



# **INL Wildland Fire/Electrical Shock Event Review**

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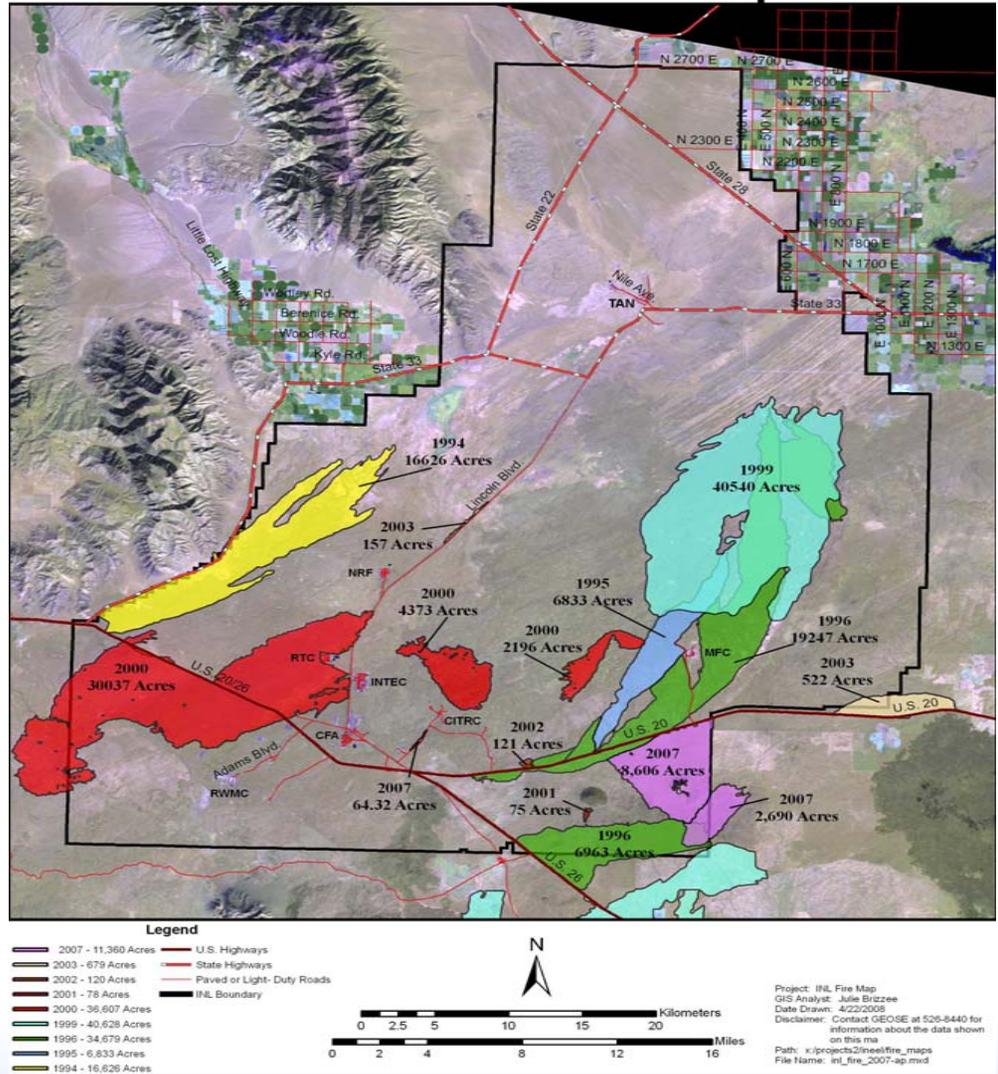
**DOE/Contractor Fire Safety  
Workshop**

**April, 2008**

# Discussion Points

- **INL Wildland Fire Experience**
- **Electrical Shock Event Description**
- **Investigation and Corrective Action Activities**
- **Judgments of Need**
- **Corrective Actions**
- **Lessons Learned**
- **10 CFR 851 Investigation Results**

# 1994 - 2007 INL Fire Map



# INL Wildland Fire Statistics

Year	Number Human Fires	Human Fire Acres	Number Lightning Fires	Lightning Fire Acres	Total Fires	Total Fire Acres
1994	5	16,639	0	0	5	16,639
1995	1	6,833	0	0	1	6,833
1996	10	28,714	2	6,973	12	35,687
1997	0	0	0	0	0	0
1998	6	16.5	0	0	6	16.5
1999	4	6	3	40,629	7	40,635
2000	5	92	8	36,685	13	36,777
2001	5	2	2	80	7	82
2002	5	121	0	0	5	121
2003	7	718	0	0	7	718
2004	5	1	1	1	6	2
2005	1	2	0	0	1	2
2006	7	15	0	0	7	15
2007	8	105	6	9,775	14	9,880
Total 1994-2007	69	53,265	22	94,062	91	147,327
1994-2007 Avg.	4.9	3,805	1.6	6,719	6.5	10,523









# Highway 20/26 WLF Electrical Shock Event Description – July 14, 2007

1. INL FD dispatched to wildland fire on Highway 20/26.
2. FD encounters approximately 3 acre fire burning on north side of highway in vicinity of Rocky Mountain Power transmission lines.
3. First two responding wildland units initiate direct attack suppression tactics on east and west flanks of fire.
4. While proceeding along east flank of fire, WLU No. 1 comes in immediate proximity of sagging overhead power line (69-kVA) and becomes energized.
5. Two nozzlemen on passenger side of WLU No. 1 receive electrical shock and fall to ground. WLU No. 1 backs away from line, breaking electrical circuit.
6. Remaining suppression resources are staged in safe locations away from power lines, pending isolation.
7. Following power isolation, fire is contained, controlled and declared out.
8. Two firefighters are transported to CFA Medical, subsequently evaluated at Eastern Idaho Regional Medical Center, and released to work without restriction.



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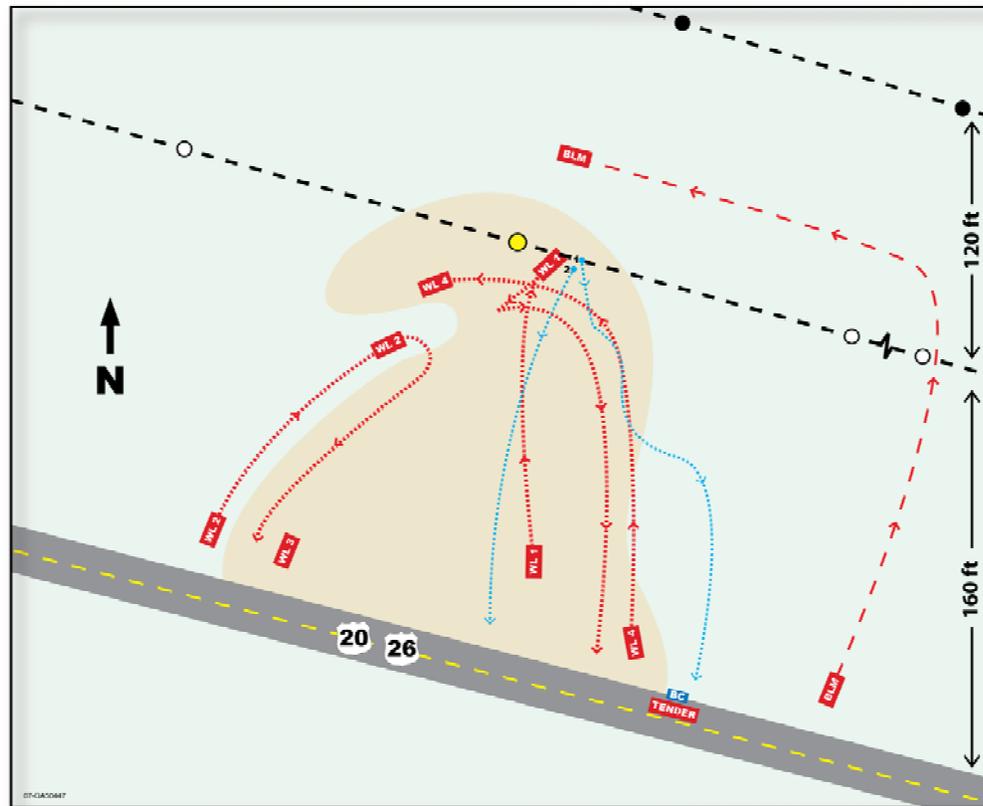
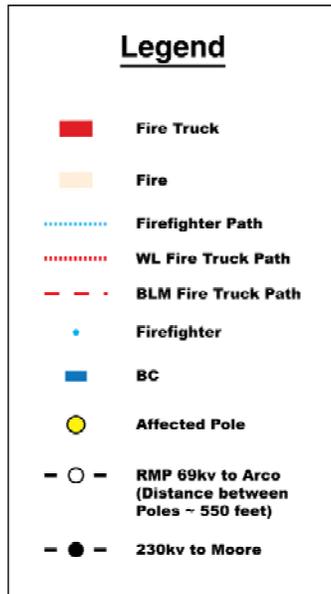






# Highway 20/26 Fire

7-14-2007



# Investigation and Corrective Action Activities

- **FSS Director conducted on-site critique Saturday evening of event**
- **Timely Order clarifying power line protocols issued following Saturday evening critique**
- **BEA accident investigation completed**
- **DOE-ID accident investigation completed**
- **BEA Corrective Action Plan completed**
- **Internal and complex-wide lessons learned distributed**
- **Office of enforcement 10 CFR 851 investigation completed.**

# **Fire Department Related Judgments of Need**

- **Review wildland fire policies, procedures and training to ensure compliant, comprehensive and contemporary with industry practices. Incorporate lessons learned. Train as necessary.**
- **Evaluate radio communications system and address limitations.**
- **Establish/Reinforce that questioning attitude is acceptable and expected.**
- **Improve Emergency Response Conduct of Operations, specifically expectations and accountability for following fire department procedures.**

# Corrective Actions

- **FD procedures modified and training provided to emphasize use of standard wildland fire management system and NWCG Incident Response Pocket Guide:**
  - **Deployment**
  - **Size Up (emphasis on special hazard mitigation)**
  - **Incident Objects (firefighter safety always first)**
  - **Incident Action Plan/ICS organization**
  - **Briefing**
  - **Directing Fire Attack**
  - **Demobilization**

# Corrective Actions (cont)

- **Addressed radio system infrastructure limitations**
  - Short and long range improvements to infrastructure are planned.
  - Short range handheld and firmware upgrades
  - Long range migration to dedicated, Project SAFECOM compliant, 700 MHZ system for emergency responders.
- **Administrative controls implemented to maximize effectiveness of existing system**
  - Base communication plan pre-defined/clarified

# Lessons Learned, The Real Story

- **SLOW DOWN!** Fight fire aggressively only **AFTER** completing adequate size up and briefing. This must occur for all wildland fires regardless of size.
- **Power lines present multiple hazards to wildland firefighters:**
  - **Heavy smoke and flames can (and does) cause arcs to ground from fully intact lines**
  - **Anticipate failure of involved towers**

# Lessons Learned (cont)

- **Know and implement NWCG IRPG power line safety provisions**
  - **Keep all resources 100 ft. from lines exposed to heavy flame and smoke.**
  - **Spot fires can be fought safely within 100 ft. provided no heavy flame and smoke.**
  - **Fog vs. straight stream.**
  - **Lines aren't rendered safe until isolated AND grounded. They may accumulate voltage if not grounded.**
  - **Have predefined process and notification lists for requesting power line safety isolation or related utility support. Try not to rely on middle man for coordination communications. Should be direct IC communication.**

# 10 CFR 851 Enforcement Investigation

Highway 20/26 electrical shock incident and separate fume hood fire incident were investigated jointly.

PNOV issued.

Conclusion: Violations of 10 CF 851 occurred.

- Four Severity Level I violations
- One Severity Level II violation

DOE-ID reduced earned fee in amount of \$250,000 in year end performance evaluation, constituting penalty under 10 CFR 851.

# Highway 20/26 Electrical Shock Incident

## 10 CFR 851 Violations

- **Severity Level I, Failed to Comply with Fire Protection Functional Area Requirements, most notably:**
  - **NFPA 1143, *Standard for Wildland Fire Management***
  - **NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program***
  - **NFPA 1561, *Standard on Emergency Services Incident Management System***
  - **NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments***

# Highway 20/26 Electrical Shock Incident

## 10 CFR 851 Violations (continued)

- Specifically:
  - IC didn't adequately evaluate and mitigate risk to responders
  - Size up missed power line hazard and didn't apply NWCG IRP mitigation
  - Inadequate briefing
  - Standard Fire Fighting Orders violated, most notably, "fight fire aggressively having provided for firefighter safety first"
  - Did not maintain effective communications with forces
  - Inadequate LCES

# Questions?