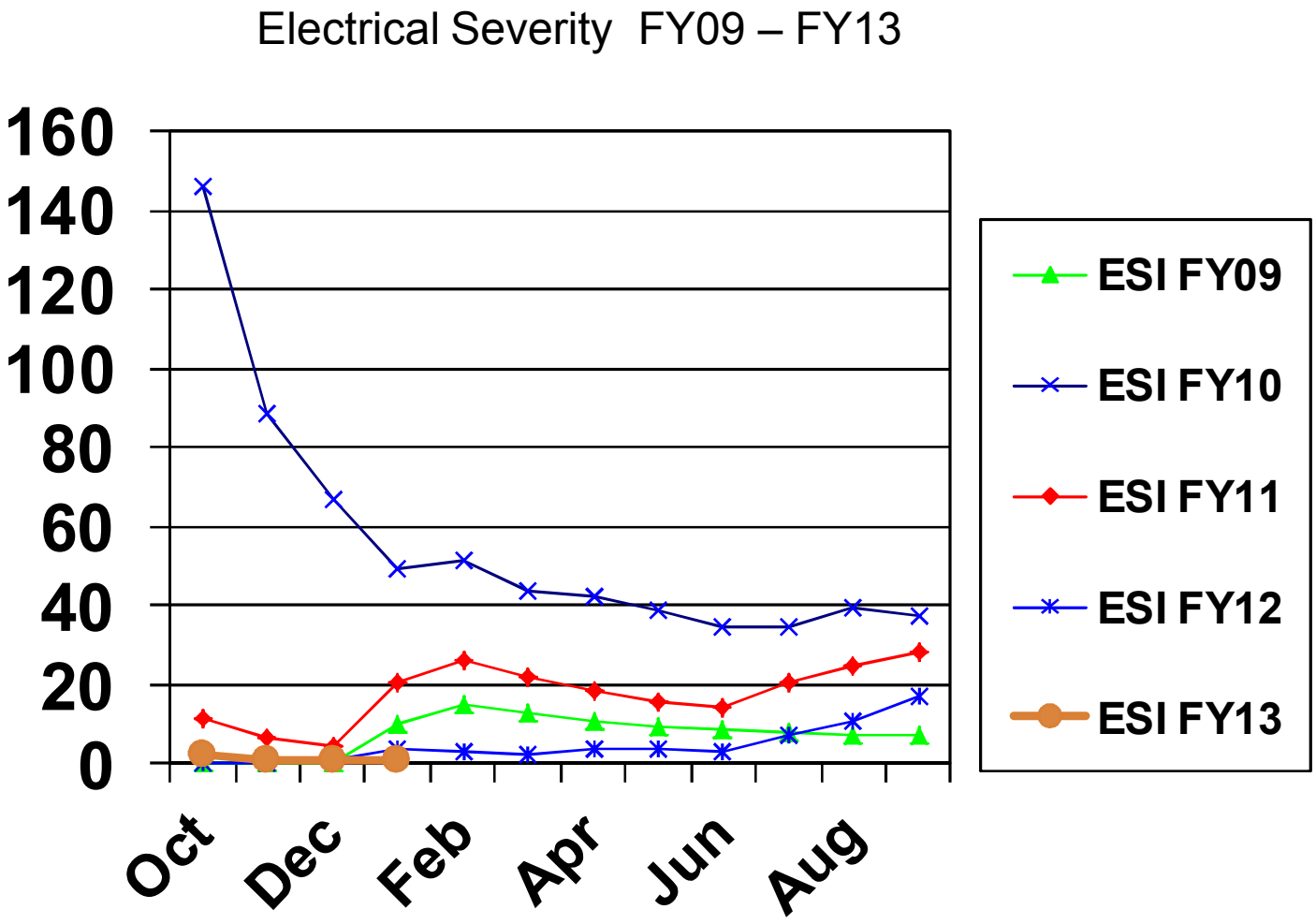
# What Worked

- Lockout/Tagout and Electrical Safety
  - Programs partnered to send out common message, rather than 2 separate, independent programs
  - Immediate impact – shock / arc flash hazard analysis template in LOTO procedure template
- Policy clarification
  - Energized work definition clarified
  - Arc Flash Hazard Analysis and common, simplified arc flash hazard mitigation strategies
  - Emphasized a “no energized work” policy at all levels of the organization

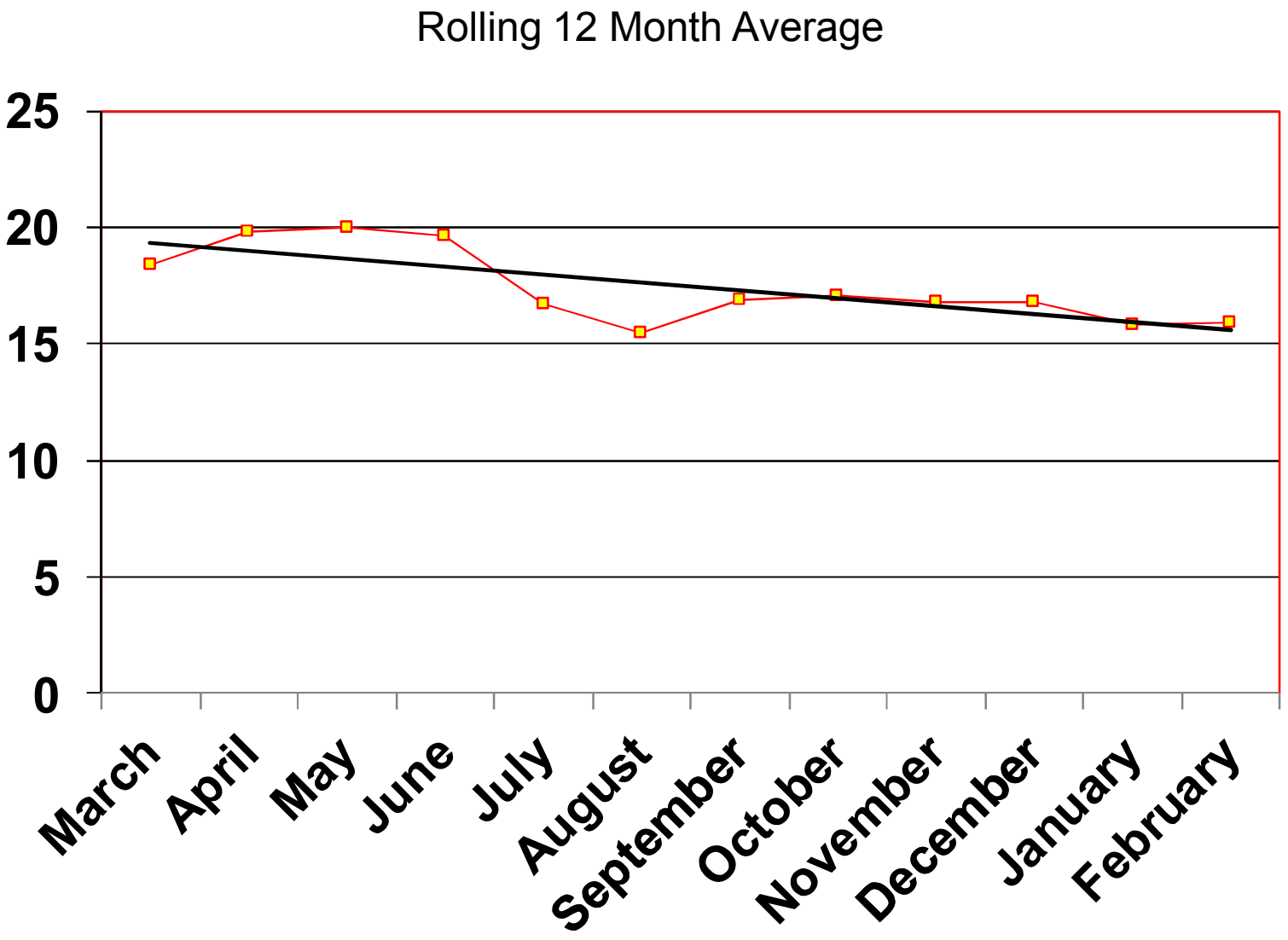
# Problematic Areas

- Communication Tools did not have a *measureable* impact
  - Difficult to evaluate effectiveness of a poster or news article other than counting them => difficulty in validating effectiveness of action in NTS report
- Assessments provided mixed messages
  - One external assessment identified program as excellent, while others within weeks identified significant problems with implementation
- Verification and Validation after 2 years was extremely difficult
  - Data collection and retention of specific items, especially those not under the control of the program, was a challenge
  - Additional surveys and assessments were required, and many actions had to be re-performed because of the lag between implementation and validation

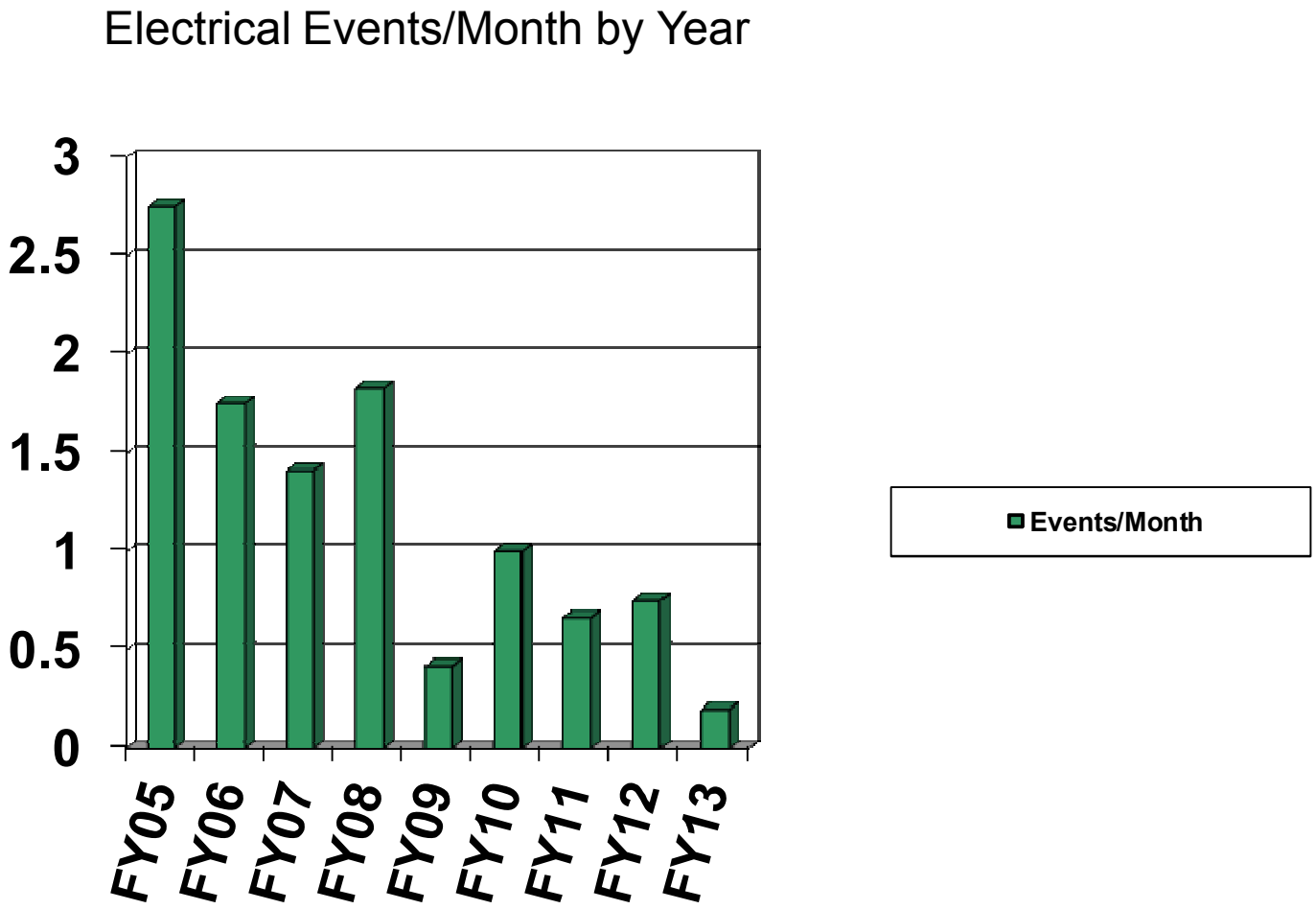
# Results


Electrical Severity FY09 – FY13
160
140
120
100
80
60
40
20
0
Oct
Dec
Feb
Apr
Jun
Aug
ESI FY09
ESI FY10
ESI FY11
ESI FY12
ESI FY13

# Results


Rolling 12 Month Average
25
20
15
10
5
0
March
April
May
June
July
August
September
October
November
December
January
February

# Results


Electrical Events/Month by Year
3
2.5
2
1.5
1
0.5
0
FY05
FY06
FY07
FY08
FY09
FY10
FY11
FY12
FY13
Events/Month

# Conclusion

- Success in this endeavor depended upon:
  - A methodical approach
  - A measurable outcome
  - Engagement by the organization – all levels, all departments
  - A culture of reporting
- Lessons Learned
  - Tracking/Trending of events by multiple methods (not just numbers or types) provides a greater understanding of the problem
  - A reduction in severity does not necessarily mean a reduction in events, but it does indicate a greater awareness of and respect for the hazards of electricity by those exposed to it most frequently
  - Management engagement is key
  - NTS reports should be closed in a timely manner