

THE RATTLESNAKE FIRE

July 9, 1953

MENDOCINO NATIONAL FOREST

CALIFORNIA REGION

U. S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE

To: Richard E. McArdle
Chief, U. S. Forest Service

From: Board of Fire Review

Subject: F, SUPERVISION
Board of Review - Rattlesnake Fire 7/9/53
Mendocino National Forest, Region 5

Reference is made to your letter of July 20 requesting a review of fire operations on the Rattlesnake Fire of July 9, 1953, Mendocino National Forest, Region 5.

The review was made during the week of July 27. As directed by you we confined the review to the disaster that cost the lives of 15 men working on the fire and did not review the history of the fire beyond the time of the tragedy.

The report with Conclusions and Recommendations is attached.

Respectfully submitted,

Edward P. Cliff, Washington, D.C. Chairman

J. H. Price, Milwaukee, Wisconsin

C. Otto Lindh, Albuquerque, New Mexico

Lawrence K. Mays, Portland, Oregon

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Note: All times shown in the report are Pacific Daylight time.

THE RATTLESNAKE FIRE

July 9, 1953

Mendocino National Forest

Region Five

Foreword

A fire of incendiary origin, later called the Rattlesnake Fire, started the afternoon of July 9, 1953, on the Stonyford District of the Mendocino National Forest. This was the second fire set by the same individual that day. The first fire, known as the Chrome Fire, was set on state protected lands in the same general area. It was quickly controlled - final area about 11 acres. The Rattlesnake Fire was controlled on July 11 at 5:20 A.M.

This fire was set at Oleta Point on the upper side of the Alder Springs road in a heavy brush area. (Figure 1).

About six hours after the origin of the Rattlesnake Fire a spot fire, later termed the Missionary Spot Fire (point 10, Figure 1) developed which required control action.

Twenty-four men in three separate groups of 4, 15, and 5 men were dispatched to the spot fire between 9:00 P.M. and 9:45 P.M. The three groups of Mission men traveled three separate routes to the spot fire. (See Figure 2 - (1) is route of first group; (2) route of second group; and (3) route of third group.)

Shortly after the last group of 5 men had arrived on the Missionary Spot Fire, which was approximately 10:02 P.M., spot fires developed below the Alder Springs road in the vicinity of Powder House Turn. Approximately 575 feet separated the Missionary Spot Fire from the closest spot fire below this road. At least one, and probably two, of the spot fires were quickly controlled. The spot fire near the bottom of the draw, and almost on a contour with the lower part of the Missionary Spot Fire, was not discovered until it had started to spread rapidly upslope in a northeasterly direction toward the Alder Springs road. An all out attempt was made to control it but without success. Sensing that the spot fire spreading from the vicinity of Stake 28 (Figure 3) might endanger the men on the Missionary Spot Fire, and while attempts at control were still in progress, Charles C. Lafferty, Fire Control Officer, Stonyford District, Mendocino National Forest, hastened to warn the 24 men working on the Missionary Spot Fire.

While the men were trying to make their escape, the fire blew up and in a brief period had engulfed the Missionary Spot Fire which had remained under control throughout this period of violent fire activity.

Fifteen men lost their lives as they were trying to escape in response to the warning given by Lafferty. Nine made their way to safety and suffered no injuries.

Names and titles of those who died:

1. Powers, Robert F.	- Forestry Aid, GS-7 (Asst. Ranger)
2. Vote, Stanley L.	- Forestry Aid, GS-4 (Fire Foreman)
3. Boddy, Allan J.	- Crew Member, Missionary
4. Colles, Sergio	- " " "
5. Dinnel, Benj. O.	- " " "
6. Gifford, Paul	- " " "
7. Griffis, Harold J.	- Straw Boss, "
8. Hitchcock, Glenn C.	- Crew Member, "
9. Johnson, David A.	- Straw Boss, "
10. Mieden, Robert J.	- Crew Member, "
11. Noah, Darrel K.	- " " "
12. Rowe, Howard F.	- " " "
13. Sherman, Raymond C.	- " " "
14. Short, G. Daniel	- " " "
15. Whitehouse, Hobard S.	- Crew Boss, "

Men assigned to the Missionary Spot Fire who escaped are:

1. Baker, William L.	- Crew Member, Missionary
2. Etherton, Kenneth A.	- " " "
3. Jackson, William H.	- " " "
4. Matteson, Lloyd M.	- " " "
5. Schlatter, Donald C.	- Straw Boss, "
6. Smith, Leon M.	- Crew Member, "
7. Stous, Duane	- " " "
8. Thompson, Leslie P.	- " " "
9. Toews, Jacob W.	- Straw Boss, "

All men listed were members of the New Tribes Mission, excepting Robert F. Powers who was a regular Forest Officer. Stanley L. Vote, Forest Service Fire Crew Foreman was also a member of the New Tribes Mission.

2. The Initial Investigation

Acting Regional Forester Branch, assisted by Regional Fire Dispatcher Baxter, initiated action to investigate the accident immediately after they learned of it.

Regional Forester Hendee, on his arrival at Willows, California, on July 11, appointed the following committee to make the investigation.

Lynne M. Correll - Chief, Div. Personnel Management, R-5, Chairman.
Normal J. Farrell - " , Special Project, R-5
George S. James - " , Div. Information and Education, R-5
Neal M. Rahm - Supervisor, Modoc National Forest, R-5
Leon R. Thomas - " , Mendocino National Forest, R-5
John Callaghan - Deputy State Forester, California

Assisting with the investigation were:

C. C. Buck, Chief, Div. of Fire Research and C.M. Countryman, assistant, both from the California Forest and Range Experiment Station; Joseph T. Radel, Safety Officer, N.F. Spangenberg, Training Officer and J. M. Keusseff, Division of Fiscal Control, Regional Office , Region 5; H. E. Ruedy Administrative Assistant, Mendocino National Forest, Region 5, and Seth Jackson, Safety Officer, Washington Office.

Field investigations began on July 10 and continued through July 17. Analysis of field data followed with a detailed report completed by July 25. Examination of the Regional report shows that it is very thorough and fully describes the events as they occurred.

• Formal Review by the Chief's Board

On July 14, Richard E. McArdle, Chief, U.S. Forest Service, appointed a Board of Review to investigate the tragedy. The Board was comprised of the following men:

Edward P. Cliff, Asst. Chief, Forest Service, Washington, D.C.
Chairman.
J. H. Price, Regional Forester, Region 9, Milwaukee, Wisconsin.
C. Otto Lindh, " " " 3, Albuquerque, N.M.
Lawrence K. Mays, Asst. Regional Forester, Region 6, Portland, Oregon
H. Dean Cochran, Chief, Div. of Personnel Management, Washington, D.C.

The following individuals were designated to serve as technical advisors of the Board:

*John Callaghan - Deputy State Forester, Redding, California.
Jack S. Barrows - Chief, Div. of Fire Research, Northern Rocky Mountain Forest Experiment Station, Missoula, Montana.
Seth Jackson - Safety Officer, Div. of Personnel Management, Washington, D.C.
C. A. Gustafson - Chief, Div. of Fire Control, Washington, D. C.

Mr. Callaghan was appointed by State Forester DeWitt Nelson to collaborate in the formal review. He also assisted extensively in the Regional investigation of the tragedy.

Mr. McArdle's directive to the Review Board is vividly pointed up by his statement, "We all realize that fighting a forest fire is dangerous. It can't be a soft job. Despite that fact, or because of it, we must assure every precaution to guard the safety of those who take on this tough assignment. Human life must never knowingly or carelessly be subordinated to other values." (Appendix)

The purpose of the review of the Rattlesnake Fire, as charged by Chief McArdle, was to determine the events that transpired which caused the tragedy and to determine what action is required to minimize the chances of, or, if possible, eliminate such accidents from occurring while fighting future fires.

of

a. Conduct/the Review

(1) Preliminary work in preparation for the Review.

Board members and advisors devoted two hours Monday, July 27, to the preparation of plans for the review, making arrangements for interviews with persons having direct knowledge of the fire action, extending invitations to members of the public who had a close connection with those who met their death on the Rattlesnake Fire, and making such other plans as were needed to make certain all facts concerning the fire would be obtained.

(2) Review of the Region's Investigative Report.

The remainder of Monday, July 27, was devoted to an exhaustive study of the investigative report prepared by the committee assigned by Regional Forester Hendee to make a thorough analysis of pertinent and associated features of the fire operations connected with the Rattlesnake Fire.

(3) Inspection of Fire Area.

Tuesday morning Board Members made a ground examination of the fire area in company with J. M. Ewing who was Fire Boss on the Rattlesnake Fire and L. R. Thomas, Forest Supervisor, who was present when the events leading up to the tragedy transpired. Regional Forester Hendee; M.M. Nelson, Chief, Division of Fire Control in Region 5; C.A. Gustafson, Chief of Fire Control; and Jack S. Barrows, Fire Research, also participated in the ground examination of the fire area. Other advisors to the Board had made an earlier examination.

(4) Interview of Witnesses.

All key individuals directly involved with fire operations in close proximity to the tragedy area in either a planning or supervisory capacity were interviewed. Other key individuals having a direct knowledge of the events which transpired and who participated in the operation were also asked to be present for interviews. Invitations to attend were extended to the survivors and the widows of the men who died. Invitations were also extended to Mr. C.M. Hare, Director of the New Tribes Mission camp at Fouts Springs, and anyone whom he wished to bring along. An attempt was made to contact Mr. Randrup of the Taylor and Randrup Logging Company but without success. Mr. Charles J. Gleeson, Willows Sentinel newspaperman was also sent an invitation. The invitations were extended either by phone or made in person.

(5) List of Individuals Interviewed.

Charles J. Gleeson - Newspaper reporter
C. M. Hare - Manager Fouts Springs camp, New Tribes Mission
J. B. Knutson - General Secretary, New Tribes Mission
Kenneth B. Finney - Foreign Secretary, New Tribes Mission
Mel Wyma - Assistant to K. B. Finney, New Tribes Mission
C. C. Buck - Chief, Div. of Fire Research, California
Norman J. Farrell, Asst. Regional Forester, Region 5
C. M. Countryman - Fire Research, California
Lynne M. Correll - Chief, Division of Personnel Management, R-5
Neal M. Rahm - Supervisor, Modoc National Forest
Joseph T. Radel - Safety Officer, Region 5

H. E. Ripley - Forest Dispatcher, Mendocino National Forest
R. S. Bacon - Timber Management, " " "
J. M. Ewing - Forest Engineer, " " "
C. C. Lafferty - Fire Control Assistant, " " "
L. R. Thomas - Forest Supervisor, " " "
R. N. Werner - Proj. Sales Officer, " " "
R. A. Casaurang - Asst. State Ranger, California
A. B. Miller - Fire Prevention Aid, Mendocino National Forest
H. M. Rife - State Fire Foreman, California
Homer Hancock - Fire Suppression truck driver, Mendocino N.F.
Julio Silva - Suppression Foreman, Mendocino National Forest

b. Examination of Facts

After studying the fire area and completing the interviews in Willows, California, the facts collected were analyzed in San Francisco. Those previously engaged in the initial investigation

of the accident were interviewed when this proved essential to a clear understanding of what transpired on the fire area during the early and later history of the Rattlesnake Fire.

The Board examined each fact they believed might have a pertinent bearing on the accident. The job was one of sifting the evidence until only those fire operations related to the tragedy were exposed in sharp relief.

4. History of Rattlesnake Fire

a. Location - Mendocino National Forest, California

b. Description of Area

The final fire area is bounded on the north by the Grindstone drainage which runs continuously for about 30 miles in an easterly direction from its source. To the south is the Salt Creek - Rattlesnake drainage. To the east the area breaks out into the foothills of somewhat rolling but sharply defined topography. To the west the area is bounded by a high ridge running in/northwesterly direction from where it joins with the main east and west divide south of the Grindstone drainage.

General aspect in the area of origin is easterly. The area in which the accident occurred is cut by numerous minor but sharply defined drainages forming part of a rugged but small canyon draining in an easterly direction. (Figure 4).

The elevation at the upper end of the canyon near which the accident occurred is 2400 feet - that at the east end of the fire area about 1,000 feet or a drop of about 1400 feet in a little over a mile.

c. Origin

Place - Oleta Point - Alder Springs Road, Sec. 24, TWP. 21 N., R.7 W., M.D.M., (Figure 1.)

Time - Approximately 2:20 P.M. - July 9, 1953.

Cause - Incendiary.

d. Discovery and Initial Action

- (1) Discovery - Mr. A. B. Miller, Fire Prevention Aid, was enroute to Alder Springs from the Chrome Fire on state protected lands which had been placed under control a short time before his departure. While progressing along the Alder Springs road in a westerly direction he saw what he believed to be a fire in the vicinity of Powder House Creek. He stopped at the Gillaspay Ranch to report the fire to the lookout on Elk Creek Butte, but the ranch phone was out of order, and he could not verify that

He had made contact with his portable radio. Mrs. A. B. Miller, Forest Service lookout on Elk Creek Butte did receive his radio report of the fire although unknown to Mr. Miller and from her accounts spotted the fire at this time. The first discovery on which action to control the fire was taken was the report received by the central forest dispatcher at Willows from Elk Creek Butte at 2:40 P.M. July 9.

- (2) Initial Action - Miller, after failing to receive a response from his radio report to Elk Creek Butte, proceeded from the Gillaspoy Ranch up the road past the fire at Oleta Point to a point near Powder House Turn (Figure 1), and again radioed Elk Creek Butte about the fire. Miller stated the fire was about 25' by 30' when he passed it, that he considered the brush too heavy for one man attack and since it was in an area blind to lookouts he wanted to make certain the central dispatcher at Willows knew about it. Learning the fire had been reported, Miller returned to Oleta Point and as he was removing his tools from his pick-up, Julio Silva, Suppression Crew Foreman with Pesonen, Powers, Werner and Simpson, arrived. Equipment consisted of a tank truck and hand tools.

First attack was made by Silva and his forces at 3:15 P.M. The head of the fire was out of reach of the hose, so anchoring their line to the Alder Springs Road, they began cutting a line up the south flank of the fire from near the point of origin. Shortly after this operation was underway, a state crew of eight men under Assistant State Ranger Casaurang arrived and helped them with the construction of line along the south flank. (This crew had a tanker with them). This flank soon became too hot to handle. About this time Lafferty arrived and instructed Silva and his forces to abandon their attempts to control the fire in this manner and to go with him to the head of the fire. The crew returned to the Alder Springs Road and went toward Powder House Turn. (Figure 1.) This was about 4:00 P.M. J. M. Ewing arrived about 4:00 P.M. and immediately made contact with Lafferty, Silva, Casaurang and the other men. There were about 15 men on the fire at this time.

g. Plan of Action for Control

When initial action failed shortly before 4:00 P.M. and following the arrival of Lafferty and Ewing, the latter being appointed Fire Boss by Supervisor Thomas, a rapid change of plans for control of the fire was made.

Ewing, while traveling toward the fire was in position to see that it was progressing westerly up and along both sides of Oleta Ridge and was approaching Rattlesnake Ridge about a mile from the point of origin. (Point 3, Figure 1.) The plan for control of the fire was made by Ewing in consultation with Lafferty. This plan and tactics to be employed called for:

- (1) Control of the head of the fire along Rattlesnake Ridge in the vicinity of Point 3, Figure 1 or if it had slopped over the ridge to pick it up by direct attack on the west slope of the ridge before it had "slipped" too far down the slope into the Rattlesnake drainage.
- (2) Control of the slicing head of the fire along Rattlesnake Ridge from near Point 3, Figure 1 to High Point. Tactics called for burning out this line fast enough to keep ahead of the slicing head of the fire as it approached this ridge from the east. (This operation was initiated after attack had failed at points 22 and 23, Figure 1.)
- (3) Control of the fire along the ridge from High Point northeasterly down this ridge to a point a short distance from Powder House Turn where plans called for dropping down the slope off this ridge to the Alder Springs Road (Point 4, Figure 1). Tactics called for burning out this ridge and dropping to the Alder Springs Road from Point 4, Figure 1, with timing of the burning out operation determined by the action of the fire in the head of Powder House Creek west of the Alder Springs Road.
- (4) Control of the north flank of the fire by burning out the Alder Springs Road from the point of origin (Oleta Point) up the road and joining up with the burning out operation along the ridge from High Point toward Powder House Turn.

Timing of this operation was to be regulated by the behavior of the northerly flank of the fire above the road and also the behavior of the fire in the head of Powder House Creek and the burning out operation along the ridge from High Point northeastward toward Powder House Turn.

- (5) Control of the south flank of the fire by the construction of a line, beginning at a point on Rattlesnake Ridge near the head of the fire along a ridge south of the south flank and thence in an easterly direction until this line was completed to the Alder Springs Road in the vicinity of the point of origin at Oleta Point. (Line connecting points 5, 6, 7 and 1 or line 5, 6, 8, 9, 7 and 1, Figure 1 - depending on movement of this flank by the time this operation could be undertaken.)

Tactics called for burning out this line starting from Rattlesnake Ridge and proceeding in an easterly direction. Timing of this operation depended on completion of the other operations - paragraphs (1), (2), (3) and (4) above described.

f. Execution of the Plan

The head of the fire (Point 3, Figure 1) was controlled after it had slipped a short distance over the Rattlesnake Ridge. This operation was completed about 5:30 P.M. July 9, 1953. The operation to control the fire along Rattlesnake Ridge from near the head of the fire to High Point (Figure 1) was also successful. The burning out operation up the road from Oleta Point to the old car, Point 11, Figure 1, was successful even though some spot fires, later controlled, resulted from this operation. The burning out operation from High Point along the ridge towards Powder House Turn was completed just prior to the blow-up.

The burning out operation from the vicinity of the old car, to Powder House Turn was not completed. As later explained subsequent developments made it necessary to abandon the burning out operations along the Alder Springs Road. The original plan to contain and hold the fire along the Ridge from High Point to some point in vicinity of Powder House Turn was successful, except it later became necessary to bring the line further down the Ridge from High Point than originally planned.

When the blow-up occurred, completion of the burning out operation along the Alder Springs Road from Oleta Point to Powder House Turn had to be abandoned, plans for the control of the south flanks had to be changed, and plans had to be made for control of the north flank from Powder House Turn eastward.

g. The Missionary Spot Fire

This spot fire started about 8:05 P.M. and was discovered about 8:15 P.M. by Supervisor Thomas. Location was about 300 feet south of Powder House Ridge and on the north side of Powder House Creek. (Figure 2 or Point 10, figure 1.) Specifically it was located on the southeast slope of a lateral ridge sloping into Powder House Creek.

h. The Tragedy

When the spots occurred below the Alder Springs Road, at stakes 22, 30, 24, 23, 26, 27 and 28, (Figure 3), at about 10:03 P.M. 24 men were working on the Missionary Spot Fire. This spot fire was under control at this time. Although the spot fire at stake 28 apparently started about the same time as those at stakes 22, 30, 24, etc., it did not show up until about 10:10 P.M.

A short while after the spot fires below the road developed the blow-up occurred (10:23 P.M. (A)) with the fire moving first northeast and then down the Powder House drainage at an exceedingly fast rate of spread.

Nine men made their escape up the slope to the tractor line (Point 12, Figure 1) which had been constructed out Powder House Ridge a short distance beyond the Missionary Spot Fire. The remaining 15 men tried to make their escape traveling in an easterly direction. They were overtaken by the flames from the advancing front of the fire at about 10:41 P.M. July 9. All 15 men were burned to death.

Figure 3 shows the estimated spread of the blow-up by brief time intervals and the escape routes selected by the survivors and those who perished.

i. Search and Recovery Operations

Following the blow-up and the envelopment of the men by the onrushing wall of flame repeated attempts were made to determine if some or all the men, other than the 9 survivors, had come out to safety at some other point along the edge of the fire or had gotten to a place of safety in some open parks along Powder House Creek inside the burned area. No other survivors were located.

The Powder House drainage remained too hot to send men into the burned over area to make a search even as late as 2:00 A.M. July 10. It was apparent by this time that a tragedy had occurred.

The Sheriff's Office, Coroner, and doctor at Willows, California were notified of the possible tragedy. They arrived at Powder House Turn shortly before daylight. By this time Forest Service directed search parties had been in this area for some time with flashlights looking for possible survivors or bodies. About this time the Regional Office was notified of the possible tragedy. This was 4:00 A.M., July 10, 1953. No survivors other than the original nine who had escaped earlier were found. The first body was discovered just before daylight. All bodies were located shortly thereafter. A road was constructed into the fire area (marked Recovery Road, Figure 3) and the bodies were transported to Willows, California.

All bodies were positively identified by 8:30 A.M. July 11.

Notification of most of the nearest of kin was accomplished by personal visits of Forest Officers. The New Tribes Mission at Chico sent telegrams to the next of kin and parents. Replies confirming receipt of notifications were received on July 11.

Arrangements were made with the next of kin for disposition of the bodies. These arrangements were carried out promptly.

j. Further Action on the Fire

Shortly after the blow-up occurred plans for the control of the fire were quickly changed to meet the radically changing conditions. The fire was controlled at 5:20 A.M. July 11; area 1,200 acres.

5. Analysis of Preparedness, Physical Conditions and Organization

a. Training and Experience of Personnel. (See Appendix for summary of qualifications and experience of key personnel).

There is evidence of good planning and systematic follow-up for on-the-job fire training on the Mendocino. The 1953 fire training camp was well planned and executed.

Higher level supervisory personnel were thoroughly experienced and trained; they were considerably above average. Crew Foreman and Straw Bosses were average or better.

The State men assigned to the fire were fully qualified and the loggers presumably were good woodsmen and had experience in fire fighting.

Laborers from the New Tribes Mission Camp were above average. Half of them had fire training or experience or both.

The Safety Code was included in all fire guard kits. Supervisor Thomas referred to it in his introductory message to the group attending the 1953 fire guard school. In the teaching of safety at the guard training school the personal experience of instructors and their knowledge of the safety principles were used rather than specific reference to the Safety Code.

b. Safety

Supervisor Thomas aggressively heads up the Forest Safety Program, assisted by Forest Engineer Ewing who is also Forest Safety Officer. In 1952 the Mendocino received awards from the Regional Forester and the National Safety Council for its outstanding performance. Nevertheless, this tragedy occurred.

Just before the tragedy occurred the Mission Crew was eating lunch in a draw out of sight from the main fire. Vote and Powers previously walked up on the spur ridge at the head of the Missionary Spot Fire to look over the general situation on the main fire. They returned to the lunch place and discussed possible alternatives but, so far as available evidence shows, did not post a lookout to keep them in touch continuously with what was going on elsewhere. Also, so far as available evidence shows, no route of escape was planned or prepared.

c. Topography and Fuels

The general fuel type westward from point of origin was nearly pure chamise, with small scattered openings containing annual grasses. East of the point of origin, in the canyons and on north slopes, the type was more mixed, containing chamise, oak

(both evergreen and deciduous), digger pine, buckeye, grass and other species. The southeast slopes in general are chamise covered, while the northeast slopes and canyon bottom are a heavier mixed brush. (Figure 4).

Map records dating back to 1911 indicate that none of the Powder House drainage had burned since that time. Hence the brush in the area of tragedy was over 40 years old.

Slopes in the area of the tragedy vary from a minimum of 30% to a maximum over 90% with an average of about 55%.

d. Weather and Fire Behavior

The behavior of the fire in the Powder House drainage was determined from eye witnesses accounts, a special study by fire research personnel and from observations at the site of the fire. The reasons for the fire behaving as it did are best explained by an examination of early and late evening wind conditions in the canyon area. These wind conditions were determined from a study of the site by a fire research team. Wind measurements made by this research team during the evening hours of July 10 and 11 are believed to provide a reliable basis for evaluating the situation at the site of the fire on July 9.

Prior to approximately 9:00 P.M. on July 9 the fire had progressed generally in an upslope direction from the point of origin. (Figure 1.) This occurred in part because daytime heating of the valley floor caused thermal winds to move up the slopes causing the fire to also travel mainly in this direction. At approximately 9:00 P.M. these upslope air currents subsided because the sun had dropped behind the ridges to the west and surface heating had thus stopped. At this time a definite lull was observed on the fire. During this period very light, intermittent winds blowing from all directions, undoubtedly occurred. This situation is the usual indicator of a change from an upslope to a downslope wind condition. It is a result of a give and take process between the last passage of upslope thermal currents and the first downward movement of heavier, cool, evening air. A crew conducting a burning out operation along the ridge fire line from High Point toward Powder House Turn had difficulty in making fires burn during this period.

Shortly before 10:00 P.M. downslope wind conditions became noticeable. At this time the fire started to burn briskly and soon thereafter was causing spot fires below the Alder Springs road in the vicinity of Powder House curve. See Figure 3 for estimated location of spot fires. This downslope movement of air is a normal evening occurrence caused by cooler, denser air seeking a lower elevation. As a result of this general change in wind direction and the increased wind velocities inherent in the initial stages of this situation the behavior of the entire fire was affected. A spot fire at Stake 28, Figure 3, began to burn violently

and then moved, first, to the northeast in a flanking motion across the slopes below the Alder Springs Road, and then as it reached the maximum zone of westerly winds in the Powder House saddle, swept rapidly downslope in an easterly direction. (See Map description of fire spread, Figure 3.)

The downslope movement of the fire was thus accentuated by a combination of factors:

- (1) Local movement of dense air to lower elevations.
- (2) General movement of air from the high mountains to the west down all east facing slopes.
- (3) Local topography which favored airflow to the east especially through the saddle between Grindstone Canyon and the Powder House drainage.
- (4) A combination of high temperature and low humidity.
- (5) Wind directions and velocities in the Powder House drainage between 9:30 P.M. and 11:00 P.M., are shown on Figure 1. These wind conditions were determined from the study made by the fire research team on July 10 and 11. They show:
 - (a) That spot fires below the road at Stakes 22, 30, 24, 23, 26, 27 and 28 could have been caused by the winds indicated at Station 13. (Figures 1 and 3).
 - (b) That spot fires at Stakes 26, 27 and 28 (Figure 3) would travel to the northeast as indicated by the winds observed on July 10 and 11 at Stations 14, 15 and 16, Figure 1.
 - (c) That the intense fire resulting from the above action would move downslope when it reached the Powder House saddle as indicated by the winds observed at Stations 17, 18 and 19, Figure 1.
 - (d) That the fire would travel directly down the canyon and along the south slope, rather than immediately engulfing the north slope as indicated by the winds observed at Stations 20 and 21, Figure 1.

e. Organization

Description of the organization developed for the control of the Rattlesnake Fire will cover two time intervals, namely 3:02 P.M. - 4:00 P.M.; and 9:30-10:15 P.M., July 9, 1953.

(1) First or Initial Attack Phase

During the early stages of the fire the organization was very fluid due to the rapidly changing pattern of the fire.

Silva, Suppression Foreman at Alder Springs, arrived on the fire at Oleta Point at 3:15 P.M., thirty-five minutes following report by Elk Creek Butte Lookout. On arrival he assumed charge and served in the capacity of Fire Boss. Casaurang, Asst. State Ranger, and his crew, arrived about $\frac{1}{2}$ hour later. Hence the organization on the fire as of 3:45 P.M. was one Fire Boss, two Crew Bosses, plus 11 men.

Silva had decided that first attack had failed and was about ready to pull back to the Alder Springs Road when Lafferty arrived. Lafferty gave instructions for the men to follow him up the Alder Springs Road toward the head of the fire.

Hence, Lafferty, because of his greater experience temporarily assumed the duties of Fire Boss for a short period prior to 4:00 P.M., July 9. Lafferty met Ewing near or at Powder House Turn about 4:00 P.M. He had previously learned over the radio that Ewing had been assigned as Fire Boss by Supervisor Thomas. Hence, by 4:00 P.M. the organization began to assume a structure which was followed substantially throughout the history of the fire up to the time of the accident - about 10:41 P.M.

(2) Subsequent Phase

The organization pattern as of 9:30 - 10:15 P.M., July 9, was about as follows:

Ewing - Fire Boss.

Lafferty - Line Boss - In charge of all line operations.

Schimmel - Crew Boss - A 5 man crew plus a pumper unit and 2 men and Purdy, Crew Boss with jeep radio unit holding slop-over, Point 3, Figure 1, and the line along Rattlesnake Ridge northwest to High Point and for a short distance along ridge toward Powder House Turn.

Cushman - Tractor Specialist, Brown - Crew Boss, tractor operator and 3 man crew constructing line from Point 5 towards Point 8, Figure 1.

Werner - Crew Boss, and Butler - Crew Boss plus 10 men on ridge from High Point toward Powder House Turn.

Harper - Crew Boss and Hancock Crew Boss and 3 men with pumper unit holding fire above Alder Springs Road from Oleta Point to old car, Point 11, Figure 1.

Powers - Crew Boss, Vote, Crew Boss, and 22 men including Straw Bosses on Missionary Spot Fire.

Casaurang - State Ranger in charge of state forces, Bass Crew Boss, Randrup - Logging Boss, State Crew and Pumper, Silva, and pumper plus 2 man crew, 3,000 gallon mother tanker, Stonyford pumper and crew at or in close proximity to spot fires below the Alder Springs Road vicinity of the Log Chute, Figure 3.

6. Analysis of Action Related to the Tragedy.

a. Burning out operation along the Alder Springs Road.

During the initial sustained run the fire moved in a westerly direction blanketing both sides of Oleta Ridge and slopping over Rattlesnake Ridge in the vicinity of Point 3, Figure 1. This slop-over was controlled early the evening of July 9. During this "run" which was completed by about 4:30 P.M., the northerly flank (Figure 1) became established along the steep slope above and south of the Alder Springs Road from Oleta Point westerly about a mile. This flank of the fire had not moved down the slope toward the road appreciably from the time the westerly run had been completed until later (approximately 6:40 P.M. - and then quite slowly) when decision was made by Fire Boss Ewing to burn out the narrow stringer of brush between the Alder Springs Road and the northerly flank of the fire. This decision called for burning out the road from the point of origin (Oleta Point) up the road to a point in close proximity to Powder House Turn where plans called for it meeting up with the burning out operation that was planned from High Point northeasterly along the ridge to a point on the Alder Springs Road in the vicinity of Powder House Turn (Point 4, Figure 1).

Casaurang and his crew supported by tanker equipment was placed in charge. Burning out operations were initiated at approximately 7:20 P.M. in the vicinity of Oleta Point. The operation proceeded in accordance with the plan until about 7:50 P.M. when a brief wind shift developed; also, some whirl-winds occurred. About 8:00 P.M. (✓ 15 minutes) several (7 or 8) spot fires occurred below the Alder Springs Road in the vicinity of the old car. (Point 11, Figure 1).

When the spot fires below the old car developed, burning out operations were stopped (approximately 8:15 P.M.) with action taken to control the spot fires with tanker equipment. A Forest Service tanker was sent by Lafferty to help the state crew control the spot fires. Operations to control them were successful; however this involved considerable time. The control of these spot fires and other activity that later developed in the vicinity of Powder House Turn prevented the completion of the burning out operations up the Alder Springs Road as originally planned.

There is considerable evidence that the Missionary Spot Fire started simultaneously with the occurrence of the other spot fires in the vicinity of the old car. A local wind of considerable turbulence developed for a brief period just prior to 8:00 P.M. This resulted in the burning out fire, in the vicinity of the old car, burning rapidly upslope and the main fire above burning rapidly downslope at this point. Casaurang states the main fire approached the Alder Springs Road with such rapidity in the vicinity of the old car at this time that he had to speed up the burning out operation to keep ahead of the main fire slicing down the slope. The spots below the road in the vicinity of Point 11, Figure 1 occurred at this time. Although this fact is not definitely substantiated the Missionary Spot Fire must have resulted from this same turbulent air condition. This would place the time of origin of the Missionary Spot Fire at about 8:05 P.M.

b. Burning out operations on the Ridge from High Point toward Powder House Turn

Twice during the evening of July 9 attempts were made to construct a line from the head of the fire on Rattlesnake Ridge down to the Alder Springs Road. Both attempts failed. (Points 22 and 23, Figure 1).

It was after these operations had failed that the decision was made by Fire Boss Ewing to burn out the brush between the Alder Springs Road and the north flank of the fire. At the same time he decided to use the old fire break along Rattlesnake Ridge from the controlled head of the fire to High Point; thence down the ridge towards Powder House Turn dropping off this ridge in an easterly direction (Point 4, Figure 1) shortly before reaching the Turn and in time to meet the burning out operation planned to proceed up the Alder Springs Road from Ole ta Point.

When the men were driven from the line (Point 22, Figure 1) firing out the old fire break toward High Point was undertaken to prevent the main fire from overrunning Rattlesnake

Ridge. The burning out operation northwesterly along Rattlesnake Ridge was completed to High Point prior to the initiation of the burning out operation along the ridge from High Point towards Powder House Turn.

that

The crew had been run out of the lost line in the vicinity of Point 22, Figure 1, went to Powder House Turn and undertook the construction of a hand line from Powder House Turn along the ridge toward High Point. About this time a group of Taylor and Randrup loggers started cutting a line down this ridge from High Point.

The line up and the line down this ridge was joined about 6:40 P.M. Two dozers arrived, probably an hour later, and widened not only the line from the High Point to Powder House Turn, but also widened the line along Rattlesnake Ridge in a southeasterly direction.

Prior to the arrival of the tractors, burning out operations were started from High Point along the ridge toward Powder House Turn.

The same crew that handled the burning out operation along Rattlesnake Ridge brought the burning out fire down the ridge from High Point to a point about half-way between High Point and Powder House Turn. Difficulty was experienced in getting the brush to burn. The burning out operation after being suspended for a brief period was again started under the direction of Werner at the request of Fire Boss Ewing.

The main fire at this time was close to the head of the Powder House drainage in the vicinity of High Point. Echelon burning had to be used to burn the brush away from the fire-line along the ridge. Wind movement at the time the burning out operation was started was from the east - southeast, or upslope, which apparently accounted in part for the poor burning conditions experienced by Werner. About 9:45 P.M., the flow of air began to shift somewhat and then became quite calm. The main fire also remained calm during this period. Shortly after 9:45 P.M., when the burning out operation had proceeded further down the ridge from High Point the wind changed, coming from the west.

The westerly or down canyon flow of air was underway. This flow of air coming over the ridge somewhat in the nature of a flow of water downhill placed pressure on Werner's burning out fire, also the main fire in the head and south of Powder House Creek. The burning out fire began building and spreading to the main fire across the draw. Werner stopped firing for a few minutes and then continued to a position about 100 yards from Powder House Turn where he stopped his burning out

operations. Casaurang came up the ridge to tell Werner to stop burning. This must have been about 10:08 P.M. since Werner states he had stopped burning about 10:00 P.M.

At this time several spot fires showed up below the road. (Figure 3, Stakes 22, 30, 24, 23, 26, 27). (Spot fire at Stake 28 had not been discovered at this time.)

Following the appearance of the spot fires below the Alder Springs Road a hose line was laid to place water on Werner's burning out fire to prevent its further spread toward the road.

It is not definitely known whether the burning out fire along the ridge, the main fire above the road, or the joining of the main fire and the burning out fire in the upper reaches of the Powder House drainage above the road fathered the spot fires below the road. (Figure 3).

c. Manning the Missionary Spot Fire

The Missionary Spot Fire was first discovered by Forest Supervisor Thomas from the road at Powder House Turn at about 8:15 P.M.

Accompanied by Gleeson and Randrup, Thomas made reconnaissance of the spot fire. It was not spreading rapidly, but was on a south slope in fairly dense, high chamise. He decided it would probably run about 300 feet upslope to Powder House Ridge.

Sending a bulldozer, which was nearby, into the spot fire was considered but the owner (Randrup) decided the terrain was too difficult for operation of the tractor which had one track slipping. Therefore, the dozer was assigned to cut a line out Powder House Ridge to a point beyond where the Missionary Spot Fire might reach the ridge if it made the anticipated uphill run. (Point 12, Figure 1). This line was apparently constructed after the first crew was sent to the spot fire.

While Thomas was making reconnaissance of the spot fire, Casaurang with State Foreman Mason arrived at Powder House Turn (having seen the Missionary Spot from his position near the old car). His intention was to make initial attack on the spot fire. He had left Foreman Rife and the state crew to mop up the other spot fires near the old car. They were informed by Thomas of the decision to let the Missionary Spot Fire run to the top of the ridge before making attack. This was about 8:35 P.M.

Shortly thereafter, the wind subsided and it became apparent that the Missionary Spot Fire was not going to run up to the crest of Powder House Ridge.

Lafferty then (about 9:00 P.M.) assigned Missionary Straw Boss Dave Johnson and three Mission Crew Men who had arrived at Powder House Turn to make initial attack on the spot fire. Johnson, according to Lafferty, was instructed to be careful and not take chances and to start work at the head of the fire which was burning very slowly.

The crew proceeded through the brush directly from the road at Powder House Turn around the slope to the fire. (Line 1, Figure 2). They had put a line across the head of the fire, and down the sides a short distance (estimated 100 feet) when the second crew with Vote in charge arrived.

Vote, (Forest Service Foreman and Mission Member), fourteen men including one crew boss, (Whitehouse), and three straw bosses, (Griffis, Toews and Schlatter), were dispatched from Powder House Turn by Lafferty at approximately 9:15 P.M. after Vote had informed Lafferty that they were no longer needed to patrol the burned out Rattlesnake Fire line southeast of High Point.

Lafferty stated he instructed Vote to be careful, watch for any change in weather and plan an escape route. He states that he did not give Vote specific instructions to post a lookout or cut a trail into the fire because he believed Vote was sufficiently experienced and would use good judgment. Also because in his capacity of Line Boss he would be expected to delegate such details.

Vote took his crew part way up the cat trail on Powder House Ridge and then down to the spot fire (Line 2, Figure 2.)

This crew split at the head of the Missionary Spot, Whitehouse taking part of the men down the east side and Vote taking the remainder down the west side. A line was quickly constructed on the sides of the burned area and the men began to build a trench near the fire. No difficulty in line construction was experienced.

Shortly after Vote had left, lunches arrived at Powder House Turn. About this time three additional missionaries from Vote's crew and one (Short) from Hancock's crew arrived at the Turn. They had not been with Vote's crew because they had been left behind to mop up a spot fire on Rattlesnake Ridge.

Powers, Forestry Aid (Asst. Ranger), informed Lafferty that the men on the Missionary Spot had not eaten and volunteered to take them lunches. He and the four missionaries were dispatched to the Missionary Spot Fire by Lafferty with lunches for the men at about 9:45 P.M. They walked up the cat trail on Powder House Ridge to a point beyond the spot fire and then down a side ridge and back to the fire. (Line 3, Figure 2).

Upon arriving at the edge of the spot fire they deposited the lunches in a draw on the northeast corner and prepared to assist in line construction as they had been instructed. However, Vote appeared over the ridge from the west and told them the line was finished.

The men then gathered near the lunches and were counted to determine if there were enough lunches.

Meanwhile Vote and Powers were discussing the fact that the main fire above and near the road at the head of the Powder House drainage was flaring up. Before the group ate, Powers and Vote walked a short distance up the spur ridge, on which the Missionary Spot Fire lay, to observe the action of the main fire.

Upon returning to the crew in the draw, Powers and Vote discussed whether the Missionary Spot Fire would afford protection if it was needed. They finally decided (according to the statement of a survivor) to have supper on the spot fire.

The lunches were then divided among the men. Vote offered a short blessing and the group sat down to eat. They were in an informal group in and near the small draw along the northeast flank of the spot fire. They were out of sight of the road in the vicinity of Powder House Turn, their vision being blocked in that direction by the lateral ridge on which the Missionary Spot Fire was located.

The time consumed in the foregoing activities is not exactly apparent from statements of survivors. However, it appears that they sat down to eat a very few minutes before they received warning of danger.

d. Spot fire occurrence below the Alder Springs Road and control action.

As related previously, spot fires begin to appear below the road near Powder House Turn at approximately the time Werner ceased his burning out operations. As far as could be determined, spot fires developed at Stakes 22, 30, 24, 23, 26, 27 and 28, Figure 3, about 10:03 P.M.

Action to control the spot fires was undertaken immediately with tanker equipment. Adequate water supply was available near Powder House Turn in the form of a mother tanker, capacity 3,000 gallons. Evidence substantiates the conclusion that 1 or 2 of the spot fires were immediately controlled. No concern apparently was evidenced over the other known spot fires since they were spreading slowly up slope towards the road. While making plans for the control of these spot fires a glow was observed further down the slope near the bottom of a draw comprising one of the numerous small drainages of Powder House Creek. This point was later established as Stake 28.(Figure 3.)

The spot fire began spreading rapidly upslope toward the road and at the same time in a northeasterly direction toward a narrow opening in the brush which is called the "log chute". Plans for control of the other spot fires were dropped with all efforts directed toward the control of spot fire spreading from Stake 28. Time was not available to cut a line and burn it out around the head of this spot fire and down its hot east flank. A man was sent down the "log chute" setting fire as he went. A second man followed immediately behind with a hose line wetting down the outer edge of the fire being set, in an attempt to burn a line along the hot flank of the spot fire. This operation proceeded for about 50 feet down the "log chute", at which time the spot fire from Stake 28 was approaching with such rapidity and heat that the men had to be pulled out with the aid of the hose to get them out of danger.

e. Warning to Mission Crew

About the time the attempt was being made to cut off the spot fire along the "log chute" it became apparent that the fire might spread in a northeasterly direction and that the men on the Missionary Spot Fire may be in danger of being cut off from the ridge above them. Thomas, Ewing and Lafferty were concerned for their safety and conferred briefly. Seeing no evidence of the men coming out, Lafferty ran down to the saddle, up the bulldozer trail on Powder House Ridge and part way down a ridge northwest of the Missionary Spot Fire to where he could see the flashlights of the men. (Point 2, Figure 3). He started at about 10:15 P.M. The blow-up had not developed at the time of his departure.

During the short time it took Lafferty to run out to where he could warn the men (about two or three minutes) the fire spread up toward the saddle and started swinging northeast along the slope. It also began to burn with some intensity in a more easterly direction up the slope southwest of the Missionary Spot.

Lafferty yelled at the men to come out and to hurry. The blow-up was starting at this time. He continued to tell them to hurry. Then he noticed the men coming out were apparently in two groups, one higher than the other and, thinking the lower group had no chance to make it up the hill, yelled to them to go east and down, toward an opening down the canyon. He did not know if they heard him as the fire was roaring and rapidly approaching and he had to make his escape. He thought that he was in danger of being cut off by the fire so he had to leave. He also thought the group coming up might not get to the ridge before they were cut off.

Some survivors did not hear the admonition to go east and down; others remember this advice, and all agree they were instructed to hurry.

According to survivors the group started out at once but in no specific order. After proceeding a short distance it developed that some of the group were bearing east (line 4-16, figure 3) while others were heading straight up. (line 4-21, figure 3). One survivor remembers thinking that the group going east were just intending to go out the way they had come. One thought the split occurred after Lafferty yelled to go east. None were clear on the reasons for the split. Some went up instead of east because they thought they were going to another fire and thought that was the easiest way. All agreed that no specific instructions as to order of progress were received from crew leaders on the spot fire.

The survivors apparently did not realize that the fire was spreading rapidly until they had gotten about a third of the way up the slope, where they could see and hear the fire and realized their danger.

During the time they were in progress up to the ridge top the fire began to blow up, spreading rapidly toward the Missionary spot, down the canyon, and also northerly towards the saddle.

The survivors reached the ridge top at about 10:30 P.M. and at about the same time the fire spread eastward very rapidly, the east flank then becoming the head of the fire. The spread of the north side of the fire subsided in its northeast movement and did not reach the ridge top until about 11:00 P.M.

The survivors rested briefly upon reaching the bulldozer trail and Ewing ran out to urge them to come at once to Powder House Turn. Meanwhile the fire was spreading easterly very rapidly down the canyon.

Very shortly after the survivors reached Powder House Turn, Casaurang drove down the Alder Springs Road through the fire, passing the head of it about the time (10:40 - 10:45 P.M.) that evidence indicates Powers, Vote, and the thirteen missionaries died.

At about the time or just after Lafferty yelled to go east and down, Powers, Vote and 13 missionaries headed in a southeasterly direction into a steep draw about 100 feet east of the Missionary Spot. They climbed up out of this draw and proceeded on slightly south of east but still losing elevation. At the top of the next ridge (Point'll, Figure 3) some tools were dropped.

Swinging into the next draw they were traveling east and more nearly along the contour. A number of tools were discarded here. Climbing out of this draw the main group swung slightly north of east, angling upward around the ridge and getting slightly in excess of 1,000 feet from the Missionary Spot Fire

that by this time had been enveloped by the advancing wall of flame. Powers and eight men reached Point 19, (Figure 2), before being overcome by the flames. One man reached Point 20, (Figure 2), 1040 feet from the Missionary Spot Fire. Vote swung sharply north where the group came out of the draw continuing about 275 feet up the ridge and raising about 125 feet in elevation before the fire reached him. Point 18, (Figure 3). One crew member travelled 920 feet, Point 17, (Figure 3). One man who was apparently behind the others was found where Vote split off the main group, having traveled about 720 feet. Point 16, (Figure 3). Another, further behind, was found slightly downhill from the main route of travel. Point 15, (Figure 3). He had traveled 660 feet. Another (Hitchcock) split off at some unknown distance from the Missionary Spot Fire, and went to the bottom of the canyon, traveling about 1,540 feet from the starting point, Point 25, (Figure 3). Watches indicated the main group was caught at about 10:41 P.M. Times at which Vote and Hitchcock were overcome by the fire are unknown.

Evidence from observers along the Alder Springs Road below the old car indicates that after the men left the Missionary Spot the fire swept rapidly down the bottom of the canyon below them and rapidly, but more slowly, along the slopes north of Powder House Creek. By the time Casaurang got through the fire (10:40-10:45) it had reached a point along the road about six hundred feet below the old car.

f. Control Along the Old Powder House Road

After it was certain that all survivors were out of the area a plan was formulated to control the open north flank from Powder House Turn to the Gillaspay Ranch.

The old Powder House Road (Figure 1) from Powder House Turn to the Gillaspay Ranch was opened up. Burning out operations, starting at Powder House saddle, were undertaken along this old road.

This operation started at approximately midnight July 9, and was completed to the Gillaspay Ranch by 4:00 A.M., July 10.

CONCLUSIONS

1. The training and experience of personnel on the Rattlesnake Fire was generally above average according to recognized standards in the Forest Service. However, it is evident that here, as generally throughout the Service, there are technical aspects of fire behavior that are not fully understood.
2. The organization, although perhaps not entirely in strict accordance with conventional standards, was well adapted to the requirements of the fire and functioned effectively.
3. The general strategy, tactics, and generalship employed on the fire were in conformance with acceptable fire suppression principles.
4. The decision to burn out along the Alder Springs Road westward from the point of origin (Oleta Point) was a sound decision and one that an experienced fire control officer would be expected to make under the conditions prevailing at that time.
5. The decision to send men into the first spot fire to show up north of Powder House Creek, later designated as the Missionary spot, was in keeping with the general plan for control of the fire. This spot fire was outside the contemplated control lines and necessarily had to be immunized if that plan were to succeed. The fact that the general strategy later proved in part unsuccessful does not alter the Board's belief in the wisdom of manning the spot fire.

Neither does the Board seriously question, under the circumstances that existed, the timing and intensity of the action taken. The relative inactivity of the spot fire, plus the appraisal of its maximum possible threat to enlargement of the main fire's perimeter, satisfactorily explains the delay in action until men could be withdrawn safely from more critical duties. What might be regarded as overmanning in the later stages of control was the result of a meritorious effort to clean up this situation, even if not believed to be an immediate threat, as rapidly as feasible after manpower not needed elsewhere became available.

While it cannot be said with certainty, the Board believes that the degree of control of the Missionary Spot was such as to have prevented its spread even under the adverse conditions that developed later. In any event, the origin of the fire front that swept easterly down Powder House Creek, returning the Missionary

spot and later overtaking most of the crew that had worked on it, was from fire or fires located further up the creek. Thus the Missionary spot was not in itself instrumental in causing the blow up. Its significance to the tragedy was that its control placed men in the path of flames originating elsewhere.

The Board's belief in the wisdom of the manning of the Missionary spot presumes the feasibility of doing so with full guarantee of safety to the fire crews involved.

6. Burning out the ridge from High Point toward Powder House Turn was an essential fire control operation necessary to prevent the spread of the main fire into the Grindstone Drainage. If the area between the ridge and the road had been burned out before the wind changed, the fire would not have gained intensity by running down into uncontrolled fuels. Continuation of the burning-out operation after the wind changed meant that the fire front would move downward and therefore, as events finally developed, it might have been better to have discontinued burning out earlier. The decision to discontinue burning when the wind shifted was sound.
7. The action on the "running" fire above the Alder Springs Road and on the several spot fires below the road was prompt and aggressive. The desperate effort made to stop the fire from the spot at Stake 28, in the "log chute", was sound after its discovery and rapid spread. Considering the rapidly changing conditions and actions taking place within a few minutes in this small area, it is concluded the commendable effort made to control this portion of the hot burning fire was that which would be expected of competent and experienced overhead.
8. The Mission crews were assigned to the spot fire on the north side of the gulch by Lafferty. It is evident that he kept them in mind since he sent in reinforcements about 15 minutes after the first crew was assigned and since he sent lunches to both groups within 30 minutes after that. The action on the fire became very rapid shortly after the lunches were sent in; but Lafferty personally ran to call the men out as soon as it appeared that the spot fire near Stake 28 in the bottom of the gulch below the road would escape control.

Testimony is conflicting as to just what the survivors understood he said and as to the exact conditions in the extremely rapidly changing scene to which he may have been referring. There can be no question, however, that Lafferty recognized the threat of danger promptly after the spot fire began to spread rapidly up the hill and acted in accordance with the best judgment he could formulate in the brief moment available for decision.

9. The weather conditions prevailing before and during the Rattlesnake Fire, while more commonly encountered later in the season, are not unusual for this time of the year. The evening change from up-slope to down-slope wind is a normal event, but unfortunately when the wind change occurred on July 9 the fire was in a critical position in the head of Powder House Creek where the down-slope wind would produce an especially damaging effect.

Based on past experience and considering the time of year, cover type, fire-weather forecasts, time of day, and other conditions, the experienced fire overhead on the Rattlesnake Fire expected the fire to be quiet and cause no difficulties.

The action of the fire in changing its direction of travel and burning intensity was the major factor leading to the accident. Inability to fully appreciate well in advance the potentialities for the fire to behave in this manner is a basic reason for the loss of life.

10. The decision of Powers and Vote to eat on the Missionary Spot Fire can be interpreted in only one way - What they observed from their vantage point on the Missionary Spot Fire did not appear to present any undue danger to them or their men.

Thomas, Ewing, Lafferty and others with a great deal more experience in brush fire fighting than either Powers or Vote and who were in the immediate vicinity of the fire above the Alder Springs Road when Powers and Vote examined the behavior of the main fire from their vantage point similarly concluded from what they observed that the men on the Missionary Spot Fire were in no immediate danger.

The tragedy, which occurred, notwithstanding the precautionary measures taken by these experienced men, leads to the conclusion that there are other safety measures that must be studied out with regard to situations such as this and applied rigidly in the future.

11. Fire weather forecasts localized for a particular area where a fire is in progress are fundamental to the development of sound plans for control and institution of adequate safety measures to protect fire fighters.

RECOMMENDATIONS

1. Fire-Weather and Fire-Behavior

Safe and efficient fire control action must be based upon a good understanding of fire-weather and fire-behavior under various fuel and topographic conditions. The Board believes that these factors were especially important on the Rattlesnake Fire, but that advancement of knowledge and training in these subjects is a Service-wide problem calling for the following action:

- a. High priority should be given in the Forest Service research program to the development of additional knowledge of fire-weather and fire-behavior.
- b. Research results now available on fire-weather and fire-behavior should be disseminated in the form of well illustrated, readily understandable publications, training films, and other guides. We recommend that administration and research participate jointly in this program.
- c. Greater use should be made of portable weather instruments in determining local weather conditions as an aid to evaluating situations at the site of fires.
- d. Fire-weather and fire-behavior training should be stepped up to include advanced training of key overhead personnel and general training of all seasonal employees. We should attempt to develop more top level fire-behavior experts in the administrative organization who, in turn, can spearhead training in each region.

2. Safety

- a. Our Safety Code should be strengthened and applied more thoroughly.
- b. Killer items dealing with fire control should be abstracted from the Safety Code and incorporated in all fire control training programs.

3. Safety Training

Safety training in fire fighting specifically directed toward the prevention of major accidents should be materially strengthened and carried on as a continuing process for all yearlong and seasonal personnel who may be used on fires.

Particular attention should be given to the following:

- a. Such important safety precautions, as planning escape routes, posting crew lookouts, recognizing critical spots even during inactive periods, issuance of specific warning instructions and orders, and preparing routes of travel in dense cover types, and taking such other safety measures as necessary.

Interpretative correlation of fire-behavior, fire-weather forecasts, topography, fuel, and available fire fighting facilities with plans and actions.

4. The U. S. Weather Bureau should be apprised of the great value of localized fire weather forecasts and urged to intensify such services.

5. Use of Rattlesnake Fire as a Training Medium

Full advantage should be taken Service-wide of the intensive study made of the Rattlesnake Fire in giving training to fire control personnel on fire-behavior and safety.

Region 5, in view of the intensity of its study and the detailed material made available, should consider marking on the ground the various phases of the fire and using it as a training demonstration area.

6. Tenure of Employment

The Board believes that greater stability in tenure of employment of key fire control personnel would minimize possibilities of similar tragedies recurring. Therefore, it is recommended that continued efforts be made to obtain adequate financing in order that skilled, well trained fire control men can be retained in the organization.

7. Brushland Management

While the brushland management program being developed by the Region is perhaps outside the assigned field of this review, the Board recognizes its relationship to fire prevention and control. It is recommended that continued and effective attention be given to this program.

APPENDIX

Washington, D. C.
July 20, 1953

To: Board Member Edward P. Cliff
From: Richard E. McArdle, Chief
Subject: F, SUPERVISION, R-5, Mendocino Board of Review

You are one of those listed below who have been asked to participate, as indicated, in the Rattlesnake Fire Board of Review.

Edward P. Cliff - Chairman of the Board
Jay H. Price - Member
C. Otto Lindh - Member
Lawrence K. Mays - Member
H. Dean Cochran - Member
Carl A. Gustafson - Adviser (and Executive Assistant)
John Callaghan - Adviser
Jack S. Barrows - Adviser
Seth Jackson - Adviser

The review will be directed toward the disaster that cost the lives of 15 men working on the fire, rather than the entire history of the fire, except, of course, as it is related to the disaster. The scope of the investigation will cover the events and conditions having a bearing on the tragedy and will not become involved in the control operations otherwise. The results of your deliberation should be a report, as clear cut and brief as is consistent with the subject and your responsibility, but in any case complete and thorough.

First we want facts - what happened, how, and why. Second, we want these facts analyzed and evaluated in terms of sound conclusions and recommendations - how could the final outcome, or any of the occurrences or situations that led up to it, have been avoided? Third, and most important of all, how can we tighten up our safeguards against such a thing happening again? I feel strongly about this, and of course it will be uppermost in your minds. We can't restore these men to the 41 widows and orphans from whom they have been snatched away. But if ever an obligation was clear this one is - to see, to the extent that it is within our power to do so, that it never happens again. If it was caused by the negligence of any one in the Forest Service, or outside of it, we want to know it. If it was an act of God, and by any chance beyond our control, we want to know that.

2-Board Member, Mendocino Board of Review-July 20, 1953

We all realize that fighting a forest fire is dangerous. It can't be made a soft job. Despite that fact, or because of it, we must assure every precaution to guard the safety of those who take on this tough assignment. Human life must never knowingly or carelessly be subordinated to other values.

I expect the Board to develop its own plan of operation and carry it out without influence or interference from other sources. There is just one exception. Although the Board is being convened in San Francisco, I expect it to go also to Willows for at least a part of its deliberations. I want the Board to be familiar with the local scene there. I want it to see and meet the people of Willows and to be accessible to those who may want to appear before it. Above everything else, the Board must visit the scene of the disaster (on the ground) and have firsthand knowledge of details there. This provision should not be modified without my prior personal approval.

A full report by the investigating committee will be available to you before the Board convenes. The Committee started to work on July 10, the day after the tragedy. It was hoped their work could be completed by July 21. However, despite long, often strenuous, hours of work this was impossible. Hence the date was changed to July 27.

I think you know without my saying so that Regional Forester Hendee and his Staff stand ready to furnish you every assistance. Similarly, it is hardly necessary for me to say that you will of course want Mr. Hendee and members of his Staff to attend and participate fully in your meetings.

One final word, underlined, although I doubt if I even need to remind you of this: † it may be necessary for you to query some of the surviving members of the crew or some of the widows or relatives of the victims. Deal considerately with them and remember the depth of their sorrow. Imagine yourself, for this purpose, in their position. Nevertheless, within these limits, get the facts.

/s/ R. E. McArdle

EXPERIENCE AND QUALIFICATION

OF

KEY PERSONNEL ON THE RATTLESNAKE FIRE

1. J. M. Ewing

April 1932 - Asst. Forest Ranger - Road work - Angeles
1933-34 - Senior Forest Ranger - Angeles
1935-40 - St. Admin. Asst. CAF-9 - Fire Control R.O.
1941 - " " " " Cleveland
1941-42 - Asst. Supt. C&M, CAF-8, Cleveland
1943-45 - Assoc. Civil Eng. & Forester, P-3, Cleveland
1946-53 - Assoc. " " " P-3 & GS-9, Mendocino

Ewing has had over 25 years of broad and varied experience on National Forests in both Northern and Southern California as well as in the Regional Office, San Francisco.

He has had over fifteen years of Southern California fire experience, including experience as Fire Boss on some of the critical fires of Southern California history. He was in charge of fire control activities on the Cleveland National Forest for several years. For many years he has been considered by his associates and superior officers as one of the most experienced brush fire men in the California Region.

The qualification card prepared on March 31, 1953 by his Superior rated Ewing as Fire Boss throughout California.

2. Charles C. Lafferty

1933-36 - CCC Foreman - Mendocino
1937-42 - Fire Guard - "
1943-49 - Fire Control Assistant SP-6 and 7 - Mendocino
1950-53 - Fire Control Aid (General) GS-6 - "

Lafferty has had extensive experience throughout California in all key fire jobs on all sizes of fire.

During 1949 and 1952 - two sample years selected from his long period of work with the Forest Service - he worked in the capacity of Fire Boss, Sector Boss, Inspector, Safety Officer or Crew Boss on 7 Class E fires (over 300 acres), 2 class D fires (100-300 acres), 1 Class C fire (10-100 acres) and 13 fires less than 10 acres in size.

His qualification card prepared on March 31, 1953 by his Superior rated him as Line Boss in Northern California and Sector Boss, Line Inspector or Safety Officer throughout California.

3. Leon R. Thomas

October 1936 appointed as Junior Forester
1937-38 - Mostly Eldorado - Timber Management
1939-41 - Asst. Ranger - Trinity
1942-46 - Armed Forces
1946-47 - District Ranger - Stanislaus
1948-1950 - Fire Staff Officer - Sequoia
1951 - to date - Forest Supervisor - Mendocino

During the periods 1937-41 and 1946-1953, Mr. Thomas has worked on the following fires:

Class A	13
" B	17
" C	9
" D	6
" E	18

He served as Fire Boss on 10 Class E fires, as Division Fire Boss on 6 Class E fires, and in various capacities such as Plans Chief, Coordinator, Sector Boss, Scout, etc., on the other fires.

4. Julio Silva - Suppression Foreman - 10 years experience
5. Robert N. Werner - Foreman - Technically trained forester - 2½ yrs.
6. Robert F. Powers - Asst. Ranger - Has had fire experience as follows:
1950 - 4 Class E fires
1951 - 20 Class A and B fires, 4 Class E fires on Plumas,
2 Class E fires on Los Padres, 1 Class E fire on
Klamath and 1 on Shasta
1952 - 7 Class A and B fires
1953 - 1 Class B fire

Rated as Crew Boss.
7. Archie B. Miller - Little fire experience.
8. Richard A. Casaurang - Asst. State Ranger - 10 or 11 years experience
in fire control work.
9. Horace M. Rife - State fire foreman - experienced.
10. Clarence W. Mason, Jr. - State fire foreman - 3 fire seasons.

11. Phil B. Schizuel - Tanker foreman - five fire seasons.
12. Gaither P. Harper - Six or seven seasons' experience in fire suppression involving also, experience on other forests than the Mendocino.
13. C. W. Randrup - Experienced Woodsman, Logger.
14. Straw Bosses Johnson, Toews and Griffis had training and experience in fire control. Schlatter had previous experience in fire control but had not received formal training.
15. Crew Bosses Vote and Whitehouse had previous training and experience in fire control work. (Vote had received special crew training and had attended 2 Forest Service Fire Control Training Schools in California. Also had 2 full seasons of experience in fire fighting prior to 1953).
16. Crew members Dinnel, Smith, Colles and Thompson had previous training and experience in fire control. Crew member Short had received training in fire control but had no experience in fire fighting. Crew members Mieden, Gifford and Mattison had some experience in fire control but had not attended fire training schools.
17. Crew members Stous, Rowe, Boddy, Sherman, Baker, Jackson, Hitchcock, Etherton and Noah had no previous experience or training in fire control work.

The men whose training and experience is described in item 14 through 17 above were those who took action to control the Missionary Spot Fire.

WEATHER, FUEL MOISTURE, WINDS

Fire Danger Rating for July 9:

Area 1.

Forecast 36 (bottom of high)

Actual 37 (bottom of high)

Actual ratings for that general period were:

July 7	36
July 8	35
July 9	37
July 10	29
July 11	44 (wind factor)
July 12	42 (wind factor)
July 13	41 (wind factor)
July 14	29

Weather: The Weather Bureau forecasts from Mt. Shasta were:

3:30 P.M. - 7/8/53 (for July 9): All forests: clear except scattered cumulus Plumas and Lassen. Temperature little change. Humidity little change. South to west winds 5-10. Eagle Peak 852142.*

8:30 A.M. - 7/9/53: Forecast unchanged.

3:30 P.M. - 7/9/53 (for July 10): All forests: scattered high cloudiness Friday. Heavy cumulus, Plumas and Lassen. Temperature and humidity little change. Increasing southerly winds becoming mostly 10-15. Eagle Peak 832253. (For actual figures see Exhibits B & C).

The wind was from the southeast all the afternoon of July 9 in the fire area.

A special evening forecast requested by the Fire Boss - for the fire area - was:

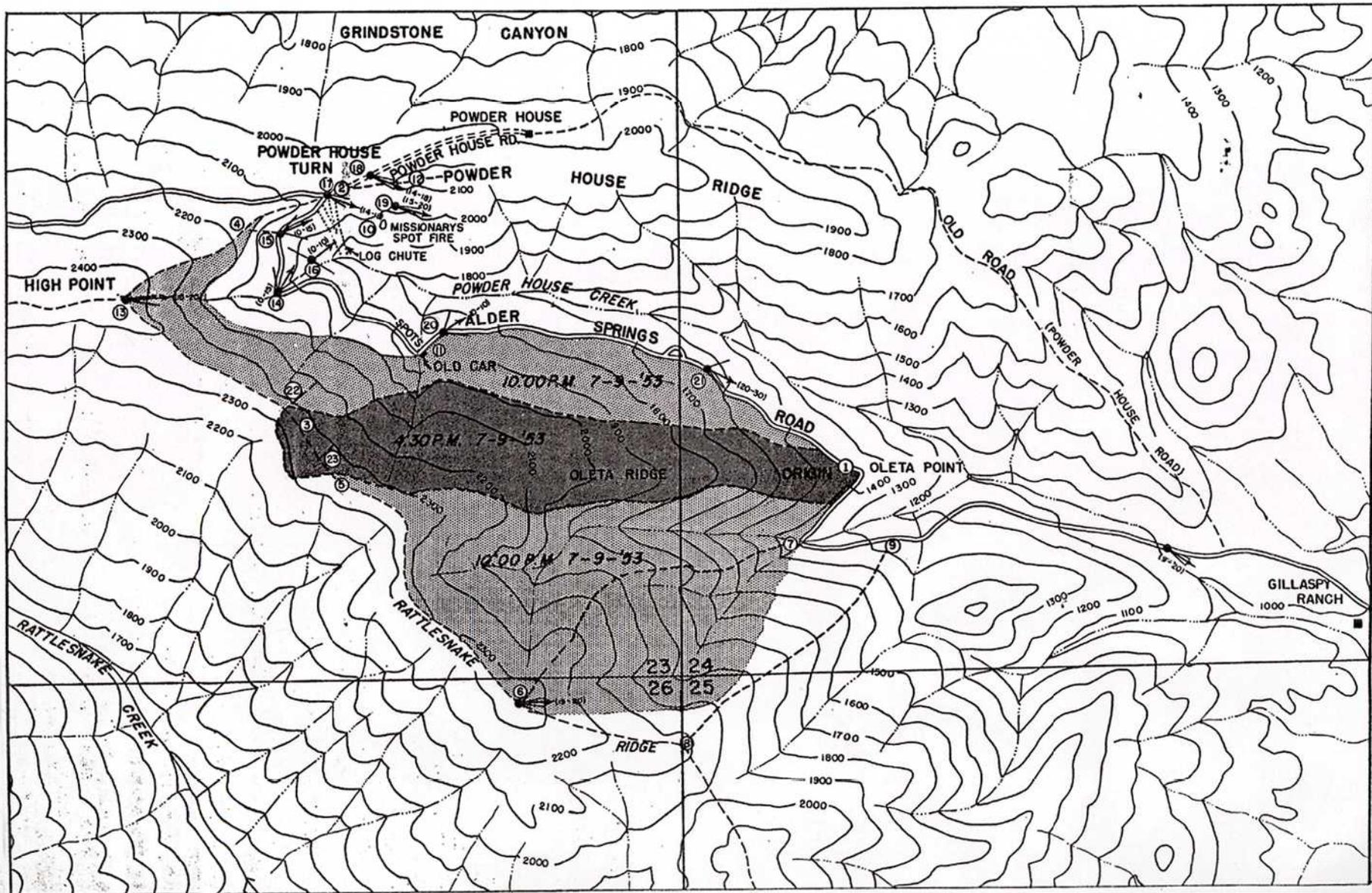
12:36 A.M. - 7/10/53 - Special for Rattlesnake: clear tonight with scattered cumulus and intermediate clouds Friday; wind light variable, but coming up canyon and up slope, southeasterly 5-12 MPH. Humidity high tonight 55%. Low Friday P.M. 20%. Minimum temp. tonight 58 degrees, high Friday 91 degrees.

At 2150 (9:50 P.M.) 7/9/53 mobile weather forecasting unit was requested from Mt. Shasta.

*85 - max. temp.; 21 - min. humidity; 4 - wind direction north; 2 - wind velocity 6 - 12 MPH.

FIGURE 1
RATTLESNAKE FIRE - MENDOCINO NATIONAL FOREST, CALIFORNIA - JULY 9, 1953
 SECTIONS 23, 24 AND PORTIONS OF SECTIONS 25, 26 OF R.7W, T.21N

0 1/2 MILE ↖ (10-10 etc.) WIND VELOCITY, MILES PER HOUR



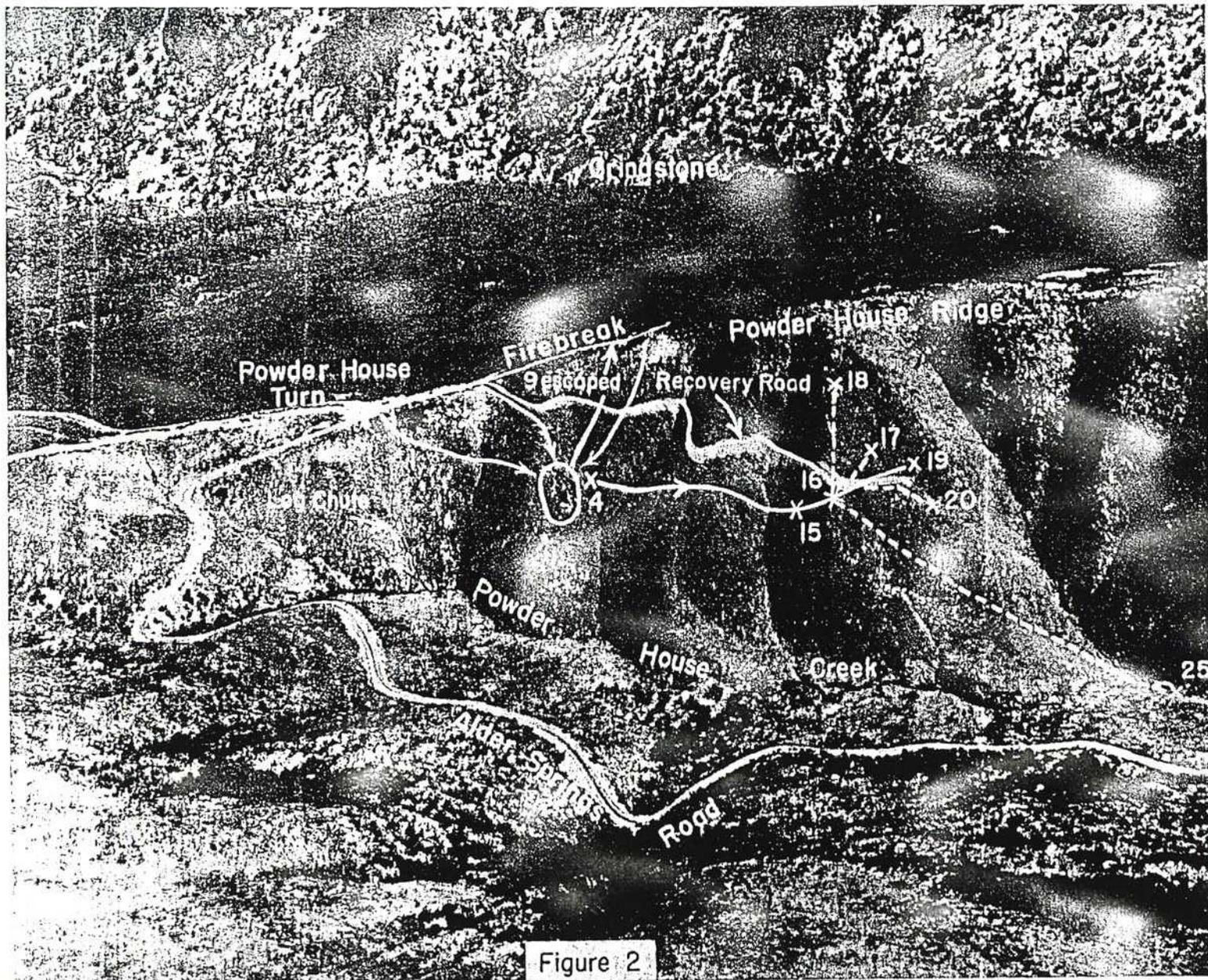


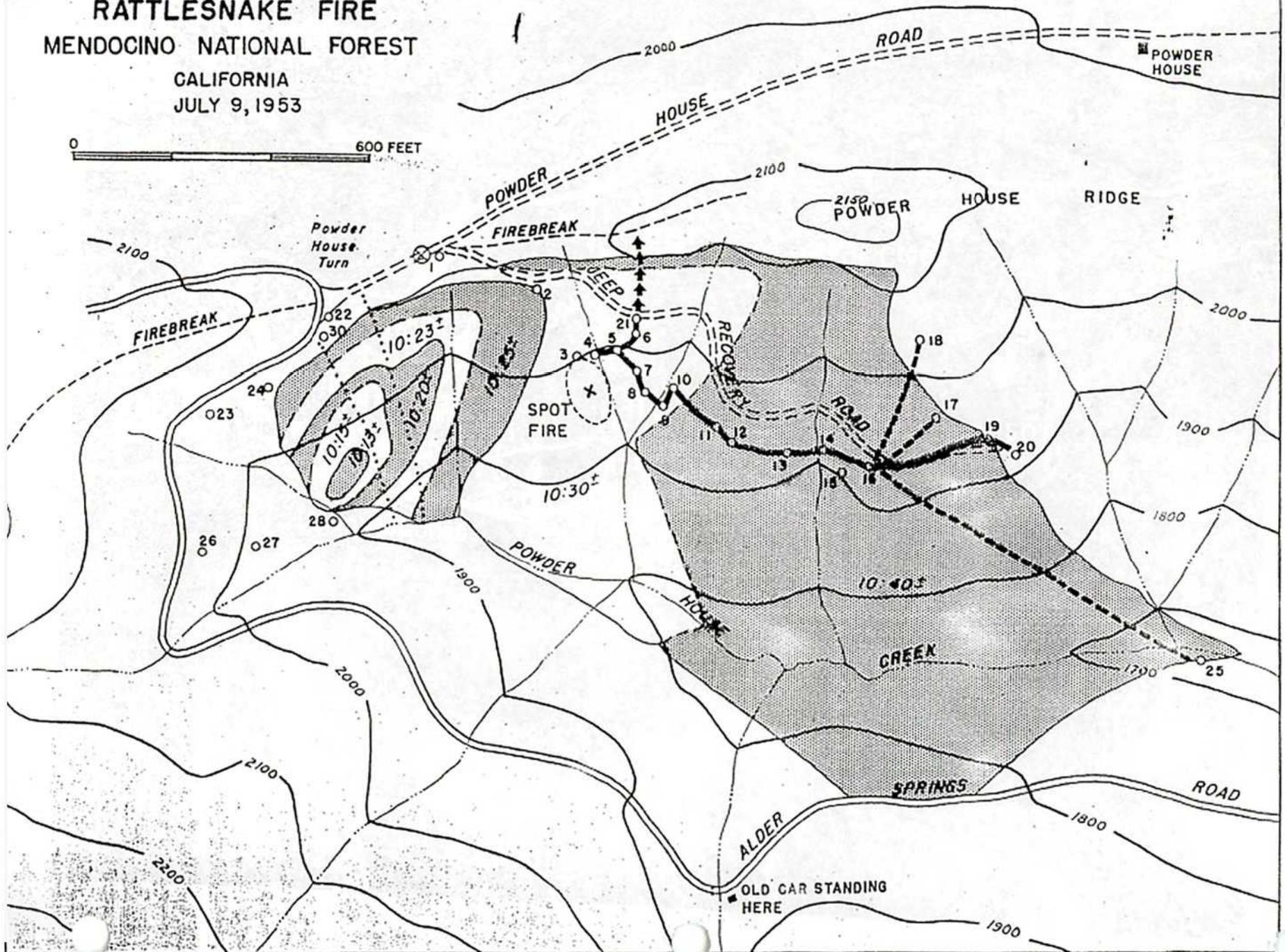
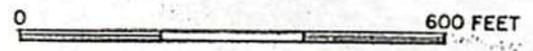
Figure 2

FIGURE 3

3, SPIKE 28

RATTLESNAKE FIRE MENDOCINO NATIONAL FOREST

CALIFORNIA
JULY 9, 1953



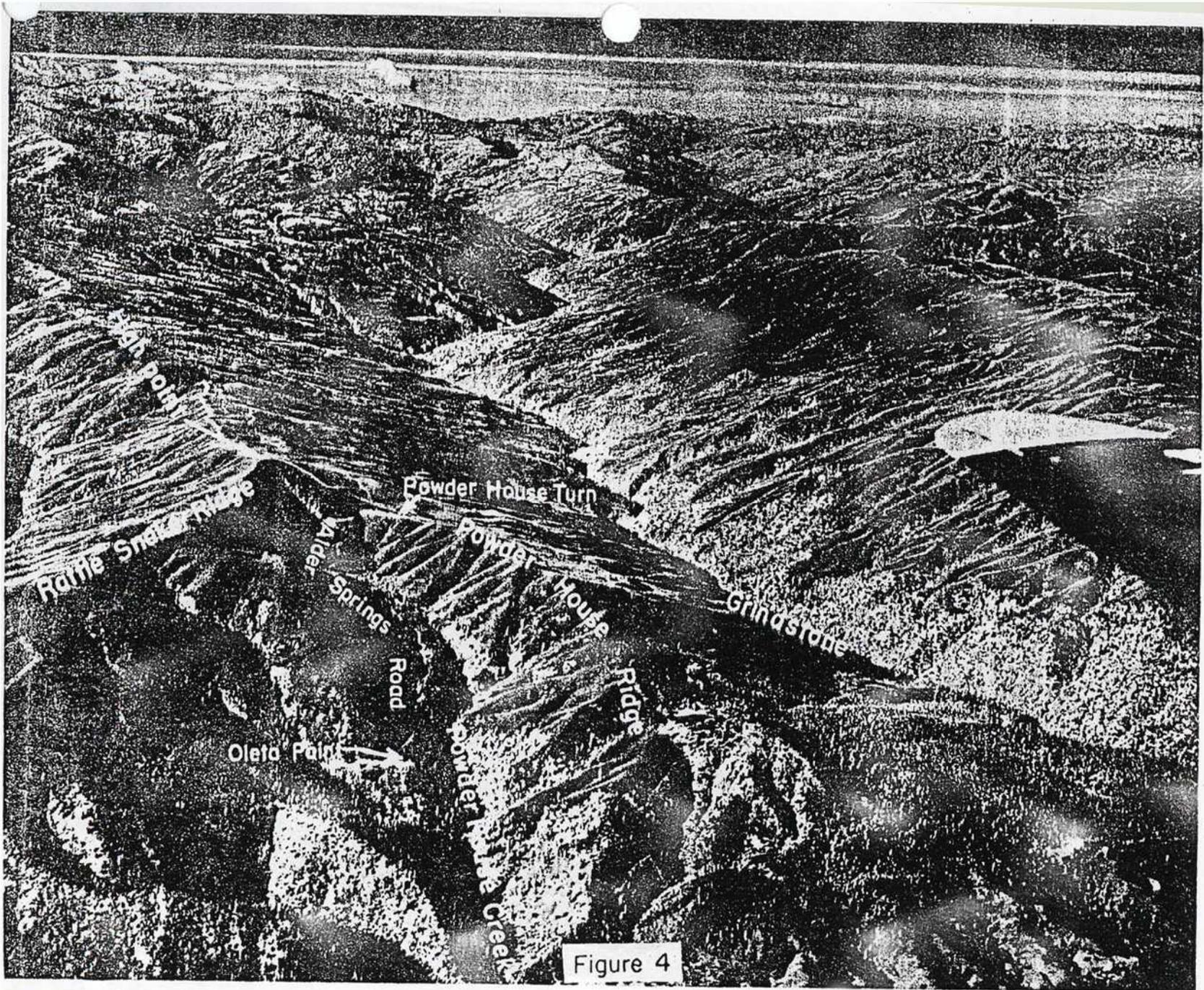


Figure 4

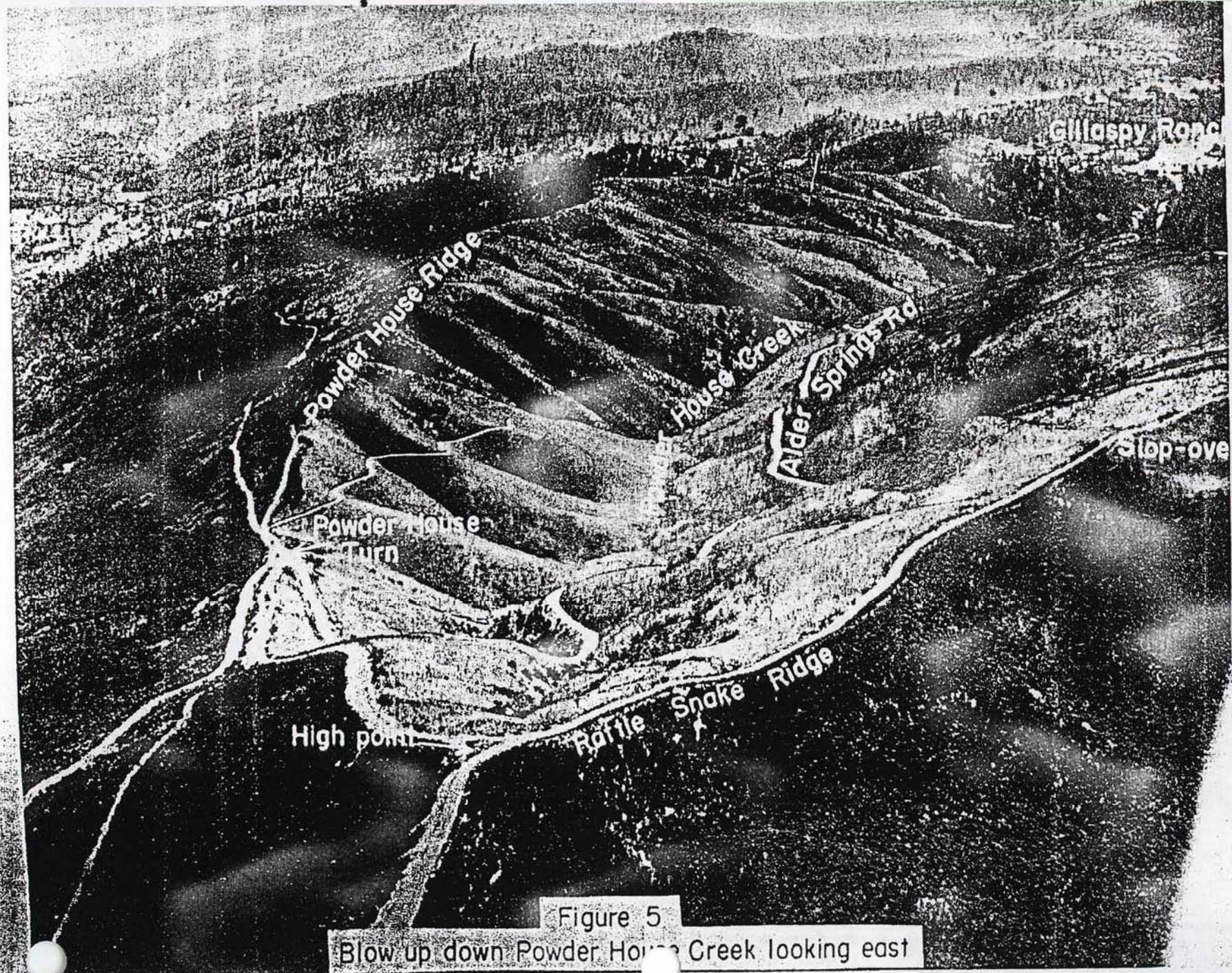


Figure 5
Blow up down Powder House Creek looking east