

Appendix E
Fire Stop's Report on Breach of
Evolution Road Control Boundary

CAUSE OF THE ESCAPED FIRE ON 24 OCTOBER 2003, FORT ORD RANGE 43–48 BURN

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Introduction

A prescribed fire was being conducted in mature maritime chaparral on old firing ranges on the former Fort Ord on 24 October 2003. The burn was ignited by helitorch and had progressed from the western corner of the project toward the east and the south. Shortly before 10:00 a.m., an escape occurred along the southern half of the southwest control line (Evolution Road). The escaped fire burned at high intensity in continuous, mature brushfields of maritime chaparral, under the influence of approximately 10-mph, ambient 20-foot winds. The escaped fire spread westward approximately 1.4 miles, where lighter fuels allowed the fire spread to be stopped. A shift of wind from east/northeast to northeast continued the movement of the escaped fire to the south.

This report summarizes the findings made regarding the cause of the original escape, based on information gathered on 25 and 26 October 2003 by Catie and Jim Bishop, photos and infrared imagery taken by John Newman, and video-helicopter images.

Examination of the Control Line

The southwest control line consisted of a dirt road with a brush-cleared zone adjacent on the burn side, and retardant-treated fuels on the opposite side of the road (Figures 1 and 2). Prior to application of the retardant, water was applied to the same fuels that received retardant, and both treatments were applied the day before the burn. The combined width of the road and brush-cleared zone totaled about 55 feet, and the retardant band was approximately the same width, for a total control line width of approximately 100 to 120 feet.



Figure 1—Escaped-fire segment of the southwest control line, with arrows indicating the locations and fire-spread directions of the largest two breaches of the control line. This photo was taken before the application of retardant. Note the presence of mature brush immediately upwind of the escape points.



Figure 2—Retardant-treatment zone, reddish color, example from another portion of the control line.

Examination of the control line showed several burned-out areas that breached the retardant-treated brush (Figure 3). Litter between the treated brush and the road showed numerous small burned spots that had been limited by the retardant. Some of the burned spots showed fire travel into the litter under the treated brush (Figure 4). Maritime chaparral has a very dense, compact architecture which greatly restricted retardant penetration and the litter underneath had largely been shielded from retardant. The litter under the brush burned, ignited by spot fires either spreading into or beginning in that litter.



Figure 3—Areas breached by northernmost escaped fire in retardant-treated zone, view northwest toward Stinger Road along the southwest control line (Evolution Road).



Figure 4—Yellow arrow indicates a spot fire that did not spread; red arrow indicates a spot fire that burned into the litter under the brush. Note the consumption of litter under the brush where the retardant did not effectively penetrate.

The several “burned-out” segments of the retardant-treated line all were aligned downwind from patches of mature brush, which would have generated firebrands (Figures 3, 7, and 8), and both the litter and foliage were burned. Remnant leaves and small branches that remained in the burned-out zones showed “leaf freeze”, which indicated the fire had moved westward (Figures 5 and 6). Measurements of the leaf-freeze directions ranged from azimuths of 240° to 280° , with an average of 267° . One border between the burned and unburned brush in the retardant-treated zone aligned at azimuth 270° . All of those fire travel indicators are consistent with the westward spread of the escaped fire and the wind direction on the project burn, eliminating the possibility that the burned-out areas occurred by fire spreading eastward later in the day (from hot spots that might have flared up after the westerly sea breeze began later in the day).



Figure 5—Leaf-freeze showing westward movement of the escaped fire.



Figure 6—Edge of southernmost escape point. Note consumption of brush, leaf freeze, and orientation of escaped fire to road edge (SW control line).



Figure 7—Locations of future escape points, with main burnout operation in progress. Note that the direction of the wind and fire spread parallel the direction of the eventual escaped fires.



Figure 8—Arrows show the two largest breaches of the retardant line. True angle between direction of fire travel and the road is distorted by the oblique view of the aerial photo. The trace of the burned, retardant-treated brush appears darker than the burned untreated brush, due to the less complete consumption of the treated brush.

Observed Spotting Distances

At its extreme west end, the escaped fire encountered light, patchy fuels; the fire intensity decreased; and some fuels were incompletely consumed. A small, isolated burned spot representing the ignition of a spot fire was located. The spot fire was measured to be 85 feet from the nearest firebrand source, indicating a spotting distance of at least 85 feet. Other spot fires seen in the retardant-treated zone show spotting distances from upwind sources of approximately 75 to 100 feet. Clearly, airborne firebrands could have exceeded the combined width of the road and brush-cleared zone (approximately 50 to 60 feet) and reached the retardant-treated zone.

Timing of the Fire Escapes

At 10:01 a.m., aerial video footage shows two escaped fires spreading west from the escaped-fire origins located on the control line—one fire roughly 100 yards long and the other several hundred yards long.

Infrared images and map measurements at 10:01 a.m. document two escaped fires—a southern (Figure 9) and a northern escaped fire extending 120 and 400 yards, respectively. Assuming the average rate-of-spread observed later for the escaped fire (80 to 100 ft/min.), it is inferred that the first escape had occurred some 12 to 15 minutes earlier, approximately at 9:45 to 9:50 a.m.

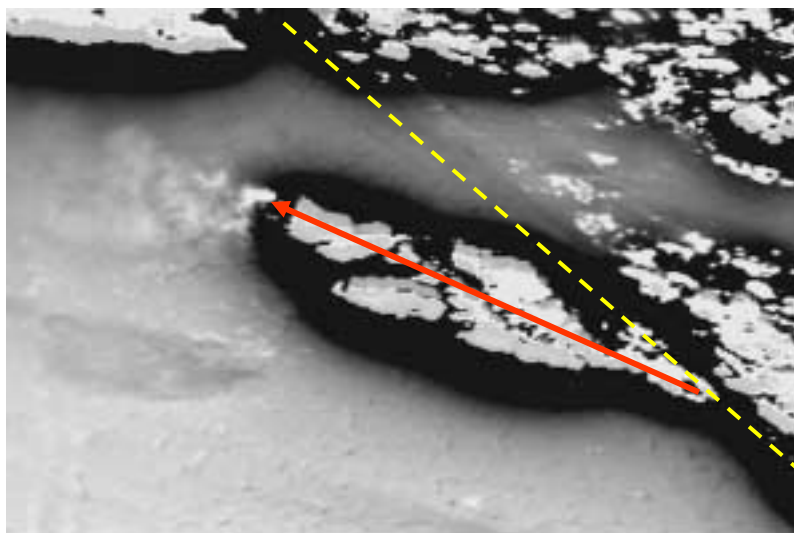


Figure 9—Infrared photo of the second (southernmost) escaped fire, shortly before 10:00 a.m. Heat from the first (northernmost) escaped fire is visible at top of photo. Road is indicated by yellow line.

Observed Weather During the Period of the Escapes

Tables 1 and 2 list the observed weather conditions from two remote automated weather stations (RAWS) at Fort Ord. The weather conditions listed were within the burn prescription.

Table 1—RAWS 01 (Range 46) Data During Burn Initiation and Escapes

| Time | Temp (F) | Relative Humidity | 10-Hr Fuel Moisture | Average Wind | | Peak Wind | |
|---|----------|-------------------|---------------------|--------------|-----------|-----------|-----------|
| | | | | Speed | Direction | Speed | Direction |
| 8:00 a.m. | 51 ° | 63% | 15% | 4 mph | 101 ° | 11 mph | 86 ° |
| 9:00 a.m. | 68 ° | 30% | 15% | 8 mph | 78 ° | 17 mph | 108 ° |
| 10:00 a.m. | 72 ° | 26% | 14% | 15 mph | 73 ° | 20 mph | 36 ° |
| 11:00 a.m. | 76 ° | 23% | 14% | 13 mph | 68 ° | 21 mph | 56 ° |
| ^a Wind speed at 10:00 and 11:00 a.m. were probably fire-influenced; ambient wind speeds were about 10 mph. | | | | | | | |

Table 2—RAWS 02 (Range 43) Data During Burn Initiation and Escapes

| Time | Temp (F) | Relative Humidity | 10 Hr Fuel Moisture | Average Wind | | Peak Wind | |
|------------|----------|-------------------|---------------------|--------------|-----------|-----------|-----------|
| | | | | Speed | Direction | Speed | Direction |
| 8:00 a.m. | 53 ° | 52% | 12% | 8 mph | 93 ° | 12 mph | 51 ° |
| 9:00 a.m. | 69 ° | 29% | 12% | 8 mph | 75 ° | 19 mph | 95 ° |
| 10:00 a.m. | 73 ° | 26% | 11% | 9 mph | 77 ° | 18 mph | 77 ° |
| 11:00 a.m. | 76 ° | 23% | 10% | 9 mph | 70 ° | 20 mph | 78 ° |

Summary and Conclusion

The following points are substantiated by the evidence evaluated in this preliminary report.

- (1) Firebrands ignited multiple points along the retardant-treated line adjacent to the road at the escape sites.
- (2) Litter under the treated brush caught fire and then involved the overlying canopy.
- (3) Fire spread westward through the breached portions of the retardant-treated zones.

It is therefore concluded that burning firebrands (probably from burning brush, but possibly from hot ordnance fragments) fell into the retardant-treated zone. The firebrands ignited litter adjacent to or under the brush. And given the good burning conditions, the fire consumed the brush and spread beyond the control line despite the retardant treatment.