Events leading up the escape of the Frijoles Upper Units 1 and 5 Prescribed Fire

On May 4, 2000 the Bandelier National Monument conducted a prescribed fire near the top of Cerro Grande. On May 5, at approximately 1300, the prescribed burn was declared a wildfire under the management of a locally staffed Type 3 Interagency Management Team. On May 7, 2000 at approximately 1230 hours a Type 1 Interagency Management Team is ordered when the fire burns off of the National Monument. The fire is transitioned to the team at 0600 on May 8, 2000.

This is a discussion of how fire behavior and management of the prescribed fire and subsequent wildfire actions led to the escape of the fire.

The description below is a compilation of observations and interviews with individuals involved in the incident as well as an onsite visit accompanied by firefighters who were involved in the burn and subsequent suppression action. On May 15, 2000 Dan O'Brien and John Robertson visited the scene. Photo documentation was made of the site visit.

At about 1920 hours on May 4, 2000 a test burn was conducted near the top of Cerro Grande on National Monument lands. The plan was to light the grasses on fire and let fire spread to observe fire behavior. During this operation the exterior edge (outer perimeter) is extinguished using water from back pack pumps or by swatting the edge with spruce or fir tree branches. The lower edge (inner edge of the fire) was extinguished after the fire had spread about 130 feet (2 chains). This created a black strip with the grass fuels burned that was about 400 feet long by 130 wide. Roughly one acre in size. The test fire confirmed that the fire would spread and that it could be controlled thus meeting the objective of creating an effective black line. At this time the black line operation began and proceeded down to the southeast along a ridge (this is down hill). Burning took place in grass with both the exterior and interior edges being extinguished. This processes continued for several hundred feet further down the ridge to the southeast.

Observations of the fire behavior within the black lined area indicated that the objectives identified for Phase One of the burn were also being meet. In addition, extinguishing the interior fire edge was taking more time, water and effort than expected. It was decided to discontinue extinguishing the interior edge of the black line allowing it to back further into the unit down slope and to the west. This then became a free burning fire, contained by the black line, up hill and the east. This allowed for a much faster operation. This process continued down the ridge to the southeast.

Fuels change from a grass fuels to a fuels made up of leaves, needles, branches, twigs and logs (timber fuels) about half way down the southeast edge. A handline (a cleared area 1 to 3 feet wide where all burnable material has been removed) had been constructed from this point down to Road 4.

Approximately two hundred yards above the fuel transition the black lining operation was halted and all but two crew members were directed back up to the top of the burn. The two folks left on the east side were to watch for and extinguish any fire outside of the black line. They remained at this area watching for spot fires because of unfavorable winds from 2200 hours until shortly after dawn.

In the meantime, the rest of the crew worked on a small (30 by 30 foot) fire that had spread outside the black line at the top of the project. It was also observed that the free burning fire from the eastern line

was working its way across the slope to the west. Eventually this fire could threaten the western perimeter that did not have a constructed handline. Black lining was then started down the west line to the south (this is down hill) at 2300 hours. The same procedure used on the east edge was employed on the west line. The grasses were ignited and the exterior edges are immediately extinguished. The fire was then allowed to freely spread down slope within the unit and towards the east where it would meet up with the fire spreading from the east.

About a third of the way down the west line is a saddle. This is an area along a ridge where the line down the ridge dips down and then rises back up again. There was a concern as the black lining approached this area that fire would want to run rapidly up the far side of the saddle and into the timber fuels at the top of knob just south of the saddle. Efforts to ignite the fuels in the timber fuels were unsuccessful however, they were unable to get the timber fuels to carry fire. They subsequently dropped below the knob to the north and black lined the grass fuels down slope (to the north) into the saddle. They met up with the people who were burning down from the top of the burn in the bottom of the saddle. This took the rest of the night. After a long difficult work shift, all but six people are released from the burn. Two on the east side and four on the west side. At dawn efforts to burn the timber fuels on the west side was again attempted unsuccessfully.

It should be pointed out that no handline had been constructed in the timber fuels below the grass on the west line. A saw line had been constructed. This is a line where all of the logs or branches that can be cut with a chainsaw are cut and removed. This activity is physically the first stage in the construction of a handline in timber fuels.

Once the Burn boss made the decision to allow the fire to freely spread towards the interior of the burn they were no longer capable of stopping the spread down hill into the timber fuels. With the exception of the attempts to fire the knob on the west line there had been no firing in the timber fuels.

At about 0300 hours on May 5, resources are requested by the burn boss to be on the burn in the morning. The dispatch center can not order resources for a prescribed fire without approval. This does not take place until the morning.

At about 0600 on May 5, personnel back at the Park Headquarters begin to determine the status of the ordered resources. It turns out that no resources are yet in route. There is a discussion with higher Park Service agency personnel regarding the funding of resources available to be used on this project. It is understood that there is a limitation on available funds for this project. It is understood that one load of fire retardant from an air tanker, the 20 person crew and a helicopter and crew can be funded by the project. This ultimately turns out to be incorrect, there is no funding limitation for prescribed fires. This misunderstanding is critical to events leading up to the escape.

It is now about 0700 on May 5. There are four firefighters on the east line having been joined by two fire fighters from the Bandelier engine. Two fire fighters remain on the west line. There is some concern that the fire will back down hill and get below where the black line ends on the east line. The four fire fighters on the east line are directed to continue the black lining down the ridge to the south, in the grass fuels. After burning out about 200 yards they rest at a small pond, located about 200 hundred yards above the handline. Around 1030 hours on May 5, a fire outside the black line above the small pond is observed. The four fire fighters on the east line begin extinguishing the fire but are unable to

and call for help.

By this time the confusion over the resource orders has been resolved and a helicopter is already in route. It arrives at 1135 hours and drops off two more fire fighters and returns to the helibase to get the bucket to use for dropping water. At 1230 hours, thirteen fire fighters from a Type 1 crew arrive at the fire slop-over near the top of the handline and take action on the escape by building line around the fire. At the same time five crew members from the same crew hike up the west saw line. The fire fighters on the east line have a difficult time holding the fire and order two air tankers to drop retardant on the slop-over and a spot in a patch of dead trees (snag patch). The crew also attacks another small spot fire that was detected by the Air Attack. The airtankers are returned to Albuquerque to standby by lead plane pilot. The slop-over and spot fire are contained with 20 to 30 acres burned. The one acre spot fire is located on National Forest.

Based on previous discussions regarding the funding limitation the prescribed fire is declared a wildfire.

Since the fire is now a wildfire, immediate action is taken to suppress the fire. There are two alternatives considered. One option is to build fireline across the bottom of the burn stopping the spread of the fire to the south. This alternative is discarded as it will require crews working in an unsafe area with dead trees (snags) and require more resources than are currently available. The selected alternative is to use the existing lines for the prescribed fire where possible and burnout both the east and west lines south to Road 4.

At 0900 on May 6, the fire is estimated to be 490 acres in size. With the southern most edge roughly on a line from the top of the handline (below the southern edge of the slop-over) running northeast to the saddle on the west line.

The handline for the east side is improved and a hose lay is laid up along part of the handline on the east side. On the west side handline is built following the saw line up to the rock knob. Burnout of the west line follows the line construction to the south. The burnout on the east proceeds to the south towards Road 4. This is followed up by slowly burning out the fuels along Road 4 from the east to the west.

About 1000 hours on May 7, a helicopter attempts to widen out the fireline along the west line in the area east of the rock knob. At about 1200 hours, fire activity picks dramatically as strong winds hit the fire. Gusts of up to 50 miles per hour are observed at Los Alamos National Laboratory. The fire spreads rapidly through the trees from west to east paralleling Road 4. A large spot fire is seen in the upper end of Frijoles Canyon below Road 4 south of the project area. Crews are unable to attack the fire due to extreme fire intensity. This spot fire triggers additional crowning (fire spreading in the trees) that causes spot fires to the east above Road 4. These areas also crown causing additional spot fires and crowning to the east of the project area. Crown fire travels rapidly to the east. The spot below the Road 4 in Frijoles Canyon is contained around 1700 hours on May 7.

Again suppression alternatives are developed and analyzed. The preferred alternative is to use Road 4, the Camp May Road and Hwy 501 as anchor lines (roads to burn out from). Burnout of these roads proceeds and by the morning of May 8, burnout is completed. A Type 1 Interagency Management Team takes over the fire at 0600.

Critical factors:
The decision to stop extinguishing the interior edge of the black line commits the personnel to continuing the operations.

There are insufficient fire fighting resources available on site on May 5.

Aggressive burnout of the firelines particularly on the flat near Road 4 provided an ignition source as well as preheated the tree canopy making it more susceptible to a crown fire.

Rationale:
The grass fuels burned readily, particularly in the upper third of the project area. When ignition of the black line (with interior edge extinguished) reached the timber fuels it is likely burning would have been stopped at the top of the handline on the east side because the timber fuels would not carry fire.

The crew had not ignited fire in the timber fuels, as these fuels were not burning well. The only exception is the slop-over on the east line where fire did carry in the timber fuels. In this situation the fuels are much more exposed to both wind and sun and are drier and ignite and spread more easily. Down in the lower portion of the project area the tree canopy is dense. This limits drying from the sun and wind and the fuels are wetter and less easily ignited.

It is probable that if contingency resources were at the burn site on May 5 these resources would have been able to contain the slop-over without the need to convert the prescribed fire to a wildfire. Instead, the prescribed fire would have progressed to the timber fuels where it is probable that ignition of the lines would have slowed or stopped completely as burn objectives would not have been met. It is very unlikely that fire would have spread down the west line into the flats (along Road 4), so little if any burnout of the west line that have taken place. Even if fire had managed to work its way along the west line it would have done so slowly and been easily contained. Large patches of aspen trees (that don't burn well) exist in the interior and along the west line that would have further reduced fire spread to the south. Thus, there would have been no fire approaching the road and no need to burnout along Road 4. Therefore, the fuels would not have been preheated and dried out and no ignition source would have existed to initiate the crown fire that resulted in the spotting outside the project area to the west.

The strong winds do not appear to have created active fire spread in the grass fuels or timber fuels that had been burned the night and early morning of May 5 (upper third of the project area). There is no indication that the source of the escape fire came from this area of the burn.

In summary, it is believed that had sufficient contingency resources been available on site the morning of May 5th, they would have been able to control the slop-over fire and the need to convert to a wildfire would not have occurred. It was the suppression action that put fire along Road 4 that resulted in the escape from the project area.

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