



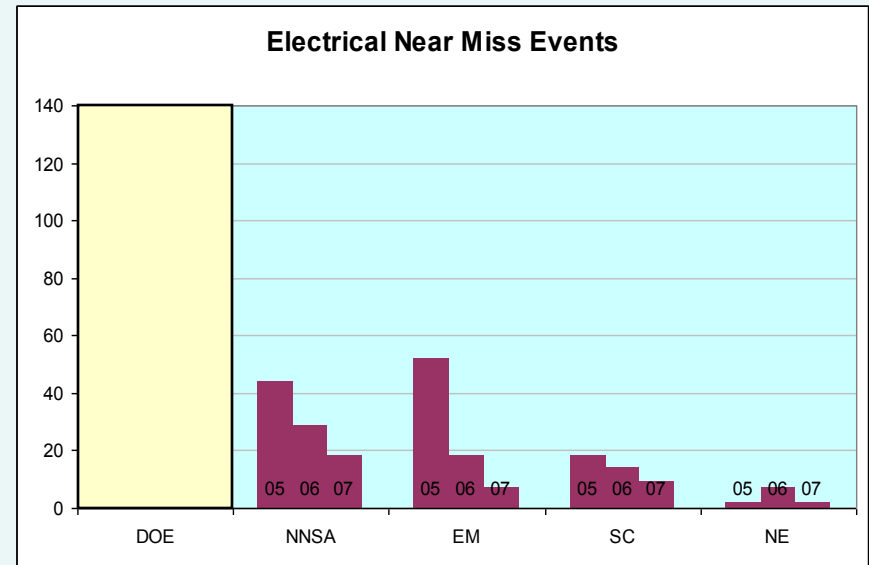
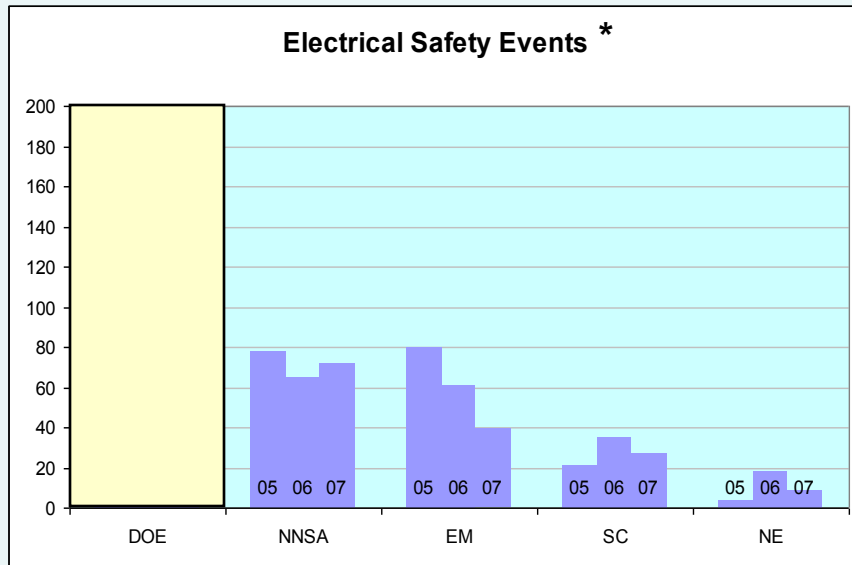
Electrical Safety Briefing
for the
2008 Annual DOE / EFCOG
Electrical Safety Meeting & Workshop

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DOE Comparisons for CY 2005 – 2007 All Electrical Safety vs. Near Miss Events (ORPS Data)



From 2005 to 2007 DOE's Electrical Safety occurrences decreased 17%, primarily as a result of a 51% reduction at EM for the period.

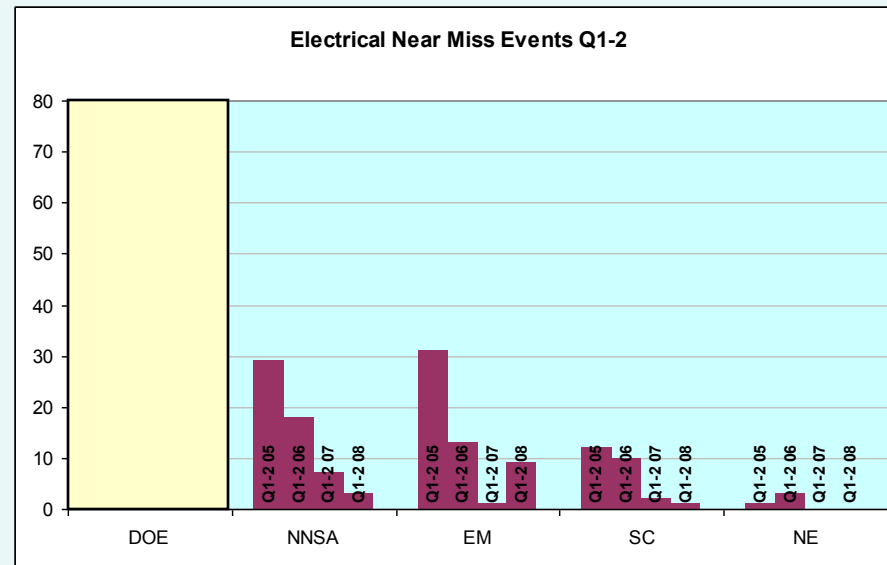
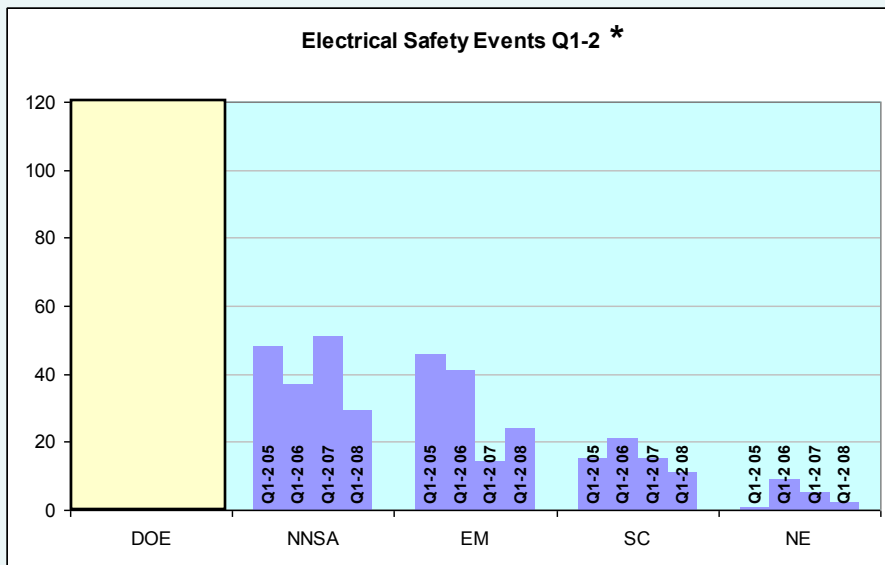
Results at the other PSOs for the same period were mixed.

Reported Electrical Near Misses generally showed a steady decline for the period.



DOE Comparisons for Q1-2 CY 2005 – 2008

All Electrical Safety vs. Near Miss Events (ORPS Data)



During the first 2 quarters of the past 4 calendar years, DOE’s Electrical Safety occurrences have decreased 37%, with both EM and NNSA posting dramatic improvements.

Q1-2 Electrical Near Misses declined from 2005 to 2007, but have seen an increase in 2008.

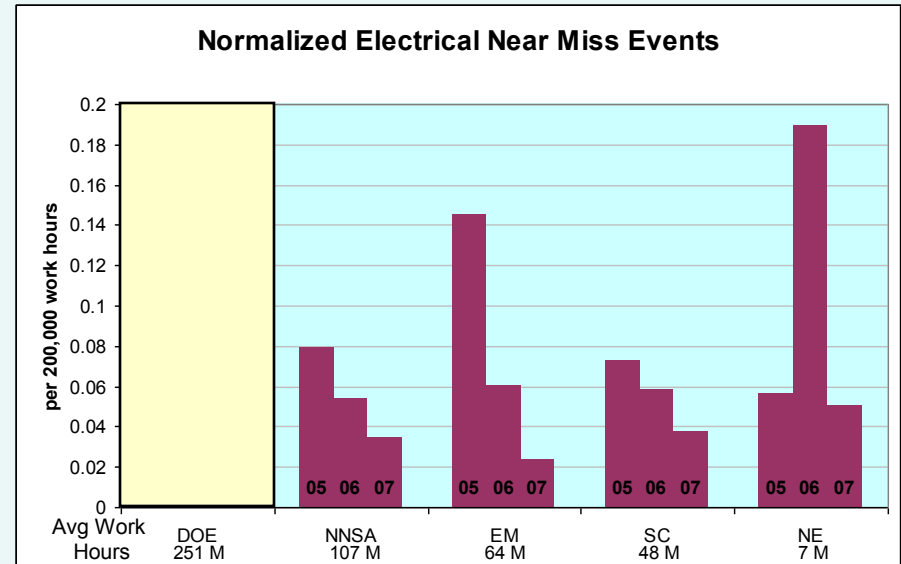
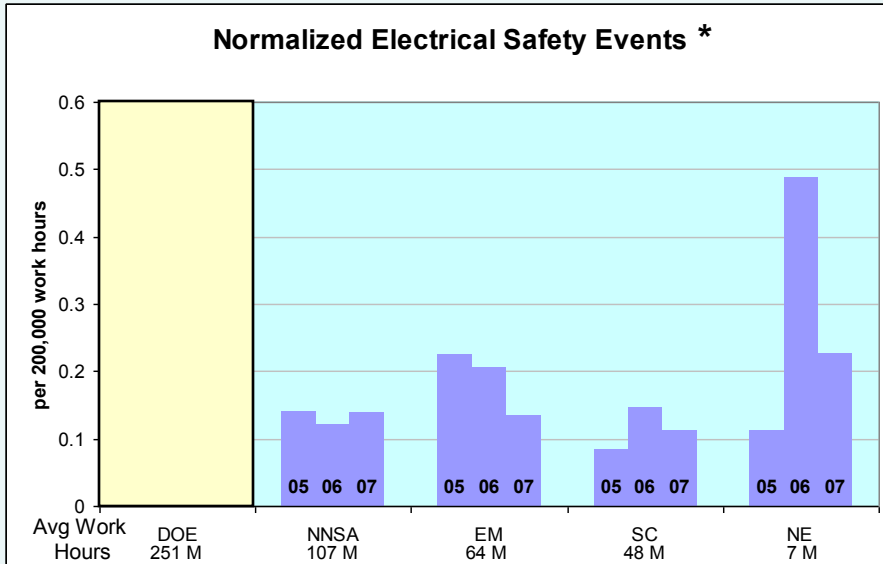
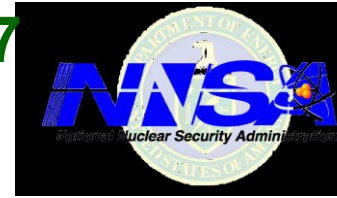
EM’s 2008 results for the period, both for Electrical Events and Near Misses, have deteriorated by comparison to Q1-2 2007, however 2007 occurrences appear to be inordinately low.



Normalized Comparisons for CY 2005 – 2007

All Electrical Safety vs. Near Miss Events

(ORPS Data - normalized per 200,000 work hours)

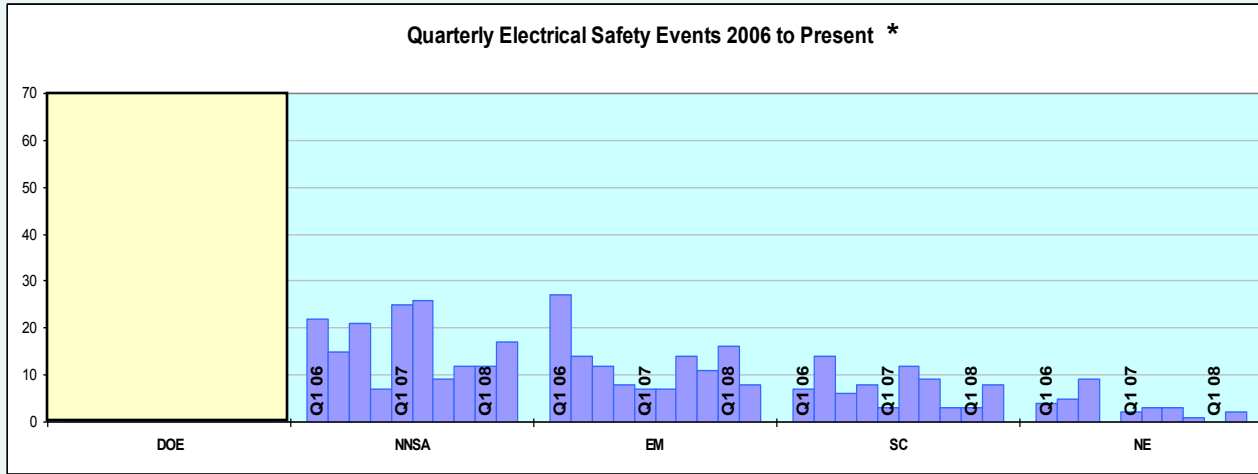
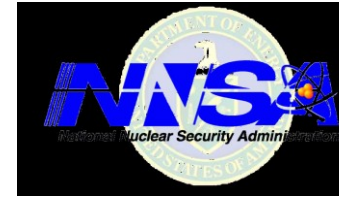


When Electrical Safety events are “normalized” per 200,00 work hours (roughly one man-year), we still see DOE-wide improvement from 2005 to 2007, although at a lower rate of 14%.

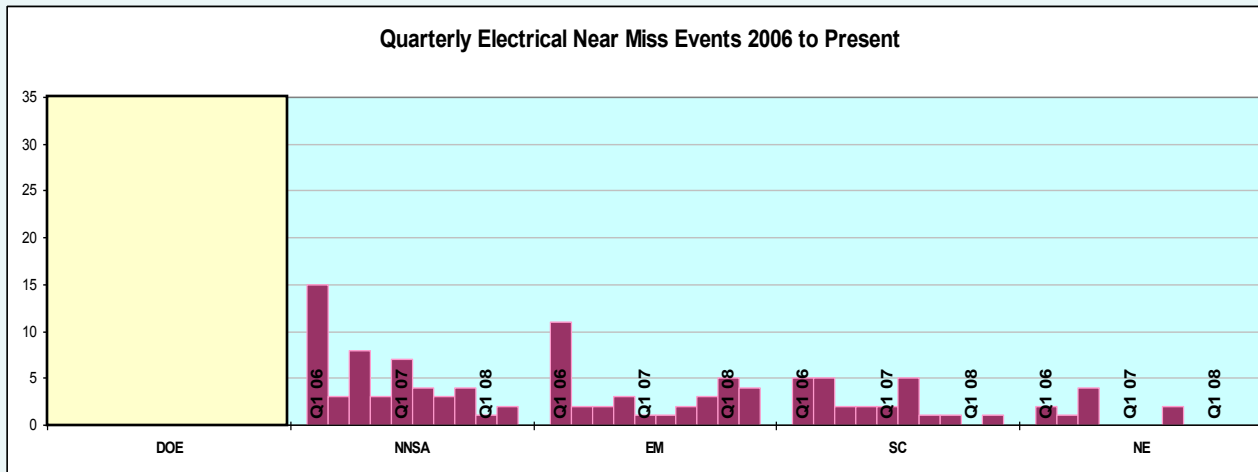
This view shows that EM started out with higher per capita Electrical Safety Events and Near Misses, but that they are now below average for both.



DOE Comparison of 10-Quarter Trends (CY) All Electrical Safety vs. Near Miss Events (ORPS Data)



- On a quarterly basis, DOE’s Electrical Safety events have trended downward for the past 10 quarters.
- DOE’s general pattern, including step 4th quarter drops, largely reflects occurrence patterns at NNSA, but does not appear to be due to seasonal fluctuations.

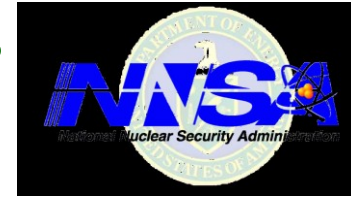


- DOE’s Electrical Near Misses show a steady decline on a quarterly basis as well, especially in NNSA.
- However, EM has seen a steady increase in Electrical Near Misses from Q1-07 to the present.



Summary of Electrical Safety Occurrences Overall vs. Subcontractor Involvement

(Subcontractors perform roughly 15% of the overall work)



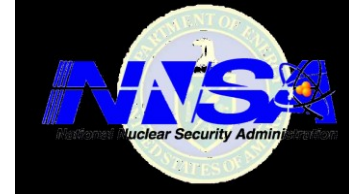
All DOE Calendar Year	Total Electrical Safety Events (Subcontractors *)	Shocks	Electrical LO/TO Violations	Electrical Near Misses
2008 Q1-2	69 (42%)	17 (6)	20 (8)	14 (8)
2007	153 (35%)	28 (9)	36 (19)	37 (14)
2006	180 (34%)	27 (7)	48 (21)	69 (29)
2005	184 (36%)	43 (11)	49 (20)	116 (44)

Rows do not total 100% - Multiple codes may be selected for an occurrence

Prime contractors and subcontractors must work together, planning work with comprehensive hazard analyses and walkdowns, so that those who perform the work are not impacted by modern or legacy electrical hazards.



Electrical Safety Occurrences Leading Causal Factors by Event Type



Electrical Occurrences & Near Misses

- Inadequate Work Planning and Controls
- Job Hazard Analysis not performed or performed incompletely
- Legacy/Discovery conditions that impact safety
- Personal error/not paying attention, inadequate training on equipment and process

Subcontractor Involvement

- Legacy hazards
- Inadequate job hazard analysis or oversight of work
- Lack of communication between groups
- Unqualified worker

Shocks

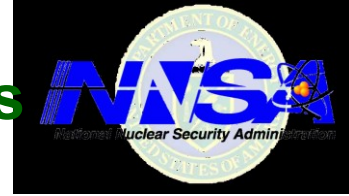
- Pre-work Testing/Inspection not performed
- Time and labor force pressures

LO/TO Program Violations

- LO/TO requirements not correctly identified
- LO/TO of electrical energy source not performed properly
- Failure to perform *Zero Energy Check* prior to starting work



Work Planning and Work Performance Issues



Work Planning

- Inadequate or non-specific job hazard analysis - particularly important when vendors perform work with hazards not normally encountered
- Incomplete walkdowns
- Inadequate communication
- Incomplete knowledge of legacy wiring hazards
- Ineffective or incomplete corrective actions from previous events

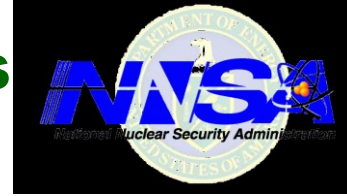
Work Performance

- Noncompliance with procedures or requirements
- Inadequate training or instructions
- Lack of adequate oversight

Establish requirements within the context of vendor and subcontractor work activities to reduce human error.



Representative DOE Electrical Safety Events January 1, 2007 - June 30, 2008



45 Shock events, including:

- Despite twice performing a zero energy check, a subcontractor electrician was shocked during work because another crew energized a down stream buss.
- Asbestos abatement subcontractor was shocked when pulling conduit from a wall to place plastic sheeting behind it, damaging the conductors and resulting in a 120 volt shock.

56 Lockout/Tagout (LO/TO) events, including:

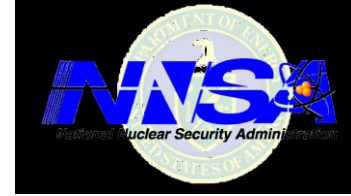
- Nine events that did not meet the reporting criteria but that indicated an unacceptable trend in hazard control and LO/TO were rolled into a report calling for improved pre-job briefings, more effective corrective actions, and strict implementation of LO/TO requirements.
- Three separate events were rolled into a recurrence report when vendors failed to follow established lockout/tagout procedures and were exposed to live electrical components.

51 Near Miss events, including:

- A worker installing fire stop material in constricted space near the ceiling of a high-bay facility experienced a non-fatal shock when his caulking gun touched an energized 480-volt crane power source.
- As subcontractor electricians replaced light ballasts, sparks came from an unidentified wire; instead of stopping, they continued working. Fact-finding revealed that the crew had not followed the LO/TO procedure and the electrician was not wearing appropriate PPE.



Electrical Safety Initiatives



- National Center of Excellence for Electrical Safety at Los Alamos National Laboratory
 - Provides electrical safety resources and promotes consistency across DOE Complex
<http://www.lanl.gov/safety/electrical/>
- National Nuclear Security Administration
 - Senior Advisor ES&H, NA-3.6 (Russo) provides quarterly updates to the NNSA Administrator
- Environmental Management
 - Provides electrical safety analysis and actively engages with field managers
 - Periodically includes review of LOTO during EM HQ Operational Oversight Assessments
 - Developed short Electrical Safety Trend Awareness Briefing for EM Field Managers for emerging adverse trends
- Office of Science
 - Tracks Electrical Safety events and provides quarterly updates to the Undersecretary
- Health, Safety and Security
 - Compiles a Monthly Electrical Safety Analysis for DOE
- EFCOG Efforts
 - DOE Electric Safety Improvement Project Team continues to draft national consensus standards for R&D electrical safety
 - Electrical Severity Measurement Tool – working with HSS to incorporate the tool into ORPS
 - Support for improving DOE electrical safety handbook



Electrical Safety Initiatives

Areas of focus for the coming year



- More stringent program validation and oversight especially for subcontractors and vendors
- Improve work planning by involving qualified workers to identify electrical hazards prior to *non-electric* work being performed
- Worker *education* on electrical safety principles and rationale to increase knowledge and improve critical thinking, in addition to ongoing training to target specific procedures and behaviors
- Emphasize “stop work/pause” when conditions or hazards are not as anticipated
- Post-work reviews/inspections to ensure approved electrical configurations were employed
- Continue this partnership with DOE and expand your efforts to include additional external organizations to advance electrical safety best practices