State of Utah

GARY R. HERBERT
Governor

GREGORY S. BELL
Lieutenant Governor

Utah Department of Public Safety

D. LANCE DAVENPORT
Commissioner

BRENT R. HALLADAY
State Fire Marshal

REPORT OF INVESTIGATION

Case Number: 132012071 – **Wood Hollow Fire near Fountain Green, Utah**

Location/County: GPS: N 39° 36.500' W 111° 35.100'

Date/Time of Loss: June 23, 2012 at about 16:56

Date of Examination: June 25, 2012. See Narrative

Requesting Agency: Utah Division of Forestry, Fire and State Lands

Owner or Insured: Public Lands

Occupant or Tenant: N/A

Fire Discovered By: Unknown/Not reported to me

Narrative:
I was contacted by Fire Warden Brett Ostler with Utah Division of Forestry, Fire and State Lands and asked to assist with the origin and cause investigation of the Wood Hollow Fire that started on Saturday June 23, 2012 near Fountain Green, Utah. At the time I was contacted the fire had already consumed approximately 39,000 acres and destroyed several structures including some homes and cabins. I was requested because of my background training and experience with electrical power distributions systems. See attached Curriculum Vitae for details.

The area of origin had previously been determined to be near a high voltage transmission structure near the GPS coordinates of N 39° 36.500' W 111° 35.100'. The structure is numbered 182 and is a double dead end structure of a 138 KV (Kilovolt) transmission line with guy wire supports to the north, south and east of the structure. The structure is directly below the conductors of a 345 KV transmission line running nearly parallel.

I examined the area around the 138 KV transmission structure and determined the fire indicators in that area were consistent with my training, knowledge and experience as being the area of origin for the fire. The available fuels in the area appear to be grass and sage brush with juniper trees some distance from the power transmission structure. I noted that the west conductors of the 345 KV Transmission line were almost directly above the east pole of the 138 KV transmission structure with only about four or five feet of clearance between the lower 345 KV conductor and the top of the 138 KV structures east pole. The top of the east pole of the 138 KV structure has obvious black sooting above the metal hardware. I also noted evidence of arcing on each of the Jonny Ball Insulators on the guy wires for the 138 KV structure. See photos below:

View of area from Google Earth

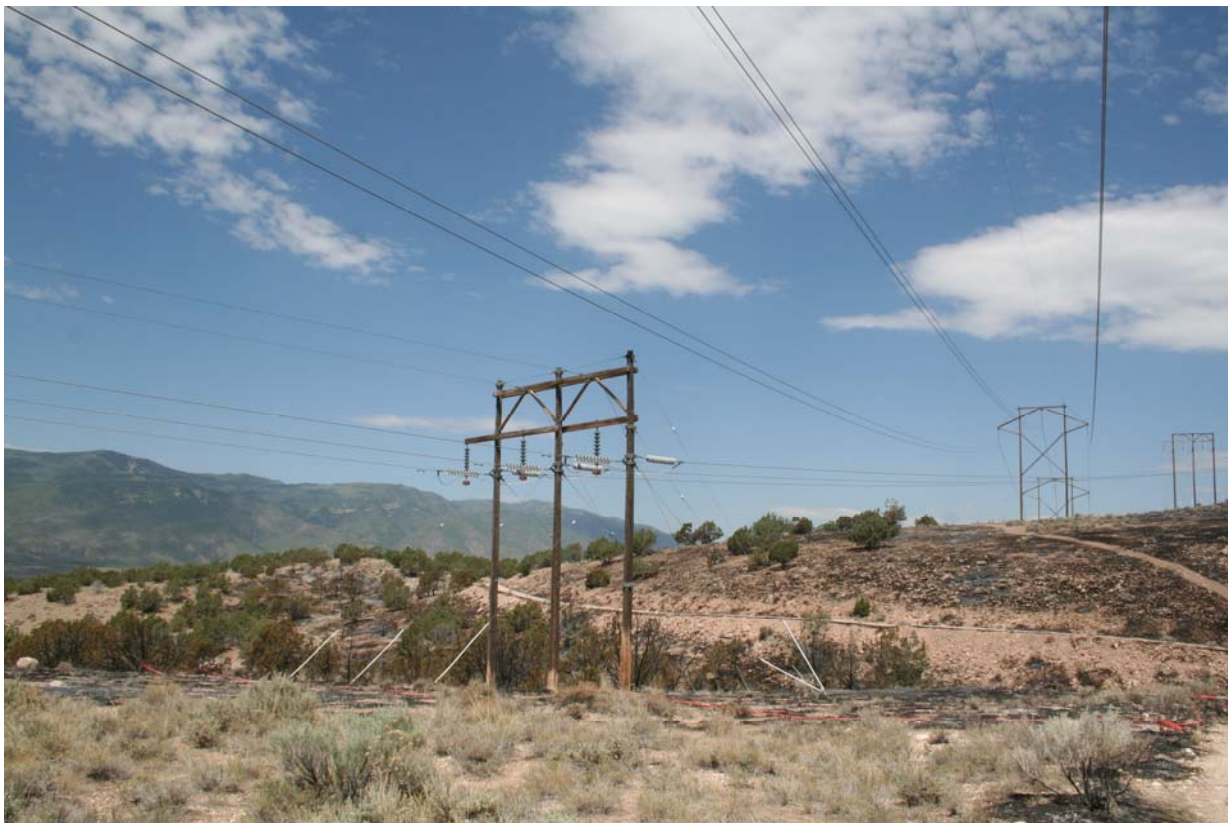
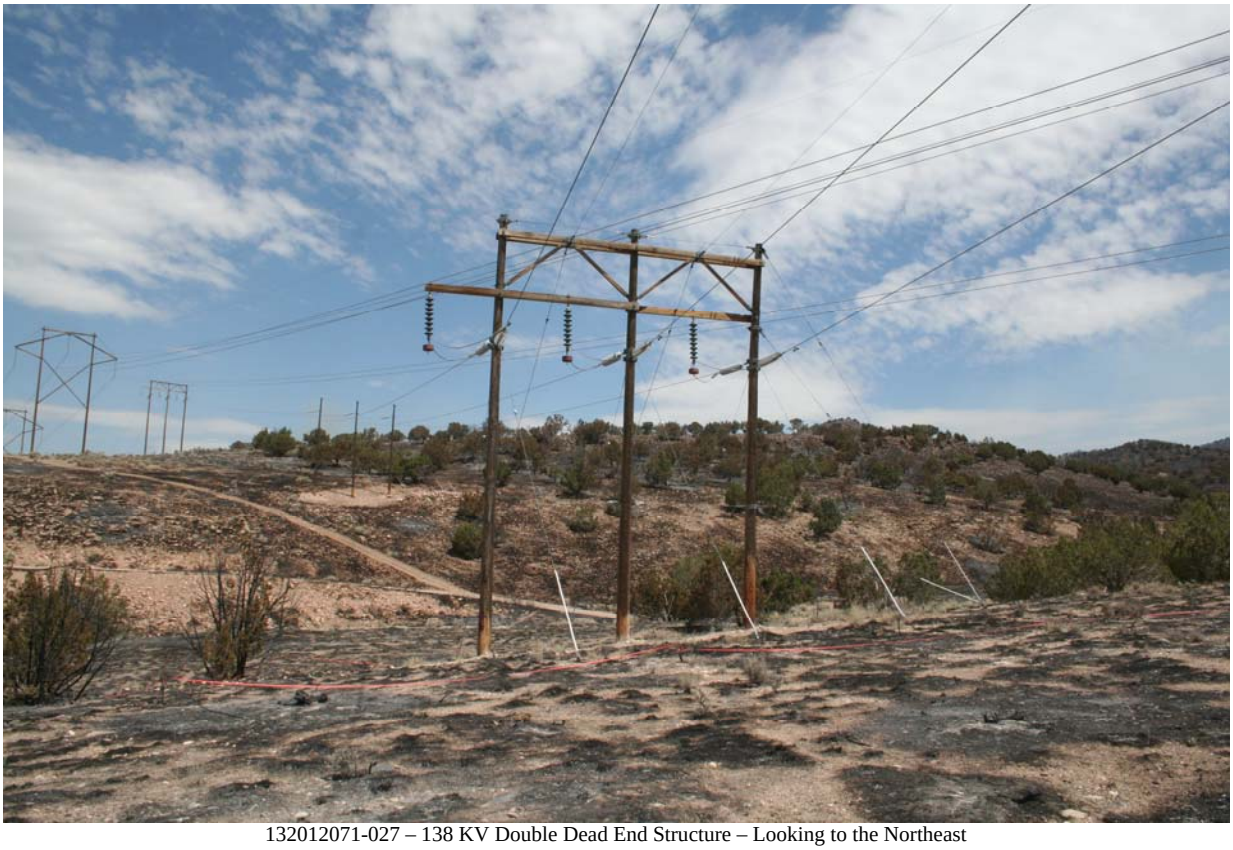
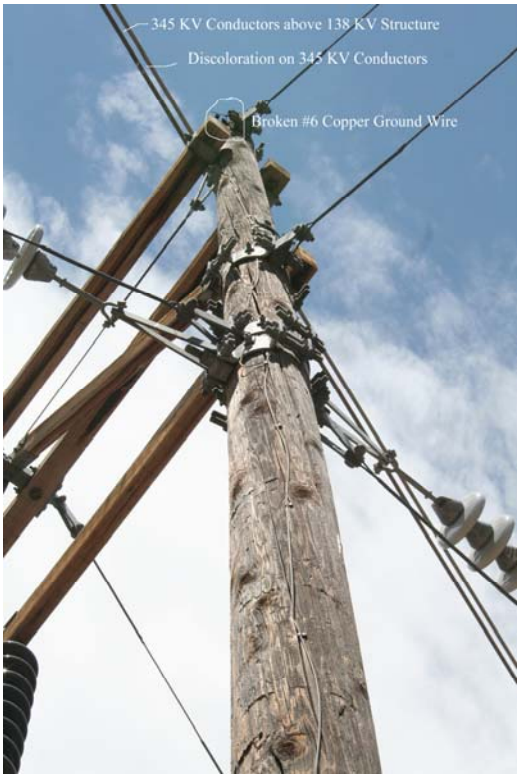


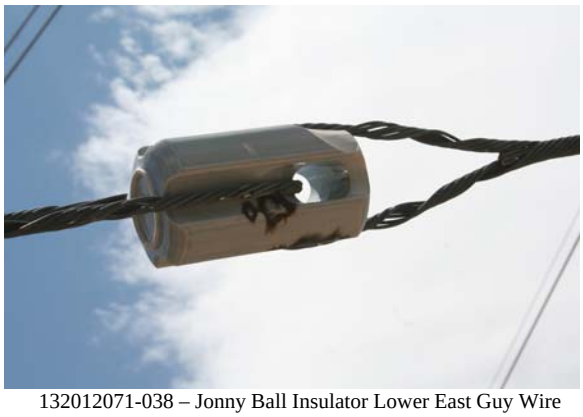
Photo 132012071-024 – 138 KV Double Dead End Structure – Looking to the Northwest



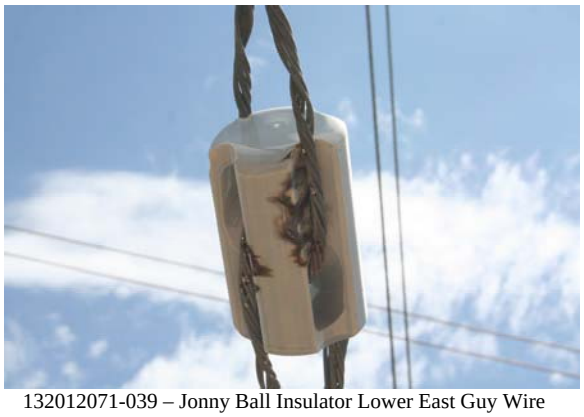
132012071-027 – 138 KV Double Dead End Structure – Looking to the Northeast



132012071-041-2 – East pole of the 138 KV Double Dead End Structure



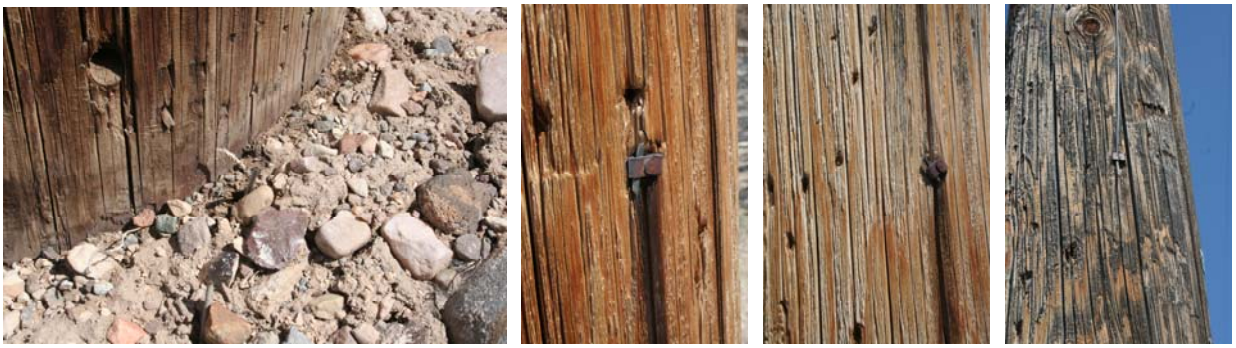
132012071-038 – Jonny Ball Insulator Lower East Guy Wire



132012071-039 – Jonny Ball Insulator Lower East Guy Wire

Using binoculars I was able to examine the top of the 138 KV structure and the 345 KV conductors above. There is some distinct discoloration on the lower west 345 KV conductor that is consistent with exposure to an electrical arc. I noted a piece of the #6 AWG solid copper ground wire about six inches long at the top of the 138 KV pole that appears to have melted off at the connection to the metal hardware near the top of the pole. This piece of copper wire was still attached to the pole with a clip and nail and was positioned horizontally. The section of wire has a rounded appearance on both ends. The photographs I took of the top of the pole do not show as good of detail as I would like of this piece of wire because of the angle and distance from the ground. The detail could be observed much better with binoculars.

I found that the #6 AWG solid copper ground wires on each of the poles of the structure had been removed by copper thieves starting at the dirt to a height of about seven or eight feet; leaving no electrical grounds for the structure.



The wind began to increase in the afternoon and I observed the conductors of the 345 KV line bounce up and down with at least two feet of movement above the 138 KV structure.

Conclusion:

It is the opinion of this investigator that this fire is the result of the lower west 345 KV conductor coming into close proximity to the top of the east pole of the 138 KV structure below. While attending college in the Lineman Training Program at Utah Valley State College several years ago, I learned that a general rule for arc distance is that 10,000 volts can arc about one centimeter in dry air. Based on that rule, a 345,000 volt system could arc about thirteen and one half inches in dry air without making direct contact with another phase or grounded object. At the time the fire was reported on June 23, 2012 there were strong gusty winds out of the southwest. As observed on the afternoon of June 25, 2012, the winds caused the conductors of the 345 KV Transmission line to bounce up and down. The lower west conductor of the 345 KV conductor

could have easily came within the distance needed to create an arc between the 345 KV conductor and the top of the pole.

The electrical grounds had been removed by copper thieves from the structure eliminating the systems ability to properly dissipate the electrical current. The current was able to travel through the structures guy wires and arc across the small gap of the Jonny Ball Insulators to continue to ground. The grass around the anchors of the guy wires ignited (specifically the northeast guy wire). The wind caused the fire to spread to other grass and sage brush in the area.

This is my expert opinion, based on the facts, information, evidence, and statements that were known, given, or available at the time of the initial investigation. If additional facts, information, evidence, or statements are obtained that were not disclosed, available, or known at the time of the initial investigation, a supplemental report will be generated under this same case number, reflecting any additions and/or modifications to the initial report.

Signature:

Troy D. Mills

Digitally signed by Troy D. Mills
DN: cn=Troy D. Mills, o=Department of Public Safety, ou=Fire Marshal, email=troymills@utah.gov, c=US
Date: 2012.06.27 15:41:07 -06'00'

Office of the State Fire Marshal
Troy D. Mills, IAAI-CFI
Deputy State Fire Marshal
250 North Main, Suite B38
Richfield, UT 84701
Cell: 801-556-4154

CURRICULUM VITAE

Last Updated March 21, 2012

Personal Information

Troy D. Mills, Deputy State Fire Marshal
Utah State Fire Marshal's Office
250 North Main, Suite B38
Richfield, Utah, 84701
801-556-4154 Cell

Education

Utah Valley State College

Associate of Applied Science Degree (AAS) in **Lineman Training** *(Includes courses in electrical theory, solid-state circuitry, motor controls, residential and commercial wiring, power line transmission and distribution systems, substation equipment, transformers and electrical metering)*

Associate of Science Degree (AS) in **Fire Science** *(Includes courses in fire behavior, firefighting fundamentals, hazardous materials first responder, flashover survival, fire inspector, incident command, fire company officer, supervision and leadership, building construction, fire protection and detection systems, and fire origin and cause/arson investigation)*

Fire Service and Related Experience

Office of the State Fire Marshal

Program Administrator, Juvenile Firesetter Intervention Specialist, Fire/Arson Investigator, Fire Prevention Specialist

Springville Volunteer Fire Department

Firefighter, Training Officer, Safety Officer, Assistant Chief

Utah Fire and Rescue Academy

Training Coordinator, Assistant Director, Special Projects Administrator

While working at the Utah Fire and Rescue Academy I directed the development of several live fire course curriculums including: Initial Fire Attack, Flashover Survival, Vehicle Fire Emergencies, and Propane Emergencies. I also directed the development of several live fire props including: Flashover Survival Prop, Initial Fire Attack Prop, Mobile Initial Fire Attack Prop, Propane Emergencies Prop, and Mobile Fire/Arson Prop

Owner (Sole Proprietor) Mills Cabling Company

Maintain and troubleshoot commercial and residential electrical systems, and install/maintain/troubleshoot telephone and computer network cabling systems

Certifications

International Association of Arson Investigators
Certified Fire Investigator

International Code Council
Fire Inspector I, Fire Inspector II, Plans Examiner

Intermountain Power Superintendents Association (IPSA)
Journey Line Worker

Utah Fire Service Certification Council
Firefighter I, Firefighter II, Fire Instructor I, Fire Instructor II, Inspector I, Hazmat Awareness, Hazmat Operations, Fire Officer I, Fire Officer II

Utah Police Officer Standards and Training
Law Enforcement Officer

Training Received

- Court Room Procedures – 20 hrs – Wendover, Nevada
- Fire/Arson Investigation at the National Fire Academy – 80 hrs – Emmitsburg, MD
- Investigation of Electrical and Appliance Related Fires – 20 hrs – Las Vegas, Nevada
- Juvenile Fire Setting Intervention
    - Child Firesetting and Juvenile Arson Intervention – 16 hrs – Park City, Utah
    - Drawn to the Flames seminar – 24 hrs – San Diego, California
    - NASFM JFS Conference – 16 hrs – Greenbelt, Maryland
    - Youth Firesetter Intervention Specialist – 32 hrs – Las Vegas, Nevada
- Low Energy Mechanisms and Ignition Sources Seminar – 20 hrs – Wendover, Nevada
- Fatal Fire Investigation – 24 hrs – Wendover, Utah
- Vehicle Fire Investigations – 21 hrs – Las Vegas, Nevada
- Interviewing/Interrogation Techniques and Courtroom Testimony – National Fire Academy – 80 hrs – Emmitsburg, MD
- Advanced Fire Investigation Seminar – 40 hrs – Denver Fire/U.S.ATF
- Small Appliance/Electrical Fires – 20 hrs – IAAI, Utah Chapter
- Advanced Fire Investigation – 40 hrs – Price, Utah
- FI-210 – Fire Origin and Cause Determination – 40 hrs – Utah Wildfire Academy, Richfield, Utah
- Fire Dynamics/Fire Modeling – National Fire Academy – 80 hrs – Emmitsburg, MD
- Workable Approach to Search and Seizure – 8 Hours – Brigham City, Utah
- Principles of Fire Protection: Structures and Systems – National Fire Academy – 80 hrs – Emmitsburg, MD
- Legal Aspects of Fire Investigation and Applied Courtroom Testimony – 24 hrs – Wendover, Utah
- Writing the Initial Origin and Cause Report – CFITrainer.net – 3 hrs

Significant Fire Investigations

- Saratoga Springs Fatal Fire – February 6, 2007

    - An explosion occurred at the home of Greg and April Roper. Mrs. April Roper (home owner) and Mr. Larry Radford (Questar Gas Employee) died as a result of that explosion after entering the basement of a home to re-ignite gas appliances. This incident occurred following a damaged natural gas line near the structure.
- Halls Crossing Marina Fire – December 18, 2008
    - A fire originated on Dock "F" at the Halls Crossing Marina at Lake Powell, Utah. The fire completely destroyed fifteen large houseboats and caused some fire damage to at least eleven additional house boats. Two floating docks used to store houseboats were also damaged as a result of the fire.
- Provo LDS Tabernacle Fire – December 17, 2010
    - A fire destroyed the Historic Provo Tabernacle owned by the Church of Jesus Christ of Latter Day Saints. The investigation into the origin and cause lasted for over six weeks.

Courses Instructed

- Basic Firefighter Tactics
- Firefighter I
- Firefighter II
- Skill Evolutions for Firefighter I and II
- Juvenile Firesetter Intervention
- Live Fire Evolutions
- Propane Emergencies
- Vehicle Fire Emergencies
- Fire/Arson Investigation for the First Responder

Courses Developed

- Basic Firefighter Tactics
- Skill Evolutions for Firefighter I and II
- Juvenile Firesetter Intervention
- Live Fire Evolutions
- Propane Emergencies
- Vehicle Fire Emergencies
- Fire/Arson Investigation for the First Responder

Affiliations

- International Association of Arson Investigators,
- Utah Chapter of the International Association of Arson Investigators
- Served as a Board Member for the Utah Chapter of the International Association of Arson Investigators – Two Year Trustee

Investigated over 300 fires