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ELECTRICAL

Report Number: 07-0000762

Synopsis: Confined space rescue concerns

Event Description: I am a full time firefighter-paramedic but also work on an ambulance part-time as a clinical manager/supervisor. I was at the station when a call came in for a man down, not breathing and under a mobile home. I wanted to evaluate a new employee so I went along on the call. A first responder team of volunteers made it on scene about 4 minutes before we did. Upon our arrival, we found a man in "full arrest" deep under the mobile home. Two of the first responders were under there trying to move him out. The patient had crawled over an axle and was deep inside a confined space. Due to the fact of the small working area, limited lighting, and a large patient (250 lbs), the scene was rushed. I went under to assist. I tied a bedroom knot, slipped it onto the patient, and began extrication with the help of the others on the rope on the outside. As the patient began to move, we noticed a wire that was lying under the patient. After the patient was moved outside, CPR was begun. I noticed the patient had two, what appeared to be electrical burn marks, on his arm. The wire that was found was traced back to a breaker box. It would appear that he cut into a 220V live wire and was shocked. He later died at the ER after transport. We, as a group, did not fully consider the issue of a confined space nor the dangers of what could be under the mobile home. I also ASSUMED that the scene was safe as the first responders were working without problems. The lesson learned is that safety needs to be re-assessed and should be on-going through the entire call.

Lessons Learned: Always re-assess the scene and make it an on-going process through the entire call. Do not assume anything. Also, be aware of the type of situation you are dealing with. This was a confined space with multiple hazards that were not addressed properly. Finally, do not get rushed into a call. Safety is number one for you and your crew, even in a life or death situation.

Report Number: 07-0000804

Synopsis: Electrical arc causes fire, creates hazard for FFs.

Event Description: Our engine was dispatched to a reported electrical fire in a very complex industrial facility in our response district. Upon arrival, we observed light smoke at the ceiling level inside the structure, approx. 60 ft. and located the point of origin with a small amount of fire, 40 ft. above the floor, in a splice of a group of high voltage electrical lines that were approx. 4 inches in diameter. Witnesses in the area reported hearing what seemed like an explosion before finding the fire. After performing a complete size-up of the area deeming no other area was involved one of our crewmembers, in full PPE, commandeered a high lift and a lift operator (a civilian in work coveralls) and ascended up to the fire with an ABC extinguisher to put out the fire. Our crewmember was able to knock out the fire with a few quick bursts from the extinguisher while up in the basket of the lift approx. 4 ft. away from fire area. I then did a secondary survey from the ground level with our thermal imaging camera (TIC) to see the extent of the spread of the heat source. After finding no other area besides the one we were addressing, I told our crewmember to come down and take the TIC back up for a closer survey of the area. Our crewmember reported no further spread and small amounts of heat. At this point command had requested electricians to respond to our location for assistance. While awaiting the arrival of the electricians the lines we were addressing apparently shorted out again discharging an arc

and a fireball approximately ten foot in circumference and re-igniting the fire along the lines. Our crew member and the lift operator, who was still in the high lift basket approx. 4 ft. away observing with the TIC, were driven down to the floor of the basket narrowly escaping the exposure of the electrical arc and fire. Our crewmember then put out the fire with the extinguisher and I ordered him to get down from the area. Once our crewmember and operator came down a quick assessment was done for both members revealing neither had any injuries at all. Shortly after the "short", the electricians arrived on scene and stated that the lines were carrying in excess of 15,000 volts and had no idea why they shorted out twice. The incident is still under investigation.

Lessons Learned: The value of wearing your full PPE cannot be stressed enough. Even though neither of the individuals were injured, the potential of injury and or loss of life could have been great. Reconsider using civilian personnel for assistance. Check and re-check the status of any and all electrical power sources before making any type of attack.

Report Number: 07-0000986

Synopsis: Electrical hazard more serious than perceived at strip mall.

Event Description: My station was called to a possible fire in the rear of a strip mall. The responding crew consisted of an engine, rescue and command vehicle. I am the driver of the engine. Upon arrival we were greeted by several occupants of the building who were exiting a common area which was a hallway that ran behind each shop for employees only. The owner of the pizza shop was the first to approach us, stating that his power had been surging and he could smell smoke near the circuit breakers outside. He was very accusatory towards an individual that was doing some remodeling in a shop a few stores down. He stated that they had wires running everywhere and that they must be overloading the circuits. The construction worker stated that he was only using tools such as a saw and drill and there was no way he was overloading anything.

Near the hallway on the outside of the building there were circuit panels for all of the shops as well as a main circuit breaker for the building on the wall outside. There were also 2 large green electrical boxes on the ground about 10 feet off of the wall that turned out to be the main breakers through which the power company runs power to this general area. The main circuit breaker box for the building had light smoke coming from it. I was dressed in my bunker pants and work shirt only at this point and was waiting for my firefighter to grab a dry-chem extinguisher. He did so and approached fully bunkered. I reached up with my non-gloved hand and unlocked the metal latch to the breaker box but looking at my firefighter fully bunkered out decided not to open the door to the breaker box at the last moment. My acting lieutenant instructed me as there was no immediate danger to anyone that we would wait for a city building inspector, the building owner and an electrician. The city building inspector arrived and in addition to the above, called the electric utility company, as those 2 large area circuit boxes were right next to the building.

After waiting approximately 1/2 hour all parties arrived. The electric company pulled the circuits for the area and the electrician opened the main breaker to the building and turned it off. The smoke that was coming out of this box was not originating from this breaker box but rather just following the piping on the wall and exiting out of the main breaker box door. There was a large 8 foot

long box near the ground that had no latches and was finally opened. This box housed large diameter wires or lines that fed each breaker box. One of them had burned through its insulation and was touching part of the large box housing. It was not red from heat but the paint had bubbled in several places. As the paint was very old it was hard to see. My leg was approximately 3 or 4 inches from this large box when I initially approach the breaker panels. As the box was apparently charged this could have been a problem for me if I had made contact with this box on a seemingly routine call. The electrician told me that it was good I did not open the breaker box, because if there was a problem with it, it could have arced.

Understanding now that this could have happened, I started to consider all of the house fires that we go on and pulling a meter means opening a breaker box and flipping a switch now a days. My understanding from the electrician is that these can arc. We pull it on every house fire for the most part. The safety officer that pulls the breaker does not carry any protected high voltage gloves that I saw used that day on scene. My lack of knowledge and exposure in this incident got me thinking I needed more training on electrical fires and understanding of electricity. The local electric company does not wish to provide any training, as they feel that they could somehow be liable if we were to make a mistake, which I understand. I cannot find any training online for electrical fires. So in addition to submitting this near miss report, I am hoping to generate some interest in discussion on how we can become better trained on electricity and what to look for. Hope this makes you think twice when approaching and responding to an electrical fire.

Lessons Learned: The main lesson learned for me was experience in this kind of situation. More caution needs to be taken on my part, and if I am unsure of what is going on or what to do, I need to contact additional resources. I feel that with more standardized training on electrical fires and what kind of precautions are needed I will be able to identify hazards more easily. I know most firefighters will probably read this and say well if you don't know then stay away but they know as well as I do that this is not always possible.

Report Number: 07-0000997

Synopsis: FF struck by lightning while advancing hose line

Event Description: In the height of an electrical storm, members were advancing on a well involved cellar fire. The private residence of Type 5 Construction was believed to be struck by lightning. The nozzle man was advancing when he received an electrical charge entering his right shoulder. The hose man behind him saw a "bluish flash" hit the nozzle man. The hose man did not receive the charge. The nozzle man recoiled and remained conscious but was complaining of numbness and pain in his right arm and leg. Command was notified and the hose team retreated from the cellar. Command ordered all personnel away from the structure and the power company was requested.

Lessons Learned: Investigators determined that all installations appeared to be up to code. The lightning strike traveled to the fuse panel and melted the phases to each another creating a feed to ground. We were reminded that the power of a lightning strike can and will circumvent all normal safeguards.

Report Number: 07-0001011

Synopsis: Firefighters attempt to extinguish fire on live electrical lines.

Event Description: We were dispatched to a report of a bush on fire on the side of the road. Prior to my arrival with a suppression unit, a paramedic unit had self-dispatched and arrived on the scene. The crew on this unit are firefighter/paramedics, but they have little job experience due to seniority. There is no supervision on their vehicle, and just a water can and chem-dry extinguisher for suppression. This crew did not communicate with my unit and since I was responding from out of zone I was not even aware of their on-scene status. The bush turned out to be burning on top of an open manhole cover that accessed underground electric cables and next to a cable television box that was also fed electrically. The initial crew did not recognize the hazard and attempted to further open and remove the manhole cover using a metal shovel. Their actions caused the short-circuiting electric cables to come in contact again and resulted in a small explosion with arcing and sparks flying. Fortunately, no one was injured as they jumped back in fear. Upon my arrival I surveyed the scene and immediately recognized the electrical hazard due to training and the involvement of similar equipment in a recent car accident. While I was making decisions and communicating with dispatch for assistance from the electric company my own crew began to deploy a hose line. I turned to explain to them that we could not flow water due to an electrical hazard. There were no immediate hazards to life or property. We chose to close off the area and wait for the electricity to be turned off. When the electric company arrived not only did he confirm the hazard as he uncovered the manhole and found crossed and damaged wires arcing and shooting sparks, but the cut-off was a good 300 yards down the street. With the electrical hazard controlled we were able to quickly extinguish the bush with a water can and leave the scene in the hands of a qualified repairman.

I was prompted to write about this incident by my chief because I responded to another similar call a few days later. In this instance a fiber glass manhole cover had completely blown off of underground electrical cable box at the base of a telephone pole. There were active flames consuming the box and burning the base of the pole. On our arrival there was a small crowd of citizens standing around the fire in awe but also in life-threatening danger as the electricity arced and sparked.

Lessons Learned: The first lesson is to always remember to do a complete survey of the scene no matter how small and incidental it may appear.

Next, regard any electricity as life threatening and involve the local electric company.

Finally, as difficult as it may be, we need to just sit back, secure the area, and wait for the electricity to be controlled.

This small incident demonstrates vulnerability due to a lack of experience that may only come from time on the job. There must be adequate accountability and supervision on all calls that we respond to.

Report Number: 07-0001024

Synopsis: Dryer fire caused by electrical short may have been energized

Event Description: Upon arrival at a reported dryer fire, a small fire was visible from beneath the dryer. The initial size up seemed to be a small lint fire under the dryer. The fire was extinguished using a water

extinguisher. After extinguishment an attempt was made to remove the damaged dryer from the residence as part of overhaul. When the dryer was moved an electrical arc was visible from the rear of the dryer. Overhaul operations were stopped and a request for power to be cut was made. After power was cut and the dryer removed from the residence it was discovered that the cause of the fire had been an electrical short and not overheated lint. Though the electrical cord had been melted and had arced at least twice, the circuit breaker never activated. There was a period of time where the dryer could have become energized during extinguishment and overhaul.

Lessons Learned: Future fires involving electrical appliances should result in an immediate termination of electrical power to a residence until the cause of the fire is determined or the appliance can be unplugged from the household power.

Report Number: 07-0001053

Synopsis: FF receives shock from quartz light

Event Description: At the conclusion of fire ground operations, a firefighter operating on a floodlight unit was retracting a quartz light back into the docking position on that unit. The firefighter came into contact with the pole of the quartz light and was electrocuted. He was thrown from the vehicle to the ground and was hospitalized overnight.

Lessons Learned: Departments MUST ensure ground fault protection on all apparatus electrical appliances and reels. Vehicles should go through equipment inspection by an electrician to ensure equipment is still serviceable. Because of this incident, the unit was upgraded with ground fault circuit breakers and they will be replacing all the receptacles on the unit.

Report Number: 07-0001063

Synopsis: Aerial ladder extended as lightning rod.

Event Description: Members responded to a reported house (single-family dwelling) fire due to a lightning strike. Upon arrival, the first due unit (Quint) investigated and confirmed a working fire in the attic space and initiated fire attack. The fire had been knocked down and overhaul and extension work began. During the operation, lightning was still in the area and the risk of lightning was significant. Due to the location of the fire and extension, members had to overhaul while working on the roof to remove roofing materials from the roof decking to gain access to the burning materials. The decision was made by the Safety Officer (mutual aid Battalion Chief) of the incident to raise the Quint's aerial ladder straight into the air and extend it to full length to act as a "lightning rod" so that if lightning were to strike in the area, the extended aerial ladder would take the hit and not the roof area where the members were still operating (overhaul/extension work). The decision was approved by the Incident Commander (IC) and the action implemented. Additionally, the Quint was pumping the fire with three (3) lines coming off the apparatus and a LDH supply line from a hydrant connected to the apparatus.

Lessons Learned: Lightning is too unpredictable and using an aerial ladder to “control” lightning and send it to ground is not an effective means. The user’s manual for the apparatus states, “electrical storms can pose a serious hazard to anyone on or near the aerial unit. User discretion is advised.” This tactic goes against all best practices, safety recommendations for lightning safety while operating outdoors, and ladder training. Fortunately, no members or civilians were injured during the operation. Aerial apparatus not in use (rescue) should be bed during lightning activity to reduce the risk of a strike. The house had been searched and it was verified that no occupants were home at the time of the fire. Members were left on the roof to operate for property, not lives.

Report Number: 07-0001102

Synopsis: Ground wire energizes plumbing.

Event Description: Dispatched on a reported pole fire behind a residence. On arrival, resident reported tree limb had pulled the electrical service from the home and that smoke was inside the residence. Confirmed moderate smoke in the residence and requested a full structural assignment and electrical company. During investigation detected smell of natural gas and requested gas to be shut off. Outside meter valve was painted open making gas control difficult. Interior personnel located broken gas line on water heater and attempted to shut off the gas valve. Firefighter reported an electrical shock when touching the gas line. Exterior gas was finally shut off and later investigation determined that when the electrical service had been pulled away from the residence it had energized the ground wire in the box. The ground wire was connected to the plumbing system and energized all pipes in the house. The plumbing pipes were in contact with the natural gas pipes at the point of the water heater causing the gas line to become energized.

[Reviewer added comment from the reporter. When the gas line separated, the closet ignited. This caused the water line on the water heater to separate. The broken water line extinguished the fire. As a result, the smoke in the house was from this fire that had extinguished itself prior to the fire department's arrival.]

Lessons Learned: All companies understood the possibility of electrical hazards on arrival given the situation. What wasn't suspected was the live wires being exposed to a ground wire and energizing all metal pipes inside of the structure. Power control had to be effected at the pole by the electrical company. Lessons learned should be a focus to avoid all metal objects in a residence whenever the power system is compromised.

Report Number: 07-0001109

Synopsis: Electric arc sends FF to the eye doctor.

Event Description: Attached is a near miss with a single FF1 being sent to check for activation of a pull station, but was confronted with electrical box located next to the main breaker that was burnt with burn marks around it.

Official statement of injury as seen by FF [deleted]:

While on the scene of an incident at [address deleted], I was exposed to an electrical explosion. I was assigned to check the 2nd floor for a "pull station" activation with one of the maintenance men from the building. When we reached the 2nd floor I smelled a faint smell of burnt electrical and checked the electrical room. I noticed a box located next to the main breaker that was burnt with burn marks around it. The maintenance man removed the box cover and checked the power source with a volt stick. The first contact showed nothing and upon touching the other terminal the box exploded. I felt the small concussion (due to the small size of the room) and the light temporarily blinded me. I located the exit door and entered the hallway. I was slowly regaining my vision when I found the maintenance man who had sustained an electrical shock in the process but said he didn't want an ambulance. We were only approximately 2 feet away from the box when the event happened. We returned to the first floor and reported the incident to [name deleted] (OIC on E[deleted]). He returned to the floor to insure there were no other hazards present. After the call, I regained my sight with some blurriness and still seeing spots. I also had pain in the eyes. I was taken to [the fire department medical officer] who evaluated me and sent me to [local hospital] for a full eye exam. I was released with orders for medicine drops for the eyes and several days of rest. I will be able to return to duty as of next shift.

The following is a witness statement from Lt. [name deleted].

On incident # [deleted], FF1 [name deleted] was exposed to an unexpected arcing electrical flash. He did not receive any obvious facial injury. However, he did state that he had a tremendous headache and reported to feel as if he just looked into the flashbulb of a camera. I did not witness this incident, but he reported it to me immediately after it happened. According to FF [name deleted], he was watching a building engineer remove a cover from an electrical relay. As the engineer attempted to test the wiring for power, the relay arced and flashed brightly. Neither FF [name deleted] nor the engineer received any electrical shock, just exposure to the flash.

Lessons Learned: Personnel should shield eyes whenever testing for electrical power. Attention should be paid to ensure testing devices are not grounded out against metal objects. Ensure testing equipment is capable of handling electrical load.

Report Number: 07-0001127

Synopsis: FF cuts electrical line

Event Description: I am a Firefighter that arrived on scene to a two story residential structure fire with light smoke showing. My engine staged on the alpha side of the home close to 75 feet away from the garage door. My crew proceeded to the bravo/charlie corner where we were told was the location of the fire. The owner of the home was on a ladder flowing a garden hose in a hole that he had smashed into the exterior wall above the fire. The fire at this time was contained in the interior wall about 4 to 5 feet off the floor. I proceeded to grab a chainsaw and reported to the engine Lieutenant for orders. He directed me to my engineer who gave me the order to cut and remove the interior plywood sheathing around the electrical receptacle. I proceeded to cut away and on the third cut on the left side of my

square cut, I sheared the electrical line. Sparks flew everywhere. It looked like a lighting storm in front of me. I then killed the saw and backed up from the wall and hollered turn the power off. The Lieutenant was already looking for the breaker to turn it off, when I decided to play Frankenstein with myself. After the breaker was turned off and the all clear was given, I finished my cuts and we extinguished the smallest structure fire that I have ever responded to.

Lessons Learned: I was wearing a helmet camera, which was recording at this time. I did not receive any shock or injury except to my pride. I have watched this recording a few times and I expected myself to have known better. I should have made sure that all power was off before I made my cut. Even before my incident and with the home owner spraying water down the inside of the wall, I should have checked utilities while we were taking our first assessment. Sometimes these things happen but they should not and I have learned that a fire of any size can be your last run and to always use my training.

Report Number: 08-0000147

Synopsis: IC directs crew to extinguish fire on electrical pole

Event Description: The Department responded to a report of an electrical pole on fire during a snowstorm. Two engine companies responded. Upon arrival, the company officer (Acting) of the first engine assumed command. Initially, he directed his crew to pull a 1 3/4" line to extinguish a visible fire on the pole. Both of his crew members refused the order as this energized electrical lines on a pole. No line was pulled. The incident commander requested through dispatch that a truck company (aerial platform) respond. This alarm was dispatched and the Captain on the truck communicated with the incident commander what his directions were. The incident commander stated he wanted the tower positioned so that a crew could extinguish the fire on the pole with a dry chemical extinguisher. The Truck Captain refused the order. The Fire Chief, who was on the air, upgraded his response from non-emergent to emergent. Once on the scene the Fire Chief did a face to face with the incident commander and assumed command. Actions at this point became close the roadway. Move all apparatus back to a minimum of three poles from the affected pole, notified the power company, and protected the area from any possible entry by bystanders, police, or fire personnel. Power was eventually de-energized and the fire became a Class "A" fire and was extinguished with less than 20 gallons of water.

Lessons Learned: This could have quickly become a tragic incident if the crew on the first arriving engine had not refused the order to extinguish the fire, the Truck Captain had not refused the order to put up his aerial ladder near energized electrical lines, and the Chief had not quickly responded and relieved the initial incident commander.

Company officers and acting company officers must do a proper size up of any fire condition and determine a safe course of action. Any fire involving potential electrical hazards should be treated as Class "C" fires. In the case of utility poles, a safe zone should be established, notification made to the power company to de-energize the situation and get assurance from the power company before attempting any type of extinguishment.

If SOP's are not established for fires involving live electrical equipment, they should be and training conducted to that SOP.

Report Number: 08-0000398

Synopsis: False negative reading from a hot stick.

Event Description: At 1321 hours, our fire department was dispatched for a "lighting strike" of a dwelling. When the fire department arrived on location, they found an outlet in the laundry room had shorted-out and scorched the wall. There was also water on the floor. The circuit breaker box was not properly labeled to identify which circuit breaker controlled the damaged outlet. A circuit breaker believed to be the correct one was shut off. The ladder company crew came in to check for extension. A member of the ladder crew came in with a "hot stick" to determine if the outlet was still energized. The firefighter checked the outlet and reported that the outlet was de-energized. In the process and removing the outlet cover, the wires in the outlet arced again. The power to the outlet was still on. The firefighter could have received a fatal electrical shock as he was kneeling on the floor in the water while checking the outlet. The firefighter had failed to verify that the "hot stick" was properly set by checking it against a known functioning energized power source.

Lessons Learned: Firefighter should not have assumed the power was secured. Prior to checking the outlet, the firefighter should have verified that the "hot stick" was properly set and functioning. All firefighters need to be familiar with the SOP for using specific equipment. Firefighters need periodic review and retraining for equipment that may not be frequently used.

Report Number: 09-0000774

Synopsis: FF narrowly escapes electrical shock

Event Description: After locating an electrical hazard as the cause of smoke in a house, all power was secured to an unlabeled electrical box. Once the location of the hazard was determined, the lieutenant was attempting to restore power to all but the isolated breaker. The lieutenant advised a firefighter to hold an electrical wand to the cord. When the wand lit up, let him know so they could secure the power to only that breaker. The incident commander then told the firefighter to move away from the cord while power was being restored because of possible hazards. When the power was restored by the lieutenant (one breaker at a time and the hazard breaker was flipped on) a large pop and electrical bolt shot out of the cord. If the firefighter had been in contact with the cord, he could have received a fatal shock.

Lessons Learned:

Stay away from electrical hazards. It is not our specialty!

Once power is secured, leave it secured if it cannot be properly isolated.

Continue training on electrical hazards.

Report Number: 09-0000899

Synopsis: Electrical hazard poses threat at structure fire.

Event Description: Our agency was called to the scene of a structure fire in a multi-story wood frame home, approximately 40 years old. The fire was contained in two rooms of the structure on arrival. Crews made entry to commence fire attack prior to application of water. There were no reports of persons inside. The breakers in the panel box were deactivated. During the attack, one of the crew members contacted a live wire and received an electrical shock. He was immediately removed and care was rendered.

Since this house was older, it did not have any of the modern main breaker safety features new houses have. All breakers in the box were deactivated, but there was still power from some source other than the breaker panel. Once the power company arrived, the drop from the street was cut and firefighting efforts were renewed.

The injured firefighter was transported for evaluation and was treated and released.

Lessons Learned: It must always be remembered that all electrical lines should be considered hot until we know otherwise from a trained professional. This is particularly true when fighting a fire in an older structure that may not have the required electrical safety features of newer homes. Understanding building construction is critical to helping our members understand the dangers associated with fighting fire in old and new structures. This includes the understanding of prevailing wiring and electrical distribution systems used in various structures.

Situational awareness should also play a role. When doing the 360, look for additional electrical service entry points, or modifications to the existing system. These may bypass the system in place and when that system is deactivated, they can back feed the system causing it to stay energized.

Report Number: 10-0000247

Synopsis: Electrical explosion endangers crew.

Event Description: I was assigned to incident command of a single story, wood framed residential fire. The fire was a single room and contents with smoke and possible fire extension into the attic space.

Vertical ventilation was ordered. Vertical ventilation was completed and the ventilation company dropped the interior ceiling. The initial company on the scene had advised that utilities had been secured almost immediately following the initial interior attack. As the ceiling was breached by the ventilation company, a large section of drywall swung free striking the HVAC unit in the garage, knocking it off its base. This action caused a large arcing and electrical explosion, exposing crews entering through the garage including an officer who had walked to the threshold without secured PPE. No one was injured and the electrical utility was immediately secured.

Lessons Learned: Command should notify interior crews of ventilation operations to coordinate and make them aware of potential for structural debris.

Request clarification from companies reporting utilities secured to insure which utilities were specifically secured and not assume the communicator meant both gas and electric.

Enforce that all individuals in hazard zone are wearing PPE.

Report Number: 10-0000890

Synopsis: Responders shocked to find live wires.

Event Description: Note: Brackets [] denote reviewer de-identification.

On [date omitted], E-[1] was dispatched to a MVC with unknown injuries on an eight lane highway on the north side of the city. As the engine was responding, our Dispatch Center advised we could cancel per EMS. We slowed our response to enroute, but continued to the scene to check for vehicle stability and possible leaks from the engine compartment.

As we approached the scene, we observed a two vehicle MVC with one pick-up truck head on into a concrete utility pole. The other vehicle sustained damage to the rear end. All the occupants were out of the vehicle and being assessed by EMS at their ambulance. We made contact with [name deleted] EMS and they advised all the occupants were ambulatory upon their arrival and they were transporting the occupants with only minor injuries. We confirmed that we were not needed to assist with patient care and went to check on the vehicles.

The pick-up truck had extensive front end damage and both the driver and the passenger air bags had deployed. The overhead electrical wires on the pole were intact and the damage to the pole was minimal. The pick-up truck was not running, but I asked my firefighter to check to make sure the ignition was off, the truck was in park, and the emergency was brake applied. I did not consider this a dangerous task since the air bags had already deployed, the overhead electrical lines were intact, and the pole had minimal damage. The vehicle ignition was turned off and the gear was placed in park when my driver/engineer yelled at us to freeze and move away from the vehicle. We immediately backed away, but did not know why he yelled for us to freeze. I originally thought he was telling us to freeze because he did not realize the air bags had deployed. I began to inform him the air bags had deployed when he asked me to come around to the passenger side of the vehicle. The driver/engineer was on his knees looking underneath the vehicle. It is then I realized the pick-up truck had come to rest on top of underground electrical lines! Some wires were insulated and others were bare aluminum wires that

were touching the vehicle's frame. An unidentified liquid was dripping from the engine compartment onto the wires. We established a safe area, advised the on-scene police traffic investigator of the situation and requested the electric department.

The [name deleted] EMS was still on scene and approached us to state they were leaving the scene. I asked if they checked the vehicle for hazards and they said not really because all the occupants were ambulatory upon their arrival. I showed them the electrical wires under the vehicle and they were shocked. We discussed the importance of checking the complete scene and were relieved no one had been electrocuted.

The electric department arrived on-scene and stated the electrical wires were still energized. The electric department shut the electricity down and waited for the tow truck to remove the vehicle from atop the wires.

Lessons Learned: The lesson learned from this situation is to complete a 360 degree check of vehicles involved in a MVC. Make sure you check above and below the vehicles. Teamwork and learning from past experiences will prevent a similar event. If electrical wires are compromising a vehicle, establish a safe area and do not attempt to remove occupants until the electric department has determined the lines are de-energized.

Report Number: 10-0001065

Synopsis: Mislabeled power supply surprises crew.

Event Description: Units responded to a reported structure fire at a commercial building involving a dishwasher on fire. I arrived on scene with my truck crew and entered the building with the crew from another unit to locate the fire. A small fire was discovered in a dishwasher and quickly extinguished. At this point, under the direction of another crew's officer, I began cutting all water lines tethering the dishwasher to the wall so that it could be moved outside. When I attempted to unplug the device, I discovered it was hard wired to the wall and appeared to be using 220 volt current. I informed the other crew's officer of this, and after checking with his crew and verifying the power had been secured, he instructed me to cut the wire. I expressed some reservations about the status of the power, but was told again that the power was off. At this point, another firefighter in my crew handed me some insulated wire cutters and I proceeded to cut the power wires inside the dishwasher. As soon as I sliced through the insulation on the wire there was a flash and bang as the unsecured power arced across the wire cutters. I dropped the tool and jumped back, shaken but apparently uninjured. After being checked out by medics, I was transported as a precaution and kept under observation for several hours before being released on injury leave. It was later discovered that the maintenance staff at the commercial building had either rewired or somehow changed the electrical panel so that the breaker labeled "Dishwasher", which crews had turned off, was no longer actually connected to that circuit. I was fortunate not to sustain serious injuries, as the wet floor in the kitchen area during the incident created the potential for even greater injury to me and other firefighters. My failure to call for a hot stick, even after my gut told me something wasn't right, also contributed to the situation.

Lessons Learned: This incident reminded me that we should never take chances around electricity and that if you feel something might be wrong, there is a good chance it is. In the future, I will definitely request a hot stick, even though we do not carry one on our truck, to verify the status of wires before cutting them.

Report Number: 10-0001197

Synopsis: Structure energized during meter incident

Event Description: Over the last several months, our department has responded to several fires involving meters. One resulted indirectly in a firefighter injury. On another incident, the exterior of the structure was energized along the gutters of the “A/B” and “C/D” corners.

Units responded to a report of a house fire involving the electrical meter. The contractor was installing a phone line and had drilled a hole from the interior of the home to the exterior; he drilled directly into the “service entry” side of the meter. Upon arrival, the units found an exterior electrical meter sparking on side “Delta” of the house. The panel box located in the basement had also been on fire. The contractor threw a bucket of water onto the panel putting out the fire. A crew was sent to the basement to turn the main breakers located in the panel to the off position.

The safety officer arrived and began to put up red tape to cordon off the affected area to address safety concerns. The safety officer used the voltage checking wand to check the home’s exterior. The gutter readings on side “Alpha/Bravo” and “Charlie/Delta” were positive. The home adjacent was also checked in the same points and was negative. After arrival of the power company, the meter was pulled and readings taken again at the same points and were negative.

On completion of the incident, the power company and electricians were consulted as to what had caused the gutters to be energized. The consensus was that the contractor drilled into the “service entry” side of the meter, in simpler terms, the side of the meter which carries power into the house. The two 120-volt wires fused to the neutral wire and became one. This allowed the power to seek ground; it entered the panel and continued in the neutral wires and the inside circuits remained energized. When the truck company turned the main breakers off, it did not cut power to the home since the electricity by-passed the panel box. This also poses a safety hazard to crew members for possible electrical shock.

The subject matter experts all agreed that the power was seeking ground on the exterior of the home. It is unclear where it grounded, but most often it is a nail in the siding or a cable wire. The wire is supposed to be grounded to the outside; this might have been dislodged or not hooked up during installation.

Lessons Learned: Upon arrival at these specific fires, we will now test the structure to see if it is energized. We will not be turning off any electrical panels.

Report Number: 10-0001260

Synopsis: Live electrical wire puts FFs at risk.

Event Description: We responded to the report of smoke coming from the crawl space of a residence. Upon arrival, we found the dirt floored crawl space filled with very dark smoke. There was a very low clearance in the crawl space. So low in fact, that crawling on my stomach my air bottle was knocking on the floor joists just above me. I made entry with a hose line and box light in very low visibility conditions. About six feet in, I found a box of plastic toys burning, similar to those received from fast food restaurants. The seat of the fire was easily extinguished with minimal water. The only thing left was to soak the floor joists and floor decking thoroughly, which had secondarily started to burn. Once visibility conditions improved, I noticed the main electrical feed to the residence ran along the bottom of the floor joists; the same electrical feed I had been unknowingly bumping up against with my air bottle and helmet. Upon further investigation it was noted that the conduit over the electrical line, which had been within the vicinity of the burning box, had burned off. Interestingly we found the service line entered the house on the "B" side of the structure, ran the length of the house along the floor joists before exiting the house on the "D" side of the structure, only then making its way to the meter. Dangerously, this line was "live" throughout this situation. I learned this type of routing of the electrical service line was common in older homes and even had the electrical service to the house been secured, this portion of the line would have still been energized.

Lessons Learned: Lessons learned: Homes of older construction can have this dangerous routing of the electrical service line in the crawl space, basement or through the attic. Even if the electrical service is "secured" at the meter, there can be still be an energized portion of the main feed from the pole to the meter running through the structure.

Suggestions: Be familiar if residences or other buildings in your response area have this type of routing of the electrical service line.

Actions to Correct:

Enforcement of up to date codes regarding the electrical service routing in buildings must be included.

Understanding this is still a situation that will have to be dealt with in older construction.

Report Number: 10-0001267

Synopsis: Static discharge shocks FF using CO2 extinguisher

Event Description: On [date omitted], units from Battalion [A and B] responded to the report of a house fire. Engine [1] was first to arrive and the officer was advised by the cable technician that he had drilled a hole on the exterior wall on Side Delta and into the panel box located inside the basement. The surrounding walls were on fire, and he had attempted to put the fire out with a dry chemical extinguisher.

The crew of Engine [1], while making their way to the basement entrance, noticed the electric meter outside the house was sparking. Upon entering the basement, the electrical panel and the surrounding wall were on fire. The firefighter on Engine [1] used an entire 20 pound dry chemical extinguisher to put out the fire. The fire had reignited the panel and the surrounding wall was once again on fire. The firefighter then attempted to use a 20 pound CO2 extinguisher when he received an electrical shock. He was holding the extinguisher off the ground, standing approximately four to five feet from the panel, holding the nozzle in his left hand and the handle in his right. While discharging the extinguisher, he felt an electrical sensation in his right hand and forearm. Not realizing what had happened, a second discharge occurred and the sensation was five times as strong as the previous one. The firefighter suffered a medical emergency and was flown to [a hospital].

There have been several instances reported of static shocks from CO2 extinguishers in the fire service and other industries. The friction of one material being rapidly passed over another insulated material typically generates static electricity. While static electricity can occur over a wide range of atmospheric conditions, dry and cool environments are the most conducive and susceptible for experiencing the buildup of static electricity. Carbon dioxide extinguishers generate static electricity with the friction created as the high pressure liquid agent quickly passes up the siphon tube, through the valve and out the discharge hose assembly where it releases as a cold gas or snow. Because the rubber hose and insulated nozzle horn are non-conductive material surfaces able to accumulate the buildup of static electricity, these extinguisher components incorporate conductive wires or similar materials to help dissipate most of the static that is generated.

The ANSI/UL-154 Carbon Dioxide Extinguisher Design Standard, as well as the 2002 edition of NFPA-10, has specific references addressing these issues. Extinguisher service recommendations require annual continuity testing and labeling of these extinguisher components to ensure they remain capable of dissipating static buildup. With these components, the fire extinguisher operator carrying and supporting the extinguisher during discharge may experience a static shock, if the static buildup instead grounds itself through the hand and body of the operator. Setting the fire extinguisher cylinder directly onto the ground during discharge can help to reduce or eliminate the buildup of static electricity.

Engineers from [fire extinguisher manufacturers] stated that it is impossible for CO2 to conduct electricity through the gas. This would suggest the electrical panel was not the cause of the shock to the firefighter. The static shock produced will vary with atmospheric conditions from a mild shock similar to a blanket in the winter to a larger shock causing injury.

It is believed that the perfect conditions were encountered by the firefighter operating the extinguisher.

Enclosed Area: Basement room

Dusty Air: Large amount of dry chemical particulates on both floor and firefighter

Damp: Basement and or sweat on firefighter's skin

Cool: Basement or lower level of structure

Lessons Learned: Operators carrying and supporting the extinguisher during discharge may experience a static shock, if the static buildup instead grounds itself through the hand and body of the operator. Setting the fire extinguisher cylinder directly onto the ground during discharge can help to reduce or eliminate the buildup of static electricity.

Caution of other hazards including:

CO2 discharge may cause frost bite; operator must wear the appropriate PPE.

A loud noise will often be heard as the chemical is discharged.

Equipment maintenance should include:

Daily inspection of the hose and cone for damage should be done.

Look for proper service tags.

When sending an extinguisher in for service, the entire unit must go, including the hose and cone. This is done so the complete unit can be tested.

Report Number: 11-0000114

Synopsis: Live wires disable FF during station cleanup

Event Description: I was told we were going to have class at 2000 hours. In the meantime, the Acting Captain told all of us to just clean up the apparatus floor. I was in the process of moving a hose when I came in contact with live wires while standing in a puddle of water. I saw a big flash and felt my whole body tighten up. I also lost a filling during the shock. The wires were cut flush in the floor during the construction of the addition to the firehouse. All of us at the firehouse were told that the wires were dead, but none of us checked the wires. We just took the Chief's word that the wires were dead.

Once I came in contact with the wires I immediately received a major shock. I was semi-conscious and found another firefighter to see what had just happened. The other firefighter said he had heard a pop but did not see anything. There was about 15 minutes of unaccounted time because I was semi-conscious. My hands started getting red with blisters from the first and second degree burns. I reported this to the Acting Captain and he called the Chief. The Chief told me to drive myself to the hospital, so I did.

The hospital staff was angry that I drove myself because my heart was beating irregular and my decision making abilities were compromised. The hospital staff told me I could have had a heart attack while I was enroute or even crashed. Then, I was told that I might need to go to a burn center because the burns were on the joints of my hands and could limit my flexibility. I was released hours later and was sent home with pain killers because the doctors told me I would be in severe pain for the next few days because of the lactic acid that was in my muscles and the pain from the burns. The next day I was in extreme pain from all of my injuries.

I have had many different therapies for over a year and numerous operations to try and relieve the problems and pain I have been left with. My driver's License was taken away for almost a year because of all the neurological problems I had. Because of my injuries I lost the best job in the world. I am currently unemployed.

Lessons Learned: 1. I will never take anyone's word about electrical wires being dead or alive again.

2. If you ever receive an electric shock, never drive yourself to the Emergency Room.

3. If you ever receive an electric shock, make sure you drink plenty of fluids because the lactic acid buildup in your muscles moves to your kidneys and could give you renal failure and ruin your kidneys.

4. Keep a daily log (documentation) of all of your activities for up to a year. I am very thankful I did for legal purposes; otherwise I could have been fired.

Report Number: 11-0000161

Synopsis: Utilities not secured at fire

Event Description: Our engine was dispatched to a structure fire reported to be from a malfunctioning electrical meter on the exterior of a townhouse. Our staffing that day was 4 personnel and we arrived as the fourth engine out of five. We reported to the command post and were directed to pull a secondary line to the rear of the building where the electric meter was located. The townhouse was a second from the end unit with a Bravo Exposure and three Delta Exposures. The electrical meter was on the exterior of a storage shed and the shed was attached to the rear of the townhouse. The only way to enter the storage shed to gain access was to exit the townhouse and enter the storage shed from outside. There was no direct way into the shed from the townhouse. The occupant had already exited the structure on his own accord and was being evaluated by the medic unit due to an electrocution. The first arriving engine had contained the fire with dry chemical fire extinguishers and CO2 extinguishers. The rescue and truck were ventilating the structure because some smoke had entered the structure, but no fire had extended into the structure. Once we had our second line in place, I looked up and noticed that the first arriving engine was starting to do salvage and overhaul on the shed and had started to use a 1 ¾ attack line to extinguish hot spots. I asked the rescue squad officer to find out if the power was still on to the meter by checking to see if the measuring wheel inside was still spinning. He came back to me and stated that it was still spinning and that it appeared to still have power. As I was getting ready to radio command, I saw a blue arc of electricity above the crew with the attack line. I did a face to face with command and told them that we should immediately stop using water until the power company could secure the power to the house. The battalion chief stated to me that he agreed, but if the fire in the house started to flare back up, he wanted us to try and hold the fire in check with a minimal amount of water. I explained to him that I did not agree with this, and he stated that he still wanted us to keep the fire in check if it flared back up. At this point I did not want to argue with him in front of everybody because the fire did appear to be completely out and there did not appear to be a chance of rekindle. Had it flared back up, I would have ordered crews not to put it out and argued my point with the battalion chief regardless of his wishes. I went and spoke with the captain in charge of the first arriving company about what had happened and asked them if they saw the blue arc of electricity above their head. They stated that they did not see it, but if their crew had not put so much water on it, they felt this would not have happened. I informed him I did not think their tactic was a good idea no matter how much water was put on it because the power was still active to the structure.

Lessons Learned: When the source of the fire is electrical in nature, only extinguishing agents that do not conduct electricity should be used for extinguishing fires, big or small. Departments should practice "risk a lot to save a lot and risk little to save little." The battalion chief in charge should not have instructed his crews to keep the fire in check with water with no life safety issues in the structure or the adjacent exposures. Command officers have to trust their line officers when they inform them that tactics are unsafe. When officers are told of their mistakes, they should accept the criticism and not make excuses from deviating from sound judgment. Individuals, like me, should voice their safety concerns as soon as they see them happen. If I had told the crew flowing water to stop immediately when I questioned whether or not the power was secured, the water would have never come in contact with the power causing the blue arc of electricity. When I saw the salvage and overhaul taking place, I knew that there wasn't any extension into the structure and that there were no life safety issues in the structure or exposures.

Report Number: 11-0000163

Synopsis: Unseen electrical line endangers FF

Event Description: A full alarm was assigned to a fully involved structure fire in the early morning. Dispatch advised that neighbors called in the fire and that the house was vacant (per the owner who was also the caller). Upon arrival, the first-in engine reported a fully involved structure fire, and that they would be operating defensively. The first hand line was placed on the "D" side, to protect an exposure. After a water supply was established, two additional hand lines were used to extinguish the fire.

After approximately 30 minutes, the lieutenant of the first-in engine was assisting in the operation of a hand line on the "B" side of the structure. While attempting to re-position the line, he felt his knees lock up and his hands clamp down on the hose and a burning/tingling sensation throughout his entire body. Not knowing what was happening, he attempted to move away from where he was standing toward his partner to get help. After 3-4 seconds, he was able to move. After moving, general pain replaced the sensation he had been feeling. He looked around to see what caused this situation, and found that he had been standing on a main service line coming off a transformer. The line was the electrical line that supplied the house with power and had apparently burned off the house and fallen into knee-high grass.

Once he realized what had happened, he reported the line to IC, and requested traffic cones to mark the line until the power company could arrive and disconnect the line. After marking the line, he reported the incident to IC, who pulled him off his duties and replaced him with another firefighter. He was immediately sent to an on-scene ambulance for assessment, to include 12-lead EKG monitoring.

The hour of the call and lack of sleep due to that night's tornadoes perhaps contributed to the loss of situational awareness. This accompanied by debris from the storms and knee high grass could have possibly kept the line from being readily visible. The nature of the fire being simple "surround & drown" perhaps also led to a sense of complacency in a veteran firefighter/officer.

Lessons Learned: I learned to be more vigilant of my surroundings and to ask the occupant/owner about utilities (if time permits). I also learned to light up the scene sooner and to look for wires coming from the poles, not just the meter on the house.

POWER LINES

Report Number: 07-0001001

Synopsis: Power lines fall on burning mobile home, injuring FF

Event Description: Dispatched to a mobile home fire in the rural area of our jurisdiction. Upon arrival, fire had already vented itself out of the room of origin through the windows. Directly above the flames were the power lines running from the pole out front, across the roof to another pole at the back end of the mobile home. Upon arrival of the first-due engine, two 1 3/4" hand lines were stretched and a two-man crew had entered the home through the front door. Due to the advanced fire conditions upon arrival, the crew was able to advance only a few feet into the structure. Because of rapidly deteriorating conditions, the crew quickly made their way back to the front door. Just as they were going to exit the structure, the live power lines melted and broke off of the pole. They bounced a couple of times across the roof and hit the ground. They continued to bounce and hit one of the firefighters in the face piece causing it to crack and knocking him to the ground. The power line then bounced away from the crew and went dead. This rapid chain of events caused the other crew member to lose his footing and fall and injure his knee as he was trying to protect his partner and avoid the live power lines. Fortunately, no firefighter was seriously injured.

Lessons Learned: Due to the unpredictability of the power lines and the rapid chain of events, I'm not sure what lesson was learned. We preach the dangers of power lines at structure fires, as well as fire ground safety rules when operating around them. The timing of the power lines failure did not allow command to communicate to the crew exiting the structure of the melted power lines. They exited just as the power lines failed and did not have time to avoid them.

Report Number: 07-0001098

Synopsis: FF walks under "DO NOT ENTER" banner tape

Event Description: Shortly after the initial stages of interior firefighting operations commenced to locate a reported missing child in a rambler-style dwelling that was approximately 50% involved upon arrival; the electrical service drop to the house sagged and then fell across the bedded steel aerial ladder of the truck company's apparatus parked on Side A of the fire building. The initial incident commander noticed this hazard and immediately requested the dispatcher to broadcast a safety announcement on the tactical radio channel. The incident commander wanted to alert members operating on the scene of this hazard. An apparatus operator deployed red "DO NOT ENTER" banner guard tape around the affected apparatus to visually warn personnel not to enter this hazard area. The incident commander requested the local electrical utility company be dispatched to the incident scene as soon as possible.

After one of the engine companies exited the burning structure to reposition for continued fire attack, one of its members still wearing his full PPE and the face piece, began to walk towards the affected ladder truck for a hand tool. He lifted the red "DO NOT ENTER" banner guard tape over his head as he advanced towards the apparatus. Another member operating on the exterior, immediately stopped this

firefighter before he proceeded close enough to come in contact with the energized ladder truck. In this agency, yellow "DO NOT ENTER" banner guard tape is used to delineate exclusion zones for citizens where fire and rescue personnel may be operating. Red "DO NOT ENTER" banner guard tape is used to exclude citizens as well as fire and rescue personnel.

Lessons Learned: The firefighter involved is an experienced and competent firefighter having worked on some of the busiest companies in the department. On this particular incident, operating as part of a crew of three, he was tasked with advancing an attack line into a well developed fire building. He was ordered to protect a truck company that was aggressively searching for a child that was reported to be in the home by the neighbor who called the fire department. Once on the outside of the structure, in what one might consider an area of refuge considering the fire conditions, this firefighter stated he could not differentiate between the yellow and red tape while wearing his SCBA face piece as he walked toward the affected rig for a tool to complete his task.

The lesson here is situational awareness and to understand that conditions can change rapidly and drastically on the exterior just as they can in the confines of the burning building. In a quick "tail-board" critique of the incident, the deputy fire chief reminded all unit officers to be cognizant of fire ground hazards and to ensure they are communicated among all personnel on the scene and to review the department's policy regarding the use of yellow and red DO NOT ENTER banner guard tape.

Report Number: 08-0000001

Synopsis: Fire apparatus comes in contact with overhead wires

Event Description: Units were dispatched to a reported dwelling fire. The Department Chief arrived on location with a two story single family wood frame dwelling with nothing evident. The Chief radioed for the tele-squirt crew upon arrival to report to side bravo with a thermal imager, dry chemical extinguisher and hand tools.

The apparatus positioned on the bravo side. The truck was placed in pump gear per departmental policy. The captain instructed his crew to the fire building to assist the Chief. The pump operator then noticed the aerial portion of the ladder was entangled in over head electrical wires. All companies operating on the fire ground were instructed not to touch any portion of the apparatus due to the electrical shock hazard.

A joint decision was made between the Chief and Deputy Chief to attempt to move the truck away from the overhead wires. The apparatus was moved away from the wires without incident.

Lessons Learned: All driver/operators and company officers shall always maintain situational awareness while arriving on the fire ground. Assumptions shall never be made that electrical wires are high enough for aerial apparatus to securely pass underneath. Chief Officers, if aware of low hanging wires shall notify communications or approaching apparatus of hazards.

Report Number: 08-0000290

Synopsis: Ladder truck bucket contacts power lines

Event Description: While doing the morning checks on our ladder truck, the bucket inadvertently came in contact with power lines. Three firefighters were involved in the process, but were not injured. There was minor damage to the bucket, but all components of the truck were operational. The concrete under the outrigger pads was spalled from the electrical current.

Lessons Learned: We have been performing apparatus checks on this vehicle every week for over a year. The operator reported that he thought he was clear of the wires but did not have a spotter. We all fall victim to complacency from time to time. This incident is a reminder for all of us that complacency kills. We need to ensure that a spotter is in place when operating in and around electrical lines. Something as simple as an apparatus check nearly killed or injured 3 firefighters.

Report Number: 08-0000346

Synopsis: Command post is set up under low hanging wires

Event Description: Units were dispatched for an "investigation". Communications center received the call 3rd party from another communications center. The caller reported hearing a pop and loud flash and the power to the home flickered. The incident was located on a secondary roadway with low visibility. Chief Officer responded in a command vehicle and an Engine Company responded. Police and Fire Police were on scene before fire apparatus arrived. The Chief arrived first and parked in a driveway across the street from the incident. The Chief ordered the Engine Company to park in the driveway of the caller and go to the interior of the dwelling and check the house electrical system and report back. The Engine Company driver placed the pump in gear per dept S.O.G. and noticed live low hanging wires across the street overhead of the Chiefs Command Vehicle. The Chief and Fire Police officer removed the vehicles instantly.

Lessons Learned: All emergency apparatus when responding to wires/electrical type incidents should be aware of the situational conditions surrounding the emergency scene. Utilization of "take down" and "left and right alley lights" should be employed to look for low hanging wires. Open lines of communication between task level oriented fire fighters and command level staff is imperative for maintaining the safety of emergency services workers.

Report Number: 08-0000487

Synopsis: Aerial ladder strikes power lines

Event Description: On August 15, 2006, after 0900 hours, a firefighter acting as the driver/operator of a ladder truck had completed the application of lubricant to the aerial ladder. The firefighter fully

extended the aerial over the cab of the vehicle at a relatively low angle, between power lines in front of the station. The turntable of Truck [1] was approximately 86 feet from the power lines. The angle of the ladder was approximately 15 degrees. The firefighter then retracted the ladder about 5 feet when the ladder contacted a 19,900 volt power line. At the same time, a firefighter was completing his check of the oxygen in a right side compartment. The firefighter heard a loud boom as “something exploded in the compartment.” Firefighters who witnessed the event reported seeing an arc from the compartment strike the firefighter in the chest. One firefighter was transported to the hospital primarily as a precaution. No injuries or fatalities occurred.

Due to the fact that this event nearly resulted in the electrocution of one member of the department, an investigation of the incident was initiated.

Lessons Learned: Findings and Discussion:

1. The operator of the ladder truck extended the aerial ladder into the power lines.

The action of placing the aerial ladder near the electrical lines endangered the life and safety of anyone who was operating near the vehicle. The manufacturer’s recommendations and OSHA standards indicate that the ladder should not have been positioned within 10 feet of power lines. This precaution is clearly indicated numerous times on the exterior of all of the department’s aerial devices as well as on the control pedestal. Additionally, this action is contrary to all training that members receive during recruit firefighter school, training by utility company representatives, and during effective driver training (to include a reading of the manufacturer’s operator’s manual). The actual extension of the aerial device into the right-of-way of the power lines was a conscious decision by the operator. The amount of space between the wires is very limited when considering the space required for an aerial at a low angle, though this is irrelevant, as the ladder should never have been positioned near the lines.

2. The process for training drivers and backup drivers lacks consistency and structure.

The process for qualifying personnel to drive and operate vehicles occurs at the station/shift level which results in a variety of training procedures and a range of criteria to become a driver. The department’s apparatus qualifications checklists make little distinction between the various types of vehicles in the department’s fleet. The “aerial” checklist makes no distinction between rear-mount aerials, rear-mount towers, and mid-mount towers, nor does it account for vehicles from different manufacturers.

In this event, the driver had been trained and “approved” to drive the ladder truck. The incident occurred on [one type of aerial the department uses]. While the trucks are both rear-mount aerial ladder trucks, there are notable differences between the operation and performance of both the vehicles and the aerials. In this case two features of the aerial that may have contributed to the incident include:

-The aluminum ladder on [one of the models] flexes or bends far more than does the steel ladder on [the other model]. The driver was retracting the ladder when it contacted the wire. It is conceivable that the act of retracting the ladder may have reduced the “flex” of the ladder enough to allow it to contact the wire (assuming no other changes were made to the positioning of the ladder, it should then also have contacted the wire during the extension process).

-The configuration of the aerial controls on [different manufacturer’s] aerials is significantly different. The location of the extension/retraction control and the raise/lower controls are reversed on [aerials made by two of the manufacturers we use]. Additionally, the raise/lower control motions are reversed between the two builders. Though the driver stated she was retracting the ladder, it is conceivable that

driver could have been confused by the change between the controls she was trained on and the ones on the device she was operating.

Note: Regardless of the features listed above, the aerial should never have been positioned near the power lines as outlined in finding #1.

3. All personnel who responded to the incident, specifically the personnel who were located in the apparatus bay, immediately took action simultaneously with isolating the danger area around the vehicle, maintaining communication with the operator, providing medical assistance to the injured firefighter, notifying the officer in charge, and requesting the power company.

The firefighters who were in the apparatus bay immediately recognized the hazard, assumed that the vehicle was still energized and removed the firefighter from his position near the vehicle. They also directed the driver to remain at the position on the turntable. They notified the officer in charge (OIC) of the event and the OIC made the proper notification using the fire phone. The OIC requested additional units to the incident. They provided medical assistance to the firefighter and communications was maintained with the driver who remained on the truck until the power company de-energized the power lines.

The incident was properly managed with definitive barriers being established around the vehicle and personnel assigned to monitor these boundaries. All appropriate notifications were made to handle all aspects of the incident, both immediate and long term.

Recommendations:

1. Establish a working group to develop the process/procedures and regular skills maintenance training for driver/operators (to include backup drivers) to meet and become qualified on a given class of vehicle.

The Training Division in collaboration with Safety, Operations and Risk Management, is to develop and utilize a standardized training and evaluation criteria that can be administered at the station level. The group will provide detailed knowledge and performance requirements. The group should seek input from a range of members to ensure that standards are established for specific vehicle types.

Example:

- Aerials, rear-mount and mid-mount towers.
- Engines and tankers.
- Specialty units (HM Unit, Field Communications Unit, etc.) could have unique standards.
- Consideration should be given to the unique requirements of reserve apparatus and variations between manufacturers or operating systems.
- The process of becoming qualified should include a method for communicating member's qualifications to the department such as a protected process for updating profiles.

2. An in-station drill should be developed and issued to provide information to members on the hazards of electricity, the components of the distribution system, and guidelines for handling incidents involving electricity.

Firefighters deal with electricity during the course of many events from building fires to "wires down" calls to investigations. Most firefighters received some level of electrical safety training during recruit training. Many others have received training from representatives from local power companies and additional knowledge has been acquired through experience and interacting with utility personnel during incidents. This training has led to correct decisions during most of our encounters with

electricity; however, this event and others, both inside and outside of our department (pulling of meters, forcing entry into transformer boxes, potential PCB incidents, national firefighter near-miss and LODD's reports), coupled with the potential consequences of incorrect decisions, indicate that regular/additional training should occur.

The training should cover topics such as:

- Basic information about electricity, the components that comprise the distribution system and the hazards presented by both.
- Awareness of overhead hazards when deploying ground ladders, aerial devices, and other devices such as light towers, antennae, cameras, etc.
- Guidelines for handling "routine" events involving electricity, as well as unusual events.
- Considerations of routine aerial maintenance and hazard awareness.

3. There is a need in the Fire and Rescue Department to change the culture of safety. We, as members, need to do everything possible everyday to minimize our risk and exposure to danger and harm.

As firefighters and paramedics, we are exposed to a variety of situations that each offer a hazard and challenge. From extensive training and education, most of the hazards and challenges have a preventative measure that each of us needs to utilize at every incident.

The Safety and Health section along with the Training Division provides education in a variety of ways, to include:

- In-station drills
- Practical exercises
- Lecture presentations
- Specialty schools
- Safety newsletter (FDSOA)
- Firefighter Near Miss reports (IAFC)
- Report of the Week (ROTW)
- LODD reports (NIOSH)
- Everyone Goes Home campaign (IAFC)

Report Number: 09-0000021

Synopsis: Chief Officer nearly steps on power line

Event Description: During an initial size-up at a SF (structure fire), I completed a 360 walk-around of the fire building. While walking, I noted that the main electrical service line to the home had been burned off at the building. This was causing a significant electrical hazard. Following my size up, I transmitted by radio that incoming units need to avoid this hazard. I clearly stated the location of the hazard (D Side) and communicated that the hazard was completely blocking all access to that side of the building. I then requested acknowledgement of this transmission by all incoming units and received replies.

Approximately 20 minutes later, a chief officer arrived at scene that had not been on the initial assignment. He conducted his own 360 and nearly stepped on the line as he was unaware of its presence.

Lessons Learned: Immediate flagging off of all on scene hazards must occur in spite of other command responsibilities, or assignments. Verbal or radio communications are not enough.

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Report Number: 09-0000093

Synopsis: Watch out for those power lines

Event Description: We responded to a report for wires down at a location where wires down were a common call. Tractor trailers would routinely knock down the cable and phone lines and whoever re-attached them would never place them higher on the pole.

About 1/2 a block before the intersection, on the response ticket, we found our wires down and called for the utility company. A truck had knocked down the power line. Several minutes later, EMS pulled up and asked where the car accident was located. Between us and the end of the block, was a large hill that obscured the real cause of the wires down. A car had sped up the hill and launched itself into a pole on the far side of the hill breaking the pole in two. The collision had caused a short that subsequently caused the wire to come down. Somehow, the driver only had minor scratches and was treated by EMS. Luckily, there was no passenger because the passenger compartment of the car was crushed.

Lessons Learned: Routine calls are not always routine. Don't get too comfortable with them.

Additional Information: Immediately upon confirming that live electrical wires are down and are creating a situation that places human life in danger, the first arriving unit must contact the dispatcher

indicating that life is in danger. Specify the location (address, pole number, etc.) of the downed wires and request the power removal and priority response by utility company. Request response of a battalion chief if not already assigned. Responding battalion chief shall also directly contact the Utility Company Electrical Operations Center by cell phone and indicate there is a life safety danger. Always request a priority response. In situations involving live electrical wires which are down but do not present an imminent life hazard, the department can only guard against the hazards of fallen wires by isolating the area, notifying the utility company, and standing-by until a utility company crew responds. It is the utility company that will correct the problem.

Report Number: 09-0000193

Synopsis: New FFs raise ground ladder under wires

Event Description: We responded to a working house fire and two firefighters attempted to place a ladder to the second division. As the firefighters were beginning to raise the ladder vertically, they failed to recognize the electrical power lines directly above and adjacent to their objective location. As the fire ground safety officer was performing his 360 of the house, he recognized the proximity of the electrical lines as the ladder was being raised and immediately intervened and stopped this operation.

Command activities were targeted to the interior of the house and not exterior operations. The safety officer was only at the incident location due to increased activity to the point of entry of the house. The firefighters involved had minimal training in ladder operation. They were first year members with overall low to no training. Each had minimal fire ground experience. The operations officer had no knowledge of why the ladder was to be placed. The location would not have had any positive affect in this operation.

Lessons Learned: Need to be specific on operation chief's responsibility.

Identify probationary firefighters by a designated identifier.

Command failed at some point due to not knowing why the ladder was placed at this location. Increase communication.

Mandate training in the department.

Report Number: 09-0000230

Synopsis: Aerial contacts electrical wires

Event Description: While operating at a building fire, the articulating boom platform contacted primary electrical wires with its middle knuckle. This caused a lot of arching. There was damage to the road and the paint at the top of the lower boom. The weather was snowy with some wind and it was dark. All of this probably contributed to not seeing the wires.

Lessons Learned: You can never be too aware of your surroundings when operating a ladder truck of any kind.

Report Number: 09-0000487

Synopsis: Aerial without spotter contacts power lines

Event Description: The company driver/operator of a 100' rear mount aerial platform was performing a company level inspection of the apparatus. The apparatus was returned to the company after having maintenance repairs completed at the City Shop Maintenance Department. The apparatus was parked on the front ramp of the station for the inspection. Weather conditions were cloudy, with light to moderate rainfall. The ramp was wet.

The apparatus requires the use of four stabilization jacks that were deployed properly and the rear wheels were approximately two inches off of the ground. The operator raised the aerial platform, fully extended it, and rotated it to the right. As the operator lowered the aerial platform, three high voltage power lines were struck. Orange and green arcs were seen coming from the base of the stabilizers along with a loud explosion. The three power lines fell to the ground and the power was interrupted to the area. Immediately, the station personnel inside the apparatus bay began isolating the danger area around the apparatus and provided verbal communication to the apparatus operator to remain on the platform and not touch anything. All personnel in the surrounding area were either completely on or completely off the apparatus at the time of the incident.

The operator was working without a spotter. The only visible damage at that time was burn holes in the aluminum water way. The ground plates continued to smoke for approximately 10-15 seconds after the incident. There were no injuries or deaths due to the incident, although the operator was transported to the hospital primarily from an abundance of caution. The local power company responded to de-energize and repair the damaged power lines. Several investigation reports were conducted including reports by the Fire Department Safety Officer and the local police department.

Lessons Learned: 1. Driver/operator has to always adhere to the policy of using a spotter anytime an aerial ladder is in use; either on the fire ground, training, or during apparatus checkout.

2. Ensure the aerial is not operated within ten feet (manufacturer and OSHA standards and recommendations) of overhead power lines. Departments should consider labeling all aerial devices and control pedestals with reminders.

3. Train on the importance of either being completely on the aerial or completely away from the aerial when operating at or near energized electrical wires. Always assume all electrical wires are energized. Anytime the apparatus is in operation, ensure the adherence to the practice of not touching the truck and the ground at the same time. Failure to do so can result in the personnel serving as a ground for the electrical flow - almost assuredly increasing the probability for serious injury or death.

4. As a company officer, know what your personnel are doing at all times and ensure that all safety practices are being followed.

Recommendations: Exercise due diligence with an inclusive perspective on the situational awareness. Designate the safe area to conduct such inspections; with degrees of measure. The operator's view of the platform and beyond is obstructed from the turntable controls. This emphasizes the mandatory use of spotters when conducting such activities.

Report Number: 09-0000798

Synopsis: Lines down on fire ground cause a problem

Event Description: We responded as third due engine to a house fire. Upon arrival, we had a single story vacant dwelling heavily involved in fire. We arrived about the time the first alarm engine was pulling the first line. As we pulled up, an electrical wire fell from the house right behind the first engine. The line was advancing in the street. As I approached, I noticed several members step very close to the line to pull hand lines off the first engine. I physically stopped several members from stepping on the wire. One member came within a foot of the wire. I stood next to the wire and had another member remove cones from the truck to place around the wire. The IC announced it over the channel to all the members.

Lessons Learned: There was a complete loss of situational awareness by the members. Members were focused on the fire coming from the house. It was where there are several burned out houses on the street. Members need to slow down and pay attention to hazards on the fire ground. Focus.

Report Number: 09-0000833

Synopsis: Aerial operation results in electrical shock.

Event Description: While operating a 100' Quint at a large furniture warehouse fire, our turntable slowly started to rotate away from the fire stream. The problem seems to be when flowing close to the 1000 GPM manufacturer recommendation in any direction, the nozzle (when rotated close to a 45 degree angle from left to right) creates enough back pressure to override the spring brake for the turntable. While we were over the recommended 10' from power lines, by the time the operator noticed the problem and took corrective action (attempted to move the ladder to the left, not the nozzle) it caused the ladder to drift faster and came in contact with the power lines. The lines had been de-energized but this was a very close call.

Lessons Learned: 1. Moving the nozzle back to the center point would have stopped the movement of the ladder.

2. When a person is on this apparatus, we will have one person at the turntable and one person at the pump panel. We only had one person assigned to the turntable and that person had left the turntable area to do other tasks.
3. The manufacturer is looking at the spring brake problem to see if there is a fix.
4. We are rewriting our training guide to avoid rotating the nozzle more than 30 degrees off the center of the ladder for this type apparatus.

Report Number: 09-0001074

Synopsis: Power lines arc and shower crew with sparks.

Event Description: Engine Crew responded to power-lines down on a tree arcing and causing minor fire with the branches. Once we were on scene, we located the downed power-lines and from the other side of the road, followed the lines to where they were down in the tree. We noticed there was some minor smoldering of the branches near the lines but no active fire. We then followed the lines with hand-lights and located the main power pole the lines came from. The officer radioed communications requesting Power Company to respond as soon as they could. There was a long wait due to the high number of power lines down, due to the wind storm. The officer of the truck called the crew back to stand across from where the lines were in the tree to make sure no one approached the danger zone. At that time, we were only about 12 to 15 feet from the base of the involved tree. After about 3 minutes of talking and not really keeping an eye on the power lines, the smoldering branch that was between the two downed lines, burnt completely through and then allowed for the two lines to contact each other. This caused a massive arc and showered sparks out toward the crew and residents that had come to ask questions about the incident. After the power surge caused by the arc, the transformer kicked killing all power to the lines.

Lessons Learned: When power-lines are involved, always keep an eye on the situation. Try to stay back as far as possible but still maintain control over the area and prevent bystanders from entering. In this situation, barricades and a fire engine blocked the road, yet the crew was standing in close proximity to the lines.

Report Number: 10-0000660

Synopsis: Tower ladder basket contacts power lines

Event Description: Our department was called to a neighboring community on a mutual aid box alarm for a commercial structure fire. We were due with an ambulance and a chief, who responded. En route, the fire was determined to be a defensive attack. The building was a large, single-story, commercial structure that was unoccupied and had heavy fire involvement (sections of the roof had collapsed). Shortly thereafter, the host department upgraded their alarm to a second and we were included in the dispatch with an engine. We are normally due with a truck. [The engine] responded with four people.

Upon the engine arrival, we noted and questioned the tower ladder placement on scene. The tower ladder had been spotted about 20-25' from the structure and was underneath high power lines. We arrived on-scene and were directed to report to the "A" division officer. The engine company reported to the "A" division and was instructed to protect the host department's tower ladder from impinging fire. Two members of [our engine] were assigned to a 2 1/2" hose line, as fire was blowing out the "A" division from doorways, windows and the parapet roof-line.

Two other members began setting up a monitor supplied by two 3" hose lines. As the monitor was put into service, the members on the 2 1/2" hose line ran out of air in their 4500psi SCBAs. They reported this to their company officer and left the area to fill their bottles. Bottles were filled and the two members of [the engine] were again assigned to the "A" division. At this time, a decision had been made to move the tower ladder from its position because the paint was starting to bubble on the apparatus. One member of [the engine], was manning the monitor and three members were assigned a 1 3/4" hose line to protect the tower until it was moved. The company officer was helping the host department take down their tower for the move. During this move, the tower operator struck the high power lines overhead with the bucket, electrocuting nine firefighters in the vicinity of the tower ladder. All nine were transported with electrical burns and injury. Five firefighters were hospitalized overnight and one of those was transferred to a trauma center. All firefighters were released from the hospital the next day.

Lessons Learned: Apparatus placement is key. Beware of overheads when spotting trucks and engine as well as incoming apparatus.

ICS should be utilized properly at all incidents.

EMS should be organized and ready to work.

Mayday procedures need to be put into place and utilized.

RIT needs to be utilized at all incidents.

No one should ever be injured or nearly killed for a defensive fire in a commercial, unoccupied structure with heavy fire involvement.

Proper apparatus manning should be utilized.

Proper training and procedures should be used, reviewed and trained on.

Report Number: 10-0000761

Synopsis: FF picks up downed electrical line

Event Description: A small wind storm around lunch time left several houses without power and we had numerous calls for power lines down. I was on a two-man engine that had been designated as the medical truck due to our rescue truck being in the shop for repairs. I was riding with a veteran of 8 years and we responded to a call for a power line down across the driveway of a residence. The line was arcing in the driveway, so the engine parked at the road. We made contact with the tenants and advised them to shelter in place and not come out of the residence. The line had been knocked loose from the weather head by a tree limb. We kept our distance while we awaited the power company. When the power company arrived, they pulled halfway into the driveway and saw the power line lying

across it. My partner, without thinking, went and picked up the power line and pulled it out of the way so the truck could pull in the driveway. It happened so fast I could not say anything to stop him and somehow nothing happened to him. The line had been arcing when we arrived and somehow was not live when he grabbed it. When he realized what he did, his knees gave out and he could not believe what had just happened. No one was hurt but the potential for loss of life was evident in this situation.

Lessons Learned: No matter how "routine" a call may seem to be, never lose your situational awareness and become complacent, because the move you make without thinking about it may be your last. Always be wary of the power that you can't see. A visible fire is somewhat easy to predict, but the invisible electrical energy is unpredictable and very unforgiving. Always try to calculate every move before you make it. No two calls are alike. Think before you act.

Report Number: 10-0000982

Synopsis: Overhead power lines threaten FFs

Event Description: Our department was performing hose testing on the station apron and one lane of a 4-lane adjacent parkway running in front of the station. We had developed a safety zone concerning the lane of traffic. During a breakdown of hoses to set up to test the next set, a vehicle clipped a power pole down guide approximately 3,000 from the station. A FF noticed the high voltage lines running above us (approximately 40 ft.) begin to whip violently and shouted to look out as the power lines were coming down. In an instant, approximately 15 FFs scrambled laterally to avoid the high voltage lines which run over our apron. Three 60 ft. power poles had snapped allowing the charged high voltage lines to fall to the ground across the road approximately 300 from the station. The first standing pole was beyond the station. As we all ran, we could see the high lines were still energized.

Once the dust settled, we realized that our rescue truck and a visiting fire equipment sales person's personal vehicle had the power lines on them, which kept the lines about 2' to 4' above the apron. The rep's wife was in the vehicle. Once the power company assured us that the lines were dead, we safely removed our visitor from her truck. This event could have resulted in several electrocutions of members. The apron was wet as well, which increased the potential of injury. Looking back, I bet we looked like a roach motel at 3AM when the lights are turned on. No injuries were sustained.

Lessons Learned: Always be aware of your surroundings, even at the station. As a department we have discussed these high lines many times, especially if we are going to flow water in the area. All fire personnel ran perpendicular to the route of the power lines, which indicates they were all conscious of the injury potential.

Report Number: 10-0001159

Synopsis: Power line overlooked during brush fire

Event Description: We were dispatched to a grass fire just out of town on the west side. We could see some light smoke as we left the city. The land was on the south side of the highway on a service road. We staged on the service road on the north-western edge of the burn. We sized up the scene and found a thirty to forty foot area that had small flame on it or had already burned. It was being contained on the east end by a driveway. There were two power poles in the affected area. All lines still appeared to be intact. Because of the 50km per hour winds, I continued the response of our brush truck. I talked with the landowner and he said that some sparks had blown out of his burn barrel. When Brush [1] arrived we began suppression with their booster reel. My captain requested that, if Brush [1] was not needed, that I send them back to the city as they needed the officer from that truck in town. I had really only kept them there for the ease of using their booster line and was just being a bit lazy. So I agreed with my captain and sent Brush [1] back to the city. At this point all flame had been extinguished. I asked the guys to take a TIC and go over the area with some hand tools to ensure that we didn't miss any hot spots and I walked the perimeter with the landowner. While walking the perimeter, I noticed a substantial cable on the ground that had minor fire damage. I traced this cable back to a power pole in the affected burn area and on the other end, a garage. I asked the owner if the power was still working in the garage and he said it was. The power line came off the pole at about three and a half feet and ran down along the ground to the garage. The wire was the power supply for the garage and it had not fully burned through the insulation yet, though there was significant melting.

Lessons Learned: I looked up at the power lines to see if there could be any electrical hazards. I missed a significant electrical hazard on the ground that had almost burned through. The firefighters on our crew stepped on that wire a few times throughout the suppression and, had the insulation been compromised, they could have been seriously injured.

Report Number: 10-0001170

Synopsis: Power line disconnects from house at fire

Event Description: At a single family house fire, firefighters came very close to being electrocuted by a high voltage wire. The wire detached from the house due to direct flame impingement. When it landed in the driveway it was not immediately marked off with cones and one firefighter stepped over this live wire while engaged in suppression operations. After at least five to eight minutes, the area around the wire was marked off with cones and a safety officer was stationed nearby.

Lessons Learned: Keep apparatus away from overhanging electrical wires. Maintain situational awareness for new developments during an operation.

Report Number: 11-0000029

Synopsis: Electrical hazard encountered during brush fire

Event Description: While on storm duty at the station, another firefighter and I responded to a report of wires down that had started a small brush fire. We arrived on scene in our forestry truck and found a 20 foot long by 100 foot wide brush fire that was between the road and someone's yard. We quickly called for more personnel. We located an arcing electrical wire that was stuck in a dead tree and assumed that the brush fire had started from the sparks from the wire as it was very dry. We grabbed our forestry rakes and headed about 20 feet ahead of where the fire was spreading and started digging a fire line to prevent further spread. While digging the fire line I pulled up what I thought was a large root and suddenly felt a strange buzzing feeling. I immediately put my tool down and moved away from the area and told the other firefighter to do the same. Finally our chief and our captain arrived and called the downed power line into public service. Once the power was shut off we were able to fully extinguish the fire and realized what I had actually dug up was an old piece of barbed wire, not a root. Then looking at the tree that had the downed power line stuck in it we saw old barbed wire running thru it and determined that it was most likely the same barbed wire I had dug up and this is most likely what had started the fire.

Lessons Learned: Next time we encounter a brush fire started by a downed power line or any downed wires, we will stay clear of the incident until public service arrives to shut off the power. Do not assume just because you are far away from the downed wire that it cannot hurt you. Electricity can travel long distances through various objects. I was over 120 feet away and felt what I believe was electricity from the downed wire.

Report Number: 11-0000128

Synopsis: Small fire becomes an electrical emergency.

Event Description: I was the on-duty dedicated fire investigator called to an unknown type fire alongside of the road at approximately 0400 hours. I was following the engine. Upon arrival I found a small fire contained to a large dirt area that had recently been worked on for the purpose of road improvements. The fire had smoke with minimal flames visible originating from underground and appeared to be a smoldering, auto ignition/decomposition type fire. No obvious ignition sources were within the area, and no obvious fuels were visible in the area of combustion. During the investigation and attempted extinguishment of the small fire, a large blue flash with a corresponding crack was witnessed. At this time the extinguishment was abandoned and the crew and I waited for the arrival of the proper energy company. Upon their arrival, their electricity detection stick indicated that the area was hot with electricity and melted from the heat. It was determined that an underground electrical line that was

supplying the street lights was damaged from the construction and was shorting out and providing the area with some high resistance heating. It was later noted that one of the street lights in the immediate area was out.

Lessons Learned: Lessons learned would be that items that present themselves as out of the ordinary and strange might deserve a little extra investigation and attention, especially if time is not important. I did not feel that anyone acted negligent on this call or that any of the department SOP's were violated. This just appeared to be a very rare situation that no one really thought about at 0400 on a very cold night.

No additional equipment, reasonably available to first responders/firefighters, would have assisted on this call. I am not sure the output of the electrical line, if an electrocution would have been life threatening or just eye opening.