

NC DIVISION OF FOREST RESOURCES



Charles Taylor Road Fire

Accident Investigation Final Report

Investigation Team Members

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March 25, 2008

Accident Sequence

On March 25, 2008 at approximately 1545 Hours, NC Division of Forest Resources, VFD, and Weyerhaeuser Paper Company personnel responded to the Charles Taylor Road Fire in Bertie County. The fire started as a result of a vehicle fire along Charles Taylor Road which spread from the roadway into the woods. The fire was burning in an area that had been V-Bladed, bedded and planted with Loblolly pines that are approximately 4-6 years old.



Photo 1 – Taken at Origin on Charles Taylor Road looking in the direction the fire spread.

Estimate of size at initial attack was 6 acres. Prior to arriving to the fire, NCDFR personnel were advised by radio from a Weyerhaeuser Paper Company employee that a second tractor plow unit and a Scout Plane would be needed at the fire. These resources were ordered through D-7 Operations, and were dispatched to the scene. The SEATs (Single Engine Air Tankers) were ordered from Kinston – Region I Operations and were launched to the fire. A NCDFR Scout Plane (Plane 12) arrived on scene and began directing the ground crews. Plane 12 arrived on the fire before NCDFR personnel, and advised them the fire had spotted the Company Road on the right side, and suggested committing the tractor plow unit to the spot over first, to try to cut it off before it got into the bigger timber. Upon arrival at the fire, the NCDFR IC had a face to face conversation with the Weyerhaeuser employee who had arrived and scouted the fire. He advised the NCDFR IC that the fire had already crossed the right side of the Company Road that runs northeast from the Charles Taylor Road. One Tractor Plow unit with a crewman arrived and was briefed of the situation by the NCDFR IC. The fire was holding along the Company Road up to where the spot over to the right (East- Southeast) side had occurred. The NCDFR IC committed the Tractor plow and crewman to start plowing the spot over. The Tractor plow anchored their fireline into the Company Road and started plowing the right flank (Division Charlie) of the fire which was a spot fire from the initial fire (Point A on Map 1). The crewman was burning out the fireline per NCDFR Fire line Policy. Fire intensity was moderate and the burn out fire was taking along the plowed fire line at time of initial attack. Tractor plow traffic ability and visibility was good, and fireline construction progress was good. The Pilot of Plane 12 stated during interview “that it looked like small windrows in the block because the fire intensity would increase, then die down, and then increase again.” Approximately 284 Ft. into the woods, the Tractor plow operator encountered an old saw dust pile

(Point B on Map 1). After plowing approximately 157 Ft. through the old saw dust pile, the FFEO advised the Tractor Plow crewman that the fire behavior and intensity appeared to be increasing and for him to be aware for detecting spotovers (Point C on Map 1).



Photo 2- Representative fuels before the fire



Photo 3 -Showing intensity in which the area burned

Line construction continued and the FFEO and Plane 12 pilot discussed trying to “Pinch the Head” if possible before it reached some larger timber. The FFEO proceeded with fireline construction for approximately 338 Ft. and was preparing to start to pinch the fire’s head until the Tractor Plow crewman observed a spot over across the fireline behind himself and the Tractor Plow (Point D on Map 1). The Tractor Plow crewman radioed the FFEO about the spotover and advised that he needed to “get out of here because there was fire all around me”. (Note – The crewman was at Point F on Map 1 at this time and the FFEO was at Point E on Map 1.) The FFEO stopped forward line construction and advised the Tractor Plow crewman to retreat to the “Black”. The Tractor Plow unit was within 120 Ft. of the Company Road at this point. The Tractor Plow crewman advised that he could not retreat to the “Black” and laid down in the fireline (at Point F on Map 1) with his head in the direction they had plowed from until the fire intensity subsided. (See Photo 4 below)

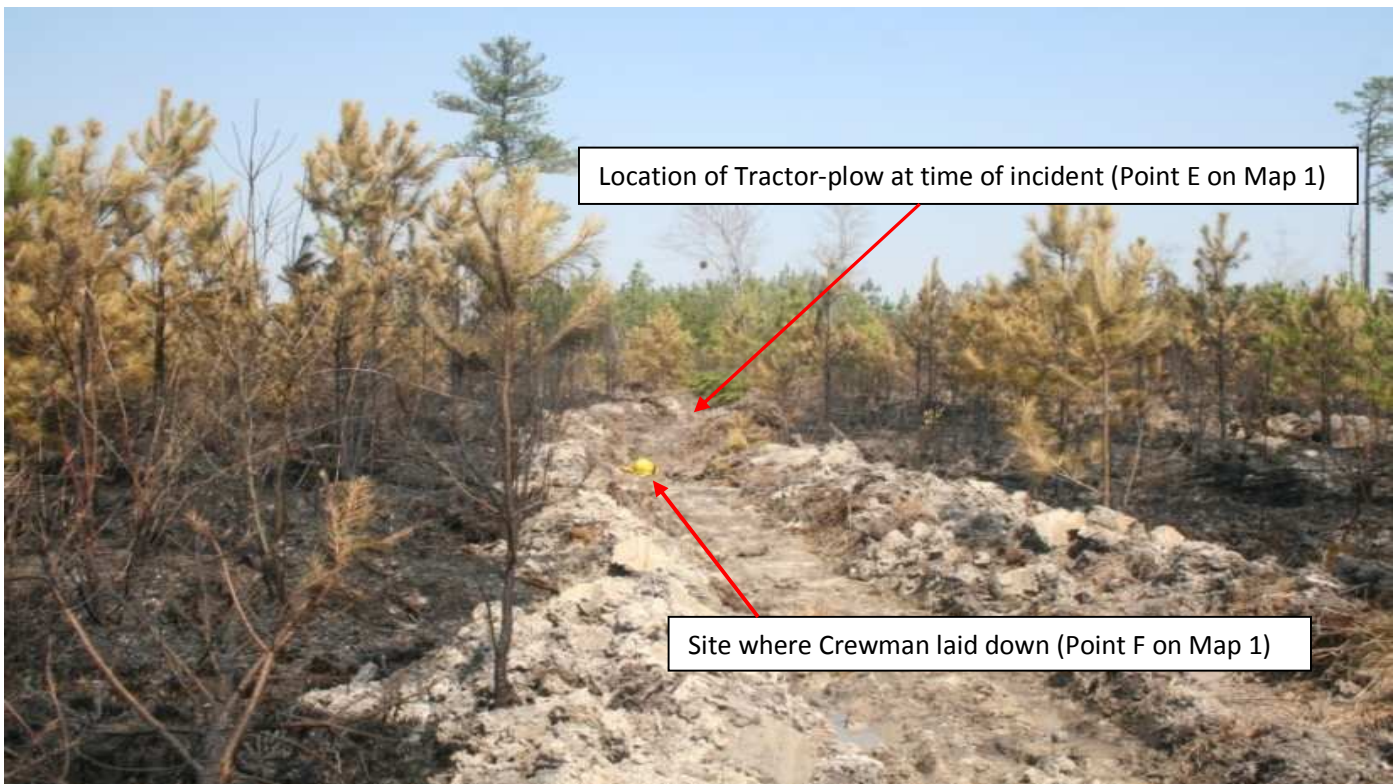


Photo 4 - Showing location where the Crewman laid down in the fire line, and the location of the Tractor-plow at the time of incident.

The FFEO attempted to turn back to catch the spotover but could not see back down the fireline due to flames laying over his already plowed line behind the tractor cab and his plow. The FFEO at this time lost sight of his Tractor Plow crewman due to the reduced visibility. Plane 12 confirmed the spot over after hearing the crewman's excited radio traffic, and advised the crewman "you are okay and in a good spot". The fire intensity lessened, the Tractor Plow crewman stood up in the fireline, and the FFEO was able to head the Tractor Plow unit back toward the spot fire to attempt to suppress it. Upon the FFEO maneuvering the Tractor Plow towards the spotover, the Tractor Plow crewman exited the woods (Point G on Map 1) and another Tractor Plow crewman walked in behind the Tractor Plow. The FFEO starting constructing firelines around the spot over, and the fire intensity was such that the fire continued to spot over the fire lines. Plane 12 observed the fire intensity and spotting and advised the IC that he would direct the SEATS to drop in this area to cool the flank down so the FFEO could construct firelines around the spot over. Plane 12 held the SEATs from dropping on the spot over the FFEO worked due to the crewman, but re-directed them to drop on the spot fires that were occurring in the bigger timber. Basic first aid (burn cream and burn spray) was applied to the Tractor Plow crewman's right ear due to redness. He was asked if he needed EMS to respond and check him out and he advised that was not necessary. No visible blistering was present at this time. The Tractor Plow crewman did not return to the fire line that evening, but had asked if he could return to following a Tractor Plow. He was assigned other duties by the IC for the remainder of the fire. The fire was contained at 250 acres at approximately 1900 Hours that evening.

On March 26, 2008 the Tractor Plow crewman was directed to seek medical attention at Bertie Memorial Hospital due to a visible blister appearing on his right ear, and right temple. The Tractor Plow crewman returned to work that day after being diagnosed with 2nd degree burns to his right ear and temple. (See Photo 5)



Photo 5 – Second degree burns on ear and temple

Environmental / Weather Factors

The observed fire behavior that was observed was typical and expected for a fire under the forecasted conditions. The area had not received appreciable rainfall over the past 9 days, having only received 0.1 inches of rain on March 20th, with the last significant rain of .61 inches on March 16th. KBDI was 96. District 7 was on a RP – 4.

NWS Fire Weather forecast for Bertie County March 25, 2008 3:13a.m. EDT

Clear

High temperature - 59°

Minimum RH – 26%

Wind (Early) – N @ 3-7mph becoming Light and variable

0% chance of precipitation

Mixing Height – 6,890Ft.

Transport Wind – N @ 5mph

Burning Category – 2

Haines Index – 4

Observed Fire Danger Readings from Bertie County March 25, 2008 1300 Hours

Temperature - 59°

Relative Humidity – 26%

Winds – NE @ 5mph

1 Hour FM – 4%

10 Hour FM – 6%

100 Hour FM – 13%

1000 Hour FM – 20%

Ignition Component – 27

Spread Component – 22

Energy Release Component – 55

Burning Index – 79

Build Up – 36

The FFEO advised that the fire burned as he expected that it would, based upon his experience, and how recent fires in similar fuel, with similar weather conditions had burned. All personnel were aware of the forecasted and observed fire weather and indices for their area. Personnel did report that they observed the wind speed to be higher than what was forecast in the fire weather forecast or observed at the weather station at 1300 Hours on the opposite side of their County.

Analysis of the Accident – How; Why?

As required by NCDNR Policy and Procedure 4180 specifically 4180.3, an Accident review team was assembled to investigate and analyze the circumstances causing an injury on the fireline. The purpose and intent of any accident review or investigation is to investigate, gather, identify, and educate as to what caused an accident to happen, and what measures can be taken in the future to avoid the same or a similar accident from occurring again. The intent of this report is to educate others in an attempt to prevent accidents from occurring. It is not a means of pointing a finger, or degrading ones decisions, but is an accident prevention tool.

It is standard practice and is expected of all wildland firefighters to comply with the 10 Standard Fire Orders and conduct fireline operations in a way that mitigates the risks identified in the 18 Situations That Shout Watch Out. Additionally, factors identified in the Common Denominators on Tragedy Fires, are to be used to identify and mitigate hazards and risks associated with wildfire operations to avoid death or injury. The Accident Review Team has looked at each component to determine if fireline personnel violated these known factors, and if so, how did they contribute to the accidents occurrence.

Fire Orders:

1. **Keep informed on fire weather conditions and forecasts.** *Personnel were informed of the fire weather, and took weather readings on-site. They recognized a difference in the observed and forecasted wind speed.*
2. **Know what your fire is doing at all times.** *Personnel were aware of the fire behavior, but may have been unsure of the fire proximity to their location. A Scout Plane was requested and utilized.*
3. **Base all actions on current and expected behavior of the fire.** *Was met.*
4. **Identify escape routes and safety zones, and make them known.** *The escape route and safety zones were known, but compromised.*
5. **Post lookouts when there is possible danger.** *Utilized the Scout Plane as their lookout.*
6. **Be alert. Keep calm. Think clearly. Act decisively.** *The personnel did this very well. Had they not remained calm and made clear decisions, the outcome would have been much worse.*
7. **Maintain prompt communications with your forces, your supervisor and adjoining forces.** *Was met.*
8. **Give clear instructions and insure they are understood.** *Was met. A briefing was held beforehand, and personnel followed those instructions as were given.*
9. **Maintain control of your forces at all times.** *This was generally met.*
10. **Fight fire aggressively, having provided for safety first.** *The fire was attacked aggressively, and this aggressiveness compromised the safety zone. Safety was addressed and PPE was worn, but was not utilized properly.*

Watch Out Situations:

1. **Fire not scouted and sized up.** *Fire was scouted and sized up.*
2. **In country not seen in daylight.** *Not applicable*
3. **Safety zones and escape routes not identified.** *They were identified, and known, but compromised.*
4. **Unfamiliar with weather and local factors influencing fire behavior.** *Not applicable*
5. **Uninformed on strategy, tactics and hazards.** *Personnel were informed, but inexperience, and a breakdown of situational awareness resulted in the injury occurring.*

6. **Instructions and assignments not clear.** *Instructions were clear, assignment was not clear due to limited training opportunity established by NCDFR to learn the responsibility of the position of a tractor crewman.*
7. **No communication link with crew members/supervisor.** *Not applicable.*
8. **Constructing fireline without safe anchor point.** *Fireline was safely anchored at the origin.*
9. **Building fireline with fire below.** *This was not applicable.*
10. **Attempting frontal assault on fire.** *Not applicable.*
11. **Unburned fuel between you and the fire.** *The fireline was constructed so close to the main body of the fire, that there wasn't enough unburned fuel between the fireline and the main body of the fire to create a "Blackline" for use as a Safety Zone.*
12. **Cannot see the main fire, not in contact with anyone who can.** *This was not applicable.*
13. **On a hillside where rolling material can ignite a fire below.** *This was not applicable.*
14. **Weather is getting hotter and drier.** *This was not applicable.*
15. **Wind increases or changes direction.** *Recognized early that the wind speed and direction were witnessed as being different than forecasted by the NWS. On-site weather was taken with a recorded wind speed of 11 mph.*
16. **Getting frequent spot fires across line.** *Spot fires occurred and were recognized.*
17. **Terrain and fuels make escape to safety zones difficult.** *This was not applicable.*
18. **Taking a nap near the fireline.** *This was not applicable.*

The Four Major Common Denominators of Fire Behavior on Tragedy Fires

1. **On relatively small fires or deceptively quiet areas of large fires.** *This was not applicable.*
2. **In relatively light fuels, such as grass and light brush.** *This did apply and contributed to the fire behavior, high radiant heat output (ERC 55).*
3. **When there is an unexpected shift in wind direction or wind speed.** *Did apply. Wind direction and wind speed varied greatly from the forecast. This was recognized and on-site weather was taken to mitigate the situation.*
4. **When fire responds to topographic conditions and runs uphill.** *This was not applicable.*

The training records of all personnel involved were reviewed, and there were no discrepancies, or lack of required training of the personnel on the fire. All personnel were trained and qualified for the positions they were functioning in. However, in-experience was identified as a contributing factor to the injury. The PPE that was being worn was examined, and was not compromised during the burn over. Therefore, failure of PPE was not a contributing factor to the injury.

Discussion of factors identified as contributing to the Burnover

After careful review and discussion of the Accident Review Team, the following items have been determined as the major contributors to the burn over incident occurring. The FFEO and crewman did a great job anchoring the fireline and were constructing good quality fireline. The Scout Plane suggested to try to "Pinch the Head" to try to stop the fire from getting into a block of larger timber that was ahead of the spot fire on the right side of the Company Road. In an attempt to do so, it appears that the FFEO turned into the fire and was plowing too closely to the fire. Note on Map 1 how the fireline turns at Point C toward the fire, instead of keeping the original course of direction as was plowed from Point A to Point B to Point C. On the ground investigation shows an increase in fire intensity from Point C and Point E due to burn patterns, freezing of needles, alligatoring of bark, and fuel consumption. Once the burn out fire was set by the crewman in the plowed line, it was immediately meeting the flank fire resulting in high radiant heat output, and high fire intensity. The crewman advised during his interview that he was very hot behind the tractor. This is why the crewman could not retreat back down the fireline into the "Black" area. Had fireline construction continued in the initial direction as was

done from Point A to Point B, then Point B to Point C, line construction would have remained within the in-draft, and there would have been adequate time for the burnout fire to create the safety zone for retreat. This may have reduced the spotting potential as well. This was the Crewman's first season, and he should have communicated to the FFEO that he was very hot and to back off of the flank some. However, he didn't know all of the expectations of his position. This was an aggressive attack on this fire. Our personnel are trained to keep the acreage as small as possible, and to suppress a fire as quickly as possible. We need to remind our personnel to not jeopardize their safety for a few more acres burned. Keep the fire acreage small, but provide for safety first.

The crewman reported that when the fire flared up with a sudden burst of intensity, his face and neck protector was not fastened in the front. This allowed the face and neck protector to fly up from the radiant heat, allowing for exposure of the ear and face where the 2nd degree burns were received. Had the face and neck protector been properly fastened, it would have prevented the burns received on the ear and temple.

Training - The training records of all personnel involved were reviewed, and there were no discrepancies, or lack of required training of the personnel on the fire. However, in-experience was identified as a contributing factor to the injury. All personnel were trained and qualified for the positions they were functioning in with the exception of the second IC. A Type IV IAIC transferred Command over to someone that was not IC Type IV qualified. Command should have been retained instead of transferred. The Initial Attack IC is highly trained and experienced with initial and extended attack fire control. However, retention of Command by the Initial Attack IC would not have prevented the injury from occurring, nor did the transfer of Command contribute to the accident. The second IC had previous experience with Weyerhaeuser Paper Company as a member of their fire crew. He had performed as FFEO on their fire control tractor plow unit on initial and extended attack fires on Weyerhaeuser lands, and had attended numerous fire control training courses that were sponsored by NCDNR during his 34 year career with Weyerhaeuser. The NCDNR FFEO was highly trained and is an excellent operator. His fire control training and experience level on initial attack and extended attack wildfires is satisfactory. The crewman stated that he wasn't real confident in what was expected of him because it was his first season with NCDNR. The crewman had 2 years of previous experience with a fire control private contractor employed by Weyerhaeuser Paper Company. Had he known to inform the FFEO that he was very hot from the radiant heat, then the FFEO wouldn't have plowed so close to the fire.

Recommendation – NCDNR needs to put more emphasis on training "Temporary" Crewman to give them the most information they can about what is expected of them, their function and purpose. Having permanent Crewman positions would eliminate having to re-train personnel each year, and would provide a well trained person to be assigned with the Tractor-plow unit and FFEO. Remind FFEO's that their safety is first and foremost. If they must sacrifice a few more acres to ensure their safety, then do so. Improve the training on what the minimum requirements are for a safety zone when relying on the "Blackline". This should be done at Basic FFEO, Advanced FFEO and Strategy and Tactics Training.

PPE - The PPE that was being worn was examined, and was not compromised during the burn over. Therefore, failure of PPE was not a contributing factor to the injury. The PPE (face and neck protector) was not utilized properly, and contributed to the injury.

Recommendation - Encourage fireline personnel to properly fasten the front of their face and neck protectors to prevent them from blowing open and exposing skin to high radiant heat.

Strategy and Tactics - The fire was attacked utilizing standard strategies and tactics common for a fire in this fuel type exhibiting the observed fire behavior as was described by the personnel on the fire. Safety was stressed by the fire personnel and contributed to their remaining calm when the situation worsened on the fireline. The Initial Attack was aggressive, but the decision to “Pinch the Head” to prevent the fire from getting in the larger timber contributed to the injury occurrence.

Recommendation – Don’t sacrifice safety for acreage by attempting to “Pinch the Head” when continuing to flank the fire will be the safest tactic to employ. Avoid plowing so close to the flank that it doesn’t give the burnout fire time to create an acceptable safety zone with the “Black line”.

Administrative Concerns Observed

During this investigation, several concerns were noted regarding “non-Fireline” administrative deficiencies. There appears to be a lack of knowledge of what constitutes reporting a “Fireline Injury”, understanding of Policy and Procedure’s definition of a burn over, and / or fireline injury. NCDFR needs to review the current P&P and develop a clearer definition of burn over and reportable fireline injury. Additional items noted are listed as follows:

- 1 – Lack of reporting to supervisor of injury and to others up the chain of command.
- 2 – Tardiness of completing and forwarding the Form 19 to the Central Office
- 3 – Only 1 authorization given for covering the Doctor and Pharmacy expense. This required the employee to have out of pocket expenses that were not necessary.
- 4 – Need a better understanding of Worker’s Comp process, follow up on recent review already done previously at District meeting with County Rangers.
- 5 – NCDFR personnel need to be checked out by EMS when any fireline injury occurs. Regardless of how minor the injury appears to be at the time, the victims vital signs should be taken and recorded for future reference in the event their condition worsens.

Map 1

