

THE BUCKHORN FIRE
FIRE INVESTIGATION TEAM REPORT

Date of Report: March 31, 1989

Ohio Department of Natural Resources
Division of Forestry
Division of Civilian Conservation
and
USDA Forest Service

Submitted by: Jack Hemphill
Investigation Team Coordinator

Approved by: Donald S. Ch...
Chief, Division of Forestry
Edgar C. Hinton
Chief, Division of Civilian Conservation
Donald K. Roberts, Deputy Director
Joseph J. Sommer, Director

INVESTIGATION REPORT

Introductory Facts:

Date: March 27, 1989:

Time of Incident: Beginning 11:15 a.m.

Fire Name: Buckhorn Fire

Fire location: Near the intersection of Route 93 and Negro Creek Road, Decatur Township, Lawrence County.

Weather information from Huntington, WV at noon:

Temperature 82 degrees F

Humidity 37%

Wind from WSW at 10 knots

Fire Size: 1 acre at initial attack
40 acres approximate total

Fuel/Vegetation: Woodland - dormant hardwoods, leaf litter

Apparent Fire Cause: Escaped debris fire

Investigation Team Members:

Coordinated by Jack Hempfling, ODNR Division of Forestry,
Columbus

Jeff Wilson, Assistant Chief, ODNR Division of Civilian
Conservation

Bill McGarity, Operations Staff, ODNR Division of Civilian
Conservation

Phil Barker, Athens Ranger District, Wayne National Forest

Nate Kirk, ODNR Division of Forestry, Athens

John Stauffer, ODNR Division of Forestry, Chillicothe

Mike Burnside, Scioto Trail State Forest

Ike McDaniels, Manager, Zaleski CCC Camp

Phyllis Greggs, ODNR Division of Forestry, Columbus

ODNR Personnel on the Fire:

Bill Sims, Forest Manager, Dean State Forest (24 years forest firefighting experience)

Wendall Phillips, CCC Project Supervisor (12 years forest firefighting experience, CCC Corp Member Riffe CCC Camp)

Ricke Phillips (fatality)

Age 18

1 previous fire

Ht. 6'0" Wt. 280 lbs.

Death cause (coroner):

smoke inhalation

Melissa Ruby

Age 18

1 previous fire

Ht. 5'1" Wt. 130 lbs.

Severe burn injuries

Sheldon Johnson

Age 20

1 previous fire

Ht. 5'9" Wt. 135 lbs.

Mary Lambert

Age 18

No previous fires

Ht. 5'8" Wt. 150 lbs.

Equipment:

Each CCC member had a fire rake and hard hat. Supervisor had 2 fuses for backfiring.

Uniforms: All had CCC uniform pants. Wendall and Ricke were wearing CCC work shirt; Mary, Melissa and Sheldon were wearing CCC T-shirts. Uniform material was of cotton/polyester blend.

Training

Because of the nature of the Division of Civilian Conservation, with a constant changeover in corpsmember personnel, fire training is provided to the Riffe CCC Camp prior to each fire season (spring and fall). CCC staff, Project Supervisors, who are full-time permanent personnel, do gain the benefit of long term firefighting experience. New corps members, after training, are teamed with experienced crew leaders, as in this case, with Wendall Phillips.

Spring Training:

Provided by Terry Browning, Ranger, Shawnee State Forest

Date: March 17, 1989 - one-day, six-hour, basic wildfire course.

Curriculum: Combination of classroom (5-1/2 hours of instruction covering fire terminology, safety, size up and initial attack, suppression methods, basic fire behavior, and mop up) and field instruction (1/2 hr.) on using fire rakes and handline construction. (Same as presented to volunteer fire departments in the area).

THE INVESTIGATION PROCESS

The team, in addition to gathering the basic information above, visited the fire site, looking for fire origin, burn patterns, fire scars on the trees, potential fuel information, topography, and checking locations with the personal accounts of witnesses.

Three members of the investigation team (Jack Hempfling, Phil Barker and Ike McDaniels) together interviewed each witness. The witnesses were interviewed one at a time, and included: Wendall Phillips, Bill Sims, Mary Lambert, Sheldon Johnson (by phone), and Bob Russel.

The following agencies or individuals also conducted investigations and/or assisted the team in the investigation:

Lawrence County Sheriff's Department
Bob Lawless, Division of State Fire Marshal
Mark Wharton, Bruce Dean, Department of Industrial
Relations, Division of Mines
Marvin Wasserman, OSHA
County Coroner
Critical Incident Stress Debriefing Team, Columbus
Fire Department and mental health personnel
Ohio State Patrol

THE BUCKHORN FIRE INCIDENT

11:15 a.m. - Colman Collins reports fire by phone to Dean Headquarters - in USFS fire suppression district. Dean Manager Bill Sims attempts unsuccessfully to contact USFS. CCC crew decides to respond while Bill continues attempts to contact Vesuvius, which he then succeeds doing and leaves Dean Headquarters to assist CCC crew. Crew arrives and Wendell evaluates the fire. Estimates size as 1 acre, burning cool, advised Bill by radio saying his crew could handle it without help (although Bill continued to scene and USFS crew also was responding).

In evaluating the fire, Wendall observed flames low, light wind from west to east, right flank of fire not a concern because of Negro Creek Road, but didn't want to circle the head of the fire from the right because they would be moving in front of the fire and wind, a dangerous move. Only logical strategy was to move out along the left flank.

Fire had started from burning debris in an old, unused pig pen area behind the house and proceeded to the east.

Crew began building the fire line at the yard. Actual fire was on the other side of small ridge, out of their sight.

Bill Sims arrived and met the crew on the line. He and Wendall talked, noticed the small amount of fuel other than leaf litter, thought it should be easy, and decided to bump the crew to the top of the hill over the ridge and work down the hill to build line and burn the fire out. Bill stayed back on the lower hand line to clean it up a little more.

The crew left the line and began walking far to the left of the flames. As they proceeded to higher ground, they could see the flames still moving slowly but at the top of the right ridge. Topography is quite unusual.

Wendall and Sheldon were in the lead as they proceeded up the left side of the small ravine. After Wendall and Sheldon climbed on top of a small "hog back" hump that is formed by a "Y" in the ravine (refer to map), Wendall looked back, saw Ricke and the two girls behind about 15 yards, resting in the ravine near point A. Wendall asked them to get moving; they needed to get to the top of the hill (main crossing ridge at E) to get over the ridge past the head of the fire.

Within seconds, Mary noticed that flames on the flank had quickly grown from a few inches high to 2 feet in height. She yelled to Wendall that "something's not right." He did not hear or respond. She saw Ricke having difficulty trying to climb up on the "hump" upon which Wendall and Sheldon had climbed. He was unsuccessful doing so.

Within a few more seconds, Wendall had been continuing a few more steps up the "hill" towards point B, when he heard a deafening roar.

Wendall turned, knew the fire had suddenly changed direction with strong force, yelled "Run! Quick!" and went down towards Ricke. Mary recalled, in a flash thought, the recent fire training she had received, in which the instructor described a rare "blow up" fire behavior. She remembered him saying that in all his years of firefighting he had never seen it happen and here she was, seeing it already. The investigating team's interviews and on site investigation reveals that neither the fuel, nor the fire's activity, nor the topography, would have even caused suspicion or indicated any possibility of a "blow up" in this direction or manner. (This will be discussed more later.)

Wendall found that the wall of fire was between he and Ricke and knew he couldn't help. Wendall, Sheldon and Mary all saw Ricke still in the ravine and Wendall felt the entire crew was in jeopardy at the time.

Wendall then gave his attention to the others, dropping his rake and 2 fusees at Point B, yelled "Run!" again. Mary was successful in running out ahead of the fire. She turned to Melissa and did help her up once. Melissa fell again. Wendall returned to Melissa, telling Mary "Run. I'll get Melissa." Mary proceeded up the hill.

Sheldon veered left to escape flames coming his way. His rake was found at Point D. He yelled for Wendall 3 times with no response, heard screaming, proceeded over the hill, went right to Negro Creek Road and back to the house and trucks.

Mary also went over the hill, and out the same route to a house, with her rake. A Negro Creek Road resident transported her back to the truck.

Back at the fire, Wendall got Melissa up and they ran some more to Point C where Melissa fell again, dropping her rake. The flames advanced, which were not the "blow up" flames, but secondary fire heads now proceeding uphill after the "blow up" toward Point C. These were the flames that caused Melissa's burn injuries. Wendell helped extinguish the flames, picked her up and began carrying her uphill toward the ridge (Ridge E). Several times they both fell. Above Point C there was a zone between two different fire heads where Wendall felt safe to pause and called Bill Sims on the radio requesting an ambulance for a girl with bad burns; he didn't mention the fatality over the radio.

Don Flegel, USFS agent, arrived. Bill instructed Don to call for the squad.

11:45 a.m. - EMS logged the request and squad dispatched. USFS crew arrived. Bill sent Bob Russel up to "look for a girl who's been burned." Wendall carried Melissa all the way out to the left and down the hill. Asked residents for sheets to cover her. The fire cooled enough that he was able to get around it. The light winds changed again, because he noted that they had clean air to breath around the left side of the fire.

11:58 a.m. - Wendall called CCC Camp to advise of the incident.

12:07 p.m. - Squad arrived at the scene. Bob Russel of the USFS crew, not knowing the girl was brought out to the far left, finds the body of Ricke.

At the request of Asst. Coroner William Nenni, who had established death at the scene, the body of Ricke Phillips was taken by Phillips Funeral Services to the Lawrence County Medical Center.

Melissa Ruby was transported by Healthnet helicopter to Cabel Huntington Hospital. Initially listed as extremely critical.

Wendall Phillips was taken by Terry Brown to Lawrence County Medical Center. Treated and released.

Sheldon Johnson and Mary Lambert were both taken to Oak Hill by Kevin Bradbury. Treated and released.

** Crew tactics were analyzed in depth by the investigation team, which included experienced state and federal firefighters. The investigation team strongly agrees with fire control tactics and decisions made by the crew supervisor and Dean Forest Manager.

FIRE BEHAVIOR

Initial fire (1 acre) appears to have been making a slow, routine advance to the east up the hill, south of the right hand ridge. Nothing unusual was noticed by anyone prior to leaving sight of the fire to begin the fire line on the left flank.

The fire, as it progressed east and slightly north up the south ridge, left higher scar which reveals that the fire's flank became more intense then the crew realized while out of their sight. None of the fire had progressed over the crest of the south ridge, until the crew had reached near Point A. As the crew neared this point, they began to notice flames at the crest, but nobody felt anything was unusual.

Near this point in time, the fire still on the crest, Mary noticed the increased flame heights. The fire suddenly spread explosively from the crest, approximately 40 yards, to Ricke's upper body. The investigation team makes special note that nobody on the crew saw the fire in intermediate locations between the crest and Ricke.

Some crew recall feeling a strong gust of wind, hard enough that Mary felt it almost knocked her over. Also, consistent in the description of the fire was the severe directional wind change, and a deafening roaring sound described as "like jet engines." In addition, Wendall (with 12 years firefighting experience) and Bill Sims (with 24 years firefighting experience) have difficulty expressing adequately a wall of flames that was exploding across to the north northeast. Neither had ever seen anything like it. During the fire "blow up", flame heights reached 15-25 feet, with a "blow up" corridor 50-60 feet in width. In addition to a thick, rolling ball of flames moving faster than the smoke could be released, arching flames were rocketing out in front. Wendall described red, orange and blue colored flames. Bill said it reminded him somewhat of seeing Napalm explode when he was in the service or as if "the whole area was saturated with gasoline and someone lit a match."

Duration of the "blow up" was for 30-60 seconds, and a review of fire scars shows results scar heights and a blow up corridor width consistent with witness accounts. Scars also reveal that the blow up burned for approximately 130 yards and then died back down. The "blow up" did leave new fire heads proceeding uphill to Point C which caught Melissa.

The investigation team notes of particular importance that not only is a "blow up" extremely unusual, but this "blow up" was incredibly untypical. "Blow ups" typically result from unusual combination of extreme conditions, including to various degrees: heavy fuel content, increased momentum from fuel preheating, winds, slopes, and ravines in which the "blow up" can shoot. However, in this case, the explosion of the flame walls was actually crossing the topography in a low fuel area, not shooting up the ravines, and when there was no fuel preheating (because up to this point the fire direction had been different). Eyewitness accounts of this "blow up's" behavior are confirmed by fire scars.

** It is also strongly felt that no increased amount or type of training would have prevented the tragedy that happened. "Blow ups" are so rare, and this "blow up" did not even behave as "blow ups" are "supposed" to. ??

FIRE BEHAVIOR ANALYSIS

The biggest question in everyone's mind was : how did the flames explode from the crest of the south ridge, to Ricke, without anyone seeing the fire anywhere in between? What fuel was burning in the path of the "blow up" and what forced it across the topography?

The initial theory of the investigation team was that a wind change, funneled from a broad valley southwest of the fire, blasted across the CCC crew's location.

Upon more indepth investigation of the burn area, another theory can be put forth for consideration and further tests. This theory involves potential methane gas from old, abandoned deep and/or drift mines. The burn area contains topography obviously disturbed by intense mining activity of long ago. Protruding rocks indicate mine entrances now covered over by years of soil debris. Numerous sink hole depressions exist. This theory is that the old mines may be a source of methane gas seeping out and then collecting in pockets in these small ravines and sink holes. This would explain the sudden explosiveness of the fire, the blue color seen by Wendall, and the "Napalm" and "exploding gas" descriptions that Bill used. The only other conclusion is that an extraordinary wind burst, changing direction of the fire, caused the "blow up", but the investigation team has difficulty accepting the latter because of the extraordinary fire behavior.

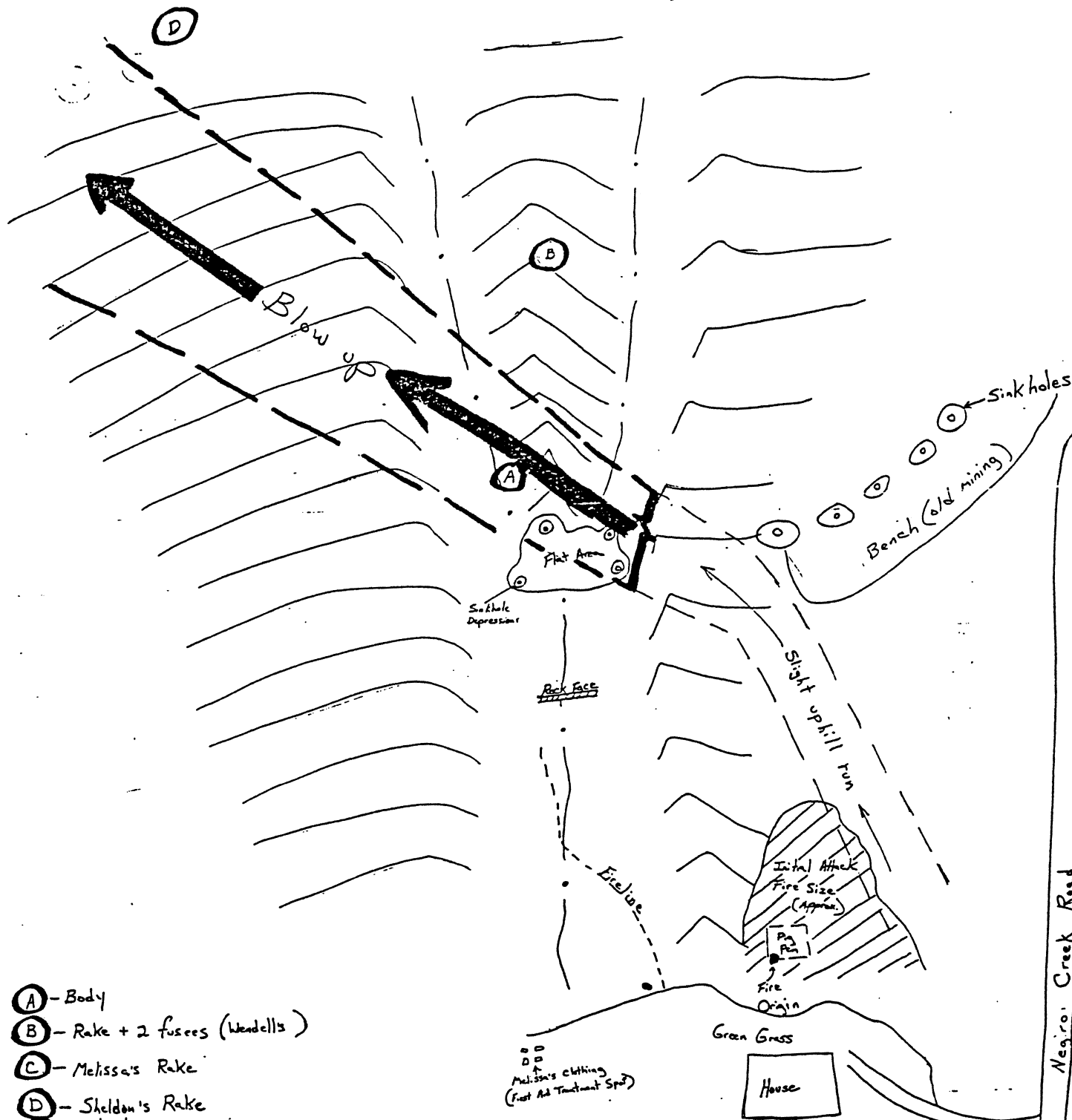
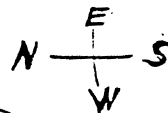
Division of Mines agents inspected the fire site two days following the incident. The tests performed revealed no methane at the time of inspection. According to Division officials, methane emissions from old mines are often very intermittent, can vary with barometric pressure, can seep out even in the absence of large openings, and may not be emitted again for a long period of time. Officials were not surprised that they could not detect any methane during their inspection, but that it could have been easily entrapped in the unusual topography of the area. Due to methane's strange characteristics, the negative test results do not detract from the possibility that methane may have been present and could explain the resulting fire behavior. Further monitoring of the area continues. All avenues and possibilities are being investigated.

ADDITIONAL INVESTIGATION TEAM COMMENTS

The team offers the following additional observations for consideration separately or as part of the investigative report:

1. Given everything else the same, fire retardant fire clothing or the availability of the fire shelter commonly available on western U.S. fires, would not have been helpful in preventing the death of Ricke Phillips, who was caught in the explosive "blow Up" corridor. The coroner has ruled smoke inhalation as the cause of death.
2. In the case of Melissa Ruby, it is the team's opinion that her burn injuries would have been reduced by wearing cotton jeans rather than polyester pants, and reduced further by wearing fire retardant trousers.
3. The team recommends that, perhaps through special appropriation, the purchase of satisfactory fire retardant pants for all ODNR forest fire personnel be accelerated. Recent Industrial Commission standards for protective clothing give agencies and fire departments until March 1, 1993 to phase in compliance, but this incident points out the need for quick action. At minimum, effective immediately, firefighters should not wear polyester clothing, but cotton blue jeans and cotton long sleeve shirts instead.
4. The team recommends that physical fitness of personnel involved in forest fire suppression be addressed.

SADDLE



- (A) - Body
- (B) - Rake + 2 fuses (Wendell's)
- (C) - Melissa's Rake
- (D) - Sheldon's Rake
- (E) - Ridgetop
- A-B - 28 yards
- B-C - 55 yards
- C-D - 22 yards
- C-E - 50 yards
- D-A - 87 yards

Hwy. 93

Negro Creek Road