HULL MOUNTAIN FIRE FATALITY REPORT

A SUMMARY

The following points summarize the key actions, causes or elements that led to the fatal accident on August 25, 1994, during the Hull Mountain Fire. The fire started during the afternoon of August 23, and burned approximately 8,000 acres near the community of Sams Valley in southwestern Oregon.

These points have been drawn from interviews, data and other information documented in the *Hull Mountain Fire Fatality Report* and its appendices.

General Chain of Events

1. On August 23, 1994, Sydney B. Maplesden, Jr. was hired to serve as a swamper—a person who works on foot out in front of the dozer to point out hazards and direct a path—working with dozer operator Mike Davis to create access to roads and waterholes for the fire fighting operation. Maplesden and Davis worked together for the next two days.

2. On August 25, 1994, the potential existed for extreme fire behavior in the fuel complex at the accident site. Fuels were extremely dry contributing to rapid rates of spread and spotting. The oak leaf litter compounded the problem by adding additional fuel loading to the grass component of the fuel complex.

3. Weather was clear, causing temperatures to reach near 90 degrees with relative humidities of 22 to 24 percent, indicative of extreme fire conditions. Fire behavior influenced the immediate area causing local, erratic fire line winds.

4. In mid-afternoon of August 25th, Davis turned over the operation of his dozer to Maplesden to continue building access roads well away from the fire's main body. Davis got in his jeep and drove a short distance to the home of his neighbor Fred Gothard to check on the progress of the fire. During that time Davis and Gothard met with Division Supervisor Mike Robison who asked Davis to take his dozer to an area off Beagle Road to attack new spot fires. Maplesden was not present and did not receive any instructions from Robison.

5. After Robison left, Maplesden arrived on Davis's dozer. Davis decided to relieve Maplesden and follow Robison's instructions. During that conversation, Davis, Maplesden and Gothard discussed the possibility of Maplesden using Gothard's dozer.

6. Unknown to Robison or any other supervisory line personnel, Maplesden returned to the fire line within one-half mile of Meadows Road on the Gothard property. Because he had not been assigned to that area, no supervisory line personnel knew of Maplesden's location or subsequent actions. The proximity of friends and neighbors homes and property probably had some impact on Maplesden's actions of where he chose to operate the bulldozer.

7. When the fire reached the oak, madrone, and scattered ponderosa pine fuel type where Maplesden chose to operate the borrowed dozer, fire intensity quickly grew and became a large plume dominated event rather than a wind driven fire run. Spotting up to one-quarter mile occurred. These spots quickly grew and were drawn back into the main fire with rapid rates of spread. Also associated with this event were multiple fire whirls (vortices), area ignition (multiple effects on fire intensity by multiple spot fires in close proximity to main fire) and horizontal flame sheeting as the fire hit Meadows Road. The victim was faced with a major fire blow up which made escape extremely difficult if not impossible.

Other Important Factors

A. Critical fire behavior predictions were not available to the victim from an incident action plan. Neither Maplesden nor Davis received copies of the daily shift plan which emphasized this and other safety information.

B. The victim apparently was wearing the required personal protective equipment, as required by the Forest Activities Rules. Nomex fire clothing and fire shelter were not in use, nor were they required. Local district policy and department policy regarding the use of fire shelters were followed (Appendices M and N - Southwest Oregon District Safety; Use of Fire Shelters, Directive 1-2-1-001, 1987).

C. The topography consisted of gentle to moderate slopes ranging from 10 to 15 percent above the accident site with a small drainage to the North. The victim and dozer were found at the base of a long ridge running to the northwest. Fire intensity at the site of the accident was extreme as evidenced by the complete combustion of forest fuels. The topography at the accident site appears to have focused fire intensity at the victim's location.

D. Both dozer operators were working in areas that put them at risk of burnover because of their front line activities on the fire and the erratic fire behavior.

E. In the opinion of the investigation team, extreme fire behavior conditions during the blow up overtaxed the number of supervisory line personnel leaving the span of control too large, thus allowing individuals to be left working alone (no dozer boss and no lookout) with no communication.

F. In addition, there was no mechanism in place to prevent untrained individuals from getting a fire line assignment. The victim had no formalized wildland fire fighting training and was most likely not aware of the warning signs that should have prompted the need for immediate escape.

Incident Overview

The Hull Mountain Fire was reported on August 23, 1994, at 1418 hours (2:18 PM) by a U.S. Forest Service reconnaissance plane. Fire investigators believe the fire was intentionally set.

No moisture had been recorded at Medford, Oregon, during the month and the drought index was at extreme. High temperatures and low fuel moistures contributed to the wildfire which grew quickly in size, threatened area residents (250-300 homes evacuated) and destroyed structures (8 homes and 36 outbuildings burned).

The Oregon Department of Forestry Incident Management Team 3 was mobilized to fight the fire which burned on private land and land managed by the Bureau of Land Management (BLM). The Department of Forestry protects BLM forest land in western Oregon. More than 2,200 firefighters as well as retardant aircraft, helicopters, engines, dozers and other equipment were brought in to assist in containment of the fire.

Despite erratic and extreme fire behavior and the early loss of several homes, fire fighting efforts proceeded normally for the first several days. Progress was made each day, but the fire continued to grow, setting back the control effort.

Tragedy struck on the early evening of Thursday, August 25, 1994, in the southeastern portion of the fire on Division C. Early in the afternoon, as the morning smoke inversion lifted, the fire began to move into extremely dry vegetative fuels. The fire quickly spotted across control lines from the previous day and once in Division C grew to a plume-dominated fire event. As fire behavior escalated to firestorm proportions, the flames made a rapid run toward Meadows Road covering a quarter mile in an estimated two to five minutes.

A half mile west of Meadows Road, two dozers became trapped by the fire. One of the dozer operators, Mike Davis, was able to create a defensible zone where he survived the fire storm. The other dozer operator, Sydney B. Maplesden Jr., was not able to get out of the fire's path and was killed. He was found laying face down on the ground next to the dozer he had borrowed from a nearby landowner. The victim was removed from the fire scene later that evening.

An investigation of the accident began immediately with the formation of an accident investigation team representing the agencies involved in the Hull Mountain Fire.

The Hull Mountain Fire was controlled on Sept. 1, 1994. ■

Accident Investigation Team

Steven L. Elefant, Team Leader
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Philomath, Oregon

Kenneth C. Moore
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Bureau of Land Management
St. George, Utah

Len A. Malmquist
Fire Marshal
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Gresham, Oregon

James R. Simpson
Lieutenant
Department of State Police
Medford, Oregon

A full copy of the Hull Mountain Fire Fatality Report *is available from the Oregon Department of Forestry. The document is 415 pages in length. Those who request copies will be charged $12 to cover the costs of photocopying and mailing. To order a copy, call or write:*

Oregon Department of Forestry
Public Affairs Office
2600 State Street
Salem, OR 97310

Phone: 503-945-7422

HULL MOUNTAIN FIRE

FATALITY REPORT

OREGON DEPARTMENT OF FORESTRY

January 1995

"STEWARDSHIP IN FORESTRY"

Oregon

DEPARTMENT OF
FORESTRY

State Forester's Office

"STEWARDSHIP IN FORESTRY"

Dear Interested Reader:

There is no simple way to describe the moments that led up to the fatal accident last August at the Hull Mountain Fire in southern Oregon. As in most accidents, it is the cumulative effect of a series of events, conditions or actions that lead to tragedy. The death last August of firefighter Sydney Maplesden Jr. followed several days of erratic fire behavior in a mix of highly flammable forest fuels. Late on the afternoon of August 25th, 1994, Mr. Maplesden was trapped and burned over between a series of spot fires and the main body of the fire.

Hours after the fatal accident an interagency investigation team set into motion an in-depth probe of the accident itself, the conditions that led up to the accident, overall incident management actions and important safety procedures, rules and policies. This report is the product of their work.

After reviewing this report I have appointed a task force to recommend corrective actions in policy or procedures to prevent or reduce the chance of a future accident of this kind. I hope to implement these changes prior to the 1995 fire season. We must continue to aggressively fight fire, but we must do it safely.

I applaud the investigation team for their diligence, professionalism and candor. I assure them, the family and friends of Mr. Maplesden and all members of the wildland fire community that lessons learned from this tragedy will positively influence safe fire operations for years to come.

Sincerely,

James E. Brown
State Forester

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ACCIDENT INVESTIGATION TEAM

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PREFACE

Wildland firefighting is a complicated profession laced with risks, difficulties, and challenges. In recent years, wildfires have grown increasingly dangerous and complex. The involvement of homes in close proximity to wildland fire adds new dimensions to an already volatile natural fuel complex. Firefighters on the line are pressed to modify traditional wildland firefighting strategies and tactics when homes are threatened or being destroyed by fire. Workloads for incident command personnel increase with the involvement of multi-jurisdictional boundaries.

The Hull Mountain Fire, which burned 7,990 acres, was a complex wildland fire which exhibited the spectrum of dangerous and challenging characteristics.

We all leave home eager to face the challenge of suppressing a major wildland fire and I'm sure that most of us in the fire community assume that we will return home tired and satisfied in our efforts. When a firefighter dies helping friends, neighbors, and the firefighting organization, we are all deeply and personally affected. At such times we ask ourselves, "why did this event happen?" This investigation report is an attempt to answer this question in a fair and factual manner.

On behalf of the team, I would like to thank the individuals and organizations that supported our efforts.

Steven L. Elefant
Team Leader
Hull Mountain Fire
Accident Investigation Team
January 1995

SUMMARY of SIGNIFICANT EVENTS

The following points summarize the key actions, causes or elements that led to the fatal accident on August 25, 1994. These points have been drawn from interviews, data and other information documented in this report and its appendices.

General Chain of Events

1. On August 23, 1994, Sydney B. Maplesden, Jr. was hired to serve as a swamper--a person who works on foot out in front of the dozer to point out hazards and direct a path--working with dozer operator Mike Davis to create access to roads and waterholes for the firefighting operation. Maplesden and Davis worked together for the next two days.

2. On August 25, 1994, the potential existed for extreme fire behavior in the fuel complex at the accident site. Fuels were extremely dry contributing to rapid rates of spread and spotting. The oak leaf litter compounded the problem by adding additional fuel loading to the grass component of the fuel complex.

3. Weather was clear, causing temperatures to reach near 90 degrees with relative humidities of 22 to 24 percent, indicative of extreme fire conditions. Fire behavior influenced the immediate area causing local, erratic fireline winds.

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D. Both dozer operators were working in areas that put them at risk of burnover because of their front line activities on the fire and the erratic fire behavior.

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F. In addition, there was no mechanism in place to prevent untrained individuals from getting a fireline assignment. The victim had no formalized wildland firefighting training and was most likely not aware of the warning signs that should have prompted the need for immediate escape.

INCIDENT OVERVIEW

The Hull Mountain Fire was reported on August 23, 1994, at 1418 hours by a U.S. Forest Service reconnaissance plane. Fire investigators believe the fire was intentionally set.

No moisture had been recorded at Medford, Oregon, during the month and the drought index was at extreme. High temperatures and low fuel moistures contributed to the wildfire which grew quickly in size, threatened area residents (250-300 homes evacuated) and destroyed structures (8 homes and 36 outbuildings burned).

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Despite erratic and extreme fire behavior and the early loss of several homes, firefighting efforts proceeded normally for the first several days. Progress was made each day, but the fire continued to grow, setting back the control effort.

Tragedy struck on the early evening of Thursday, August 25, 1994, in the southeastern portion of the fire on Division C. Early in the afternoon, as the morning smoke inversion lifted, the fire began to move into extremely dry vegetative fuels. The fire quickly spotted across control lines from the previous day and once in Division C grew to a plume-dominated fire event. As fire behavior escalated to firestorm proportions, the flames made a rapid run toward Meadows Road covering a quarter mile in an estimated two to five minutes.

A half mile west of Meadows Road, two dozers became trapped by the fire. One of the dozer operators, Mike Davis, was able to create a defensible zone where he survived the fire storm. The other dozer operator, Sydney B. Maplesden Jr., was not able to get out of the fire's path and was killed. He was found laying face down on the ground next to the dozer he had borrowed from a nearby landowner. The victim was removed from the fire scene later that evening.

An investigation of the accident began immediately with the formation of an accident investigation team representing the agencies involved in the Hull Mountain Fire.

The Hull Mountain Fire was controlled on Sept. 1, 1994.

INVESTIGATION

An Interagency Accident Investigation Team, assembled by the Oregon Department of Forestry, made an intensive study and review of the circumstances leading up to the Hull Mountain Fire fatality. They conducted numerous interviews, collected photographic evidence, reviewed news service video tape, and examined the accident scene. Most of this information is included in the investigation report.

The team first met on the evening of Friday, August 26, 1994 and developed the following objectives:

1. Identify factual data associated with the circumstances relating to the accident.

2. Accurately and objectively record the findings.

3. Analyze the findings to identify the significant factors involved in the accident and their relationships.

This investigation report is organized into four main sections. The **Findings** section describes information gathered by the investigation team relative to the accident. **Causal Factors** emphasizes those areas that had an immediate impact on the accident. **Contributory Causes** provides information that influenced the outcome of the accident. Lastly, the **Appendices** provide all the documentary evidence that supports the previous sections.

SECTION 1: FINDINGS

This section presents the Hull Mountain Fire Accident Investigation Team's findings. The team examined the accident scene from the ground, from an aerial perspective by helicopter, and through the use of photos and video footage.

The findings section is broken down into the following units: fire behavior, environmental factors, fire chronology, incident management, and control mechanisms. The results are supported by an extensive appendix of documents related to the accident.

FINDINGS...

Fire Behavior

The following analysis is a summary of a more detailed examination of fire behavior and fire weather conducted by D. Perilli and T. Murphy, Fire Behavior Analysts (FBA) assigned to the Hull Mountain Fire. Their reports appear in Appendix I. Analysis examined fuels, weather, topography and predicted and observed fire behavior.

Fuels

The fuel complex in the accident area consisted of moderately dense stands of California Black Oak, Oregon White Oak, Madrone and scattered Ponderosa Pine. The oaks ranged in height from 20-40 feet. The understory fuels consisted of buck brush, shrubs and grass. Grass was continuous and fully cured. In addition, drought had induced leaf drop (mainly oak leaves) creating a continuous ground litter of cured hardwood leaves. Fuel moisture (dead) at the time of the fatality was calculated and is displayed in **Table 1.** Fuel moistures indicated the potential for aggressive, erratic, and extreme fire behavior. Though samples of live fuel moisture (LFM) were not taken at the accident site, visual clues indicated that living fuels were in transition or curing (30-100 percent LFM) or fully cured (less than 30 percent LFM). Low live fuel moisture compounded fire behavior conditions that were already extreme.

Table 1. Fuel Moisture

Fuel Moisture

Time Lag	Size Class (diameter)	Example	Percent Moisture
1 Hour	0-1/4 inch	Grass/Oak leaves	4%
10 Hour	1/4-1 inch	Brush	5%
100 Hour	1-3 inch	Woody Debris	6%
1000 Hour	3 inch plus	Woody Debris Fallen Timber	9%

Weather

During the morning of August 25, 1994, a temperature inversion persisted throughout the morning into early afternoon trapping smoke over the fire. Gradual lifting began at 0930 hours, with complete lifting occurring approximately 1330 hours. With the inversion gone, upslope and upcanyon winds began influencing fire behavior. Heating and burning levels increased. Prevailing winds combined with topographic winds to increase heat intensities. By 1500 hours, smoke column development was prevalent on all divisions of the fire.

General winds on the south end of the fire were from the southwest to west due to the influence of topography. The north end of the fire experienced northwest to north winds with occasional northeast flows. Heat from smoke columns created enough force to produce indrafts of wind which influenced wind flow up to one-half mile away from the fire. This created local erratic wind directions with midflame winds steady at 6-12 mph and gusts observed 12-15 mph and up to 25 mph in areas near columns (Appendix I, Weather and Fire Behavior Summary).

Relative humidities remained above 30 percent until the inversion lifted, then dropped into the mid to low 20's by mid-afternoon.

The forecasted Haines Index, which measures atmospheric conditions relating to extreme fire behavior, was high, indicating atmospheric conditions that could lead to extreme fire behavior.

Fireline weather observations are displayed in **Table 2.** Note that the relative humidity for Division C was below 25 percent. According to Fireline Handbook NWCG #3, Table #74, "The Fire Severity Related to Fuel Moisture Chart," p.B91, low relative humidity is indicative of quick ignition, rapid fire buildup, crowning, and spotting with the wind. In general, the burning conditions were extreme.

Table 2. Fireline Weather Observations

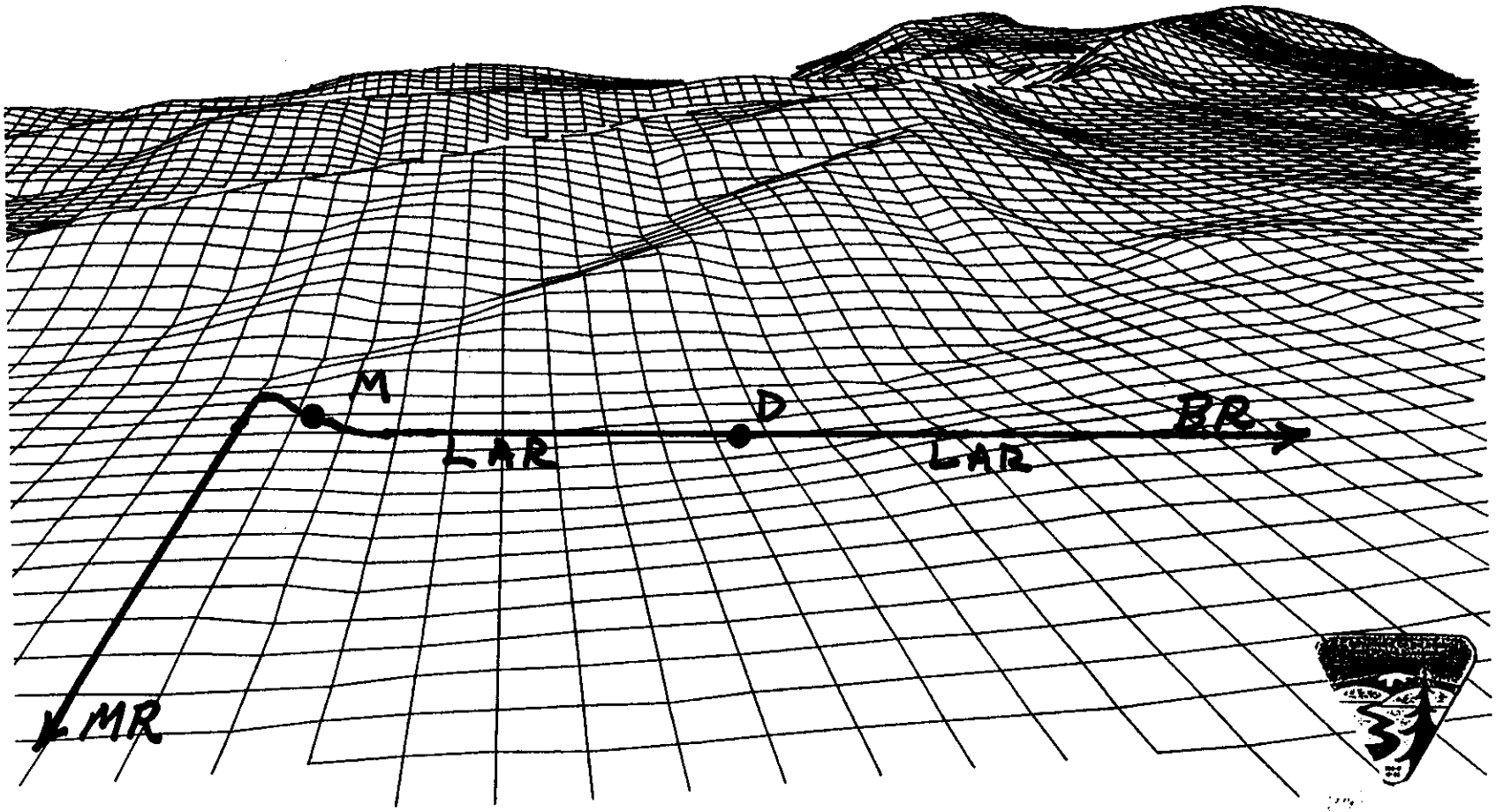
Division (DIV) and Drop Point (DP)	Time	Temperature (°F)	Relative Humidity	Windspeed Direction (mph)
DIV D-DP30	0800	60	68%	0
DIV D-DP35	0930	64	38%	0
DIV D-DP35	1009	69	38%	0
DIV C-DP20	1500	90	22%	0-5 NW
DIV A-DP40	1540	89	23%	1-10 N-NW
DIV E	1630	85	22%	5 S
DIV C-DP20	1630	87	24%	0-2 W-NW

Topography

The terrain to the west of the accident site consisted of gentle to moderate slopes ranging from 10 to 15 percent directly above the accident scene. Continuing to the east, slopes range from 5 to 10 percent with level conditions near Meadows Road. Elevation of the accident site was approximately 1,480 feet. The area is shown in **Figure 1.**

Figure 1. Computer generated oblique view of the accident site looking West from an elevation of 2,500 feet.

D Location of Davis dozer entrapment (burnover)
M Fatality Site
BR Beagle Road
MR Meadows Road
LAR Lower Access Road connecting to the North to Beagle Road and to the East Meadows Road.



Predicted and Observed Fire Behavior

Predicted fire behavior near the fire's south end called for upslope, west and southwest winds in the afternoon and resulting flare-ups and short range spotting in an easterly direction. Steep, rugged terrain and heavy fuels in that area would hinder control efforts. Spotting downslope would contribute to rapid fire runs uphill. Line personnel were warned to watch for spot fires and to post lookouts.

Observed fire behavior in the southeast corner of Division C noted development of a large plume by 1600 hours. By 1615, crowning was occurring as fire spread began to occur to the east with some south flanking spread.

For most of the day, the fire located in the southeast corner of Division C burned in fuels consisting of dense timber with full crowns and ladder fuels. Fire spread was relatively slow in these fuels but heat intensity was great. The fire advanced downslope through these fuels entering a different fuel type at approximately 1630 hours. The new fuel type consisted of a hardwood tree overstory and a understory of grass with some shrubs. Fresh cured leaf litter on the ground was continuous and the grass was fully cured.

Fire intensity was rapidly increasing at this point (1630 hours) and the fire began to reach the lower portions of the slope near the accident site. A significant smoke plume rapidly developed and the fire became a plume-dominated event driven by convection rather than local winds. Spotting was occurring up to one-quarter mile from the fire front. These spot fires quickly grew and were drawn back into the main fire with rapid rates of spread. By 1640 hours, the plume was drafting winds into itself. Midflame wind speeds one-quarter mile away were steady 6-8 mph, with gusts 10-15 to 25 mph on the flanks. The plume height quickly grew with stage two cumulus development occurring on top of the smoke plume. The Incident Meteorologist estimated plume height at 15,000 feet.

At 1645 hours, the fire made an extremely rapid run to the east. At one point a rate of spread was observed to be approximately one-quarter mile in 2 to 5 minutes. Flame lengths exceeded 11 feet. By 1715 hours, the fire reached Meadows Road and was spotting across the road. The fire was stopped at Meadows Road by aggressive ground and air attack.

FINDINGS...

Environmental Factors
Analysis examined wind, smoke, temperature, relative humidity, terrain and visibility.

Wind
By 1640 hours, the smoke plume was drafting winds into itself. Midflame wind speeds one-quarter mile away from the main fire were a steady 6-8 mph with gusts up to 25 mph on the flanks.

Smoke
Smoke was not a significant factor before the blowup. During the blowup heavy smoke reduced visibility and may have impeded escape.

Temperature
Temperature in the area ranged from 90 degrees (°F) at 1500 hours to 87 degrees at 1630 hours.

Relative Humidity
Relative humidity in the area ranged from 22 percent at 1500 hours to 24 percent at 1630 hours.

Terrain
The terrain consists of gentle to moderate slopes ranging from 10 to 15 percent (to the west of the accident site) and continues to the east with decreasing slope, becoming level in the valley. A small drainage north of the incident flows into the valley. The fatality occurred at the base of a long ridge running to the northwest. Forest cover varied from continuous (closed) to open.

Visibility
The mixed brush understory, oak and madrone trees reached a height of 20-40 feet in the area making visibility difficult from the fire line. The dozers operators probably could not see the entire extent of the development of the main fire above them on the ridge nor the entire extent of the spot fires below because of the forest vegetation and intense smoke.

FINDINGS...

Fire Chronology

The Hull Mountain Fire exhibited aggressive fire growth when inversion conditions broke in the early afternoon. Faced with significant hot line exposure, crews exhibited skill and good judgement about fire behavior to stay out of trouble. The fire growth and activity pattern that developed on the afternoon of the 25th was much like the previous day. First the inversion lifted. Then the winds picked up.

Time sequences are not particularly accurate on 25th of August. Some time references overlap or do not exist in some witness statements (Appendix C) but an attempt was made to piece together observations for the day from witness statements and other sources. More detailed information can be found by reading the witness statements located in the Appendix C.

The exact time of death is unknown, but occurred when the victim was trapped between two walls of flame merging together into a plume dominated fire storm. The main fire approached the victim coming downhill from the west and was met by numerous spot fires below the victim to the east being pulled back into the main fire front. Death occurred sometime between 1600-1700 hours, on August 25, 1994.

The following table attempts to capture the major events related to the accident on August 25th, 1994.

Time	Event
1418 (8/23)	Report of the Hull Mountain Fire by USFS recon plane (Source - Dispatch notes)
Afternoon (8/23)	M. Davis calls local Forestry office to see if he and his dozer can aid the firefighting effort (Source - Witness Statement, Davis)
1530-1600 (8/23)	M. Davis and S. Maplesden meet at staging area and plan to work together; both hired on as AD labor by O. Eary of Forestry Department (Source - Witness Statement, Davis)
0700 (8/24)	M. Davis and S. Maplesden go to the Forestry office on Table Rock Road to sign up for work; the day is then spent at various locations and the pair ends up on West Beagle Road near the Sanctuary (Source - Witness Statement, Davis)
Evening (8/24)	M. Davis to spend the night in the Sanctuary constructing firelines while S. Maplesden returns to Davis residence with the dozer transport truck (Source - Witness Statement, Davis)
0230 (8/25)	S. Maplesden returned to Sanctuary to pick up M. Davis and drive home for additional supplies (Source - Witness Statement, Davis)
0530 (8/25)	Morning briefing with all sections of command staff providing information on fire situation (Source - Witness Statement, Robison)
0730 (8/25)	Division Supervisor Robison on the line; no fire activity with a tight inversion; driving difficult because of heavy smoke conditions (Source - Witness Statement, Robison)
1200 (8/25)	S. Maplesden relieved M. Davis as dozer operator to build line and open access to water holes near the colony; Davis leaves the area to return home (Source - Witness Statement, Davis)

Time	Event
1400 (8/25)	Estimated time M. Davis and F. Gothard return to the line to find Maplesden approaching Beagle Road; Robison gives instructions to M. Davis to work the Lower Access Road and spot fires in the area near Beagle Road; Maplesden leaves the area with F. Gothard to get Gothard's dozer and presumed to work around the Davis and Gothard residences (Source - Witness Statements, Davis, Gothard, Robison)
1400-1600 (8/25)	Davis makes decision to leave his line assignment given by Robison to move dozer closer to his home (Source - Witness Statement, Davis)
1400-1600 (8/25)	Davis trapped in the fire on the Lower Access Road and constructs a defensible space, later, while escaping the area, Davis discovers Maplesden burned to death near Gothard's dozer (Source - Witness Statement, Davis)
1530 (8/25)	Estimated time that Eychner relates fire roared through the area; no specific location (Source - Witness Statement, Eychner)
1600 (8/25)	General increase in fire intensity; discussions beginning about evacuating Meadows Road area (Source - Witness Statement, Thornton)
1615-1630 (8/25)	Estimated time that operator and dozer (M. Davis/Case 850 dozer) came out of the brush after being trapped in the fire and drove to residence at 12039 Meadows Road; Attended to by structural firefighting crew (Source - Witness Statement, Eychner)
1628 (8/25)	Several acres outside the line; spreading towards Meadows Road (Source - Radio log)
1645 (8/25)	Spot fire couple hundred yards from Meadows Road (Source - Radio log)
1655 (8/25)	Retardant drop to slow fire before trailer; probably near Gothard's residence (Source, I214 Air Operations)
1700 (8/25)	Estimated time the fire blew out (Source Witness Statements, Malmquist and Thornton)
1700-1715 (8/25)	Increased fire activity Meadows Road; structure protection at Gothard's residence (Source - Witness Statement, Hull)

Time	Event
1710 (8/25)	Fire makes run to Meadows Road; some spotting across the road; Structure threatened (Source - Radio log)
1728 (8/25)	Notify county that Meadows Road slick from retardant drop (Source - Radio log)
1735 (8/25)	TV stations at Meadows Road (Source - Radio log)
1730-1740 (8/25)	Robison looking for Davis dozer in area S18/S19 (Source - Witness Statement, Robison)
1750 (8/25)	Estimated time that Robison saw the fire whirl (Source - Witness Statement, Robison)
1800 (8/25)	Estimated time Thornton aware of missing dozer; told M. Robison to go find the dozer (Source - Witness Statement, Thornton)
1810 (8/25)	Victim reported missing (Source - Jackson County Sheriff Department Report - JCSDR)
1820 (8/25)	Victim found (JCSDR); report of fatality and burned over dozer (Unit Log Turnbull); Deputy Marty Clark responding to residence 12107 Meadows Road for report of accident (JCSDR)
1900 (8/25)	Shift change (Source - Witness Statement, Robison)
1920 (8/25)	Victim examined at scene by Detective Spencer R. Smith (JCSDR); victim moved later in the evening by Conger Morris Funeral Home.

FINDINGS...

Incident Management
Analysis examined incident objectives, strategy and tactics, resources assigned to Division C and safety briefing.

Incident Objectives
On August 25, 1994, the general control objectives for this interagency incident included:

1. Ensure safety of all personnel.
2. Ensure protection of structures and public in area.
3. Continue to take aggressive action.
4. Tie in lines where not complete. Close the gaps.

The complete shift briefing plan for August 25, 1994 can be found in Appendix F.

Strategy and Tactics
Fire control was achieved by aggressive direct attack where possible. Air attack with retardant planes and helicopters took place when the inversion lifted over the fire or in areas that were smoke free. Ground crews, engines, and dozers were faced with considerable hot line exposure while conducting direct attack.

Resources Assigned to Division C
The following resources and approximate number of personnel were assigned to Division C on August 25th:

Resource Type	Approximate Number of Personnel
6 Crews	120
10 Engines	20
3 Water tenders	3
5 Dozers	10
2 Fallers (crew)	4
26	157

In addition, one Division Supervisor (DS) and five Task Force Unit Leaders (TFUL) worked on Division C supervising the line assignments. Two Dozer Bosses (DB) supplemented line supervisors. A complete incident organization chart is in the Incident Action Plan, Appendix F, page 6.

Safety Briefing

From the onset of the fire, the 10 Standard Fire Orders and 18 Watch Out Situations were emphasized in safety briefings. Briefings were conducted in fire camp for overhead personnel and line supervisors. Line supervisors were responsible for providing information to firefighters in their division. Other items mentioned in the safety briefing and shift plan for August 25th included:

1. Crews need to be certain that lookouts are established, safety zones are prepared, accessible escape routes known and good communications maintained.

2. Snags are still a problem, particularly on Divisions D and E. Be aware of rolling rocks and debris.

3. Watch your footing in steep areas, and drive with your lights on.

4. The next time you fuel up, wash your vehicle windows to increase your visibility.

5. While driving, control your speed, and drive with your lights on.

6. Continue to use all of your protective equipment and clothing. Fire shelters should be carried as this fire has high fuel loads in places.

Safety on the Hull Mountain Fire was emphasized throughout the incident shift plan and paramount to the success of the fire operation.

FINDINGS...

Control Mechanisms
Analysis examined span of control, radio communications, ongoing evaluations, employment records, training, training, personal protective equipment, 10 Standard Fire Orders, 18 Watchout Situations, Lookout, Communication, Escape Routes and Safety Zones (LCES)

Span of Control
The Incident Management System was in place and operational. On Division C there was one Division Supervisor and five Task Force Unit Leaders. There was no Dozer Boss working with the Davis/Maplesden dozer crew.

Radio Communications
All crews and engines had radio communication. Line overhead also had radio communication. The incident radio communication plan in effect on August 25th, was included in the Shift Plan (Refer to Appendix F, Shift Briefing Plan). The dozer operators did not have radio communication.

Ongoing Evaluations
There were two Fire Behavior Analysts (FBA) assigned to the incident. The FBAs constantly monitored fire behavior and gathered information from line scouts and the National Weather Service fire weather forecaster. On August 25, the FBAs predicted the following fire activity for Division C:

1. South end of fire has west to southwest wind in the afternoon which will cause flare-ups and possible spotting to the east.

2. Undetected spots will become active by early afternoon.

3. Downslope fire runs to the east may reach high spread rates due to winds.

In addition to the FBAs, the incident command team had a safety specialist in the area (Division C) monitoring conditions on the line (Refer to Witness Statement, Appendix C, page 49).

Employment Records
The investigation team examined employment documents for the involved individuals. Records for M. Davis indicate he was hired as a dozer operator along with his Case 850 dozer. S. Maplesden's documents indicate he was hired as a swamper (a person who works on foot out in front of the dozer to point out hazards and direct a path) to work with this dozer, and on August 25, the Division Supervisor's Time Report indicates that both Davis and Maplesden were dozer operators using the Case 850 dozer. Their main

assignments on the fire included creating access to roads and waterholes. Employment documents can be found in Appendix G. The dozer involved in the fatality incident was owned by F. Gothard and not on an Equipment Rental Agreement.

Training
All firefighters are required to have training. In this instance, forest activity employees--essentially those people hired on the spot, also called "pick up labor" or "AD Hires" based on the term "administratively determined"--who may be called upon to do fire suppression in wildland areas shall:

1. Receive basic fire suppression training.

2. This training shall be given prior to commencement of fire activities.

The required training emphasizes the safe use of fire fighting tools and escape procedures in a fire area (see Appendix L).

The Incident Management Team's Contract Administrator noted that there was no system in place to document whether or not AD hired employees had received required training before being assigned to the fire (Refer to Witness Statement, Appendix C, page 7). District training records showed no evidence that either of the two dozer operators trapped by the fire had received any training.

Personal Protective Equipment
The Oregon Administrative Rules, Division 6, Forest Activities, Subdivision E (Fire Protection/Suppression and Prescribed Burning) describes the following protective equipment for fire suppression by employees other than firefighters:

1. When forest activity employees--including AD hired employees--whose primary duty is not fire suppression are called upon to fight wildland fire, they shall wear the following protective clothing:

    a. Pants and long-sleeve shirt.
    b. 8-inch high top leather lace-up boots or other suitable foot wear. The sole and heel of boots shall be of slip resistant material.
    c. Hand protection of at least cotton gloves.
    d. Head protection as required by OAR 437-06-045 (2) and (3).

2. When employees are required to wear other than the basic listed protective clothing as required by OAR 437-06-080(2), all such special protective clothing and equipment shall be provided by the employer at no cost to the employee.

According to M. Davis (Refer to Witness Statement, Appendix C, page 32), Maplesden was wearing a leather welding coat and hard hat. Fred Gothard (Refer to Witness Statement, Appendix C, page 38) recalled that Maplesden was wearing a leather welding coat, hard hat, blue jeans, and boots. Examination of the victim at the accident scene by the Jackson County Sheriff's Department revealed the following evidence of clothing (Refer to Witness Statement, Appendix D, page 4):

1. Boots burned off the body except for the soles.
2. Remnants of leather gloves.
3. Remnants of a grey and white hickory shirt.
4. Remnants of white T-shirt.
5. Remnants of jeans.
6. Remains of a plastic hard hat.

Oregon Department of Forestry Directive 1-2-1-001 (July, 1987), establishes policy on the use of fire shelters for all department employees, including employees hired under AD process. In addition, the Southwest Oregon District Safety Plan speaks to the use of fire shelters by pick-up labor (Refer to Appendix N, SWO District Safety Plan). The fire shelter directive was revised in July, 1992 and issued as a draft directive for field review. The directive had not been adopted for department use at the time of the accident. Both directives are included in Appendix M. The district was following the 1987 directive. Maplesden and Davis were not carrying a fire shelter.

10 Standard Fire Orders

The following analysis compares the accident victim's response to the 10 Standard Fire Orders. A violation of any order could result in death or serious injury to the wildland firefighter. Since the victim was alone and unobserved there is no way to know exactly what thoughts or actions Maplesden took at the time, leaving much of the analysis to speculation. In addition, the victim, having had no training, may not have even been aware of these fire protection guidelines and the impacts they had on his personal safety.

1. **Fight fire aggressively but provide for safety first.**
   - Engines, crews, and dozers were using direct attack and parallel attack tactics where possible and exposed to hot line conditions.
   - The victim had worked the fireline beginning 8/23 (opening roads and access to water), and most likely was exposed to no hot fireline. What considerations he gave to his own safety remain unknown.

2. **Initiate all actions in response to current and expected fire behavior.**
   - Subject appears to have been focused on his work and failed to note the development of extreme fire behavior conditions and the impact these changes would have on his safety.
   - The extreme fire potential of the leaf litter and the grass evidently did not influence the victims decision to work in this fuel type, thus compromising his safety.
   - The victim was not aware of information provided to firefighters in the Shift Plan.

3. **Recognize current weather conditions and obtain forecasts.**
   - Fire weather forecasts were available as part of the shift plan, but a discussion of the information did not take place with the Maplesden/Davis dozer crew.
   - The effects of on-site weather phenomena were not recognized.

4. **Ensure that instructions are given and understood.**
   - Instructions given by Robison to Davis were not followed exactly. Davis was trapped on the fire line he was constructing by a variety of circumstances. Maplesden acted on his own volition after a discussion with Gothard and Davis and took fire control actions that ultimately cost him his life. (Refer to Witness Statements).

5. **Obtain current information on fire status.**
   - The victim was working alone and had no knowledge of the fire's changing conditions other than what he observed personally.

6. **Remain in communication with crew members, your supervisor, and adjoining forces.**
   - Maplesden and Davis separated with no radio communication.
   - The victim's work location was unknown to all other line personnel on the division.

7. **Determine safety zones and escape routes.**
   - Escape routes and safety zones were inadequate for the fuel type where the dozers operated (Maplesden and Davis).
   - The victim probably had no clear plan for an escape route or safety zone.

8. **Establish lookouts in potentially hazardous situations.**
   - Supervisory line personnel were observing the fire's changing behavior.
   - The victim was working in a hazardous situation without a lookout and unknown to supervisory line personnel in the division.
   - Dense smoke probably obscured the area where the victim was working.

9. **Retain control at all times.**
   - The victim was operating unsupervised at the time of the accident.
   - The victim acted without instructions from a line supervisor and went to work in a location not specifically known to his work partner (Davis) or to any other line personnel.

10. **Stay alert, keep calm, think clearly, act decisively.**
   - The firefighter was most likely alert, but failed to recognize or react to changing conditions of the fire.
   - Once entrapment occurred there was no option for an additional act or decision, death was imminent.

18 Watchout Situations

The watchout situations provide additional safety information to wildland firefighters and raise other issues which require caution and mitigation on the fireline. Watchout situations can be mitigated by safe work practices. The following analysis looks at the 18 Watchout Situations as they apply to the accident.

1. **Fire not scouted and sized up.**
   - Fireline supervisors were in contact with each other and conducting size up and scouting.
   - The victim had no radio communication, was not aware of the main fire's activities, and was working in an area unknown to any fire supervisory personnel.

2. **Country not seen during the daylight.**
   - Not a factor. Victim was a familiar with the area having opened access roads near the accident scene the previous day (8/24) and because he was a local resident.

3. **Safety zones and escape routes not identified.**
   - Safety zones and escape routes for both dozer operators (Maplesden and Davis) were inadequate for the fuel type and burning conditions.
   - Rapid, extreme fire behavior over took the victim; there was no time to look for escape routes or build a safety zone.
   - Lack of training was a contributory cause.

4. **Unfamiliar with local weather and local factors influencing the fire.**
   - The victim, lacking training, ignored changing conditions and did not recognize or react to these conditions.
   - The victim ignored the potential for rapid, erratic, and extreme fire behavior in the fuel type in which he was working.
   - Lack of training in fire weather and fire behavior was a contributory cause.

5. **Uninformed on strategy, tactics, and hazards.**
   - Victim was working alone and probably did not realize the strategic and tactical mistake he was making or the hazards at hand.
   - The victim had not seen or been given a Shift Plan.
   - Lack of training was a contributory cause.

6. **Instructions and assignments not clear.**
   - No instructions were given by M. Robison (Division Supervisor)to Maplesden. M. Davis (dozer operator), F. Gothard and Maplesden discussed making a change to Maplesden's line assignment and the suggestion was made that Maplesden work down near Gothard's and Davis's homes. That decision was unknown to line supervisors. (Refer to the Witness Statements, Appendix C).
   - The victim worked in an area that was not assigned by any fireline supervisors and his work location was unknown to all supervisory line personnel on the division.

7. **No communication link with crew members and supervisors.**
   - Both dozer operators involved in the entrapment had no radio communication.

- The victim worked in an area that was not assigned by any fireline supervisors and his work location was unknown to all supervisory line personnel on the division.

8. **Constructing fireline without a safe anchor point.**
   - Extreme fire behavior was occurring with spotting activity. The fireline was compromised (crossed by spot fires) in numerous locations.
   - There were no safe anchor points where the victim was operating.
   - Lack of training was a contributory cause.

9. **Building fireline downhill with fire below.**
   - Not a factor.

10. **Attempting frontal assault on fire.**
    - The firefighter was working near the fire front and was overrun between fire fronts (one from the main fire and a second from spot fires pulling back into the main fire).
    - Lack of training was a contributory cause.

11. **Unburned fuel between you and the fire.**
    - Victim was working in unburned fuels with a fire front to the west of his location and spotting below his location.
    - Area ignition occurred trapping the victim.
    - Lack of training was a contributory cause.

12. **Cannot see the main fire and are not in contact with anyone who can.**
    - The victim probably saw the main fire bearing down on him when it was too late to escape.
    - The victim was working alone with no communication.

13. **On a hillside where rolling material can ignite fuels below.**
    - Not a factor.

14. **Weather is getting hotter and drier.**
    - Line personnel faced hotter and drier weather conditions.
    - Victim did not recognize or react to critical weather indicators.

- Lack of training was a contributory cause.

15. **Wind increases or changes direction.**
    - Wind was increasing and changing direction as the fire modified its own environment.
    - Victim did not recognize or react to critical changes.
    - Lack of training was a contributory cause.

16. **Getting frequent spot fires across line.**
    - Frequent spotting was occurring prior to the accident and was influenced by the main fire.
    - Victim did not react to critical changes. Victim lacked training to interpret the impact of changing fire conditions.
    - Lack of communication capability prevented the victim from receiving information by radio on changing fire conditions.

17. **Terrain and fuels make escape to safety zones difficult.**
    - There was no established safety zone for the victim.
    - The terrain was relatively flat.
    - Spotting and dense smoke blocked escape routes.
    - Victim did not recognize or react to critical changes in fire behavior.
    - Lack of training was a contributory cause.

18. **Taking a nap near the fireline.**
    - Not a factor.

Lookouts, Communication, Escape Routes and Safety Zones (LCES)
LCES emphasizes critical fireline safety concerns. A firefighter must establish LCES prior to their need. The following analysis looks at LCES as applied to the accident location.

1. **Lookouts**
    - Victim acted alone without assignment by fire management staff and had no lookout.

2. **Communication**
   - No communication existed between the victim and other line personnel.

3. **Escape Routes**
   - The victim had no escape route.

4. **Safety Zone**
   - Victim had no safety zone for escape.

Lack of training and awareness were critical factors contributing to the accident. The victim lacked training in fire behavior and fire weather to understand and apply LCES.

SECTION 2: CAUSAL FACTORS

This section presents the Hull Mountain Fire Accident Investigation Team's analysis of causal factors. The causal factors presented had a direct and significant relationship to the outcome of this accident.

CAUSAL FACTORS...

Fire Behavior
Analysis examined fuels, weather, topography, predicted fire behavior and observed fire behavior.

Fuels
The potential existed for extreme fire behavior in the fuel complex at the accident site. Fuels were extremely dry contributing to rapid rates of spread and spotting. The oak leaf litter compounded the problem by adding additional fuel loading to the grass component of the fuel complex. Maplesden did not recognize the extreme volatility of the fuel complex and the severe risk it posed to his safety.

Weather
Weather was clear, causing temperatures to reach near 90 degrees with relative humidities of 22 to 24 percent, indicative of extreme fire conditions. Fire behavior influenced the immediate area causing local, erratic fireline winds.

Topography
The topography consisted of gentle to moderate slopes ranging from 10 to 15 percent above the accident site with a small drainage to the North. Elevation was approximately 1,480 feet. The victim and dozer were found at the base of a long ridge running to the northwest. Fire intensity at the site of the accident was extreme as evidenced by the complete combustion of forest fuels. The topography at the accident site appears to have focused fire intensity at the victim's location.

Predicted Behavior
Predicted fire behavior in the area was for upslope, west to southwest winds in the afternoon causing flare-ups and possible spotting to the east. Spotting downslope would ignite fires which would then make rapid runs back uphill toward the main body of the fire. Predicted fire behavior was verified by conditions that occurred on the afternoon of August 25th, on Division C. Critical fire behavior predictions were not available to the victim from an incident action plan.

Observed Behavior
The fire advanced downslope slowly throughout the day through dense timber stands until it reached the oak, madrone, and scattered ponderosa pine fuel type. Fire intensity quickly grew and became a large plume dominated event rather than a wind driven fire run. Spotting up to one-quarter mile occurred. These spots quickly grew and were drawn back into the main fire with rapid rates of spread. Also associated with this event were multiple fire whirls (vortices), area ignition (multiple effects on fire intensity by multiple spot fires in close proximity to main fire) and horizontal flame sheeting as the fire hit Meadows Road. The victim was faced with a major fire blow up which made escape extremely difficult if not impossible.

CAUSAL FACTORS...

Incident Management
Analysis examined strategy and tactics, safety briefing and major concerns, involved personal profile, and equipment.

Strategy and Tactics
Escape routes and safety zones for the two dozers (Maplesden and Davis) were inadequate for the burning conditions that prevailed. In addition, the two dozer operators did not adjust their strategy and tactics to prepare for the potential extreme fire behavior that developed and enveloped them.

Safety Briefing and Major Concerns
The Incident Shift Plan covered safety concerns in an adequate manner. There was a break down in the transmission of critical safety concerns to the affected line personnel. Escape routes and safety zones were inadequate considering the fire's extreme and explosive potential. Ten of the 10 Standard Firefighting Orders were violated. Fourteen of the 18 Watchout Situations were not recognized so that steps could have been taken to prevent this accident.

Involved Personal Profile
The accident victim, Sidney B. Maplesden Jr., from White City, Oregon, was a lifelong Rogue Valley resident. Maplesden is survived by his expectant wife and a child. The victim was excited about operating a dozer on the Hull Mountain Fire, and helping friends and neighbors threatened by the advancing fire. Maplesden was frustrated in the change of his assignment when relieved on the afternoon of the 25th of August by fellow dozer operator M. Davis.

Instructions given to Davis by Robison had Davis working an area off Beagle Road attacking spot fires. Maplesden received no instructions from Robison and was not part of their (Robison and Davis) discussion. A discussion took place between Davis, Gothard and Maplesden about the use of Gothard's dozer near the Davis and Gothard residences. Maplesden acted on his own after arranging to use another dozer owned by Gothard and returned to the fire line within one-half mile of Meadows Road on the Gothard property. The victim was caught in an extreme fire behavior event with no escape possible. Because he had not been assigned to that area, no supervisory line personnel knew of Maplesden's location or subsequent actions. The proximity of friends and neighbors homes and property probably had some impact on Maplesden's actions of where he chose to operate the bulldozer.

Equipment
The victim apparently was wearing the required personal protective equipment, as required by the Forest Activities Rules. Nomex fire clothing and fire shelter were not in

use, nor were they required. Local district policy and department policy regarding the use of fire shelters were followed (Appendices M and N - Southwest Oregon District Safety; Use of Fire Shelters, Directive 1-2-1-001, 1987).

Both dozer operators were working in areas that put them at risk of burnover because of their front line activities on the fire and the erratic fire behavior. This compromised their safety and strayed from district safety policy. It is not known whether nomex clothing and a fire shelter would have altered the outcome of this accident.

SECTION 3: CONTRIBUTORY CAUSES

The following factors contributed to the fatality on the Hull Mountain Fire...

Incident Management and Control

The investigation team believes that management actions on Division C on the afternoon of August 25 were stretched thin. Extreme fire behavior conditions during the blow up overtaxed the number of supervisory line personnel leaving the span of control too large, thus allowing individuals to be left working alone (no dozer boss and no lookout) with no communication.

In addition, there was no mechanism in place to prevent untrained individuals from getting a fireline assignment. The victim had no formalized wildland firefighting training and was most likely not aware of the warning signs that should have prompted the need for immediate escape.

FOLLOW UP ACTIONS

This investigative report was presented to State Forester James E. Brown for review.

In January of 1995, the State Forester appointed a task force to review the report and draft recommended corrective actions in policy or procedures to prevent or reduce the chance of a future accident of this kind. Copies of this report were also distributed to all Department of Forestry field districts and incident commanders.

Copies are available from the Oregon Department of Forestry's Public Affairs Office, 2600 State St., Salem, OR 97310. (503) 945-7422.

HullRep.Fin/30.4
January 30, 1995

APPENDICES

Appendix A

MAPS

Map Index

Map Number	Description
1	Hull Mountain Fire: The Numbers. Source - Forest Log, September - October, 1994. M - Fatality Site
2	Portion of Trail Sub-Unit, Southwest Oregon Protection District Map. M - Fatality Site, Twn. 35S, Rge. 2W, Sec. 16
3	Hull Mountain Fire Daily Perimeter Map (8/23-8/27). M - Fatality Site
4	Portion of Topographic Map of Fatality Site. M - Fatality Site
5	Detail of the Accident Scene drawn by K. Moore of the Hull Mountain Fire Investigation Team.

#1

Hull Mountain Fire: The Numbers

Acres Burned and Losses:

8,000 acres burned
1 fatality
8 homes
36 outbuildings
15 vehicles
Forest resource damage significant, but yet to be determined

Evacuation and Community Impacts:

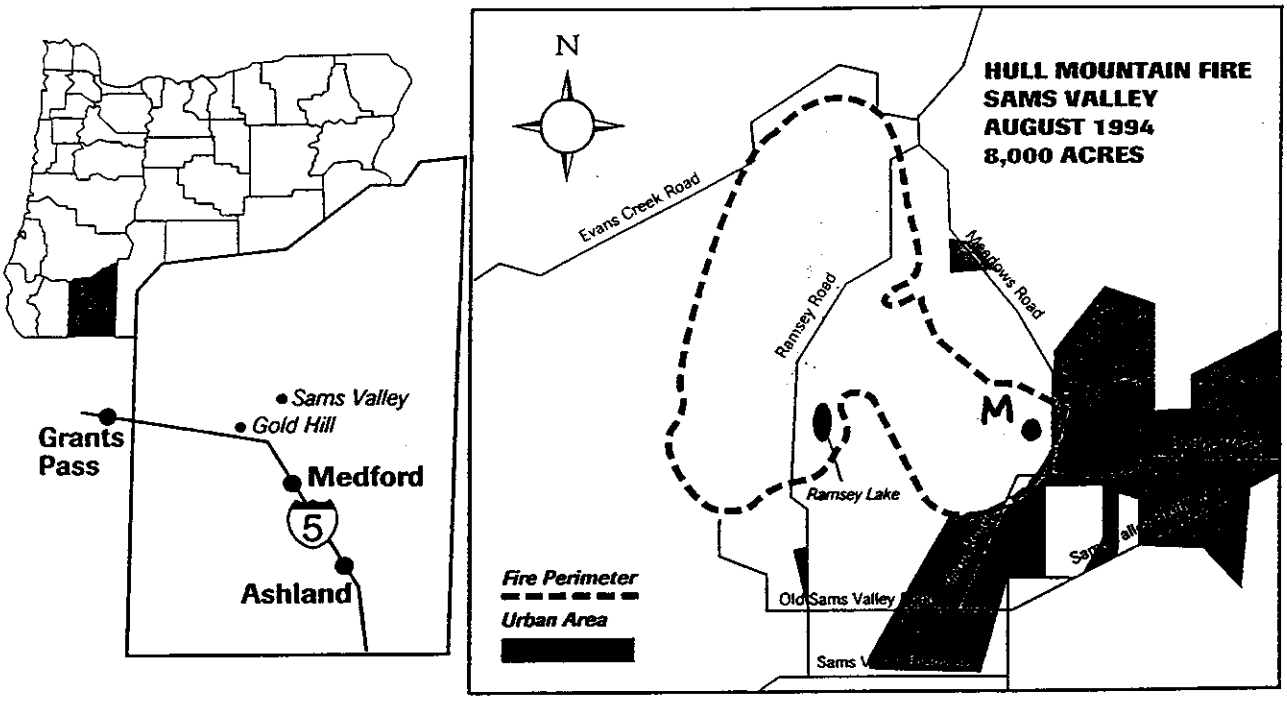
250-300 homes evacuated
55 homes actively protected or "saved" by firefighters (30 of these homes were inside the fire perimeter)

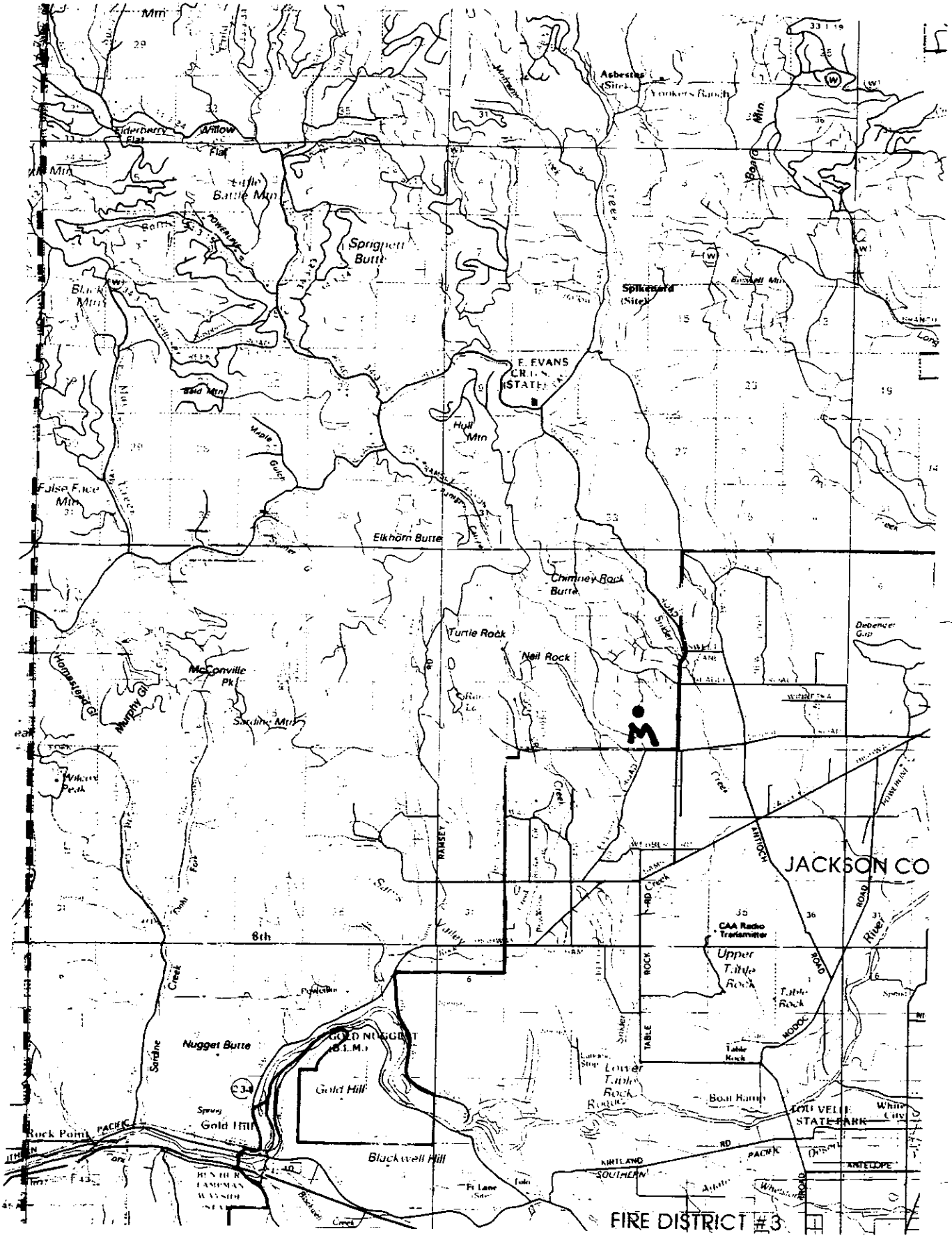
Air Operations

7 airtankers
161 loads of retardant (63 dropped on one day, a record for the Medford tanker base)
563,500 gallons of retardant dropped
2 lead planes
12 helicopters that dropped a combined total of 7,142,857 gallons of water

Ground Operations

63 engines
65 20-person fire crews
25 bulldozers
41 water tenders
49 fallers and swampers

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Battle Mtn
Sprigbett Butte
Black Mtn
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Asbestos (Site)
Yankees Ranch
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Hull Mtn
Maple Gulch
False Face Mtn
Elkhorn Butte
Chimney Rock Butte
Turtle Rock
Neil Rock
McConville Pk
Sardine Mtn
Murphy Gl
Thompson Gl
Wilson Peak
Sardine Creek
Nugget Butte
Gold Hill
Blackwell Hill
Rock Point
Gold Hill
8th
Antioch
Table Rock
Upper Table Rock
Lower Table Rock
Boat Ramp
CAA Radio Transmitter
Applegate River
Williams Creek
Ninemile Creek
Sucker Creek
Deadenden Gulch
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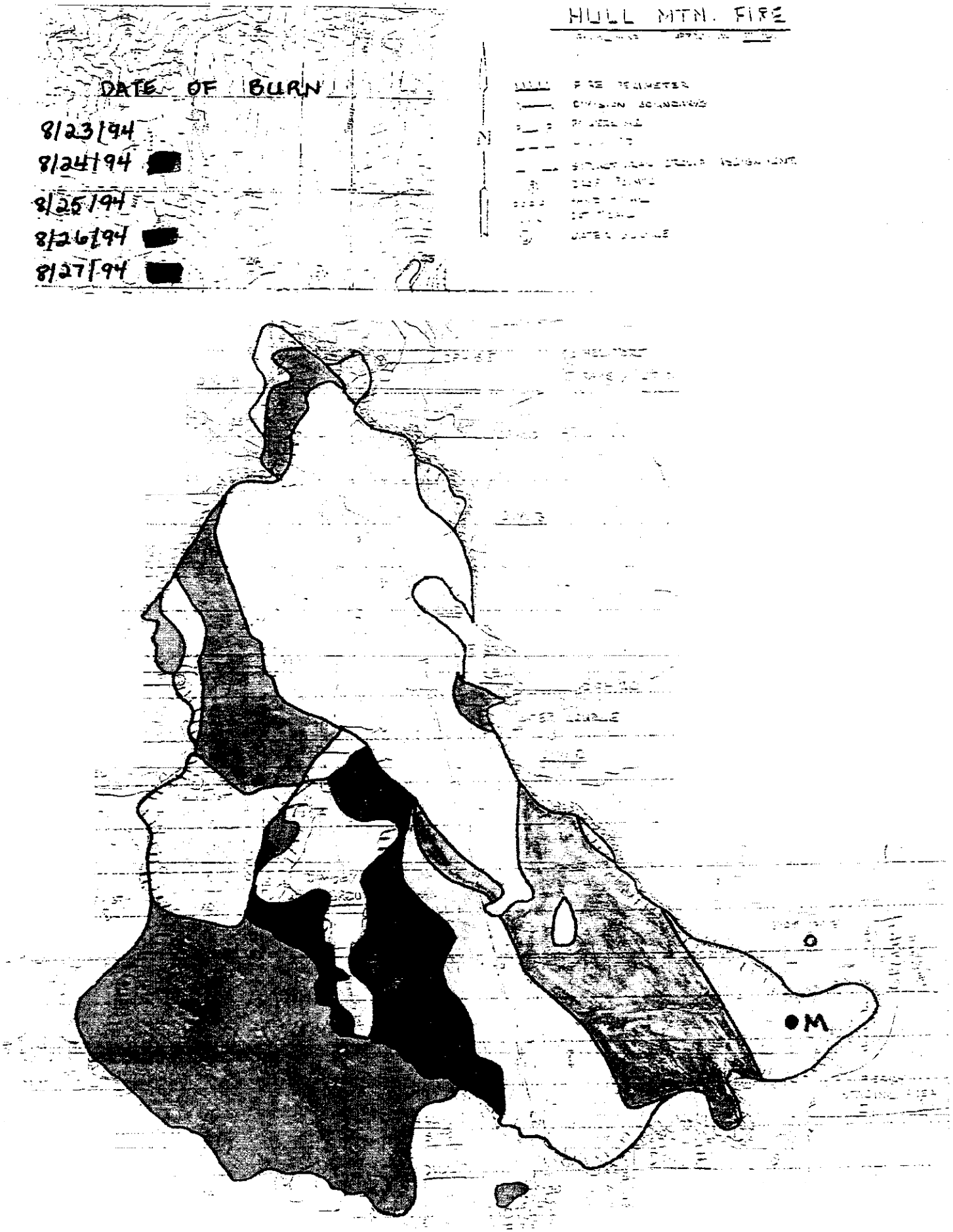
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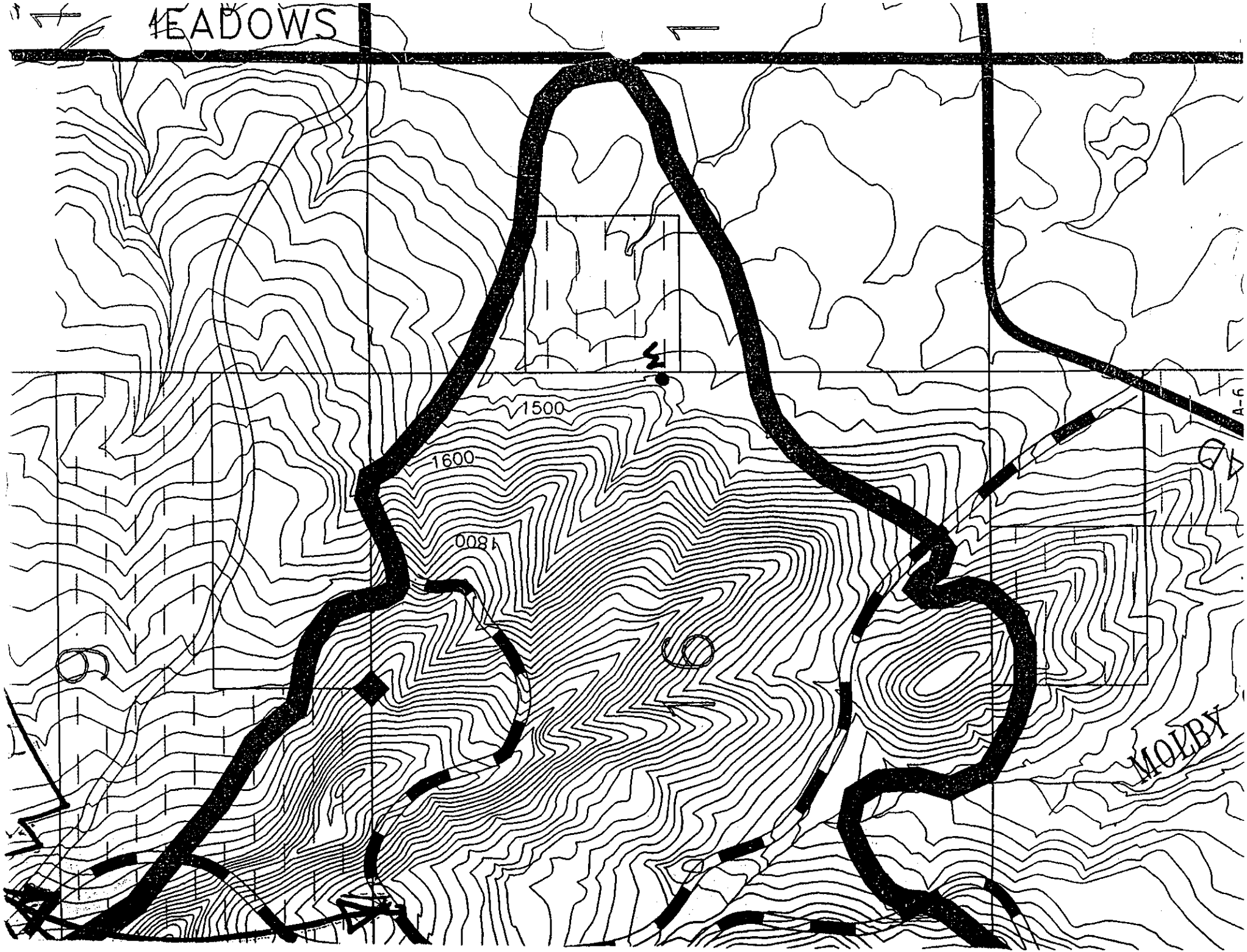
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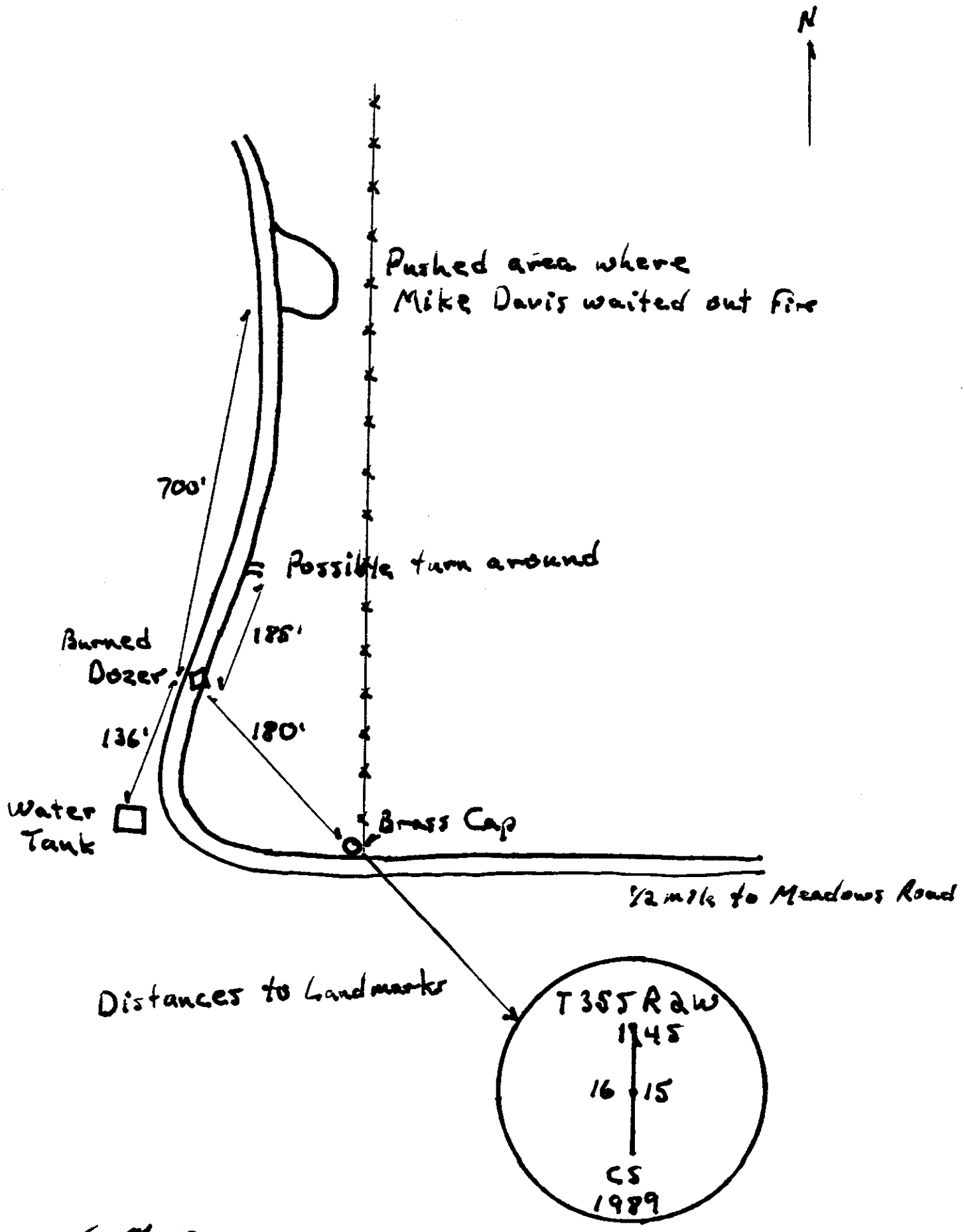


Ken Moore
8/22/94

Appendix B

PHOTOGRAPHS

Photograph Index

Photo Number	Explanation
1	Fuel Complex in the vicinity of the accident site showing mixed species of trees.
2	Typical oak stand in the vicinity of the accident site.
3	Cured leaf litter which contributed to extreme fire behavior and rapid fire runs.
4	Typical brush component of the fuel complex in the vicinity of the accident site.
5	View of the accident area taken from Meadows Road looking West. The approximate time was 1545-1600 hrs. F. Gothard residence in the foreground. Fire was beginning to move down from the ridge towards the accident site. Photograph taken on August 25, 1994.
6	Fire intensity buildup above the accident site at 1345-1600 hrs. on August 25, 1994. View looking west from Meadows Road.
7	Increased fire activity West of Meadows Road. No time reference.
8	Fire activity sometime after 1600 hrs. (8/25) on ridge above the accident site. View from Meadows Road.
9	Beginning of the blowup on Division C near the accident location sometime after 1600 hrs. (8/25). Photograph has captured the base of a swirling column (plume dominated event) of smoke.
10	Air attack on Division C near the accident area.
11	Air attack in the vicinity of Davis residence off Meadows Road.
12	Fire front has moved down the ridge above the accident to the valley flats just before the major fire run to Meadows Road.
13	Fire leaving the oak trees and moving into the grass areas West of Meadows Road.

14	Fire front hitting Meadows Road exhibiting horizontal flame sheeting.
15	Fire stopped at Meadows Road. Note the road is still wet from a retardant drop.
16	Aerial view of the accident site taken early evening on 8/25. Note the nearly complete combustion of all forest and ground fuels. Area has not been examined by a coroner at this time.
17	Accident site looking East towards Meadows Road.
18	Accident site looking Northwest showing the burned over dozer owned by F. Gothard.
19	Closeup of the Gothard dozer (Komatzu, Model D31-16, Serial #25040).
20	Location of the victim on the ground, face down, and looking North along the Lower Access Road.
21	Fatality site close up.
22	View looking Northwest of the burn over site. M - Fatality, D - Davis dozer entrapment.
23	View looking Southwest of the accident area. Meadows Road is located to the lower left in this photograph.
24	Fatality site looking North along the Lower Access Road.
25	View looking West at the accident site. Meadows Road in the lower portion of the photo. F. Gothard residence located in the lower left portion of the photo.
26	Ridge line above the accident from which the fire moved down towards the victim.
27	Accident site taken from a helicopter. Locations of the two dozers marked.
28	Accident site taken from a helicopter showing location of the two dozers on the Lower Access Road. The dozers are 700 feet apart.
29	Accident site looking Northwest. Ridgeline is prominent above the accident site. Dozer locations indicated on the Lower Access Road.

30	Accident site looking to the Southeast. Note the complete combustion of forest and ground fuels.
31	Accident site looking North along the Lower Access Road.
32	Accident site looking West.
33	Accident site looking Northeast. F. Gothard's cement water cistern is located on the lower left portion of the photo.
34	Area where M. Davis survived being burnover by the fire. View looking South towards the fatality site; located 700 feet away to the South.
35	View of the area where M. Davis survived being burnover by the fire. View looking North. Fatality site to the South, 700 feet away indicated by the arrow.
36	Bureau of Land Management low level aerial photograph of the accident scene and vicinity. Taken September 6, 1994.

Legend to Photograph Labels

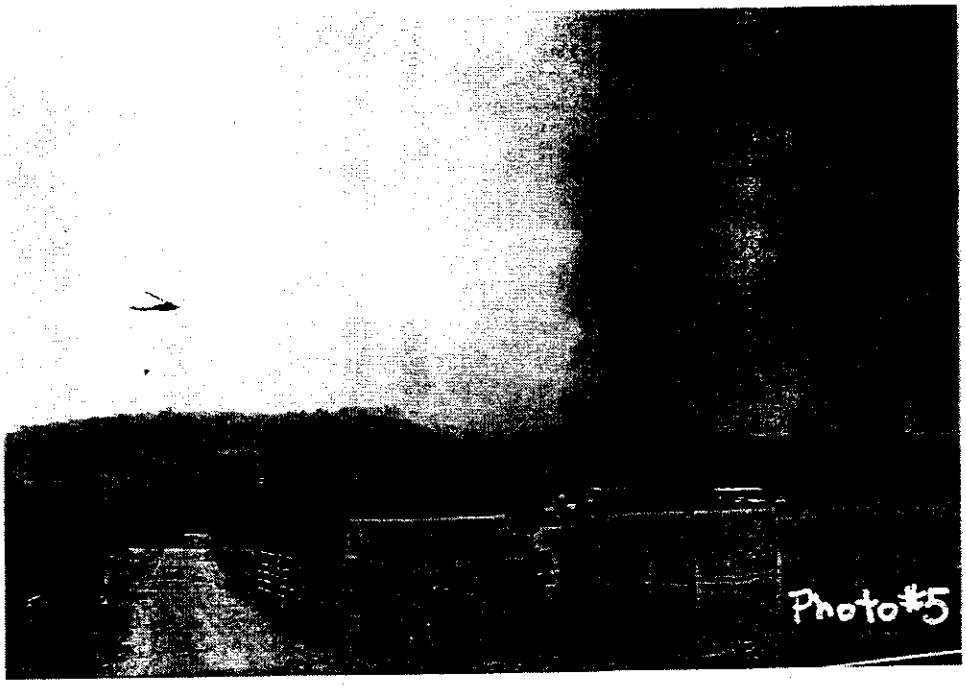
D - Davis Burnover Site
M - Fatality Site
BR - Beagle Road
DR - Dodge Road
MR - Meadows Road
FGR - Fred Gothard Residence
LAR - Lower Access Road


Photo #1


Photo #2


Photo #3


Photo #4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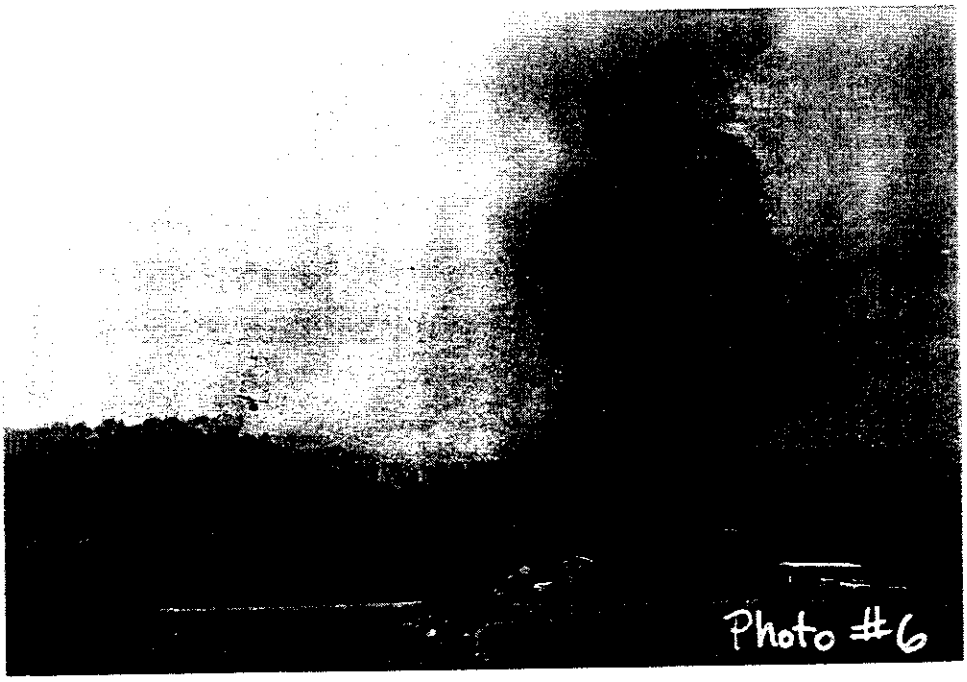
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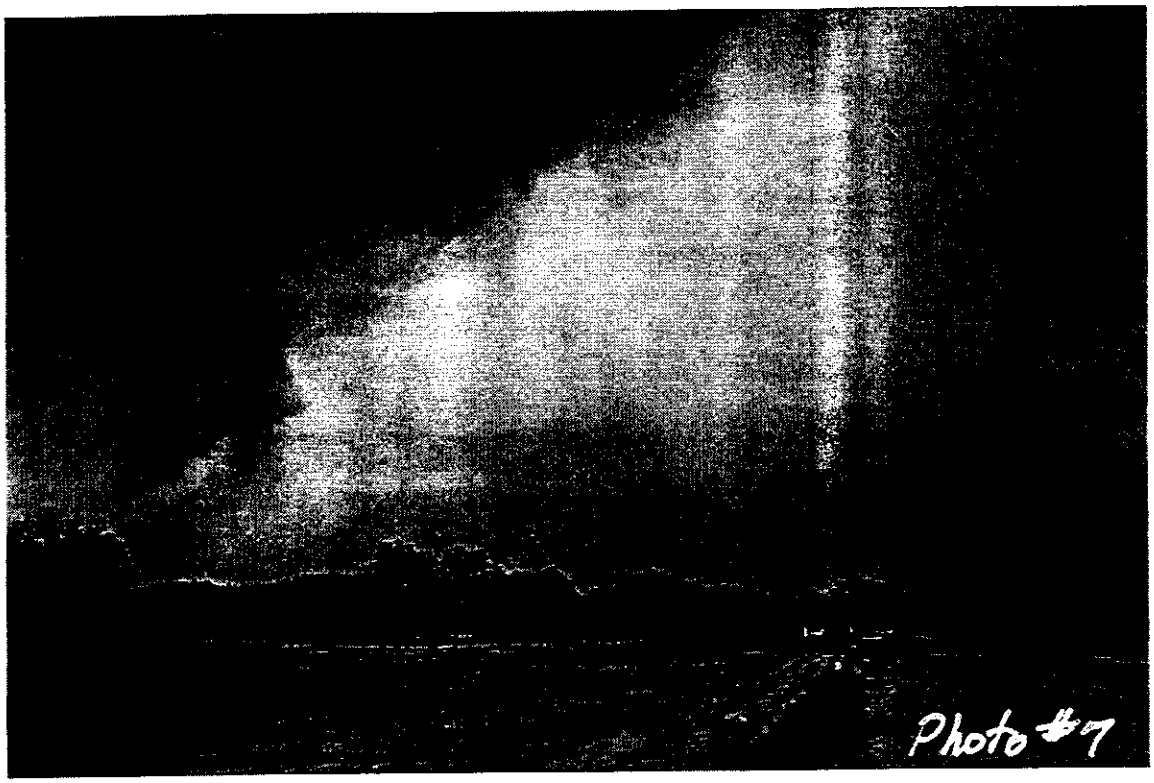

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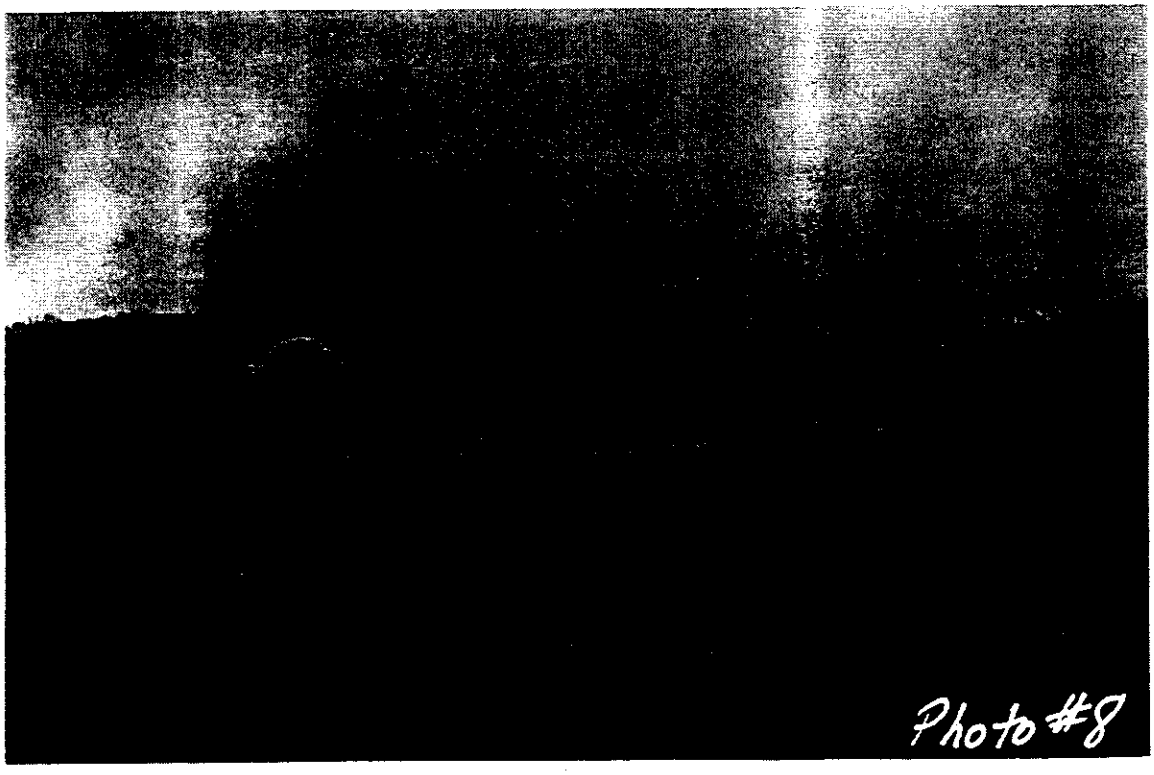

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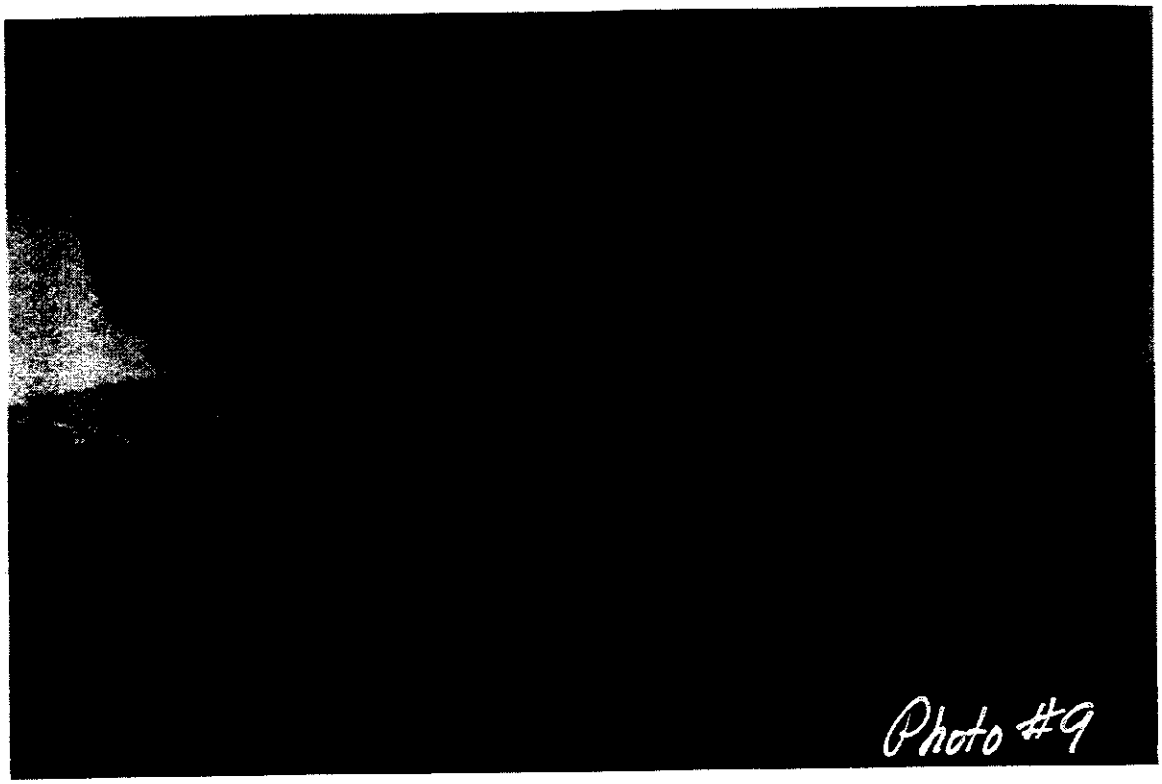

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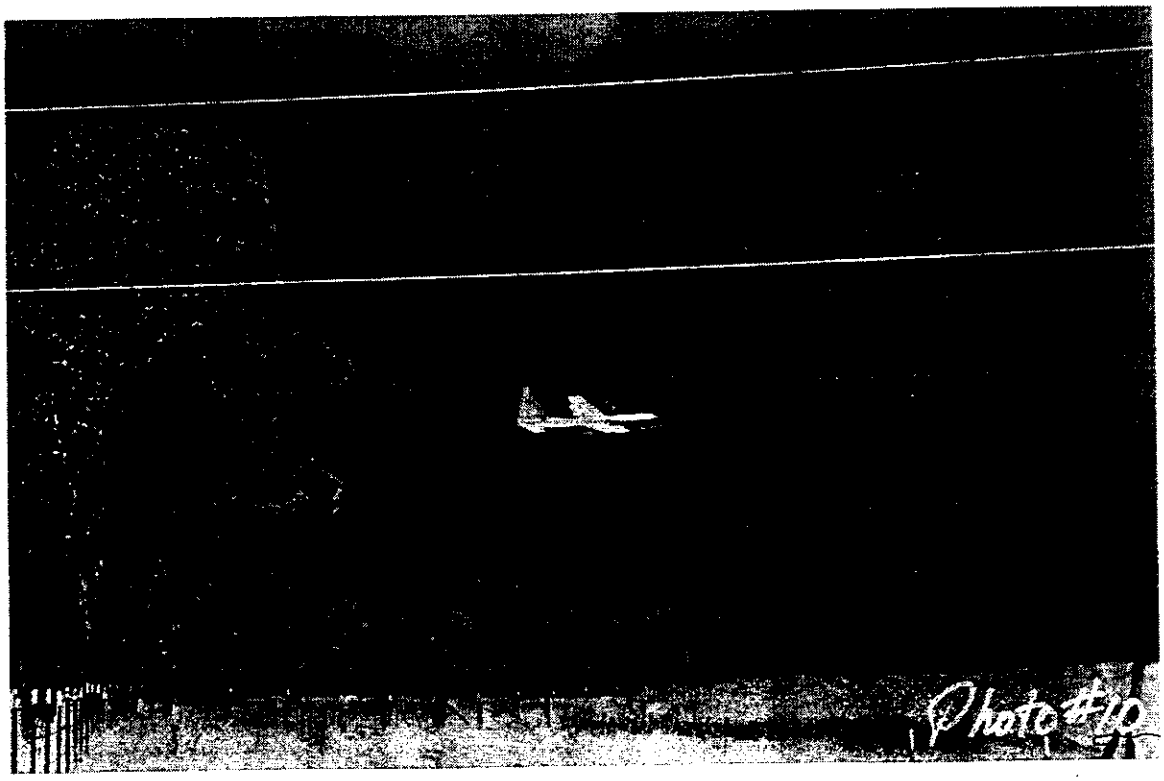

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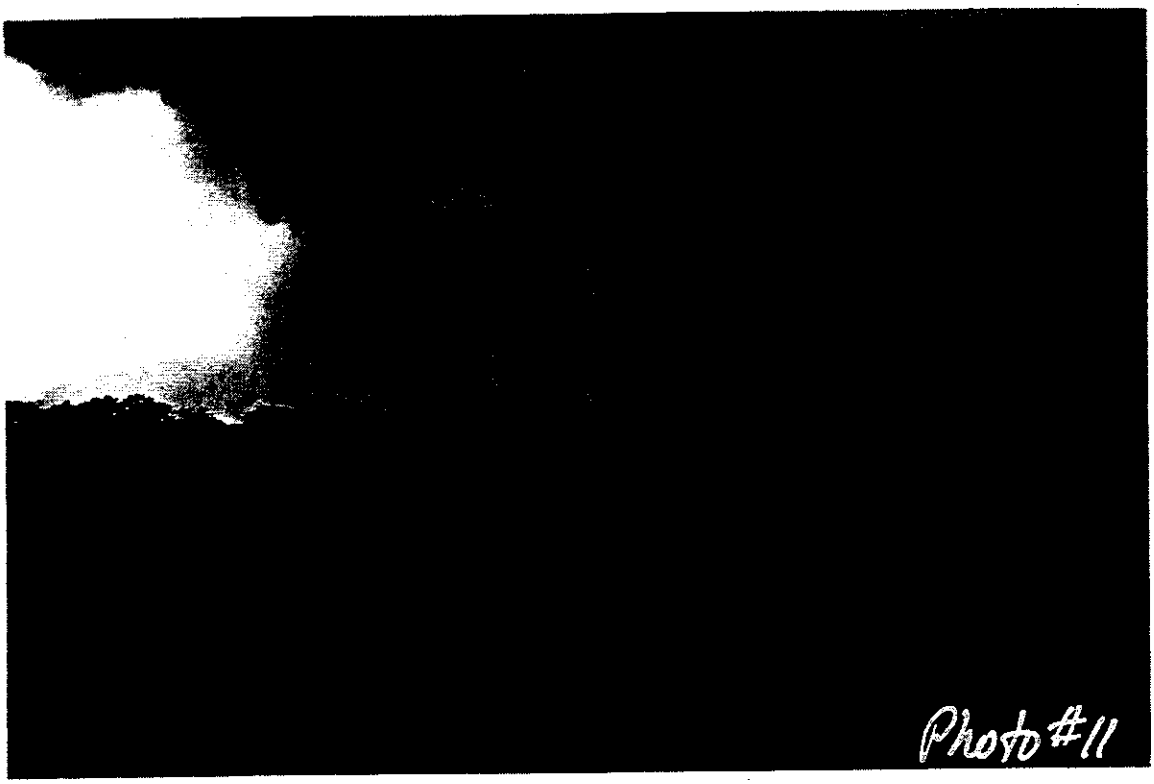

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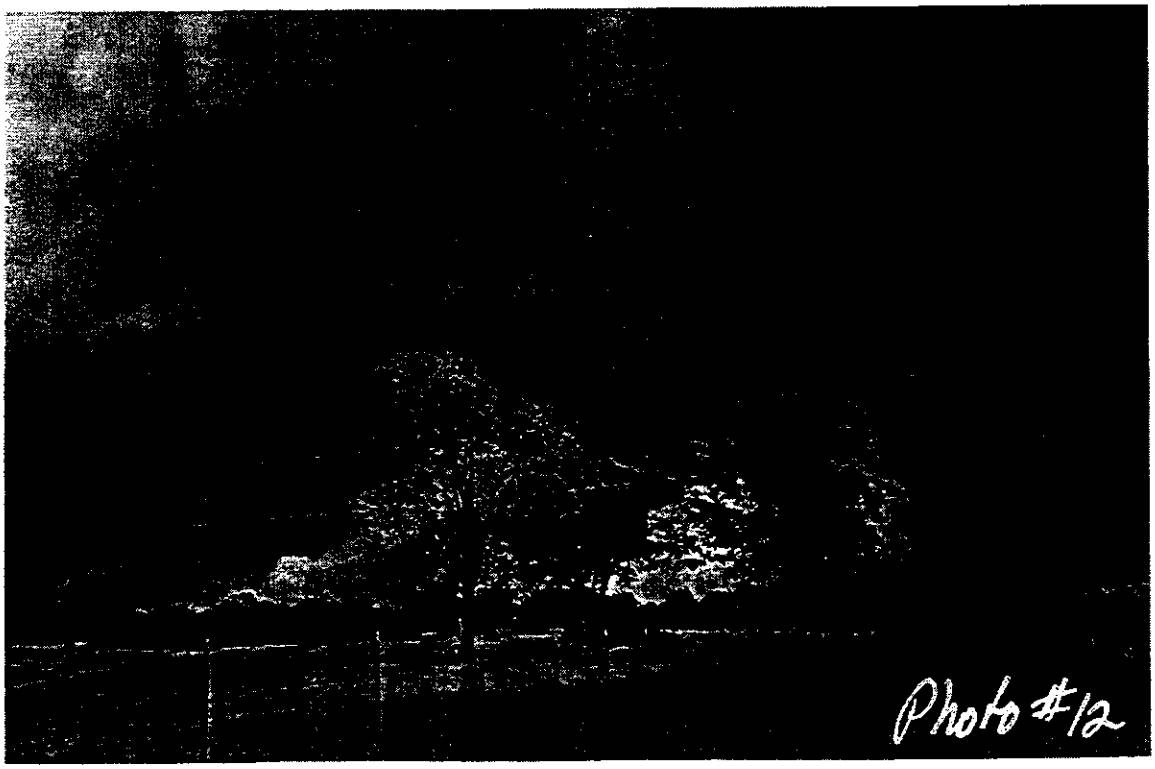

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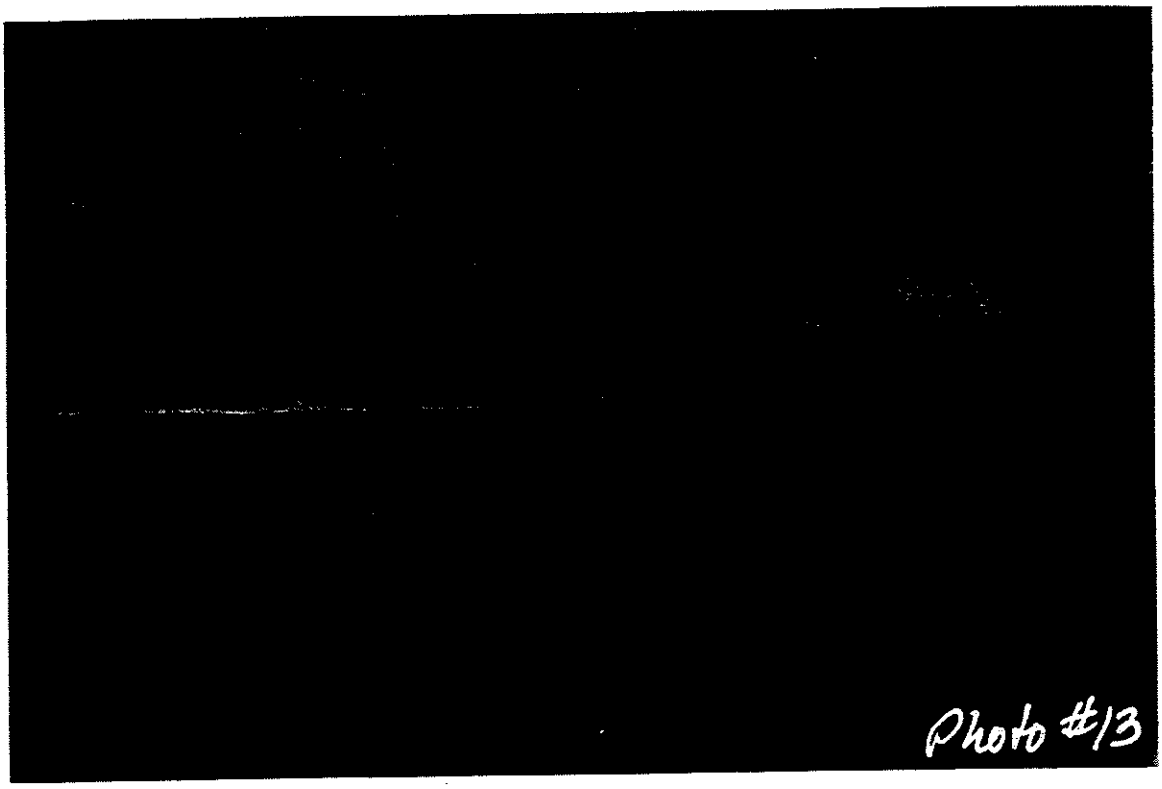

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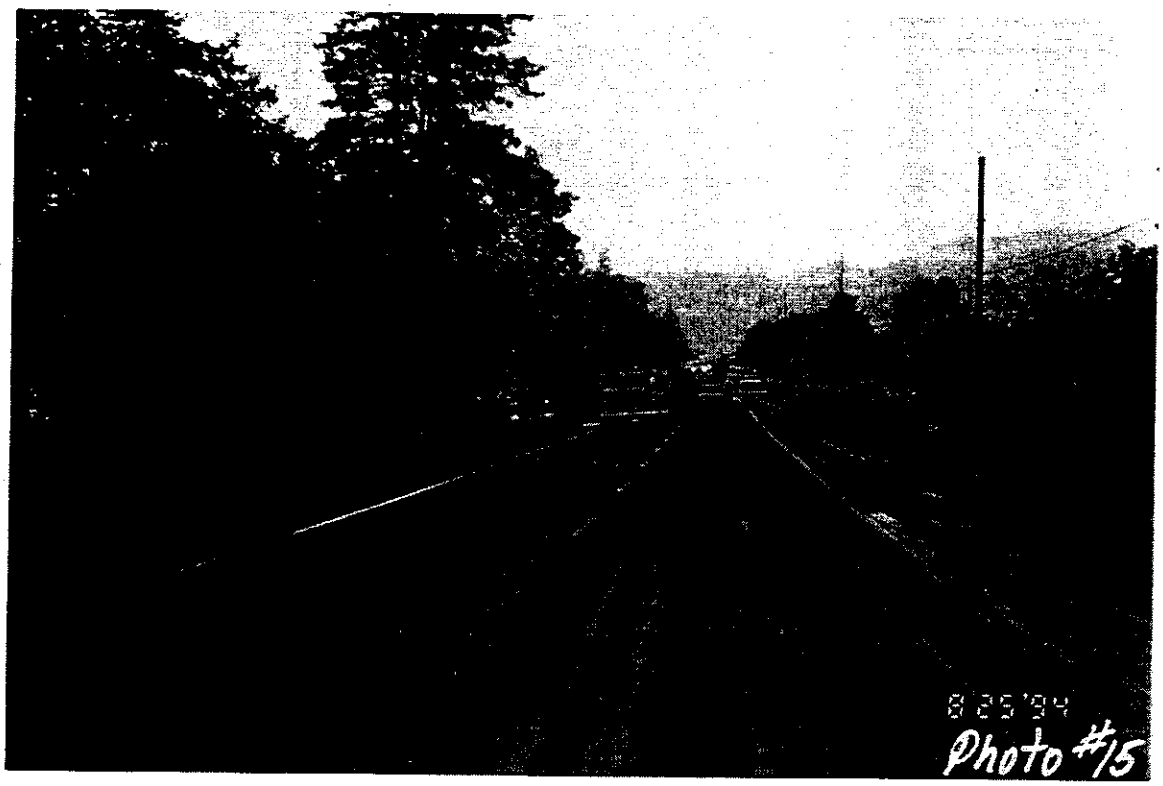
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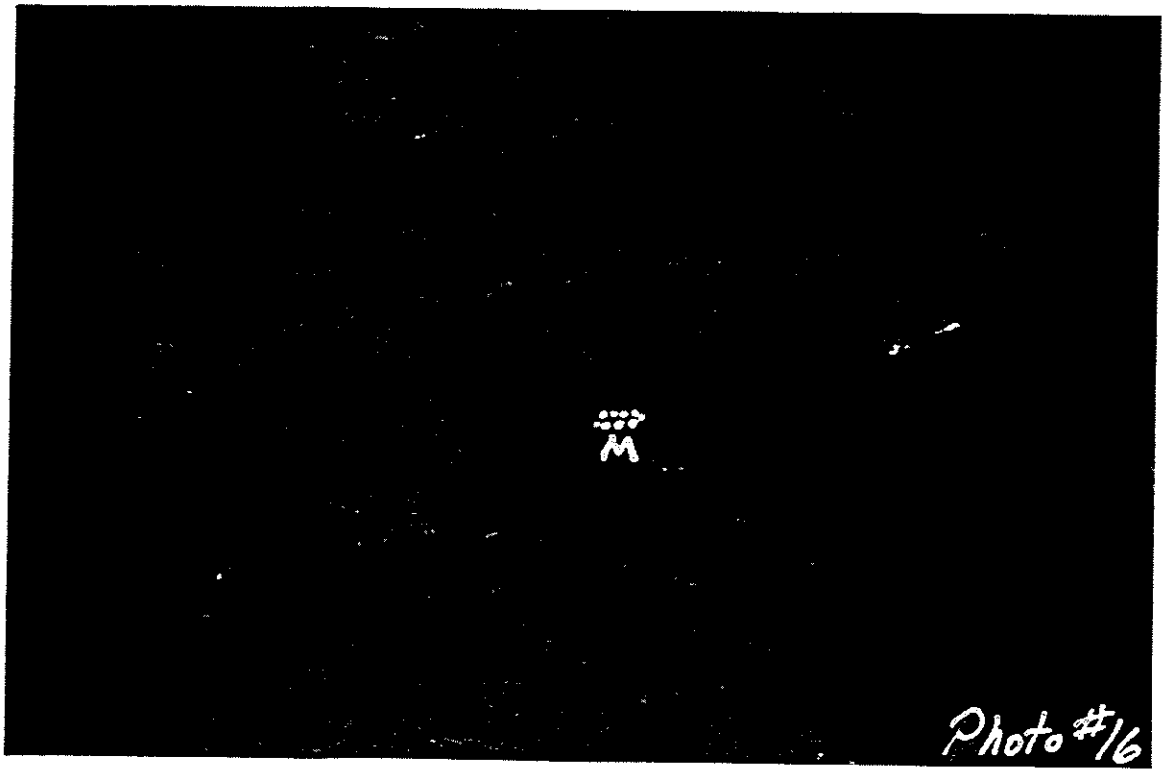
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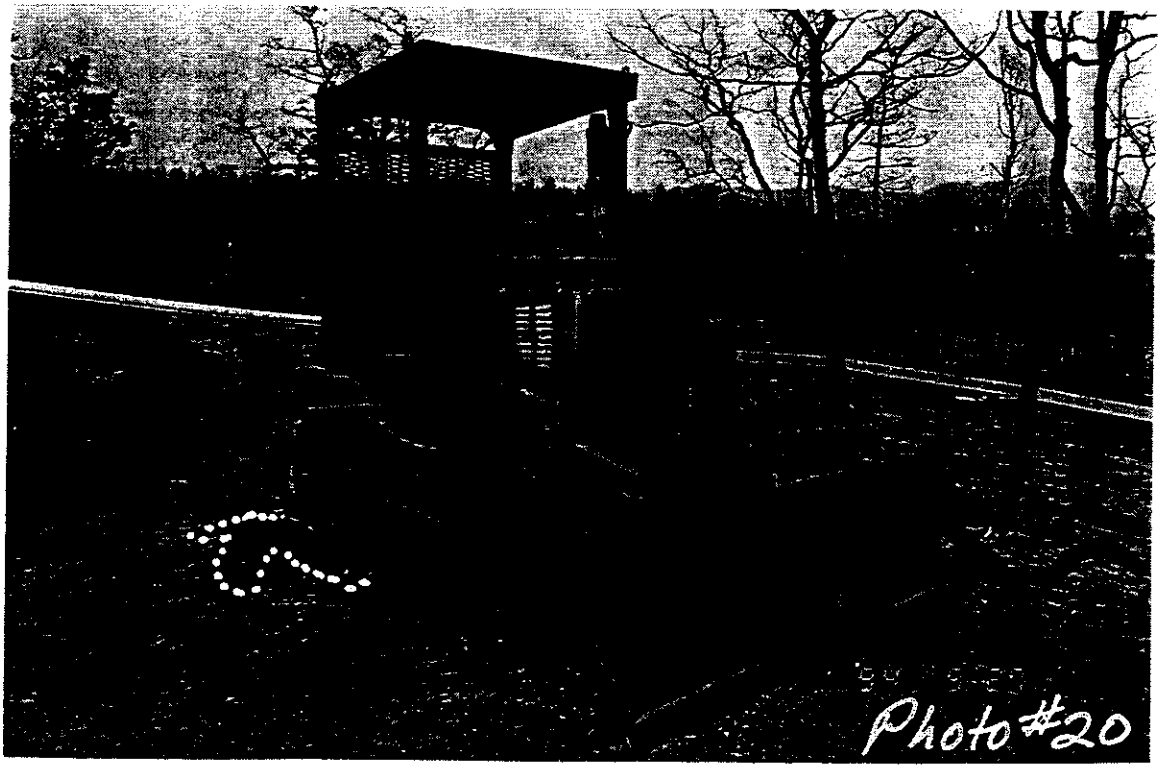
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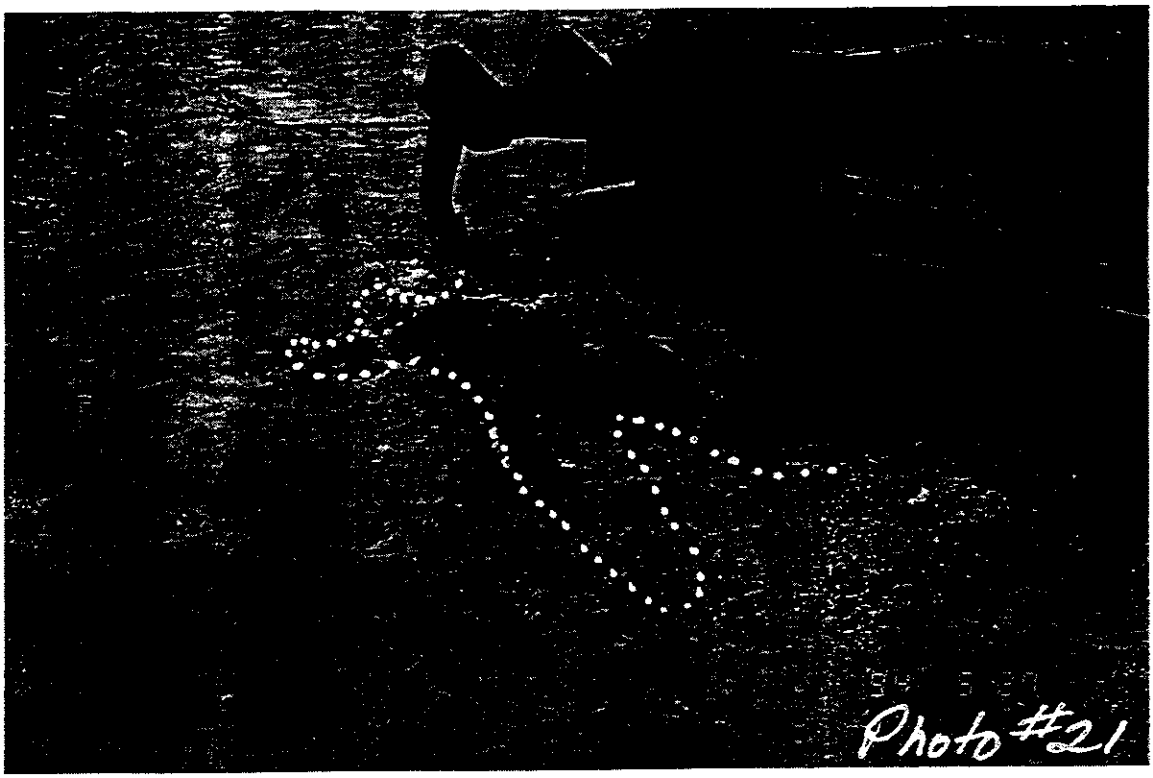

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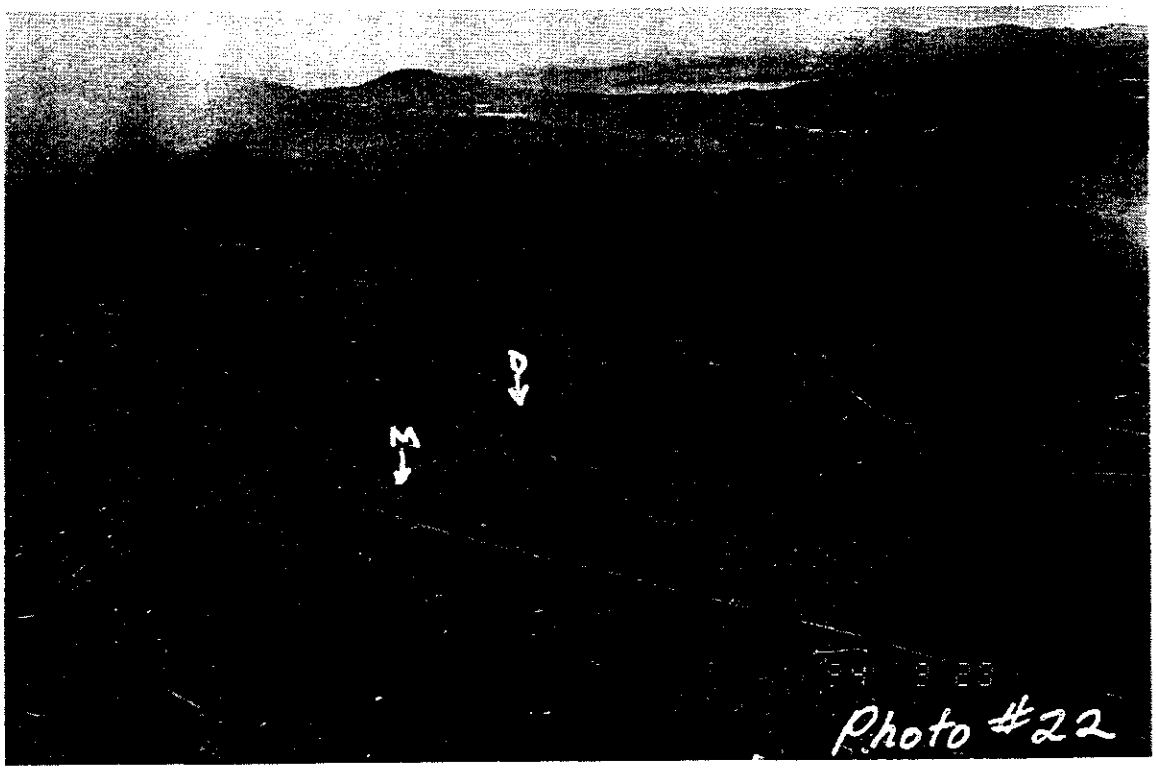

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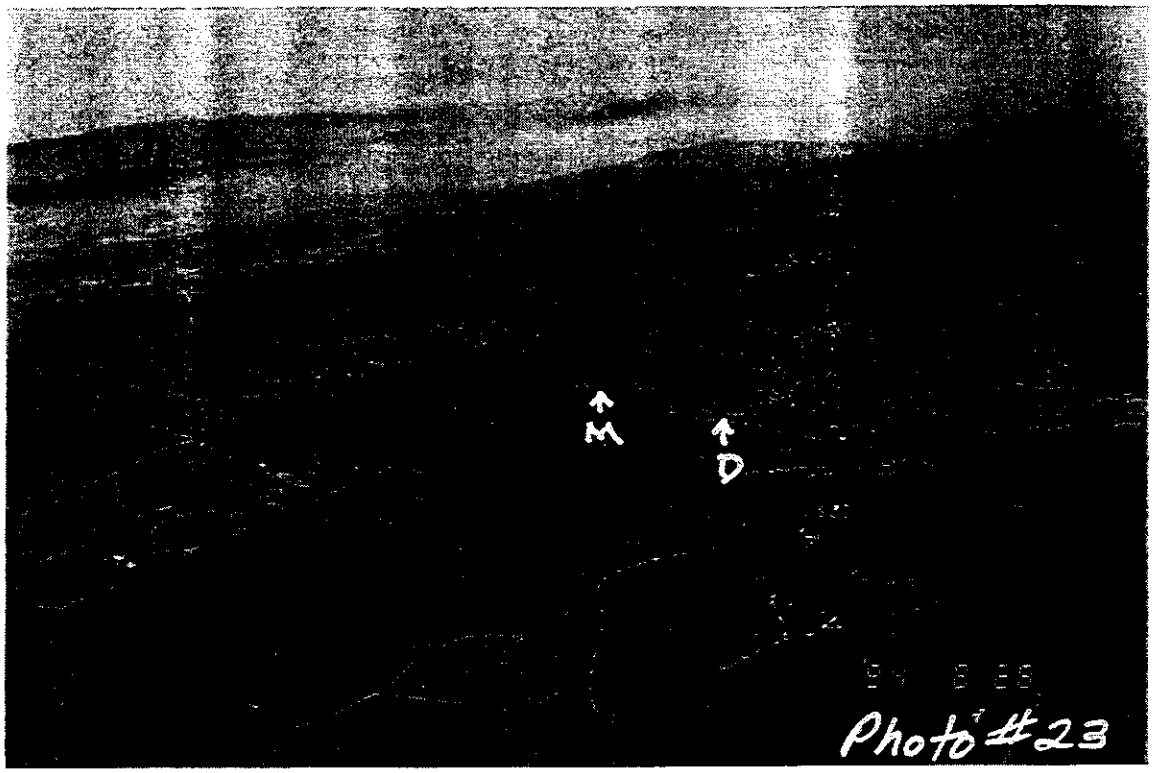

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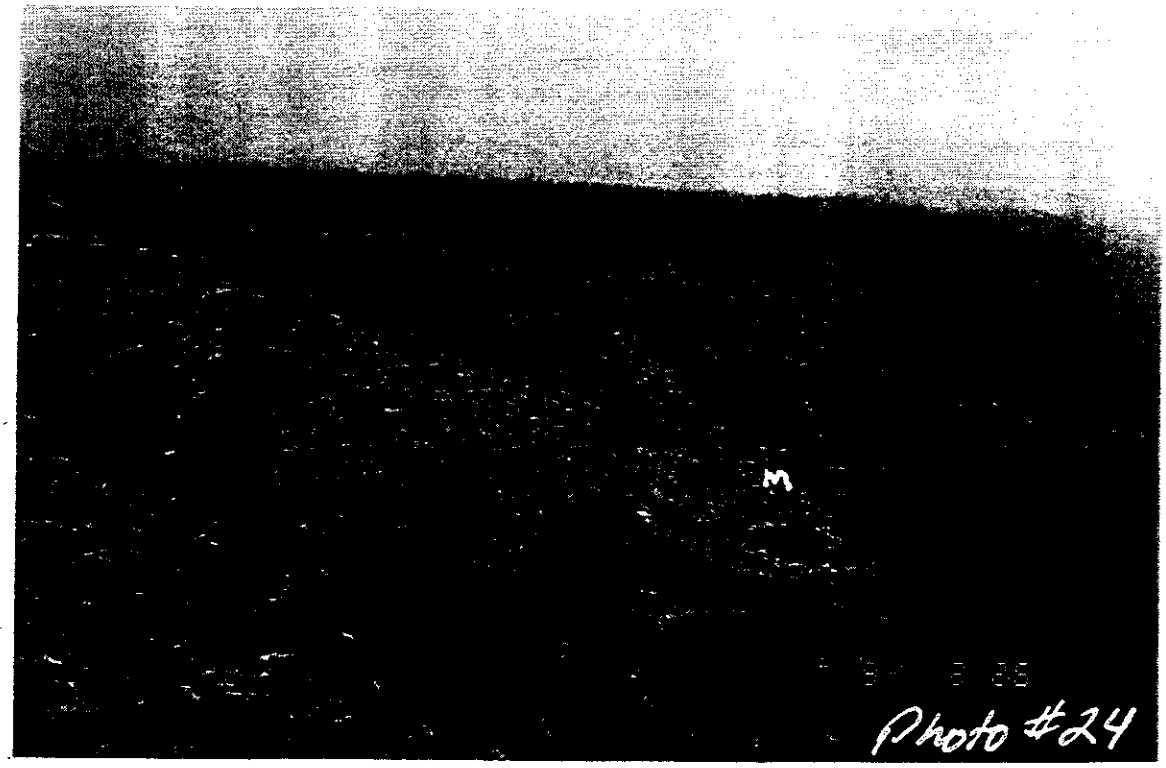

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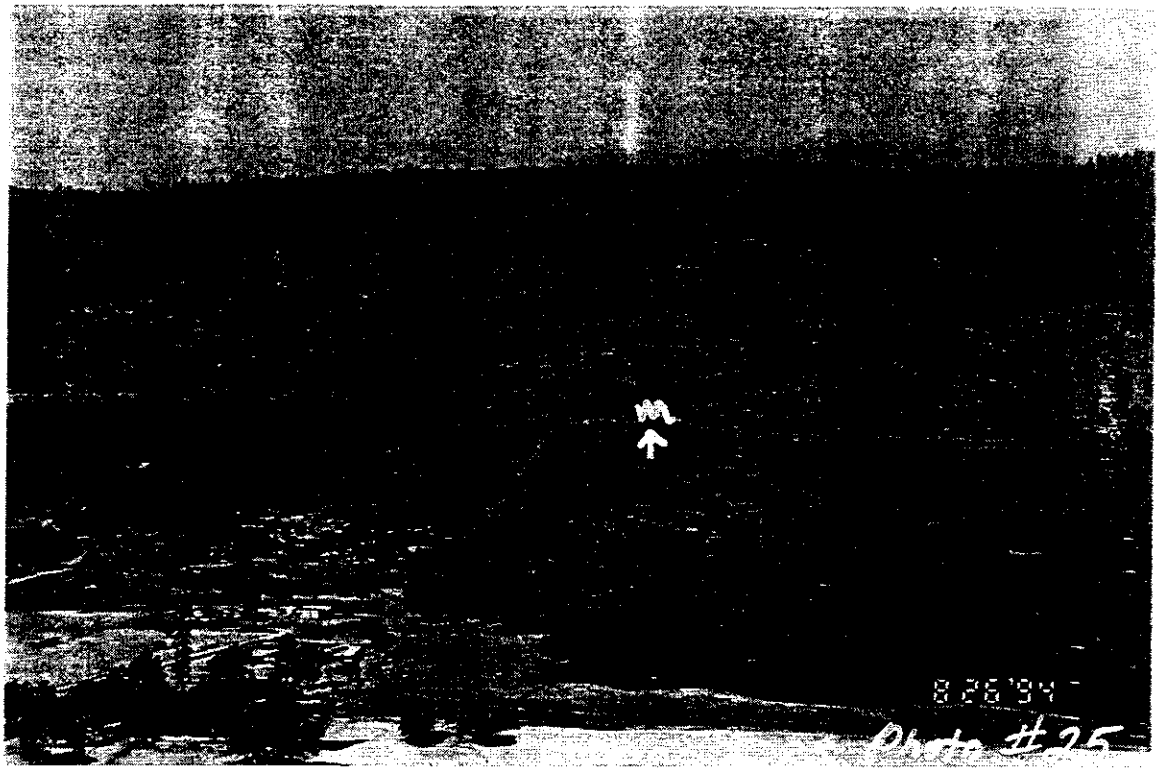
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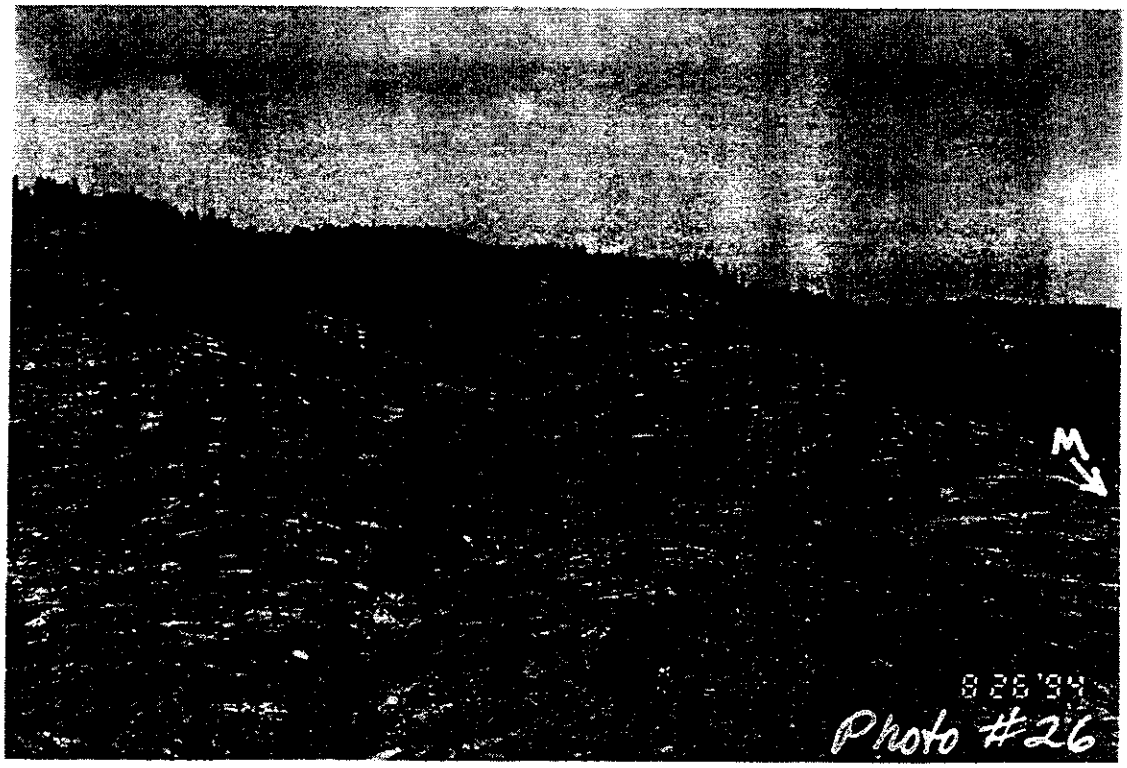
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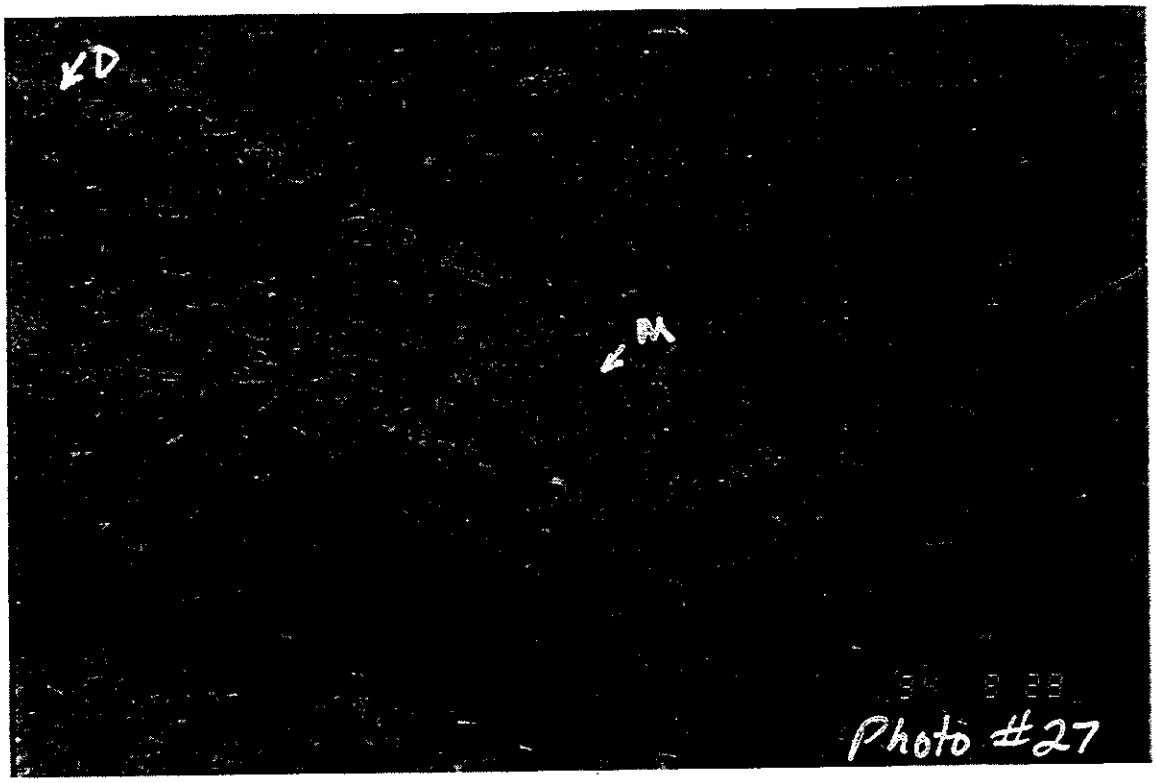

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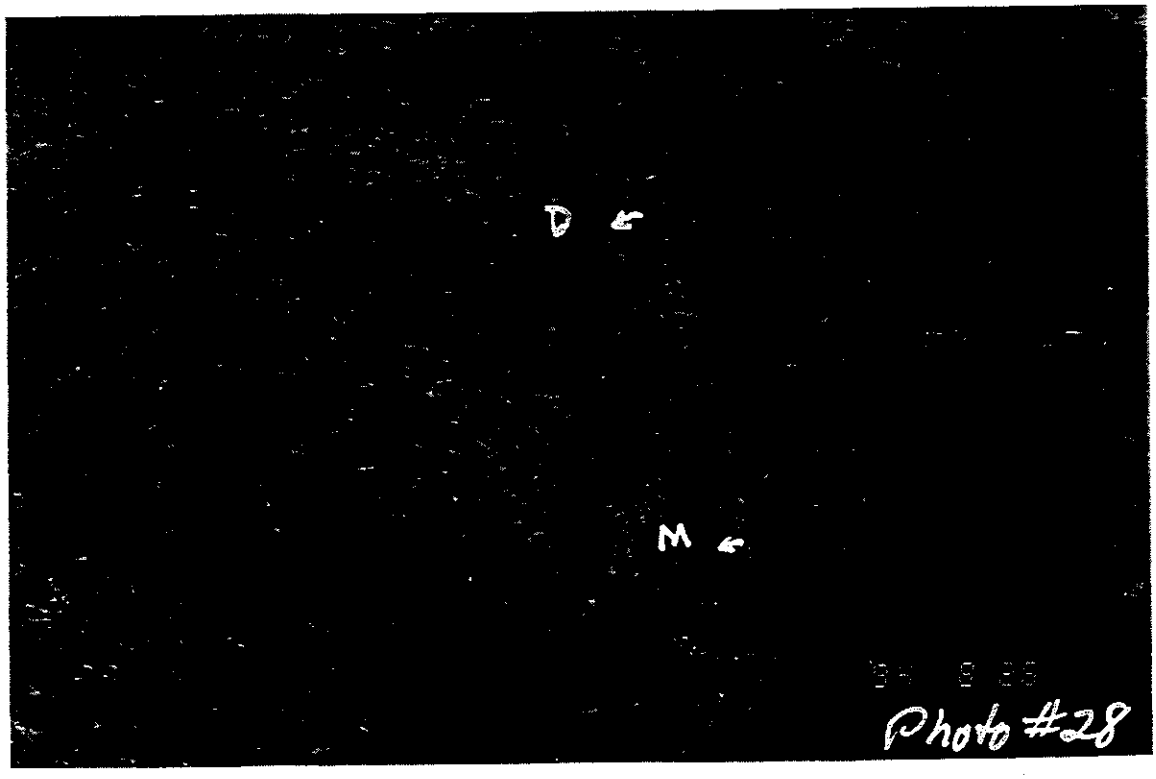

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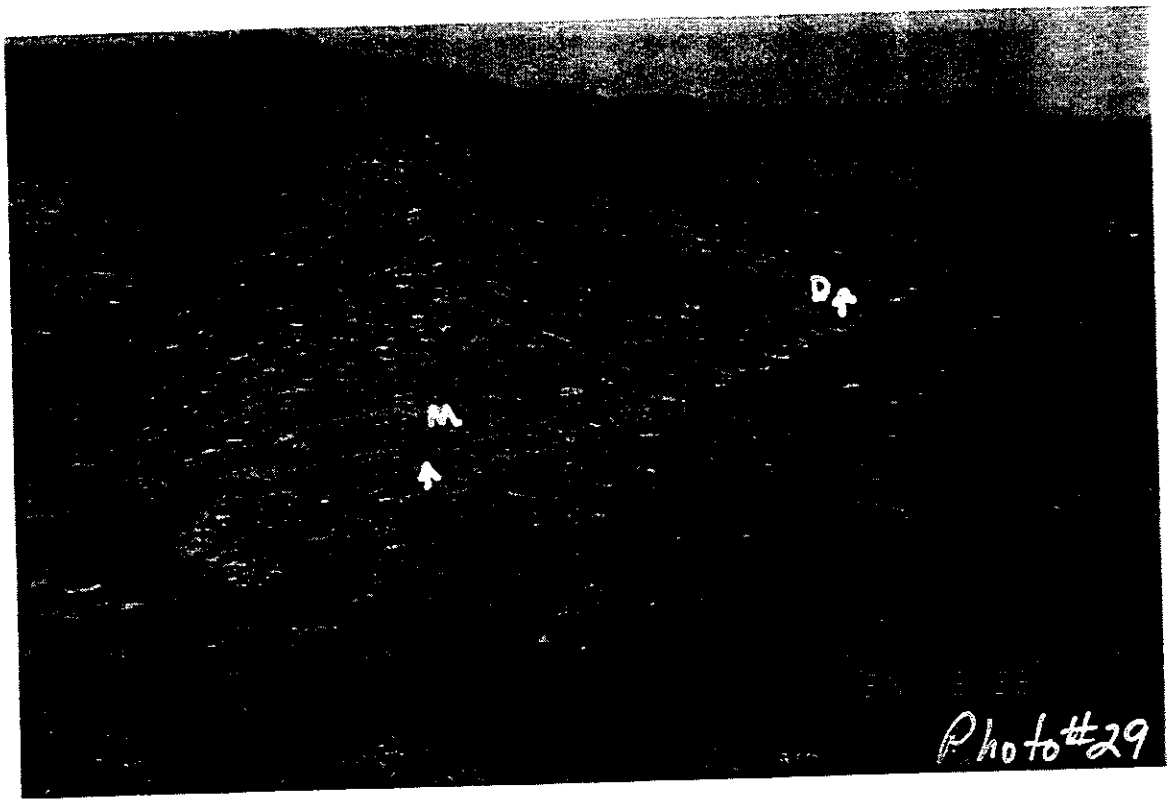
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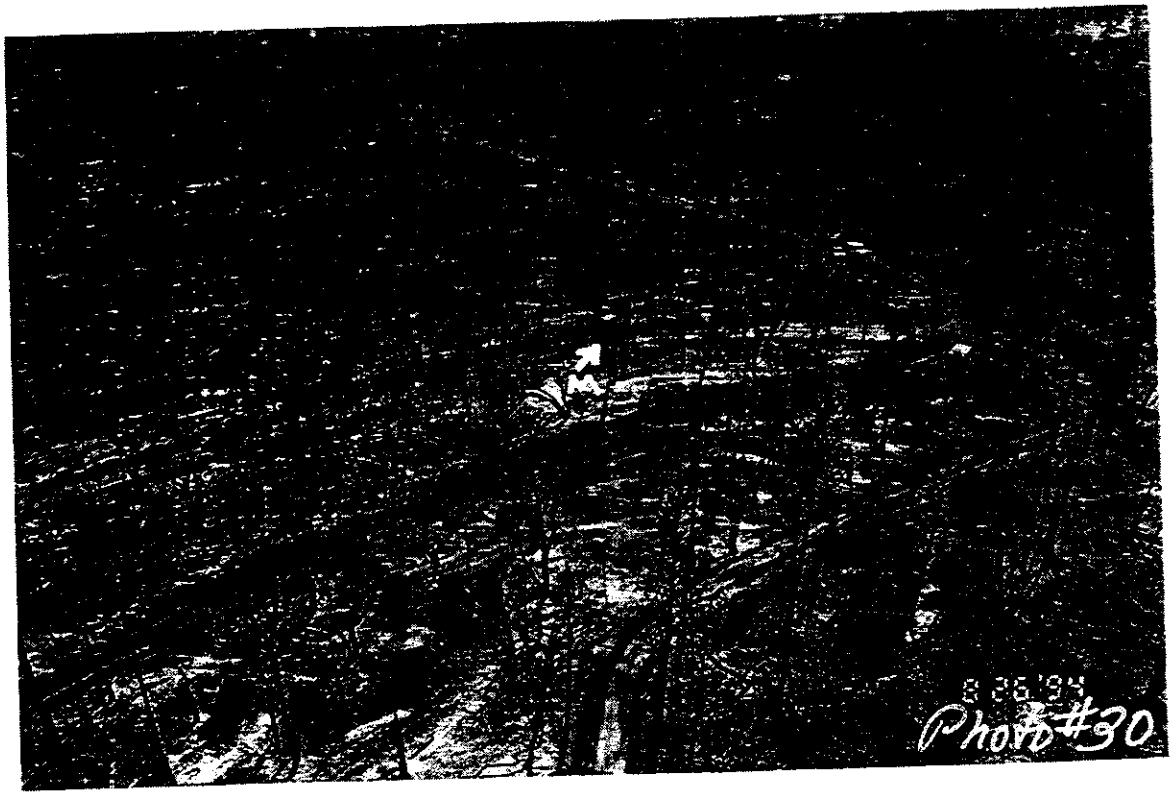
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Photo #30


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Photo #31


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Photo #32


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Photo #33


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Photo #34

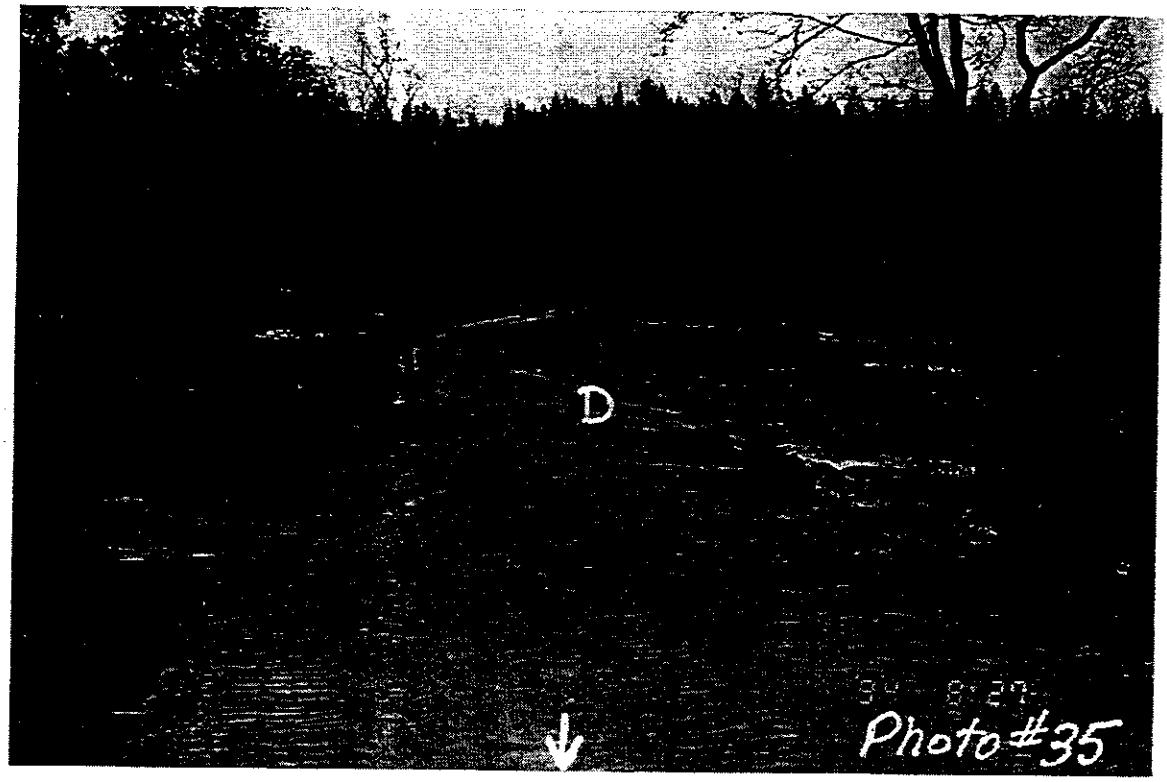
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Photo #35


Photo 36

UNIT LOG	1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED
	HULL MTN. FIRE	8/25/94	

4. UNIT NAME/DESIGNATORS.	5. UNIT LEADER (NAME AND POSITION)	6. OPERATIONAL PERIOD
	DUBAIN VERMILYEA (IFL)	DAY SHIFT

7. PERSONNEL ROSTER ASSIGNED

NAME	ICS POSITION	HOME BASE

8. ACTIVITY LOG (CONTINUE ON REVERSE)

TIME	MAJOR EVENTS
09:40	PUT DON (L) ANDERSON 500 GAL ENG TO WORK W/ HARTING CREW
10:10	RESOURCE ORDER 2 FOLDATANICS
	2 TENDERS
	5,000' 1½" HOSE
	5,000 1" HOSE
	5 CAT ED. 4's
	5 INLINE "T"s
	10 NOZZLES
	15 20 PERSON CREWS
	3 TYPE 6 ENG
11:25	Lu Kornes reports damaged phone connect at his home and broken culvert along driveway. Have permission to use pond at residence as water source.

TIME	MAJOR EVENTS
12:00	1588 D+H, Not Previously Signed up arrived at M.P. 2 on Peer Rd. Signed on and moved up Beagle Road to Clear Brush From Around House Guy Heppner Owner, Doug Knight OP Michael Ortiz swamper.
12:45	Engines & Cat at House on Beagle
13:45	Reported line jumped in grid 17P Requested Air attack
14:00	C3 Gulf dropping in area

APPENDIX F

Hull Mountain Fire
Shift Briefing Plan

Incident Objectives

Safety Message

Medical Plan

Fire Behavior Forecast

Organization Assignment List

Division Assignment Lists

Incident Radio Communication Plan

INCIDENT OBJECTIVES

1. INCIDENT NAME: Hull Mtn.

2. DATE PREPARED: 8-24-94

3. TIME PREPARED: 2130

4. OPERATIONAL PERIOD (DATE/TIME): 8-25-94 0700-1900

5. GENERAL CONTROL OBJECTIVES FOR THE INCIDENT (INCLUDE ALTERNATIVES)

1. Ensure safety of all personnel
2. Ensure protection of structures and public in area.
3. Continue to take aggressive action.
4. Tie in lines where not complete. Close the gaps.

6. WEATHER FORECAST FOR OPERATIONAL PERIOD

Smoky A.M., becoming sunny afternoon. Max temps 78-83. Min RH 25-35%. Valley winds light in A.M. W to NW 6-15 afternoon. Ridge winds N to NE early morning, NW 8 to 18 afternoon.

7. GENERAL/SAFETY MESSAGE

Keep alert and keep up the good work. Watch out for snags, rolling rocks and debris.

8. ATTACHMENTS (✓ IF ATTACHED)

- ✓ ORGANIZATION LIST (ICS 203)
- ✓ DIVISION ASSIGNMENT LISTS (ICS 204)
- COMMUNICATIONS PLAN (ICS 205)
- ✓ MEDICAL PLAN (ICS 206)
- INCIDENT MAP
- TRAFFIC PLAN
- ✓ WEATHER FORECAST
- ✓ FIRE BEHAVIOR FORECAST
- ✓ SAFETY MESSAGE

ICS 202 - ODF 7/91

9. PREPARED BY (PLANNING SECTION CHIEF): Tom Holloway

10. APPROVED BY (INCIDENT COMMANDER): Michael W. Templeton

SAFETY MESSAGE

INCIDENT: Hull Mountain Fire

DATE: 8/24/14

TIME: 2130

Day shift crews need to be certain that lookouts are established, safety zones be prepared and accessab escape routes known, and maintain good communicatio

Snags are still a problem, particularly on Divisions) & E. Be aware of rolling rocks and debris.

Watch your footing in steep areas, and watch for bees - which continue to be a problem.

The next time you fuel up, wash your vehicle windows to increase your visibility

While driving, control your speed, and drive with your lights on.

Continue to use ALL of your protective equipment and clothing. Fire shelters should be carried as this fire has high fuel loads in places.

Keep up the good work.

Think and Act Safely

Len Malmquist
Safety Officer

MEDICAL PLAN	1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED	4. OPERATIONAL PERIOD
	Hull 197th.	8/25/94	0550	

5. INCIDENT MEDICAL AID STATIONS

MEDICAL AID STATIONS	LOCATION	PARAMEDICS YES	PARAMEDICS NO
First Aid Station	Fire Camp - Valley of the Rogue	X	
Ambulance	Staging	X	

6. TRANSPORTATION

A. AMBULANCE SERVICES

NAME	ADDRESS	PHONE	PARAMEDICS YES	PARAMEDICS NO
Rogue River Fire Dept.	City of Rogue River	582-4411	X	
Mercy Ambulance	W. Main - Medford	779-6572	X	

B. INCIDENT AMBULANCES

NAME	LOCATION	PARAMEDICS YES	PARAMEDICS NO
Rogue River Rural	First Aid Station - Fire Camp	X	
Mercy Ambulance	Staging	X	

7. HOSPITALS

NAME	ADDRESS	TRAVEL TIME AIR	TRAVEL TIME GRND	PHONE	HELIPAD YES	HELIPAD NO	BURN CENTER YES	BURN CENTER NO
Providence	1111 Crater Lake Ave. Medford	10 min	30 min	776-5855	X			X
Rogue Valley Medical Center	Barnet Road Medford	10 min	30 min	770-4144	X			X
Josephine Memorial	Dimmick Grants Pass		20 min	474-6149		X		X
Southern Oregon Medical Center	Washington Grants Pass		20 min	479-7531		X		X

8. MEDICAL EMERGENCY PROCEDURES

Potentially Serious Injury - DO NOT MOVE if back or neck injury. Call Fire Camp or 911 for ambulance. Have someone available to direct ambulance to patient.

Less Serious Injury - Administer first aid and transport to ambulance or hospital if necessary

206 ICS 8/78	9. PREPARED BY (MEDICAL UNIT LEADER)	10. REVIEWED BY (SAFETY OFFICER)

NFES 1331

FIRE BEHAVIOR FORECAST NO. 2

NAME OF FIRE: HULL MTN. PREDICTION FOR: DAY

LOCATION: ODF-MEDFORD SHIFT DATE: 8/25/94

TIME AND DATE
FORECAST ISSUED: 16:00 8/24/94 SIGNED: PERILLI/MURPHY
FIRE BEHAVIOR ANALYST

WEATHER SUMMARY: Inversion weakening 0930-1000 hours, braking 1130-1330 hours. NOTE: South end of fire will experience local wind influence which creates WEST to SOUTHWEST afternoon winds!!! (SEE WEATHER FORECAST)

GENERAL FIRE BEHAVIOR
Low activity until inversion lifts. Gradual increase in behavior with torching, spotting, and short crown runs beginning by 1400-1500 hours. Fire spread will be wind driven and upslope in direction. Highest activity in wind exposed areas. Direct attack favorable in morning when flame lengths are less then 3 feet. Fire behavior in afternoon will be beyond direct attack at fire head when flame lengths reach 6-10+ feet. WATCH OUT FOR SPOTTING AND RUNS AGAINST CONTROL LINES FROM UNBURNED FUELS INSIDE FIRELINES.

SPECIFIC FIRE BEHAVIOR:
DIV A Winds will direct any fire spread to the south and east. Spotting downslope will burn back toward main fire. East flank may experience spotting and control problems.

DIV B Winds from the west may cause flare-up of hot areas along line. Spotting into grass fuels will ignite and spread readily.

DIV C South end of fire has west-southwest wind in afternoon which will cause flare-ups and possible spotting to the east. Undetected spots will become active by early afternoon. Downslope fire runs to the east may reach high spread rates due to winds.

DIV D Expect upslope and north to northwest fire spread in afternoon as flare-ups and short range spotting occurs. Steep, rugged terrain and heavy fuels will hinder control efforts. Spotting downslope will make rapid runs uphill! Watch for spots and post lookouts.

DIV E Any unburned fuels on north-northeast aspect between fire and control line will burn actively in afternoon and make uphill runs. Watch for spotting on west side of ridge into Section 2.

AIR OPERATIONS Inversion/smokey conditions will limit visibility until late morning/early afternoon. Smokey conditions may persist on downwind side of fire in late afternoon.

SAFETY: WATCH OUT FOR FALLING SNAGS! KNOW YOUR ESCAPE ROUTES AND SAFETY ZONES!!! POST LOOK-OUTS!!!!!

8111132

F 31304

STATE OF OREGON-DEPARTMENT OF FORESTRY
FIREFIGHTER EMPLOYMENT RECORD AND INVOICE

PLEASE PRINT

Name: Davis (Last) Mike (First) E (M.I.) SS or TI Number: 544-68-8543
Address: 12039 Meadows Rd
City: White City State: OR Zip: 97503
Home Phone: 826-2892 Business: 826-1848 Message:
Agency/Company: Mike Davis Bulldozing Home District/Office:

District: SWO Medford Fire Name: Hull Mnt. Fire No.: 7171191190
Hired By: Madona McCrea Date: 8/23/94 Time: 1600
Payment Type: ☐ Revolving Fund ☐ Purchase Order ☐ Timekeeping Only
Record Type: ☐ Employment ☐ Equipment ☐ Both F/EQ #
Resource Order No.: Request No.:

1. Job Assignment: Dozer op Date: Time:
Rate Type: ☐ A.D. ☐ Industrial ☐ Other Rate: $ /hr.
2. Job Assignment: Date: Time:
Rate Type: ☐ A.D. ☐ Industrial ☐ Other Rate: $ /hr.

DAILY SUMMARY

Date	Begin	End	Total	Rate					Total$	Int.	Remarks
8/23	1600	2400									
8/24	cool	0200									
8/24	1030										
		Totals									
									One Time Only Costs		
									Other Deductions		
									S.A.I.F. Deductions		
									Totals from Other Pages		
									Net (Amount Due)		

Doc. No. Doc. Date Fin. Br. Dir. Sig.

SUPERVISOR'S TIME REPORT

FORM 1-2-4-030.1
REV. 6/90

Fire Name:	Fire No:	Date:	Shift		Division Supervisor	Division	Segment
			Begin	End			
HULL MTN		8-25-94	0600		M. ROBISON	C	

PERSONNEL

Crew Name:

Name	Job	24 hr Time ON	24 hr Time OFF
1. MIKE DAVIS	CAT OP		1030
2. WAYNE MALOTTE	CAT OP	0900	1900
3. ERNIE IRONS	CAT OP		0930
4. SID MADISON	CAT OP	0930	
5.			
6. STEVE GRAY	ENGINE OP	0700	2100
7. WILLIAM SCHACHER	CREW	0700	2100
8. BRANDON CRANER FIRE	SERVICE	E-63	
9. MARK DILLAVOU		0700	1800
10. TERRA ENOS		0700	1800
11. HEVERN + SONS FIRE	FIGHTERS	E-62	
12.			
13. RICK ROHRBOUGH			
14. CITY OF MEDFORD			
15. DAVID JACOBS	TMR	0500	2200
16.			
17. MALCOLM BROWN	CAT OP	1000	1200
18. ROD BECHTOLD	SWAMPER	1000	1200
19.			
20. JACKSON CO FIRE DIST			
21. TYLER BLETCHER	ENGINE	1300	1900
22. RICK SHERIDAN	CAT OP	1300	1900

EQUIPMENT

Owner's Name	Resource # or type/size	24 hr Time ON	24 hr Time OFF	Mileage Begin	Mileage End	REMARKS
1. DAVID BRADSHAW	CASE 850	NITE SHIFT	?			ON ALL NITE
2. STUART LOGGING	CAT D6D	0600	1900			ON ALL NITE / BRUCE SUPPLIED
3. ~~STUART LOGGING~~	~~FELLER~~					
4. ~~DAVID BRADSHAW~~	~~RELIEF~~					
5.						
6.						
7.						
8. 250 GAL 4X4	E-63	0700	2100			
9.						
10.						
11. 200 GAL 4X4		0700	1800			
12.						
13.						FIRE DEPT UNION
14.						
15. DAVE CONTR	PICKUP			34431	38557	91-93
16.						
17. M. BROWN	CAT D6D	1000	1200			LEFT AREA
18.						
19.						
20. JCFD E-3	1000 GAL CK	1300	1900			BACK TO STATION
21.						
22.						

Crew Supervisor's Signature:

Is travel time to the Division included in the reported times?

Y / /

ODF Representative's Signature:

TIMEKEEPING COPY

##<A
:CZC PDXFWSMFR
TAA00 KMFR 242107
?OT FORECAST
IRE WEATHER OFFICE MEDFORD OREGON
30 PM PDT WED AUG 24 1994 CASAD

?OT WEATHER FORECAST FOR THE HULL MOUNTAIN FIRE
4S 3W SEC 25 ELEVATION 1600 FT.

ISCUSSION...UPPER LEVEL RIDGE TO REMAIN SOUTHEAST OF FIRE TODAY AND
HURSDAY. WEAK UPPER LEVEL TROUGH OFF THE COAST THIS AFTN TO DRIFT
)WARD SOUTHERN OREGON AND CROSS FIRE LATE THURSDAY. FLOW ALOFT SOUTHWEST
EXT 24-36 HRS. AIR MASS MILD AND DRY MID AND UPPER LEVELS. SFC HIGH
_ONG THE COAST THIS AFTERNOON TO WEAKEN THURSDAY AFTN. LOWER SFC PRESSURE
)UTH AND EAST OF FIRE TODAY AND THURSDSAY. SFC GRADIENT NORTHWEST TO
THEAST TODAY AND THURSDAY. SFC INVERSION TO FORM TONIGHT AND BREAK
MID MRNG THURSDAY. SFC INVERION FROM LOWER VALLEYS TO NEAR 4000 FT.

IRCRAFT OPERATIONS.....MVFR TO VFR THIS AFTN. THURSDAY IFR TO MVFR
ECOMING VFR MID MRNG THROUGH THE AFTN.

ORECAST...ALL WINDS ARE 20 FT
HIS AFTERNOON....SMOKY. MAX TEMPS 80-85 VALLEYS AND MID 70S RIDGES.
OWEST RH 25-35% VALLEYS AND 30-45% RIDGES. WINDS NORTHWEST TO NORTH
TO 12 MPH VALLEYS AND 6-15 MPH RIDGES. LAL 1.

ONIGHT...SMOKY. LOW TEMPS 46-53 VALLEYS AND 45-55 RIDGES. MAX RH
5-85% VALLEYS AND 55-75% RIDGES. WINDS LIGHT DOWN VALLEY/SLOPE 3-5
PH AND NORTH TO NORTHEAST RIDGES 6-12 MPH. LAL 1.

HURSDAY...SMOKY BECOMING SUNNY AFTN. MAX TEMP 78-83 VALLEYS AND 70-75
IDGES. LOWEST RH 25-35% VALLEYS AND 35-45% RIDGES. VALLEY WINDS LIGHT
RNG AND WEST TO NORTHWEST AFTN 6-15 MPH. RIDGE WINDS NORTH TO NORTHEAST
ARLY MRNG 6-12 MPH...AFTN NORTHWEST 8 TO 18 MPH. LAL 1

UTLOOK...FRIDAY THRU SUNDAY

LOW ALOFT SOUTHWEST TO WEST. AIR MASS A LITTLE COOLER BUT DRY MID
ND UPPER LEVEL. MARINE LAYER A LITTLE DEEPER BY LATE FRIDAY AND
ATURDAY. SFC GRADIENT ONSHR.

TLY SUNNY WITH A CHANCE OF MRNG LOW CLOUDS. TEMPS DOWN 4-9 AND
1 UP 8-12%. WINDS WEST TO NORTHWEST LIGHT NIGHT AND MRNG 8 TO 18
PH AFTN.

ND

ORGANIZATION ASSIGNMENT LIST

1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED
Hull Mtn	8-25-9-	0400

4. OPERATIONAL PERIOD (DATE/TIME): 0700 to 1900

POSITION	NAME
5. INCIDENT COMMANDER AND STAFF	
INCIDENT COMMANDER	Mike Templeton
DEPUTY	Bill [illegible]/Gary Beer
SAFETY OFFICER	Len Malmquist/Larry [illegible]
INFORMATION OFFICER	Mike Borgstie/Don Ferguson
LIAISON OFFICER	
6. AGENCY REPRESENTATIVES	
AGENCY / NAME	
7. PLANNING SECTION	
CHIEF	Ross Hollowing
DEPUTY	Jim Young
RESOURCES UNIT	Dan Bare
SITUATION UNIT	Rick Rogers
DOCUMENTATION UNIT	
DEMOBILIZATION UNIT	
TECHNICAL SPECIALISTS	
Structural Deputy	Brett Fillis
8. LOGISTICS SECTION	
CHIEF	Mike Curry
DEPUTY	David Curry/Bob Butts (Staging Area)
a. SUPPORT BRANCH	
DIRECTOR	Bernie Boschler
~~SUPPLY UNIT~~ Staging Area Mgr.	Alan Berry
FACILITIES UNIT	
GROUND SUPPORT UNIT	Lew Downs Steve Pettit Steve Ferguson
b. SERVICE BRANCH	
DIRECTOR	Malcolm Hiatt
COMMUNICATIONS UNIT	
MEDICAL UNIT	
FOOD UNIT	Peggie Rea

9. OPERATIONS SECTION		
CHIEF		Melvin Thornton
DEPUTY		
a. BRANCH I — DIVISIONS/GROUPS		
BRANCH DIRECTOR		
~~DEPUTY~~		
DIVISION/~~GROUP~~	A	Lorenz
DIVISION/~~GROUP~~	B	Cline
DIVISION/~~GROUP~~	C	Robinson
DIVISION/~~GROUP~~	D	Wrench
DIVISION/~~GROUP~~	E	Young
b. BRANCH II — ~~DIVISIONS/GROUPS~~ Structure		
BRANCH DIRECTOR		Moran
DEPUTY		
DIVISION/GROUP	2	
DIVISION/GROUP	3	Griffith
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
c. BRANCH III — DIVISIONS/GROUPS		
BRANCH DIRECTOR		
DEPUTY		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
d. AIR OPERATIONS BRANCH		
AIR OPERATIONS BR. DIR.		Pilot Hufstader
AIR ATTACK SUPERVISOR		Craig MacKay
AIR SUPPORT SUPERVISOR		
HELICOPTER COORDINATOR		
AIR TANKER COORDINATOR		

10. FINANCE SECTION	
CHIEF	Chuck Anderson
~~DEPUTY~~ Fiscal Officer	Pat Hefton
TIME UNIT	Jeanne Sanderson
PROCUREMENT UNIT	
COMPENSATION/CLAIMS UNIT	
COST UNIT	

1. BRANCH

2. DIVISION/GROUP A

DIVISION ASSIGNMENT LIST

3. INCIDENT NAME Hull Mountain

4. OPERATIONAL PERIOD
DATE 8/25/94
TIME 0700-1900 Day Shift

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF Mel Thornton

DIVISION/GROUP SUPERVISOR Dave Lorenz

~~BRANCH DIRECTOR~~ TFL Dave Beek O-619
Jim Heines

AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	TRANS. NEEDED	DROP OFF PT./TIME	PICK UP PT./TIME
C 10 White Fang	Jeanette	20			
C 25 Miller	John Jayne	20			
C Timberline	Swanson	20			
E 57 250	S+G Service Rdtn	2			
E 79 300 4x4	West Inc	2			ETA 0600
Tender 2500 gal	Evans Valley #6	1			
E20 D D7 Sm Bull	Smith	2			
Fallers: Juan Bodrez plus 3		4			

TROL OPERATIONS

8. SPECIAL INSTRUCTIONS

9. DIVISION/GROUP COMMUNICATION SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN.	FUNCTION		FREQ.	SYSTEM	CH
COMMAND	LOCAL				STATUS/ LOGISTICS	LOCAL			
	REPEAT					REPEAT			
DIV./GROUP TACTICAL					GROUND TO AIR				

PREPARED BY (RESOURCE UNIT LDR.)

APPROVED BY (PLANNING SECT. CH.)

DATE

TIME

ICS 1/82
NFES 1328

1. BRANCH

2. DIVISION/GROUP 13

DIVISION ASSIGNMENT LIST

3. INCIDENT NAME Hull Mountain

4. OPERATIONAL PERIOD DATE 8/25/91 TIME 0700 - 1930 Day Sh.

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF Mel Thornton

DIVISION/GROUP SUPERVISOR Greg Cline

~~BRANCH DIRECTOR~~ TFUL Dennis Klein 0-713 TFL? Craig Shimp

AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	TRANS. NEEDED	DROP OFF PT./TIME	PICK UP PT./TIME
C11 Skamkum	Henry Jones	20			
C Forest Air Future	Ser Vrons	20			
C7 C&R Reforest	A. Todd	20			
E5E 200g 4x4	Darren Welburn	2			
200g 4x4	Burns - Cooper	2			
E40T Tepler	Covered Bridge Cont	2			
E2T Tender	Halicka	2			
E14T 3500g	Griswold	2			
E72T 3000g	Clyde Petty	2			
E83E 200 4x4	Havern & Son	2			
E84E 200 4x4	Havern & Son	2			
E85E 200 4x4	Wildfire Control Corp.	2			ETA ?
E86E 200 4x4	GHR Resources	2			
E87E 200 4x4	GHR Resources	2			

7. CONTROL OPERATIONS

8. SPECIAL INSTRUCTIONS

9. DIVISION/GROUP COMMUNICATION SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN.	FUNCTION		FREQ.	SYSTEM	CH
COMMAND	LOCAL				STATUS/ LOGISTICS	LOCAL			
	REPEAT					REPEAT			
DIV./GROUP TACTICAL					GROUND TO AIR				

PREPARED BY (RESOURCE UNIT LDR.)

APPROVED BY (PLANNING SECT. CH.)

DATE

204 ICS 1/82

NFES 1328

1. BRANCH

2. DIVISION/GROUP C

DIVISION ASSIGNMENT LIST

3. INCIDENT NAME Hull Mountain

4. OPERATIONAL PERIOD
DATE 8/2c/94
TIME 0700 - 1900 Day Shift

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF Mel Thornton
Dozer Boss - Darrin Cone
BRANCH DIRECTOR Trainee - Barb Moore

DIVISION/GROUP SUPERVISOR Mike Robison
TFL - Pat Maloney, Wels Storkson Rolland Cabibag
AIR ATTACK SUPERVISOR NO. Craig Mackey
TFL Steve Strunk, DAVID Jacobs

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	TRANS. NEEDED	DROP OFF PT./TIME	PICK UP PT./TIME
C-21 Patrick	[illegible]	19			
C-12 Skookum	Ferrer	20			
C-13 Skookum	Rangers / Communications	20			
E-7-E 300 gal 4x4	Sanders	2			
E-45-E [illegible] 4x4	Alexander	2			
E-48-E 300 gal 4x4	ATC Interns	2			
E-10-T	Burrill	1			
E- -D D6 Estramada	Wilson	1			
E-55 D Dozer	Andersen	1			
E- -D D6 [illegible]	Baker	1			
E -D Case 550	Davis	1			
E- D D6 Stout	Wagner	1			
E-14-T 3000 gal	Brunkhorst	1			
E-76-T 3800 gal	Powell/Hostler	2			
E-95-E 200 gal 4x4	Patrick	2			
E 200 gal 4x4	Pat Rick	2		ETA Dock	
ROL OPERATIONS					
-17-E 200 gal 4x4	Pat Rick	2			
E-98 E 200 gal 4x4	Pat Rick	2			
O-721 Falling Crew	Lloyd Jule	2			
O-703 Falling Crew	Tom Pardu	2			
E-80E 200 gal 4x4	[illegible]	2		ETA ?	
E 81 E 200 gal 4x4	[illegible]	2			
E 82E 200 gal 4x4	Hanson & Son	2			
C-23 Timberland	Hartley	2			
C-42 Pacific Rim	[illegible]	2			
C-36 OPCal #1	[illegible]	2			

8. SPECIAL INSTRUCTIONS

9. DIVISION/GROUP COMMUNICATION SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN.	FUNCTION		FREQ.	SYSTEM	CHA
COMMAND	LOCAL				STATUS/ LOGISTICS	LOCAL			
	REPEAT					REPEAT			
DIV./GROUP TACTICAL					GROUND TO AIR				

PREPARED BY (RESOURCE UNIT LDR.)

APPROVED BY (PLANNING SECT. CH.)

DATE

TIME

204 ICS 1/82
NFES 1328

1. BRANCH

2. DIVISION/GROUP D

DIVISION ASSIGNMENT LIST

3. INCIDENT NAME Hull Mountain

4. OPERATIONAL PERIOD
DATE 8/25/94
TIME 0700-1900 Day Shift

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF Mel Thornton
DIVISION/GROUP SUPERVISOR Lee Vaughn
~~BRANCH DIRECTOR~~ TFL Ken Faulk
AIR ATTACK SUPERVISOR NO. TFL - Jessie Blair

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	TRANS. NEEDED	DROP OFF PT./TIME	PICK UP PT./TIME
C6 C+F Rcforrst.	Harry Winston	21			
C14 Umpqua Valley	Bartolo Ramos	20			
C15 Sulfridge	Carl Nash	20			
C16 Sulfridge	Steve Knighton	20			
C17 Oregon Wood	Al Higgins	20			
C18 Oregon Wood	Reggie Soto	20			
E41E 2000g 4x4	Valley Fire	2			
E-93 1000g 4x4	Conover	2			
E-94 2000g 4x4	Pineview Rld	2			
E-88 2000g 4x4	Cahill Resources	2			ETA !
E73T 2500g	First Strike B. Hardage	2			
E53D Dozer	Hegler	1			
Fallers; Scott Car 50h O-704 Jack Eary		0-705			
O-694 Dozer Boss	Art Ramon	1			

7. CONTROL OPERATIONS
O-686 Faller Boss Rick Kern 1

8. SPECIAL INSTRUCTIONS

9. DIVISION/GROUP COMMUNICATION SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN.	FUNCTION		FREQ.	SYSTEM	CH.
COMMAND	LOCAL				STATUS/ LOGISTICS	LOCAL			
	REPEAT					REPEAT			
DIV./GROUP TACTICAL					GROUND TO AIR				

PREPARED BY (RESOURCE UNIT LDR.)

APPROVED BY (PLANNING SECT. CH.)

DATE

T

204 ICS 1/82
NFES 1328

1. BRANCH

2. DIVISION/GROUP E

DIVISION ASSIGNMENT LIST

3. INCIDENT NAME

4. OPERATIONAL PERIOD
DATE 8/25/94
TIME 0700-1900

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF Mel Thornton

DIVISION/GROUP SUPERVISOR Bob Young

BRANCH DIRECTOR TFL Marvin Vetter, Jeff Brown

AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	TRANS. NEEDED	DROP OFF PT./TIME	PICK UP PT./TIME
C-19 Strada	Wood	2-6			
C-21 Pat Rick	Leonard	2			
C-22 Pat Rick	Smith	2			
E-89E 200 gal 4X4	High Country Wildfire	2		ETA 0800	
E 90E 200 gal 4x4	High Country Wildfire	2		ETA 0800	
E91E 200 gal 4X4	Enterprises	2		ETA 0800	
E92E 200 gal 4X4	Lawrence	2		ETA ?	
E47E 315 gal 4X4	R. Ranger	2			
E49E 200 gal 4x4	ODF / Carter	2			
E50E 200 gal 4X4	ODF / Cottrell	2			
E51E 200 gal 4X4	McMichael	2			
E14T	Brookens	1			
O-706 Falling Crew	Rocco Warren	2			
O-707 Falling Crew	J. Hardin	2			
O-687 Faller Boss	Driskell	1			
F 200 gal 4X4 ROL OPERATIONS	Farnsworth	2			
DG (Wilson)	Newsome	1			
E-16 DB (Bristol)	Gibson	1			
O- Dozer Boss	Winkle	1			

8. SPECIAL INSTRUCTIONS

9. DIVISION/GROUP COMMUNICATION SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN.	FUNCTION		FREQ.	SYSTEM	CHA
COMMAND	LOCAL				STATUS/ LOGISTICS	LOCAL			
	REPEAT					REPEAT			
DIV./GROUP TACTICAL					GROUND TO AIR				

PREPARED BY (RESOURCE UNIT LDR.)

APPROVED BY (PLANNING SECT. CH.)

DATE

TIME

ICS 1/82
NFES 1328

1. BRANCH: STRUCTURAL	2. DIVISION/GROUP: 2	**DIVISION ASSIGNMENT LIST**	ICS 204 (1-82)

3. INCIDENT NAME: HULL MTN	4. OPERATIONAL PERIOD: DATE 8/24 TIME 0700

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF: THORTON — DIVISION/GROUP SUPERVISOR:

BRANCH DIRECTOR: MORAN — AIR ATTACK SUPERVISOR:

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	TRANS. NEEDED	DROP OFF PT./TIME	PICK UP PT./TIME
WTF-4	8100			1000	

7. CONTROL OPERATIONS

PROTECT STRUCTURES IN THE RAMSEY RD AREA. SEE ACCOMPANYING MAP

8. SPECIAL INSTRUCTIONS

9. DIVISION/GROUP COMMUNICATION SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN.	FUNCTION		FREQ.	SYSTEM	CHAN.
COMMAND	LOCAL				SUPPORT	LOCAL			
	REPEAT					REPEAT			
DIV./GROUP TACTICAL		154.280	STM		GROUND TO AIR				

PREPARED BY (RESOURCE UNIT LDR.)	APPROVED BY (PLANNING SECT. CH.)	DATE	TIME
DAN PETERSEN			

7540-130-0285

1. BRANCH	2. ~~DIVISION/GROUP~~	DIVISION ASSIGNMENT LIST	ICS 204 (1-82)
STRUCTURAL	3		

3. INCIDENT NAME	4. OPERATIONAL PERIOD
HULL MTN	DATE 8/24 TIME 0700

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF: THORTON	DIVISION/GROUP SUPERVISOR: GRIFFITH
BRANCH DIRECTOR: MORAN	AIR ATTACK SUPERVISOR:

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	TRANS. NEEDED	DROP OFF PT./TIME	PICK UP PT./TIME
STF-6	8800			0600	
STF-2	8400 Ray			1000	

7. CONTROL OPERATIONS

PROTECT STRUCTURES IN THE DUGAN ROAD AREA → BE ~~PREPARED~~ PREPARED FOR POTENTIAL SPOT FIRES

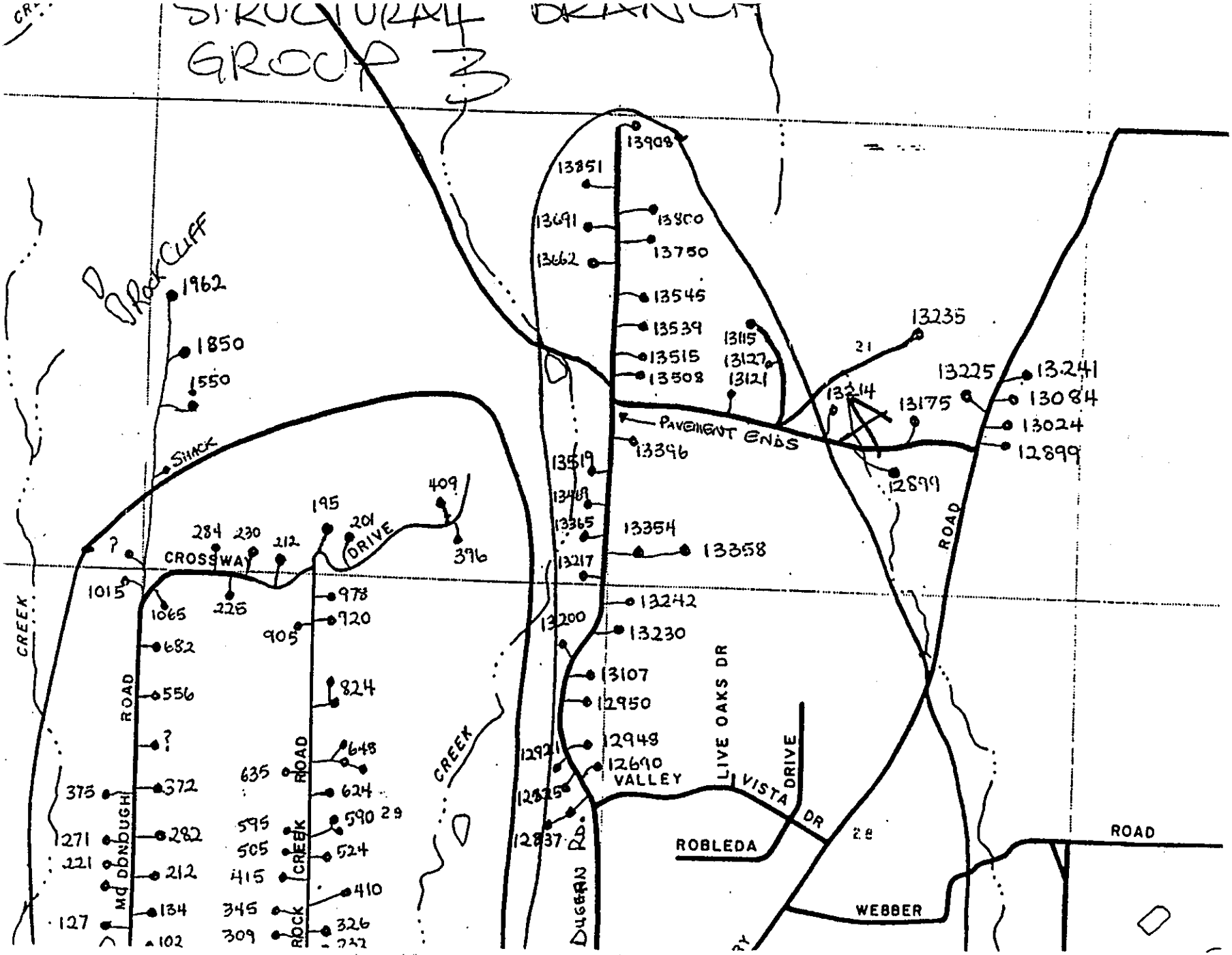
8. SPECIAL INSTRUCTIONS

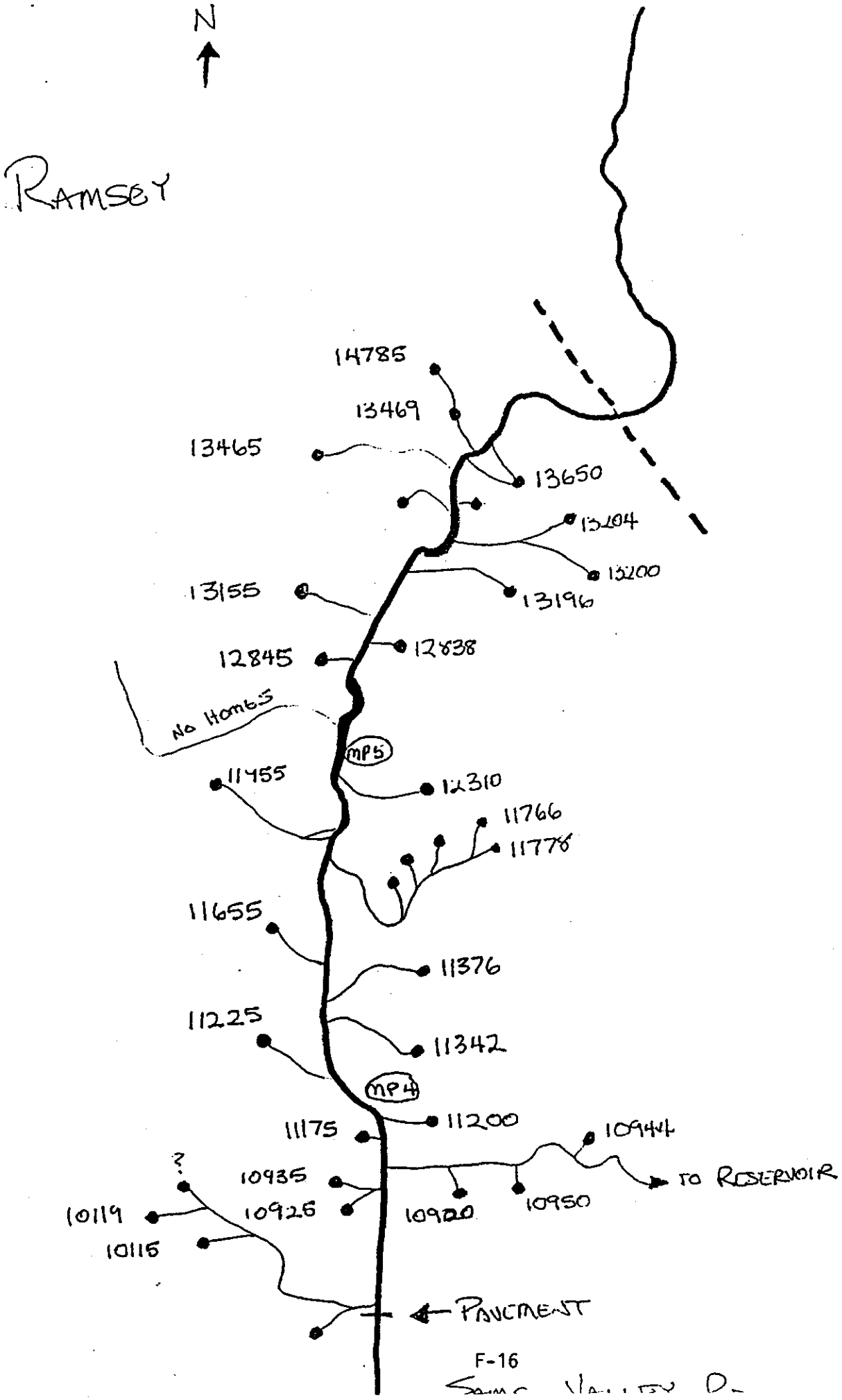
9. DIVISION/GROUP COMMUNICATION SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN.	FUNCTION		FREQ.	SYSTEM	CHAN.
COMMAND	LOCAL				SUPPORT	LOCAL			
	REPEAT					REPEAT			
DIV./GROUP TACTICAL		154.280	SEM		GROUND TO AIR				

PREPARED BY (RESOURCE UNIT LDR.)	APPROVED BY (PLANNING SECT. CH.)	DATE	TIME
DAN PETERSEN			

7540-130-0285


STRUCTURAL
GROUP 3
ROCKCLIFF
1962
1850
1550
SHACK
CROSSWAY
284
230
212
195
201
DRIVE
409
396
?
1015
1065
225
978
920
905
682
556
824
?
372
282
212
134
102
MD DONOUGH
ROAD
635
648
624
590
595
505
524
415
410
345
326
309
ROCK CREEK
ROAD
CREEK
CREEK
13908
13851
13691
13800
13662
13750
13545
13539
13515
13508
13115
13127
13121
13235
21
13225
13241
13214
13175
13084
13024
12899
PAVEMENT ENDS
13396
12899
13519
13354
13358
13365
13217
13242
13200
13230
13107
12950
12948
12921
12690
12825
12837
VALLEY
LIVE OAKS DR
VISTA DRIVE
DR
ROBLEDA
DUGGAN RD.
ROAD
WEBBER
ROAD
28
29


N
RAMSEY
14785
13469
13465
13650
13204
13200
13155
13196
12845
12838
No Homes
MP5
11455
12310
11766
11778
11655
11376
11225
11342
MP4
11175
11200
10944
TO RESERVOIR
10935
10926
10920
10950
10119
10116
?
PAVEMENT

INCIDENT RADIO COMMUNICATIONS PLAN

1. Incident Name:	2. Date/Time Prepared:	3. Operational Period:
HULL MT.	2230 8/23/94	8/25 0700 - 1900

4. Basic Radio Channel Utilization - SWO Net 3

System/Cache	Portable Channel	Function	Frequency	Assignment	Remarks	Mobile Chn	Mobile Tone
Fire Cache Tac 1	1	Tactical	159.315	Div. A		15	D
Fire Cache Tac 2	2	Tactical	159.285	Div. B		16	D
Fire Cache Tac 3	3	Tactical	159.405	Div. C		17	D
Fire Cache Tac 4	4	Tactical	159.375	Div. D		18	D
Fire Cache Tac 5	5	Tactical	159.435	Div. E		19	D
ODF NICS	6	Air-Ground	159.240	Air Ops 1		10	D
Fire Cache Relay A	7	Command	T 159.465 | Tone 162.2 R 158.895	Fire Relay		20	D
Fire Cache Relay B	8	Command	T 159.465 | Tone 167.9 R 158.895	2nd Fire Relay		20	E
~~Fire Cache Relay C~~	~~9~~	~~Command~~	T 151.235 | Tone 131.8 R 151.235	~~Backup Relay~~ X		X	A
White Net	10	Logistics	151.310	Camp Net		8	D
State Fire Marshal	11	Structural	154.280	Fire Depts	BETWEEN TASK FORCE APPARATUS	13	D
Red Net	12	Wildcard	151.340			7	D
~~NICS Gallup~~	~~13~~	~~Air-Ground 2~~	~~168.550~~	~~Air Ops 2~~		9	D
MEDFORD DIRECT	14	DISTRICT	151.175 TONE 179.9	DISTRICT COMMUNICATIONS		X	D

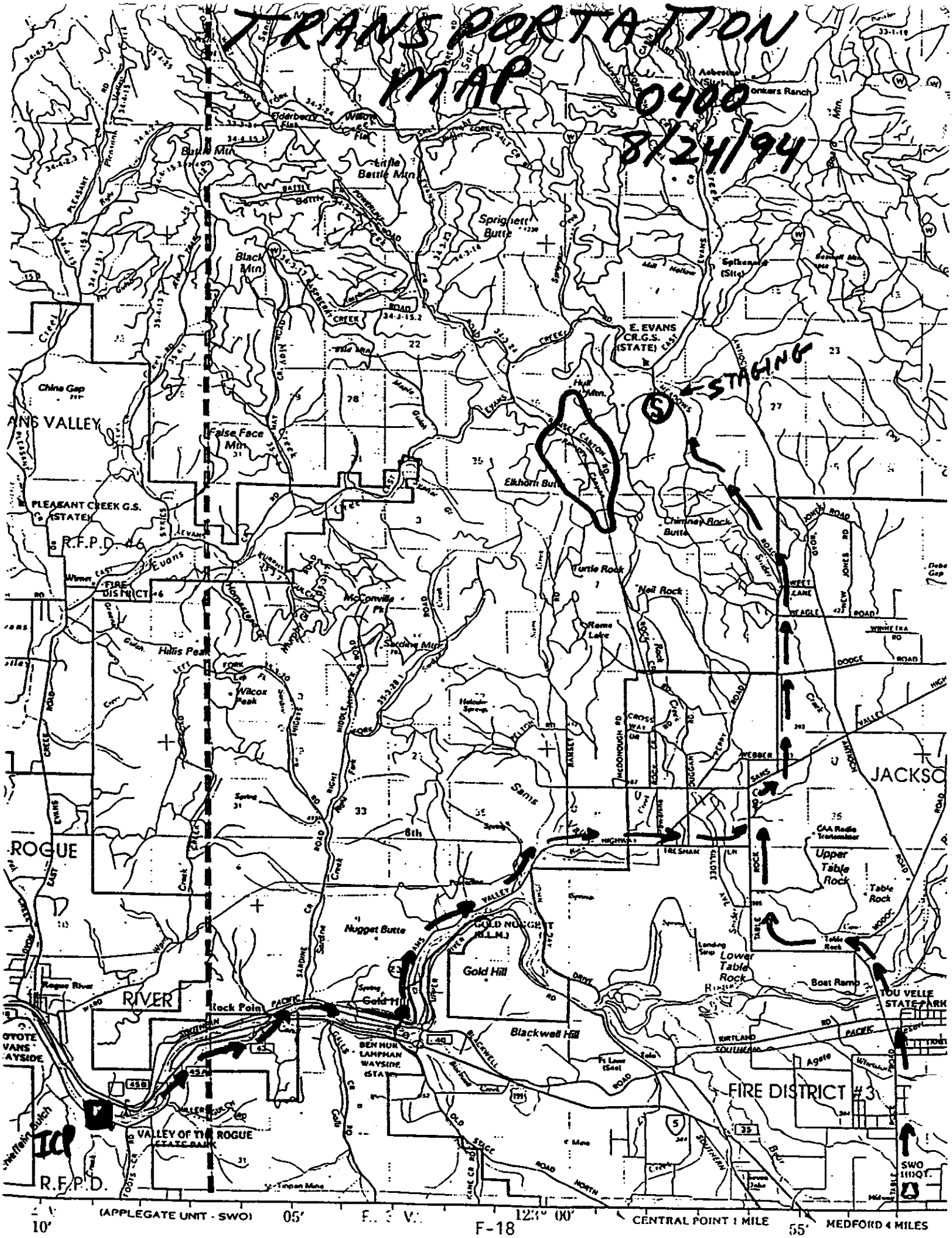
ODF - SWO 8/92

5. Prepared by: (Communications Unit)
BILL OSTRANDER - SWO

X-Not avail. on mobiles.
Cross out channels not used on this incident.

X If Fire Cache Relay C is used, Div. B will move to Fire Cache Tac 5.

FLIGHT FOLLOWING WILL BE ON 122.925 (AIRCRAFT BAND)


TRANSPORTATION MAP
0400
8/24/94
STAGING
E. EVANS CR.G.S. (STATE)
PLEASANT CREEK G.S. (STATE)
R.F.P.D. #6
FIRE DISTRICT #6
R.F.P.D.
FIRE DISTRICT #3
VALLEY OF THE ROGUE STATE PARK
TOU VELLE STATE PARK
GOLD NUGGET (B.L.M.)
BEN HUR LAMPMAN WAYSIDE (STATE)
ANS VALLEY
ROGUE
RIVER
JACKSO
Elkhorn Butte
Chimney Rock Butte
Turtle Rock
Neil Rock
Rams Lake
Nugget Butte
Gold Hill
Blackwell Hill
Upper Table Rock
Lower Table Rock
Table Rock
Boat Ramp
Rock Point
Gold Hill
Hillis Peak
Wilcox Peak
McConville Pk
Sardine Mtn
False Face Mtn
Black Mtn
Little Battle Mtn
Sprighett Butte
Hoff Mtn.
China Gap
Asbestos (Site)
Orkers Ranch
Spikenard (Site)
Elderberry Flat
Willow Flat
Battle Mtn
Holcolm Springs
Rams Lake
CAA Radio Transmitter
(APPLEGATE UNIT - SWO)
CENTRAL POINT 1 MILE
MEDFORD 4 MILES
F-18

APPENDIX I

Weather and Fire Behavior Summary

Haines Index

Oregon Weather and Climate Conditions

WEATHER AND FIRE BEHAVIOR SUMMARY
HULL MOUNTAIN FIRE

THURSDAY, AUGUST 25, 1994

Preliminary report prepared August 26, 1994, 1200 hours by Tom Murphy and Dennis Perilli, Fire Behavior Analysts, Oregon Department of Forestry Fire Team III, Hull Mountain Fire, Central Point, Oregon.

Weather For August 25, 1994

Inversion persisted throughout the morning into early afternoon. Gradual lifting began at 0930 hours, with complete lifting occurring by 1330 hours. With inversion gone, upslope/upcanyon winds started to influence fire behavior. Heating and burning increased. Prevailing winds combined with topographic winds to increase heat intensities. By 1500 hours smoke column development was prevalent on all Divisions.

General winds on the south end of fire were from the southwest to west due to the influence of the I-5 corridor. The north end of the fire experienced northwest to north winds with occasional northeast flows. Heat from smoke columns created enough force to produce indrafts of wind which influenced wind flows up to 1/2 mile away. This created local erratic wind directions with midflame winds steady at 6-12 MPH and gusts observed 12-15 MPH and up to 25 MPH in areas near columns.

Relative humidities remained above 30 percent until the inversion lifted, then dropped into the mid to low 20's by mid-afternoon.

The forecasted Haines Index, which measures atmospheric conditions relating to extreme fire behavior, was a 3 or low for the High Elevations Index which is the recommended Index to use for the western USA. Haines Index predicted for the Mid Elevation Index was a 6 or high (See Attachment #1). The Mid Elevation Index is typically only used in the Mid-West portions of the USA. Fire behavior conditions on this low elevation valley fire indicate that the actual Haines Index on the fire was most likely near a 6 level, the Mid Elevation Index.

Observations:

DIV D-DP30 - 0800 hr Temp 60 RH 68% Wind 0
DIV D-DP35 - 0920 hr Temp 64 RH 38% Wind 0
DIV D-DP35 - 1009 hr Temp 69 RH 38% Wind 0-2 East

DIV C-DP20 - 1500 hr Temp 90 RH 22% Wind 0-5 NW
DIV A-DP40 - 1540 hr Temp 89 RH 23% Wind 1-10 N-NW
DIV E - 1630 hr Temp 85 RH 22% Wind 5 South
DIV C-DP20 - 1630 hr Temp 87 RH 24% Wind 0-2G6 W-NW

Weather Forecasts, both general and spot forecast for the fire are attached (Attachments #2,3). Additional observations from Incident Meteorologist John Casad are included in Attachment #4.

Fire Behavior for August 25, 1994

GENERAL

Fire activity was low under the inversion. Little fire spread was occurring, mainly larger fuels burning out and minor creep in light fuels and grass. Activity increased as the inversion lifted at approximately 1330 hours. Hot areas began to build in intensity and smoke plumes started to form. Heating increased and smoke plumes developed more vertical height from 1400 hours on. By 1500 hours activity was reaching high levels. Plumes developed in all Divisions except B. The largest plumes and activity was in Division C on the southeast corner, and on the west side (later called Div G). Other areas included south flank on Division D, west flank of Division E, and west flank of Division A. At 1600 hours fire spread was slowly beginning. Heating with individual torching and short range spotting was widespread in areas mentioned above. Fire Behavior Forecast is attached (See Attachment #5).

DIVISION C

The southeast corner of Division C began to develop a large plume By 1600 hours. By 1615 crowning was occurring as fire spread began to occur to the east with some south flanking spread.

The fire on the southeast corner of Division C was burning in fuels consisting of dense timber with full crowns and ladder fuels for most of the day. Fire spread was relatively slow in these fuels but heat intensity was great. The fire advanced downslope through these fuels for approximately 15 minutes then entered a different fuel type at approximately 1630 hours . The new fuel type consisted of a hardwood tree overstory and a understory of grass with some shrubs. Fresh cured leaf litter was continuous on the ground and grass was fully cured.

Fire intensity was quickly growing at this point (1630 hours). Fire was reaching lower portions of slope. Large plume development rapidly occurred and the fire became a

plume dominated event rather then a wind driven fire run. Spotting up to 1/4 mile was occurring. These spots quickly grew and were drawn back into the main fire with rapid rates of spread. By 1640 hours, plume was drafting winds into itself. Midflame wind speeds 1/4 mile away were steady 6-8 MPH with gusts 10-15 to 25 MPH on the flanks. The plume height quickly grew and stage 2 cumulus development occurred on top. John Casad, Incident Meteorologist estimated plume height at 15,000 feet.

At 1645 hours the fire made a extremely rapid run to the east. Rate of spread observed was approximately 1/4 mile in 3 to 5 minutes. By 1500 hours the fire reached Meadows Road and was spotting across the road. The eastern spread of the fire stopped at this point. Prompt suppression actions, the road, and fuel type change to predominately all grass aided in ending the fire run. The rapid rate of spread produced quick burnout in the grass and did not allow heat intensity to build. The newly burned timber fuel type continued to burn-out slowly decreasing in intensity over the next several hours but experiencing only slow spread on the flanks.

FATALITY AREA

The area where the fatality occurred was approximately T. 35 S., R. 2 W., Section 15 NW/SW (preliminary estimate), on a dirt road at the bottom of the hill. The road is on the slope break with slopes 20 percent above the road and 10 percent below. The area is a east aspect.

Fuels in the area were moderately dense Madrone and Oak trees 20-40 feet tall, with understory of grass and scattered shrubs. Grass was continuous and fully cured. Recent drought induced leaf drop created a continuous ground litter of cured hardwood leaves. Fuel moisture at the time of the fatality were calculated to be as follows:

One-Hour Fuels	4 %
Ten-Hour Fuels	5 %
Hundred-Hour Fuels	6 %
Thousand-Hour Fuels	9 %

Fire Behavior - The immediate area where the fatality occurred experienced high heat intensity. Ground fuel consumption was almost 100 percent for all fuel sizes. Very little remains of larger fuels. Leaf and needle consumption was similar, with near 100 percent consumption. No live vegetation remains.

Two possible scenarios of fire behavior are possible. (1) A rapid fire spread from one direction, west, overran the victim. (2) Spotting ahead of the main fire front burned

back to the main fire trapping the victim between the two flaming fronts.

Murphy and Perilli examined the fatality site on the morning of 8/26/94. Fire spread direction indicators such as tree bole scorch, leaf or needle curl, or unburned islands are absent. Tree scorch is uniform around all boles. No indicators of single direction fire spread were observed in this preliminary survey. Further intense review may find some indicators, however, fire intensity and duration may now obscure any of these indicators. Fire effects and observation from people who witnessed the fire run indicates that spotting ahead of main fire front did occur and that spot fires burned back into the main fire (Attachment #6). This scenario rather then rapid wind driven spread from the west appears to be the fire behavior occurrence at the fatality site based on this preliminary review.

Attachment #1	Memo from John Casad to Dennis Perilli on Haines Index, 8/26/94, 0929 hours.
Attachment #2	General Fire Weather Forecast for Thursday 8/25/94 prepared by John Casad 0800 hours 8/25/94
Attachment #3	Spot Fire Weather Forecast for Hull Mtn. Fire prepared by John Casad 1530 hours 8/24/94
Attachment #4	Meteorological observations used for Weather forecasts on 8/25/94, provided by John Casad.
Attachment #5	Fire Behavior Forecast for Day Shift 8/25/94, prepared by tom Murphy and Dennis Perilli on 8/24/94, 1600 hours.
Attachment #6	List of people who provided information on fire behavior events for fire activity during fatality occurrence.

TTAA00 KMFR 261325

Attachment #1

): DENNIS PREILLI FIRE BEHAVIOR

FROM: JOHN CASAD FIRE WEATHER

DENNIS THE HAINES HAS THREE LEVELS:

LOW...USED IN THE EASTERN U.S.

MID...USED IN THE GREAT BASIN AND APPLALACHIAN MTS.

HIGH...USED IN THE MOUNTAINOUS WESTERN U.S.

NO ACTUAL ELEVATION RANGE IS USED FOR EACH LEVEL. IT MAYBE THAT IN THE VALLEY UNDER THE CONDITIONS OF THE LAST FEW DAYS THE MID LEVEL MAY HAVE BEEN A BETTER GUIDE THAN THE HIGH WHICH WE HAVING BEEN USING. THE HAINES FOR THURSDAY AFTN WERE: HIGH 3...MID 6....LOW 5

THE HAINES FOR FRIDAY MRNG ARE: HIGH 3...MID 4....LOW 4

USING THE MRNG SOUNDING IT LOOKS LIKE THE MID LEVEL FOR THE FIRE THIS AFTN WILL BE 5 TO 6. THIS WILL PUT THE HAINES IN THE MODERATE TO HIGH CLASS.(POTENTIAL FOR LARGE FIRE GROWTH)

I WILL BRING MORE INFO ABOUT HAINES TO THE 1530 MEETING THIS AFTN...

..NN

ATTACHMENT #2

Date: Thu Aug 25 11:05:36 EDT 1994
From: !a11ormfr (NWS MEDFORD AFM)
Phone: +1 703 235 2477
Subject: Medford Fire Weather Forecast
To: mhs!fswa/S=DISP/OU1=R06F02A
To: mhs!fswa/S=DISP/OU1=R06F10A
To: mhs!fswa/S=DISP/OU1=R06F11A
To: mhs!fswa/S=DISP/OU1=R06F15A
To: mhs!fswa/S=DISP/OU1=R06F20A
To: mhs!fswa/S=DISP/OU1=R06F12A
To: mhs!fswa/S=DISP/OU1=R06F18A
To: !or944fire (Oregon Fire and Aviation)
To: !or123disp (Oregon Coos Bay Dispatch)
To: !or013disp (Oregon L Dispatch)
To: !or102disp (Oregon Roseburg Dispatch)
To: !a11orors (Dawn W Davis)
To: !or113disp (Oregon Medford Dispatch)
To: !or083disp (Oregon Salem Dispatch)
To: mhs!fswa/S=C.JENSEN/OU1=R06F01D01A
Content-Length: 6616

ZCZC PDXFWFMFR WES
TTAA00 KMFR 251427
Fire Weather Forecast
Fire Weather Office Medford, Oregon
8 am PDT Thu Aug 25 1994 Casad

Discussion...Upper level trough off the coast starting split this mrng. Northern part lifting northeast toward Washington and southern part to drop southwest off the nrn Calif coast by Friday. Flow aloft over zones south to southwest...mild and on the dry side. Sfc high along the coast to weaken a little today and Friday with lower sfc pressure south and east of zones. Sfc gradient onshr through Friday. Marine layer to deepen a little tonight and Friday with light marine push into western zones Friday.

****

Area 1... Coast... Zones 615 618

Today
Weather...Mostly sunny.
LAL...1
Temperatures...Highs in the 70s coast and ridges and upper 70s to near 80 valleys.
Humidities...40-55%.
Winds...Southwest to northwest 10 to 20 mph by afternoon.
Haines...3
Powers 76/ 52/ 3 Wheeler Cr 79/ 43/ 2

Tonight
Weather...Partly cloudy with areas of drizzle.
LAL...1
Temperatures...Lows 46-54.
Humidities...Recovery above 85%.
Winds...Light valleys...northwest to north 5 to 10 mph coast and ridges.
Haines...3
Powers 49/100/ 12 Wheeler Cr 51/ 96/ 8

Friday
Weather...mostly sunny after morning clouds.
LAL...1
Temperatures...mid 70s coast and ridges to near 80 valleys.

****
2... Umpqua Basin... Zones 616 617

Today
Weather...Mostly sunny.
LAL...1
Temperatures...Highs in the low to mid 70s ridges and upper 70s valleys.
Humidities...35-55%
Winds...Light morning then southwest to northwest 10 to 20 mph afternoon.
Haines...3

Burnt Mtn	72/	55/	2	Taft Bench	76/ 48/ 1

Tonight
Weather...Fair...then areas of clouds forming late.
LAL...1
Temperatures...Lows in the 40s to near 50.
Humidities...Recovery above 85%...except 70-85% highest ridges.
Winds...Light valleys...northwest to north 5 to 12 mph ridges.
Haines...3

Burnt Mtn	49/	95/	10	Taft Bench	49/ 87/ 14

Friday
Weather...Morning clouds then mostly sunny.
LAL...1
Temperatures...low to mid 70s ridges and 75-80 valleys.
Humidities...30-55%.
Winds...light mrng and southwest to northwest aftn 10 to 20 mph.
Haines...3

urnt Mtn	71/	56/	4	Taft Bench	73/ 47/ 4

****
rea 3... Southwest Interior... Zones 619 (620) 621 622 623
Holl Mtn. Fire weather Zone

Today
Weather...Mostly sunny...except smoky areas zones 622 and 623.
LAL...1
Temperatures...Highs in the 70s ridges and upper 70s to upper 80s valleys.
Humidities...20-35% valleys and 35-45% ridges.
Winds...Valley becoming west to northwest 10 to 20 mph by afternoon. Ridge winds north to northeast 5 to 10 mph morning and southwest to north aftnernoon 8 to 18 mph.
Haines...4

Agness	82/	35/	2	Quail Pr.	75/	41/ 2
Buck Pk	74/	40/	2	Dead Indian	71/	38/ 2

Tonight
Weather...Fair...some smoke zone 622.
LAL...1
Temperatures...Lows near 40 to near 50.
Humidities...Recovery above 80% valleys...70-80% ridges.
Winds...Light valleys...northwest to northeast 5 to 12 mph ridges.
Haines...3

Agness	51/	100/	7	Quail Pr.	51/	78/ 6
Buck Pk	44/	80/	7	Dead Indian	40/	98/ 19

Friday
ther...sunny.
...1
emperatures...70s ridges and 80s valleys.
Humidities...20-30% valleys and 25-45% ridges.
Winds...valleys light mrng and west to northwest aftn 10 to 20 mph. Ridge winds light morning aftn southwest to northwest 8 to 18 mph.
Haines...4

Agness	80/	40/	4	Quail Pr.	71/	45/ 3
	69/	43/	2	Dead Indian	68/	43/ 5

Today
Weather...Sunny with a few afternoon buildups.
LAL...1
Temperatures...Highs in the lower to middle 70s ridges and 80s valleys.
Humidities...15-25% valleys and 20-35% ridges
Winds...light north morning and south to southwest afternoon 10 to 20 mph. Winds gusty late day zone 624.
Haines...4

Calmus	71/	27/	5	Strawberry	76/	16/	4
Fort Rock	82/	17/	3	Fish Fin	85/	12/	2
Gerber	81/	18/	2				

Tonight
Weather...Fair.
LAL...1
Temperatures...Lows 36-43 valleys and 44-50 ridges.
Humidities...Recovery 60-80% valleys and 45-65% ridges.
Winds...West to north 5 to 10 mph except south to west 7 to 12 mph higher ridges.
Haines...4

Calmus	48/	67/	10	Strawberry	44/	68/	8
Fort Rock	44/	75/	6	Fish Fin	50/	50/	5
Gerber	46/	67/	4				

Friday
Weather...sunny few afternoon buildup southern mtns.
LAL...1
Temperatures...70-75 ridges and upper 70s to lower 80s valleys.
Humidities...15-25% valleys and 25-35% ridges.
Winds...light mrng and west to southwest aftn 10 to 20 mph.
Haines...4

Calmus	72/	35/	6	Strawberry	71/	24/	7
Fort Rock	77/	23/	5	Fish Fin	79/	19/	6
Gerber	76/	24/	3				

Outlook Saturday through Monday

Discussion....Weak upper level low/trough to move inland north of zones Saturday. Flow aloft westerly Sunday and Monday. Air mass mild and dry mid and upper levels. Sfc high along the coast with weak thermal trough south of zones. Sfc gradient northwest to northeast.

Zones 615 thru 623

Saturday through Monday...Few morning low clouds otherwise mostly sunny days. Highs 65-75 coast and ridges...80s valleys. Lows in the mid 40s to mid 50s. Winds northwest to northeast.

Zones 624 and 625

Saturday through Monday...Sunny days. Highs lower 70s ridges and mid 80s vallyes. Lows in the 40s. Winds west to northeast.

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NNNN

Attachment # 3

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>###<A
<ZCZC PDXFWSMFR
ETTAA00 KMFR 242107
SPOT FORECAST
FIRE WEATHER OFFICE MEDFORD OREGON
330 PM PDT WED AUG 24 1994  CASAD

SPOT WEATHER FORECAST FOR THE HULL MOUNTAIN FIRE
34S 3W SEC 25, ELEVATION 1600 FT.

DISCUSSION...UPPER LEVEL RIDGE TO REMAIN SOUTHEAST OF FIRE TODAY AND
THURSDAY. WEAK UPPER LEVEL TROUGH OFF THE COAST THIS AFTN TO DRIFT
TOWARD SOUTHERN OREGON AND CROSS FIRE LATE THURSDAY. FLOW ALOFT SOUTHWEST
NEXT 24-36 HRS. AIR MASS MILD AND DRY MID AND UPPER LEVELS. SFC HIGH
ALONG THE COAST THIS AFTERNOON TO WEAKEN THURSDAY AFTN. LOWER SFC PRESSURE
SOUTH AND EAST OF FIRE TODAY AND THURSDSAY. SFC GRADIENT NORTHWEST TO
NORTHEAST TODAY AND THURSDAY.  SFC INVERSION TO FORM TONIGHT AND BREAK
BY MID MRNG THURSDAY. SFC INVERION FROM LOWER VALLEYS TO NEAR 4000 FT.

   AFT OPERATIONS.....MVFR TO VFR THIS AFTN.  THURSDAY IFR TO MVFR
BECOMING VFR MID MRNG THROUGH THE AFTN.

FORECAST...ALL WINDS ARE 20 FT
THIS AFTERNOON....SMOKY. MAX TEMPS 80-85 VALLEYS AND MID 70S RIDGES.
LOWEST RH 25-35% VALLEYS AND 30-45% RIDGES. WINDS NORTHWEST TO NORTH
5 TO 12 MPH VALLEYS AND 6-15 MPH RIDGES. LAL 1.

TONIGHT...SMOKY. LOW TEMPS 46-53 VALLEYS AND 45-55 RIDGES. MAX RH
65-85% VALLEYS AND 55-75% RIDGES. WINDS LIGHT DOWN VALLEY/SLOPE 3-5
MPH AND NORTH TO NORTHEAST RIDGES 6-12 MPH. LAL 1.

THURSDAY...SMOKY BECOMING SUNNY AFTN. MAX TEMP 78-83 VALLEYS AND 70-75
RIDGES. LOWEST RH 25-35% VALLEYS AND 35-45% RIDGES. VALLEY WINDS LIGHT
MRNG AND WEST TO NORTHWEST AFTN 6-15 MPH. RIDGE WINDS NORTH TO NORTHEAST
EARLY MRNG 6-12 MPH...AFTN NORTHWEST 8 TO 18 MPH. LAL 1

OUTLOOK...FRIDAY THRU SUNDAY

FLOW ALOFT SOUTHWEST TO WEST. AIR MASS A LITTLE COOLER BUT DRY MID
AND UPPER LEVEL. MARINE LAYER A LITTLE DEEPER BY LATE FRIDAY AND
SATURDAY. SFC GRADIENT ONSHR.

MOSTLY SUNNY WITH A CHANCE OF MRNG LOW CLOUDS. TEMPS DOWN 4-9 AND
   UP 8-12%. WINDS WEST TO NORTHWEST LIGHT NIGHT AND MRNG 8 TO 18
    AFTN.


END
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Attachment # 4

Surface Weather Observations - - HDR72597MFR 9408
08/25/94 MF1-10A

SA 0058 CLR 10 167/58/44/0304/005/ 000 (DS 00:52Z)
SA 0152 CLR 10 166/57/44/0000/005 (DS 09:54Z)
SA 0252 CLR 10 166/56/44/0000/005 (DS 10:53Z)
SA 0351 40 -SCT 10 163/55/44/0000/004/K40 -SCT/ 003 54 (DS 11:54Z)
SY 72597 32966 00000 10128 20067 39694 40163 50003 333 10322 20122 555 92512= (DS11:55Z)

SA 0450 40 -SCT 30 163/53/44/1403/004 (DS 12:52Z)
SA 0550 40 -SCT 250 -BKN 30 167/52/44/0000/004/K40 -SCT (DS 13:52Z)
SA 0650 40 -BKN 250 -BKN 30 171/55/46/2403/005/K40 -BKN/ 305 1001 (DS 14:52Z)
SA 0753 45 -BKN 250 -BKN 10 160/62/44/0000/005/K45 -BKN (MO 15:53Z)
SA 0854 45 SCT 250 -BKN 10 162/68/44/0000/003/K45 SCT (MO 16:55Z)
SA 0954 45 SCT 250 -BKN 10 157/72/44/3604/002/K45 SCT VSBY LWR NW-NE/ 712 1001 51 (MO 17:57Z)
SY 72597 32966 73604 10222 20067 39687 40157 57012 00001 333 10222 20106 555 92510= (MO10:00Z)

SA 1054 -X E250 OVC 4K 151/75/46/3405/000/K8 (MO 18:54Z)
SP 1121 -X E250 OVC 11/4K 3604/999/K9 TWR VSBY 2 (MO 19:22Z)
SA 1154 -X E250 OVC 11/4K 142/81/44/3304/997/K8 (MO 19:55Z)
SP 1233 -X E250 OVC 11/2K 3605/995/K8 (MO 20:35Z)
RS 1253 -X E250 OVC 2K 131/87/44/3108/994/K7/ 724 1001 (MO 20:55Z)
SP 1323 50 SCT 65 SCT 10 3007/993/K50 SCT (MO 21:33Z)
SA 1353 45 SCT 65 SCT 10 121/90/43/3610/992/K45 SCT CU S (MO 21:53Z)
SA 1454 45 -BKN 65 -BKN 20 115/89/44/3111/990/K45 -BKN CU SE-NW K PLUME N (JAC 22:56Z)
SA 1555 CLR 30 115/90/44/3114/990/FEW CU OHTNS/ 615 1100 91 (RG 23:54Z)
SY 72597 32883 13114 10322 20067 39648 40115 56015 81100 333 10328 20106 555 92600= (RG00:01Z)

SA 1650 CLR 30 115/89/40/3013/990/FEW CU OHTNS (RG 00:49Z)
SA 1751 CLR 30 118/87/39/3013/990/FEW AC OHTNS (RG 01:52Z)
SA 1853 CLR 30 127/82/38/3307/993/FEW AC/ 310 1070 (RG 02:54Z)
SA 1951 120 SCT 20 137/70/36/3005/996/K PLUME N (RG 03:51Z)
SA 2052 130 SCT 250 SCT 15 144/74/40/0206/998/K PLUME N (RG 04:53Z)
SA 2154 130 SCT 250 SCT 15 147/72/40/0000/999/K PLUME N/ 120 1071 91 (RG 05:53Z)
SY 72597 32974 20000 10222 20044 39678 40147 51020 62071 333 10328 20106 70000 555 92606= (RG05:55Z)

SA 2251 CLR 15 149/65/43/1105/000/FEW AC AND CI/K PLUME N (RG 06:52Z)
SA 2351 CLR 10 152/65/43/3203/001 (DS 07:53Z)

..rface Weather Observations - - HDR72597MFR 9408
08/25/94 MF1-10B

0050	28.635	58.0	0								0 0	00.00
0152	28.635	57.0	0								0	00.00
0252	28.635	56.0	0								0	00.00
0351	28.625	55.0	2	2K	40						0 0	00.00
0450	28.625	53.0	3	3K	40						0	00.00
0550	28.630	52.0	6	5K	40	1CI	250	6			0	00.00
0650	28.640	55.0	8	7K	40	1CI	250	8			0 3	00.00
0753	28.635	62.0	8	6K	45	2CI	250	8			4	00.00
0854	28.620	68.0	9	2K	45	7CI	250	9			2	00.00
0954	28.605	72.0	9	3K	45	6CI	250	9			4 7	00.00
1054	28.590	75.0	10	8K	0	2CI	250	10			10	00.00
1154	28.565	81.0	10	8K	0	2CI	250	10			0	00.00
1253	28.535	87.0	10	7K	0	3CI	250	10			0 7	00.00
1353	28.510	90.0	2	2K	45	0CU	65	2			2	00.00
1454	28.490	89.0	6	6K	45	0CU	65	6			2	00.00
1555	28.490	90.0	0	0CU	65						0 6	00.00
1650	28.490	89.0	0	0CU	70						0	00.00
1751	28.495	87.0	0	0AC	80						0	00.00
1853	28.520	82.0	0	0AC	100						0 3	00.00
1951	28.550	78.0	1	1AC	120						1	00.00
2052	28.570	74.0	4	2AC	130	2CI	250	4			3	00.00
	28.580	72.0	3	2AC	130	1CI	250	3			2 1	00.00
	28.585	65.0	0	0AC	130	0CI	250	0			0	00.00
2351	28.595	65.0	0								0	00.00

Synoptic Observations

```
MID1  0.00   .0     63  54
0350  0.00   .0   0 67  54 0      28.620 +.005
0950  0.00   .0   0 72  51 0      28.600 +.005
1551  0.00   .0   0 91  72 0      28.480 +.010
2151  0.00   .0   0 90  72 0      28.565 +.015
MID2  0.00   .0   0 72  64
```

Summary of Day (midnight to midnight)

Max Temp	Min Temp	Precip (Ins.)	Snow Fall	Snow Depth	[Peak Speed/Dir	Wind] Time	Sky Cover s/s	a/a	Water Equiv.	Fastest Wind
91	51	00.00	.0	0	18NW	1628	6	4		16 31 1555

Sunrise: 0529 Sunset: 1859 Total Sunshine: % Psbl: Character of Sunrise/Sunset:

Weather & Obstructions to Vision

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K    1045 1323
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Remarks, Notes and Miscellaneous Phenomena

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TIME CHECK== 0029 //
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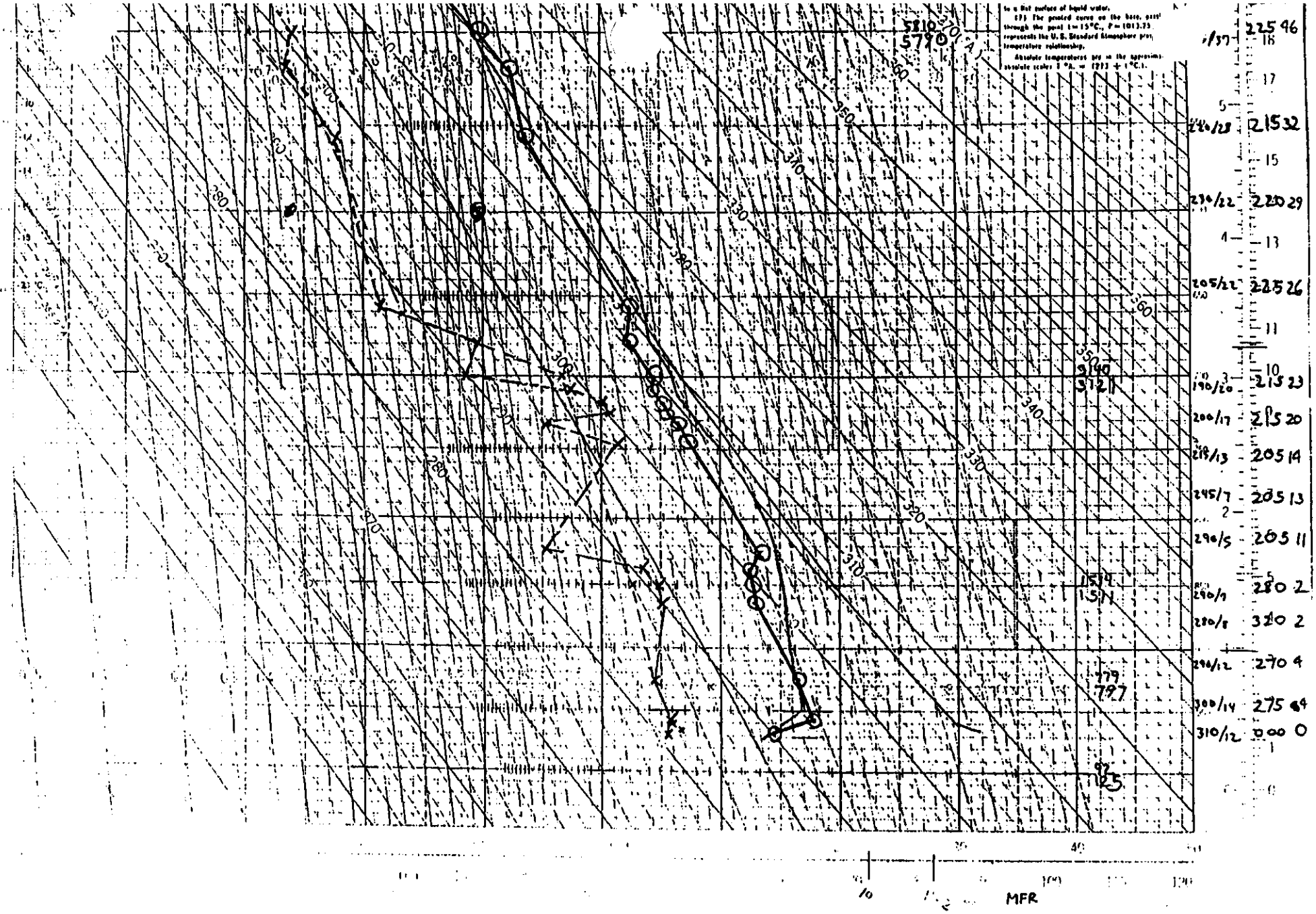

8-25-94

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R M-Y9
TTAA00 KMFR 261829
EVN03 SA 1808 RAWS 71/46/0301/952/ RH 41 FT 77 PCP 7.06 PKWND 0907 EVN
EVN03 SA 1708 RAWS 68/46/1403/952/ RH 46 FT 73 PCP 7.06 PKWND 1506 EVN
EVN03 SA 1608 RAWS 62/44/1204/952/ RH 52 FT 64 PCP 7.06 PKWND 1208 EVN
EVN03 SA 1508 RAWS 60/43/1205/952/ RH 53 FT 59 PCP 7.06 PKWND 1106 EVN
EVN03 SA 1408 RAWS 58/42/1103/951/ RH 55 FT 52 PCP 7.06 PKWND 0305 EVN
EVN03 SA 1308 RAWS 57/41/0704/950/ RH 55 FT 53 PCP 7.06 PKWND 0606 EVN
EVN03 SA 1208 RAWS 58/42/0603/950/ RH 55 FT 54 PCP 7.06 PKWND 0107 EVN
EVN03 SA 1108 RAWS 59/41/0406/950/ RH 52 FT 57 PCP 7.06 PKWND 3515 EVN
EVN03 SA 1008 RAWS 60/40/3507/950/ RH 47 FT 58 PCP 7.06 PKWND 3512 EVN
EVN03 SA 0608 RAWS 63/46/3310/951/ RH 54 FT 61 PCP 7.06 PKWND 3521 EVN
EVN03 SA 0508 RAWS 64/46/3412/950/ RH 52 FT 62 PCP 7.06 PKWND 3319 EVN
EVN03 SA 0408 RAWS 68/44/3608/950/ RH 42 FT 66 PCP 7.06 PKWND 3521 EVN
EVN03 SA 0308 RAWS 69/44/3412/949/ RH 41 FT 67 PCP 7.06 PKWND 3424 EVN
EVN03 SA 0208 RAWS 75/45/3307/946/ RH 34 FT 74 PCP 7.06 PKWND 3221 EVN
EVN03 SA 0108 RAWS 79/46/3308/946/ RH 31 FT 79 PCP 7.06 PKWND 0525 EVN
EVN03 SA 0308 RAWS 69/44/3412/949/ RH 41 FT 67 PCP 7.06 PKWND 3424 EVN
EVN03 SA 0208 RAWS 75/45/3307/946/ RH 34 FT 74 PCP 7.06 PKWND 3221 EVN
EVN03 SA 0108 RAWS 79/46/3308/946/ RH 31 FT 79 PCP 7.06 PKWND 0525 EVN
EVN03 SA 0008 RAWS 85/47/3308/946/ RH 27 FT 90 PCP 7.06 PKWND 2932 EVN
EVN03 SA 2308 RAWS 82/44/3015/946/ RH 26 FT 91 PCP 7.06 PKWND 3026 EVN
EVN03 SA 2208 RAWS 82/45/2911/947/ RH 27 FT 94 PCP 7.06 PKWND 3224 EVN
                                                                  PAGE 01
EVN03 SA 2108 RAWS 80/44/2812/949/ RH 28 FT 94 PCP 7.06 PKWND 3119 EVN
EVN03 SA 2008 RAWS 79/43/3003/950/ RH 28 FT 93 PCP 7.06 PKWND 2909 EVN
EVN03 SA 1908 RAWS 76/45/3304/951/ RH 34 FT 86 PCP 7.06 PKWND 3209 EVN
EVN03 SA 1808 RAWS 69/42/3203/952/ RH 38 FT 74 PCP 7.06 PKWND 3404 EVN
EVN03 SA 1708 RAWS 68/42/3302/951/ RH 39 FT 72 PCP 7.06 PKWND 3403 EVN
EVN03 SA 1608 RAWS 64/40/3502/951/ RH 41 FT 64 PCP 7.06 PKWND 3503 EVN
EVN03 SA 0608 RAWS 65/39/0402/956/ RH 38 FT 61 PCP 7.06 PKWND 0612 EVN
EVN03 SA 0508 RAWS 64/38/0506/956/ RH 38 FT 62 PCP 7.06 PKWND 0124 EVN
EVN03 SA 0408 RAWS 67/40/0116/955/ RH 37 FT 65 PCP 7.06 PKWND 3627 EVN
EVN03 SA 0308 RAWS 67/42/3611/955/ RH 40 FT 65 PCP 7.06 PKWND 3521 EVN
EVN03 SA 0208 RAWS 71/45/3410/954/ RH 39 FT 70 PCP 7.06 PKWND 3525 EVN
EVN03 SA 0108 RAWS 75/46/3411/955/ RH 36 FT 77 PCP 7.06 PKWND 3523 EVN
EVN03 SA 0308 RAWS 67/42/3611/955/ RH 40 FT 65 PCP 7.06 PKWND 3521 EVN
EVN03 SA 0208 RAWS 71/45/3410/954/ RH 39 FT 70 PCP 7.06 PKWND 3525 EVN
EVN03 SA 0108 RAWS 75/46/3411/955/ RH 36 FT 77 PCP 7.06 PKWND 3523 EVN
                                                                  PAGE 02
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FIRE BEHAVIOR FORECAST NO. 2 Attachment #5

NAME OF FIRE: HULL MTN. PREDICTION FOR: DAY

LOCATION: ODF-MEDFORD SHIFT DATE: 8/25/94

TIME AND DATE
FORECAST ISSUED: 16:00 8/24/94 SIGNED: PERILLI/MURPHY
FIRE BEHAVIOR ANALYST

WEATHER SUMMARY: Inversion weakening 0930-1000 hours, braking 1130-1330 hours. NOTE: South end of fire will experience local wind influence which creates WEST to SOUTHWEST afternoon winds!!! (SEE WEATHER FORECAST)

GENERAL FIRE BEHAVIOR
Low activity until inversion lifts. Gradual increase in behavior with torching, spotting, and short crown runs beginning by 1400-1500 hours. Fire spread will be wind driven and upslope in direction. Highest activity in wind exposed areas. Direct attack favorable in morning when flame lengths are less then 3 feet. Fire behavior in afternoon will be beyond direct attack at fire head when flame lengths reach 6-10+ feet. WATCH OUT FOR SPOTTING AND RUNS AGAINST CONTROL LINES FROM UNBURNED FUELS INSIDE FIRELINES.

SPECIFIC FIRE BEHAVIOR:
DIV A Winds will direct any fire spread to the south and east. Spotting downslope will burn back toward main fire. East flank may experience spotting and control problems.

DIV B Winds from the west may cause flare-up of hot areas along line. Spotting into grass fuels will ignite and spread readily.

DIV C South end of fire has west-southwest wind in afternoon which will cause flare-ups and possible spotting to the east. Undetected spots will become active by early afternoon. Downslope fire runs to the east may reach high spread rates due to winds.

DIV D Expect upslope and north to northwest fire spread in afternoon as flare-ups and short range spotting occurs. Steep, rugged terrain and heavy fuels will hinder control efforts. Spotting downslope will make rapid runs uphill! Watch for spots and post lookouts.

DIV E Any unburned fuels on north-northeast aspect between fire and control line will burn actively in afternoon and make uphill runs. Watch for spotting on west side of ridge into Section 2.

AIR OPERATIONS Inversion/smokey conditions will limit visibility until late morning/early afternoon. Smokey conditions may persist on downwind side of fire in late afternoon.

SAFETY: WATCH OUT FOR FALLING SNAGS! KNOW YOUR ESCAPE ROUTES AND SAFETY ZONES!!! POST LOOK-OUTS!!!!!

PERSONS WHO PROVIDED OBSERVATIONS ON FIRE BEHAVIOR AT THE PROBABLE TIME ON FATALITY OCCURRENCE.

Rick Rogers	Situation Unit Leader, located on Meadows Road.
Dennis Perilli	Fire Behavior Analyst, located at intersection of Perry Rd. and Dodge Rd.
Tom Murphy	Fire Behavior Analyst, located at intersection of Perry Rd. and Dodge Rd.
Mike Davis	Dozer Operator, Supervisor of victim, survivor on burn over in Division C.

September 22, 1994

To: Steve Elephant
Dept of Forestry
24533 Alsea Hwy.
Philomath, Oregon 97370

From: Dennis D. Gettman
National Weather Service
4000 Cirrus Dr.
Medford, Oregon 97504

Enclosed is the information you requested. In briefly reviewing the surface charts for that day, I noted that a typical onshore pressure pattern existed that day. Thus winds were expected to increase from the northwest to west during the 3-5 pm time period. According to the observations, this is what happened.

John Casad, Meteorologist, was providing meteorological support for the fire. Further information concerning meteorological guidance given to the team during the course of the fire should be obtained through him. He can be reached at (503) 773-1067.

Evans Creek RAWS (TIMES ARE PST)

+---------- TABULAR Display Observation ----------+
(Station ID: 353228 or SIG: _____) Type: R Date: 25-AUG-94_____ Time: __
+----------+

Station ID	Obs Date	Ob Tm	O T	W	Dry Tmp	RH	M L	HC Rsk	Wind Dir	Wind Sp	10 Hr	Temp Max	Temp Min	RH% Max	RH% Min	Dur	Amt	Y L	FHC Rsk
353228	25-AUG-94	2	R	4	62	40	0	0	101	6	__	84	57	70	30	0	0	0	0
353228	25-AUG-94	3	R	3	61	42	0	0	94	5	__	84	57	70	30	0	0	0	0
353228	25-AUG-94	4	R	3	60	45	0	0	148	5	__	84	57	70	30	0	0	0	0
353228	25-AUG-94	5	R	3	59	46	0	0	127	5	__	84	57	70	30	0	0	0	0
353228	25-AUG-94	6	R	4	59	45	0	0	33	2	__	84	58	70	30	0	0	0	0
353228	25-AUG-94	7	R	4	61	44	0	0	345	3	__	84	60	63	30	0	0	0	0
353228	25-AUG-94	8	R	4	64	41	0	0	347	2	__	84	59	56	30	0	0	0	0
353228	25-AUG-94	9	R	4	68	39	0	0	334	2	__	84	59	49	30	0	0	0	0
353228	25-AUG-94	10	R	3	69	38	0	0	323	3	__	84	59	46	30	0	0	0	0
353228	25-AUG-94	11	R	3	76	34	0	0	333	4	__	84	59	46	30	0	0	0	0
353228	25-AUG-94	12	R	2	79	28	0	0	304	3	__	84	59	46	28	0	0	0	0
353228	25-AUG-94	14	R	2	82	27	0	0	287	11	__	84	59	46	27	0	0	0	0
353228	25-AUG-94	15	R	3	82	26	0	0	295	15	__	83	59	46	26	0	0	0	0
353228	25-AUG-94	16	R	3	85	27	0	0	326	8	__	85	59	46	27	0	0	0	0

-- All values are in the ENGLISH number system ----------
F2-Help F5-Show Keys F11-Exit F19-Edit Obs

Enter the station id for this observation._____
Count: 14 v

+---------- TABULAR Display Observation ----------+
(Station ID: 353228 or SIG: _____) Type: R Date: 25-AUG-94_____ Time: __
+----------+

Station	Obs Date	Ob Tm	O T	W	Dry Tmp	RH	M L	HC Rsk	Wind Dir	Wind Sp	10 Hr	Temp Max	Temp Min	RH% Max	RH% Min	Dur	Amt	Y L	FHC Rsk
8	25-AUG-94	8	R	4	64	41	0	0	347	2	__	84	59	56	30	0	0	0	0
353228	25-AUG-94	9	R	4	68	39	0	0	334	2	__	84	59	49	30	0	0	0	0
353228	25-AUG-94	10	R	3	69	38	0	0	323	3	__	84	59	46	30	0	0	0	0
353228	25-AUG-94	11	R	3	76	34	0	0	333	4	__	84	59	46	30	0	0	0	0
353228	25-AUG-94	12	R	2	79	28	0	0	304	3	__	84	59	46	28	0	0	0	0
353228	25-AUG-94	14	R	2	82	27	0	0	287	11	__	84	59	46	27	0	0	0	0
353228	25-AUG-94	15	R	3	82	26	0	0	295	15	__	83	59	46	26	0	0	0	0
353228	25-AUG-94	16	R	3	85	27	0	0	326	8	__	85	59	46	27	0	0	0	0
353228	25-AUG-94	17	R	4	79	31	0	0	329	8	__	85	59	46	26	0	0	0	0
353228	25-AUG-94	18	R	4	75	34	0	0	333	7	__	85	59	46	26	0	0	0	0
353228	25-AUG-94	19	R	4	69	41	0	0	344	12	__	85	59	46	26	0	0	0	0
353228	25-AUG-94	20	R	4	68	42	0	0	0	8	__	85	59	46	26	0	0	0	0
353228	25-AUG-94	21	R	4	64	52	0	0	338	12	__	85	59	52	26	0	0	0	0
353228	25-AUG-94	22	R	4	63	54	0	0	334	10	__	85	59	54	26	0	0	0	0

-- All values are in the ENGLISH number system ----------
F2-Help F5-Show Keys F11-Exit F19-Edit Obs

Enter the station id for this observation._____
Count: *20

Evans Creek RAWS

+---------- TABULAR Display Observation ----------+
(Station ID: 353228 or SIG: _____) Type: R Date: 24-AUG-94_____ Time: __
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Station ID	Obs Date	Ob Tm	O T	W	Dry Tmp	RH	M L	HC Rsk	Wind Dir	Sp	10 Hr	Temp Max	Temp Min	RH% Max	RH% Min	Dur	Amt	L	
353228	24-AUG-94	2	R	3	61	62	0	0	3	1	__	86	58	63	31	0	0	0	0
353228	24-AUG-94	3	R	4	60	62	0	0	359	2	__	86	58	63	31	0	0	0	0
353228	24-AUG-94	4	R	4	59	64	0	0	50	2	__	86	58	64	31	0	0	0	0
353228	24-AUG-94	5	R	4	57	69	0	0	334	2	__	86	57	69	31	0	0	0	0
353228	24-AUG-94	6	R	4	58	70	0	0	70	4	__	86	58	70	31	0	0	0	0
353228	24-AUG-94	7	R	4	62	63	0	0	17	3	__	86	59	64	31	0	0	0	0
353228	24-AUG-94	8	R	4	67	56	0	0	111	2	__	86	57	70	31	0	0	0	0
353228	24-AUG-94	9	R	4	73	49	0	0	198	2	__	86	57	70	31	0	0	0	0
353228	24-AUG-94	10	R	3	74	46	0	0	287	2	__	86	57	70	31	0	0	0	0
353228	24-AUG-94	11	R	2	76	43	0	0	294	3	__	86	57	70	31	0	0	0	0
353228	24-AUG-94	12	R	2	81	40	0	0	305	5	__	86	57	70	31	0	0	0	0
353228	24-AUG-94	14	R	3	84	30	0	0	316	6	__	86	57	70	30	0	0	0	0
353228	24-AUG-94	15	R	3	83	32	0	0	316	7	__	86	57	70	31	0	0	0	0
353228	24-AUG-94	16	R	4	76	37	0	0	338	11	__	85	57	70	32	0	0	0	0

-- All values are in the ENGLISH number system ----------
F2-Help F5-Show Keys F11-Exit F19-Edit Obs

Enter the station id for this observation._____
Count: 14 v

+---------- TABULAR Display Observation ----------+
(Station ID: 353228 or SIG: _____) Type: R Date: 24-AUG-94_____ Time: __
+----------+

Station ID	Obs Date	Ob Tm	O T	W	Dry Tmp	RH	M L	HC Rsk	Wind Dir	Sp	10 Hr	Temp Max	Temp Min	RH% Max	RH% Min	Dur	Amt	Y I	FHC
353228	24-AUG-94	8	R	4	67	56	0	0	111	2	__	86	57	70	31	0	0	(	
353228	24-AUG-94	9	R	4	73	49	0	0	198	2	__	86	57	70	31	0	0	0	)
353228	24-AUG-94	10	R	3	74	46	0	0	287	2	__	86	57	70	31	0	0	0	0
353228	24-AUG-94	11	R	2	76	43	0	0	294	3	__	86	57	70	31	0	0	0	0
353228	24-AUG-94	12	R	2	81	40	0	0	305	5	__	86	57	70	31	0	0	0	0
353228	24-AUG-94	14	R	3	84	30	0	0	316	6	__	86	57	70	30	0	0	0	0
353228	24-AUG-94	15	R	3	83	32	0	0	316	7	__	86	57	70	31	0	0	0	0
353228	24-AUG-94	16	R	4	76	37	0	0	338	11	__	85	57	70	32	0	0	0	0
353228	24-AUG-94	17	R	4	75	36	0	0	337	11	__	84	57	70	30	0	0	0	0
353228	24-AUG-94	18	R	4	71	39	0	0	337	10	__	84	57	70	30	0	0	0	0
353228	24-AUG-94	19	R	4	67	40	0	0	359	11	__	84	57	70	30	0	0	0	0
353228	24-AUG-94	20	R	4	67	37	0	0	13	16	__	84	57	70	30	0	0	0	0
353228	24-AUG-94	21	R	4	64	38	0	0	50	6	__	84	57	70	30	0	0	0	0
353228	24-AUG-94	22	R	4	65	38	0	0	44	2	__	84	57	70	30	0	0	0	0

-- All values are in the ENGLISH number system ----------
F2-Help F5-Show Keys F11-Exit F19-Edit Obs

Enter the station id for this observation._____
Count: *20 ^

Medford Airport Observations (TIMES ARE PST

Surface Weather Observations - - HDR72597MFR 9408
08/25/94 MF1-10A

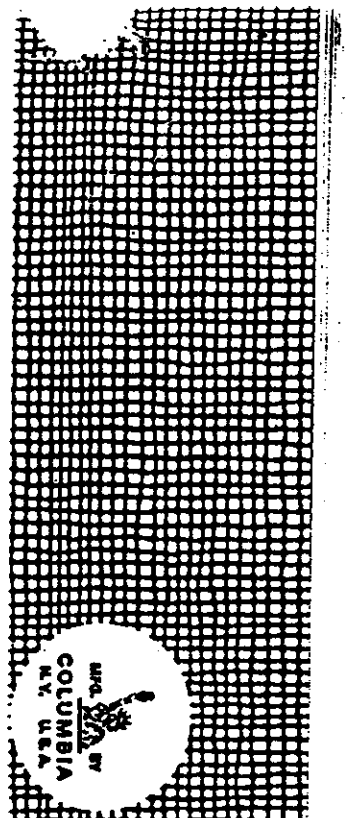
SA 0050 CLR 10 167/58/44/0304/005/ 000 (DS 08:52Z)
SA 0152 CLR 10 166/57/44/0000/005 (DS 09:54Z)
SA 0252 CLR 10 166/56/44/0000/005 (DS 10:53Z)
SA 0351 40 -SCT 10 163/55/44/0000/004/K40 -SCT/ 003 54 (DS 11:54Z)
SY 72597 32966 00000 10128 20067 39694 40163 58003 333 10322 20122 555 92512= (DS11:55Z)

SA 0450 40 -SCT 30 163/53/44/1403/004 (DS 12:52Z)
SA 0550 40 -SCT 250 -BKN 30 167/52/44/0000/004/K40 -SCT (DS 13:52Z)
SA 0650 40 -BKN 250 -BKN 30 171/55/46/2403/005/K40 -BKN/ 305 1001 (DS 14:52Z)
SA 0753 45 -BKN 250 -BKN 10 168/62/44/0000/005/K45 -BKN (MO 15:53Z)
SA 0854 45 SCT 250 -BKN 10 162/68/44/0000/003/K45 SCT (MO 16:55Z)
SA 0954 45 SCT 250 -BKN 10 157/72/44/3604/002/K45 SCT VSBY LWR NW-NE/ 712 1001 51 (MO 17:57Z)
SY 72597 32966 73604 10222 20067 39687 40157 57012 00001 333 10222 20106 555 92518= (MO10:00Z)

SA 1054 -I E250 OVC 4K 151/75/46/3405/000/K8 (MO 18:54Z)
SP 1121 -I E250 OVC 11/4K 3604/999/K9 TWR VSBY 2 (MO 19:22Z)
SA 1154 -I E250 OVC 11/4K 142/81/44/3304/997/K8 (MO 19:55Z)
SP 1233 -I E250 OVC 11/2K 3605/995/K8 (MO 20:35Z)
RS 1253 -I E250 OVC 2K 131/87/44/3108/994/K7/ 724 1001 (MO 20:55Z)
SP 1323 50 SCT 65 SCT 10 3007/993/K50 SCT (MO 21:33Z)
SA 1353 45 SCT 65 SCT 10 121/90/43/3610/992/K45 SCT CU S (MO 21:53Z)
SA 1454 45 -BKN 65 -BKN 20 115/89/44/3111/990/K45 -BKN CU SE-NW K PLUME N (JAC 22:56Z)
SA 1555 CLR 30 115/90/44/3114/990/FEW CU OMTNS/ 615 1100 91 (RG 23:54Z)
SY 72597 32883 13114 10322 20067 39648 40115 56015 81100 333 10328 20106 555 92600= (RG00:01Z)

SA 1650 CLR 30 115/89/40/3013/990/FEW CU OMTNS (RG 00:49Z)
SA 1751 CLR 30 118/87/39/3013/990/FEW AC OMTNS (RG 01:52Z)
SA 1853 CLR 30 127/82/38/3307/993/FEW AC/ 310 1070 (RG 02:54Z)
SA 1951 120 SCT 20 137/78/36/3005/996/K PLUME N (RG 03:51Z)
SA 2052 130 SCT 250 SCT 15 144/74/40/0206/998/K PLUME N (RG 04:53Z)
SA 2154 130 SCT 250 SCT 15 147/72/40/0000/999/K PLUME N/ 120 1071 91 (RG 05:53Z)
SY 72597 32974 20000 10222 20044 39678 40147 51020 82071 333 10328 20106 70000 555 92606= (RG05:55Z)

SA 2251 CLR 15 149/65/43/1105/000/FEW AC AND CI/K PLUME N (RG 06:52Z)
SA 2351 CLR 10 152/65/43/3203/001 (DS 07:53Z)



SA 0051 CLR 10 163/63/46/3404/004/ 208 (DS 00:52Z)
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SA 0250 120 -SCT 16 167/58/49/1304/005/K120 -SCT (DS 10:51Z)
SA 0351 CLR 10 169/59/49/0000/006/ 205 57 (DS 11:53Z)
SY 72597 32966 00000 10150 20094 39700 40169 52005 333 10333 20139 555 92412= (DS11:54Z)

SA 0451 120 -SCT 30 173/55/47/0000/007/K120 -SCT (DS 12:53Z)
SA 0550 40 -SCT 30 179/56/48/0000/008/K40 -SCT (DS 13:53Z)
SA 0650 40 -BKN 30 187/59/48/0000/010/K40 -BKN/ 215 (DS 14:52Z)
SA 0752 40 -OVC 15 189/63/48/0405/011/K40 -OVC VSBY HIR S-SW (HWG 15:53Z)
SA 0854 40 -OVC 15 188/69/50/0000/011/K40 -OVC VSBY HIR SW (HWG 16:56Z)
SA 0955 40 -OVC 15 188/75/51/3404/011/K40 -OVC VSBY HIR SW/ 002 54 (HWG 17:58Z)
SY 72597 32874 83404 10239 20186 39717 40188 50002 81/// 333 10239 20122 555 92418= (HWG18:00Z)

SA 1054 -X E40 OVC 15 183/76/58/2905/009/K2 K40 OVC CU FRNG S (HWG 18:57Z)
SP 1147 -X M40 OVC 3K 2505/008/K8 K40 OVC TWR VSBY4 (HWG 19:50Z)
SA 1154 -X M40 OVC 3K 173/81/51/2506/007/K7 TWR VSBY4 K40 OVC SFC VSBY W5 (HWG 20:00Z)
SP 1230 -X M40 OVC 11/2K 3205/006/K9 TWR VSBY 2 K40 OVC (HWG 20:33Z)
RS 1254 -X E40 OVC 1K 168/83/58/0504/006/R14VR60+ K9 TWR VSBY 1 1/2 K40 OVC/ 719 (HWG 20:56Z)
RS 1352 -X E40 OVC 11/2K 168/87/49/0306/003/K7 K40 OVC (HWG 21:54Z)
SP 1409 -X E40 OVC 21/2K 2009/003/K4 SFC VSBY 3 K40 OVC (HWG 22:10Z)
SP 1415 -X E40 OVC 3K 3208/003/K4 K40 OVC (HWG 22:15Z)
SP 1426 -X 40 -BKN 250 -BKN 7 3106/002/K2 K40 -BKN K PLUME N (HWG 22:32Z)
SA 1454 200 SCT 18 153/89/46/3309/001/SMOKY K PLUME N (HWG 22:55Z)
SA 1555 250 -SCT 25 146/86/47/2811/000/SMOKY K PLUME N/ 619 1001 98 (RG 23:57Z)
SY 72597 32982 32811 10311 20083 39688 40145 56019 80001 333 10322 20122 555 92500= (RG00:00Z)

SA 1655 250 -SCT 20 147/88/47/3612/999/SMOKY K PLUME N (RG 00:57Z)
SA 1755 250 -SCT 25 151/83/47/0213/000/SMOKY K PLUME N (RG 01:56Z)
SA 1854 CLR 30 160/76/46/3507/002/FEW CI N K PLUME N/ 308 1001 (RG 02:53Z)
SA 1955 CLR 15 163/74/44/3505/003 (RG 03:55Z)
SA 2051 CLR 10 167/73/42/3403/005 (RG 04:51Z)
SA 2154 CLR 10 167/67/46/2004/005/ 108 98 (RG 05:52Z)
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SA 2252 CLR 10 167/64/46/0904/005 (RG 06:52Z)
SA 2351 CLR 10 166/63/45/0000/005 (DS 07:53Z)

THE HAINES INDEX AND IDAHO WILDFIRE GROWTH

Paul Werth and Richard Ochoa

Fire Weather Meteorologists
National Weather Service
Boise, Idaho

INTRODUCTION

The growth of wildfires is related to three broad factors: fuel type, topography and weather. The "National Fire Danger Rating System" and the "Fire Behavior Prediction System" combine these factors to predict the probability and severity of wildland fires. However, these systems have mixed results in predicting extreme fire behavior conditions characterized by intense crowning and spotting. Extreme fire behavior is rare, but when it occurs, fires burn with intense heat and spread rapidly, endangering life and property.

An atmospheric index was developed in 1988 by Donald Haines, a research meteorologist with the USDA Forest Service, that addresses the problem of how weather promotes extreme fire behavior conditions. His index uses the environmental lapse rate (temperature difference) within a layer of air coupled with its moisture content to determine a "Lower Atmospheric Severity Index (LASI) for Wildland Fires".

This paper compares the Haines Index with recent large Idaho fires in an attempt to determine it's predictive capabilities with regard to large fire growth.

HAINES INDEX - BACKGROUND INFORMATION

In 1988, Donald Haines developed a severity index (LASI) for wildland fires based upon the stability and moisture content of the lower atmosphere. Earlier research, conducted on fires in the eastern United States, had identified unstable air and low moisture as major contributors to fire severity.

Haines contacted wildland fire management units and requested information on their worst fire situations over a 20 year period. Information was received from 30 states regarding 29 major fires in the west and 45 fires in the east. Data from one to three

radiosonde stations closest to each fire were examined to determine airmass lapse rates and moisture values over the fires. The 0000 GMT/1800 MDT temperature and dew point profile for the evenings on which the fires were reported were constructed for one of three layers between 950 and 500 millibars (approximately 2,000 and 18,000 ft msl), depending upon the elevation of the fire. Due to large differences in elevation across the United States, three combinations of atmospheric layers were used to construct the LASI.

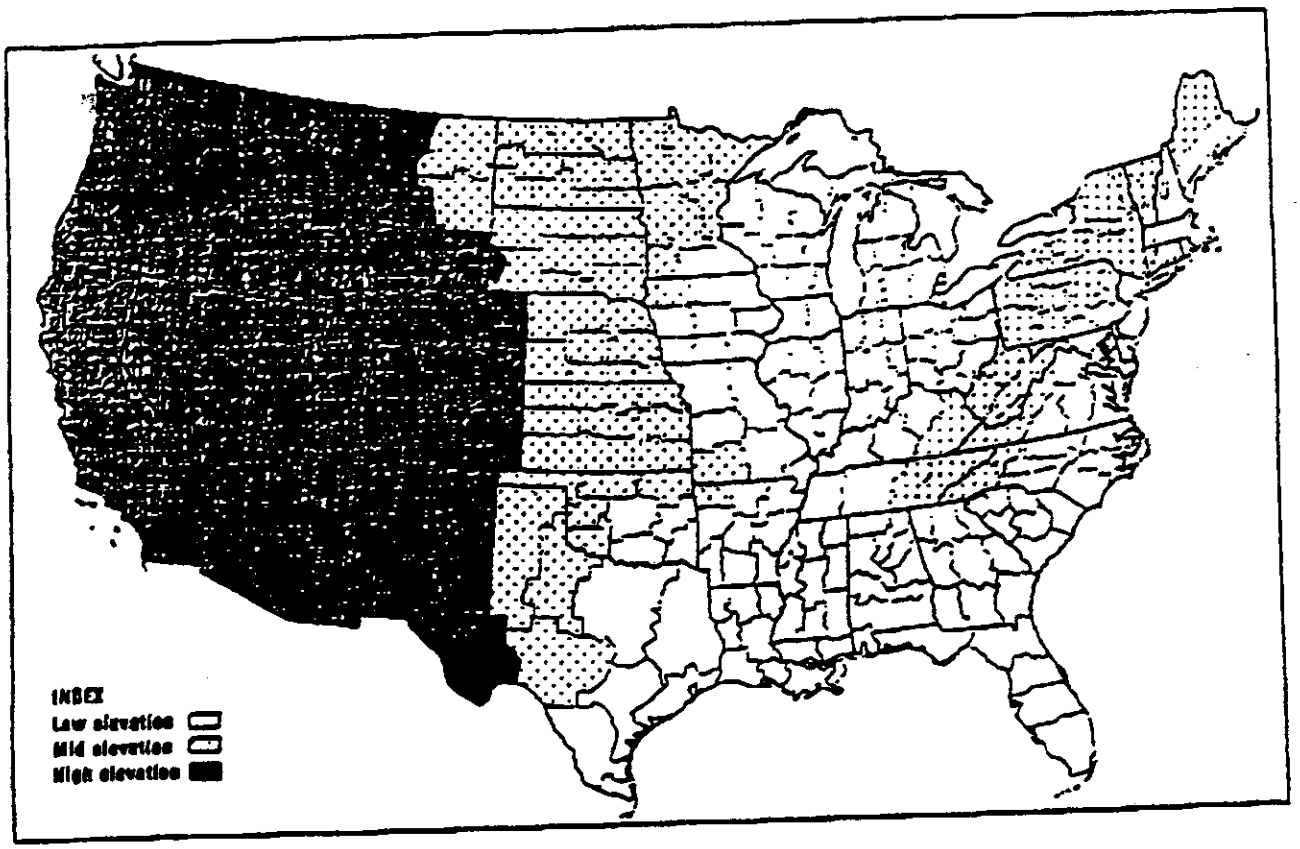

Figure 1 - Map of the United States divided into three regional elevations (from Haines 1988)

Figure 1 shows a map of the United States divided into three regional elevations. Much of the eastern United States, excluding the Appalachian Mountains, uses a low elevation index computed from 950-850 millibar data (approximately 2,000 and 5,000 ft msl). A mid-elevation index was developed for the Great Plains and Appalachian Mountains using 850-700 millibar data (approximately 5,000 and 10,000 ft msl). A high elevation index is used for the mountainous western United States using 700- 500 millibar data (approximately 10,000 and 18,000 ft msl).

Comparing large fires and nearby upper air data, Haines developed his lower atmospheric severity index which determines the potential for large fire growth. Temperature lapse rate and moisture are combined, resulting in the LASI (which we will now call the HAINES INDEX) using:

$$\text{LASI (HAINES INDEX)} = \text{STABILITY} + \text{MOISTURE}$$
$$= (Tp_1 - Tp_2) + (Tp_1 - Tdp_2)$$
$$= A + B$$

where T is the temperature at two pressure surfaces (p_1,p_2); and Tp_1 and Tdp_1 are the dry bulb temperature and dew point temperature at a lower level. All temperature values are centigrade.

Illustrated below are the lapse rate and moisture limits used in the low, mid and high elevation Haines Indexes.

ELEVATION	STABILITY TERM	MOISTURE TERM
LOW	950 - 850 MB TEMP A= 1 when 3 deg C or less A= 2 when 4-7 deg C A=3 when 8 deg C or more	850 MB TEMP - DEW POINT B= 1 when 5 deg C or less B =2 when 6-9 deg C B=3 when 10 deg C or more
MID	850 - 700 MB TEMP A= 1 when 5 deg C or less A=2 when 6-10 deg C A = 3 when 11 deg C or more	850 MB TEMP - DEW POINT B= 1 when 5 deg C or less B=2 when 6-12 deg C B =3 when 13 deg C or more
HIGH	700 - 500 MB TEMP A = 1 when 17 deg C or less A=2 when 18-21 deg C A=3 when 22 deg C or more	700 MB TEMP - DEW POINT B = 1 when 14 deg C or less B=2 when 15-20 deg C B=3 when 21 deg C or more

Add the factor values (A + B):

(A + B)	Class of Day (potential for large fire)
2 or 3	very low
4	low
5	moderate
6	high

Haines found that only 10% of large fires occurred when the class of day was very low, though 62% of the fire-season days fell in the very low class. Forty-five percent of the fires were associated with the high class days, while only 6% of the days fell in that class.

Instability and dry air are key parameters that must be present to result in a high Haines Index. Instability can be caused by either warming the lower levels of the airmass or by cooling the upper levels. When warming below and cooling aloft occur at the same time, the airmass rapidly destabilize. In the western United States, this occurs when cooling, associated with an upper trough of low pressure, moves over a surface thermal trough or "heat low". An increase in moisture usually accompanies the upper trough, but at times a "tongue" of very dry air wraps around the leading edge of the upper trough resulting in low relative humidities at the surface. Figure 2 on the next page, displays a typical weather pattern which produces a high Haines Index in the western United States; a thermal trough at the surface, a 500 millibar trough moving onto the West Coast, and a "tongue" of dry air across the Sierra Nevada Mountains into the Great Basin and Northern Rockies. This is the classic pattern associated with the "breakdown of the 500 millibar ridge". Nimchuk and Janz (1984) state that the breakdown of the 500 millibar ridge is clearly associated with severe wildfire behavior. However, not every "breakdown of the 50 millibar ridge" will produce extreme fire weather conditions...both instability and dry air must be present. Haines has addressed these two parameters in developing his index.

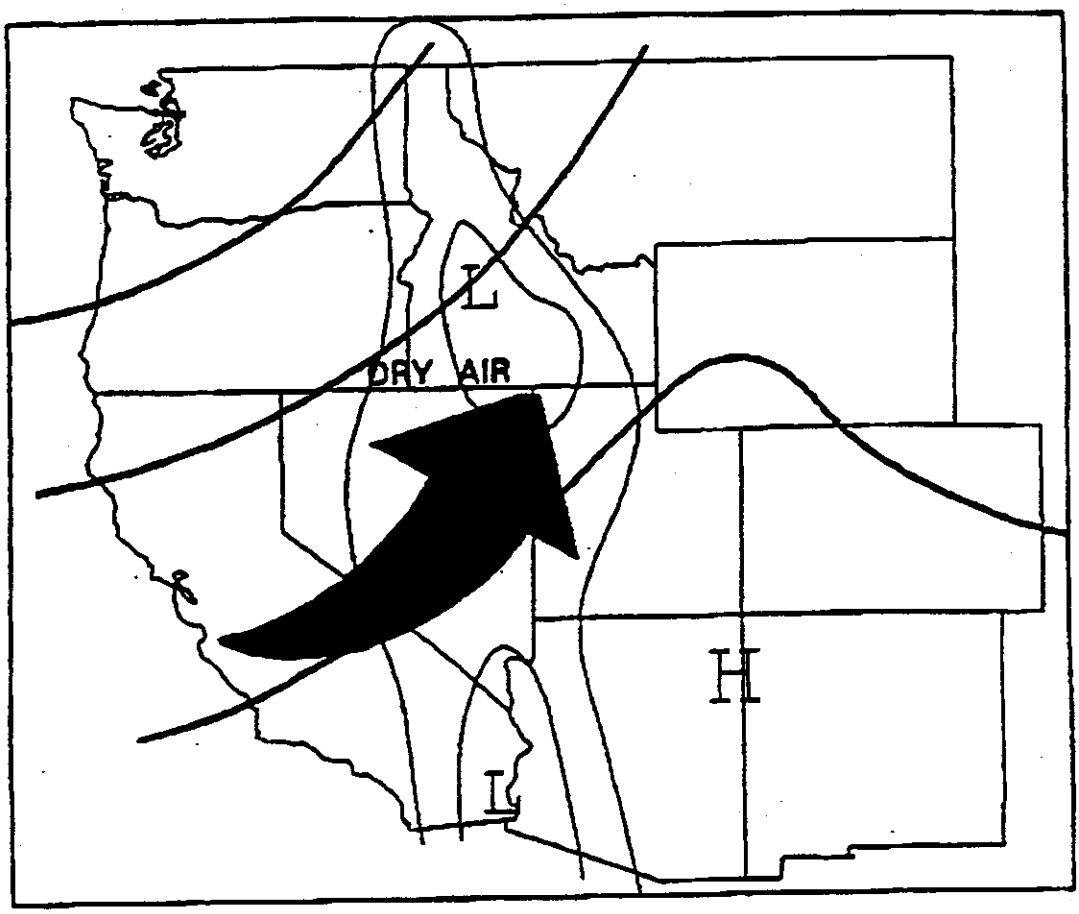

Figure 2 - Typical synoptic situation which produces a moderate/high Haines Index.

IDAHO WILDFIRES AND THE HAINES INDEX

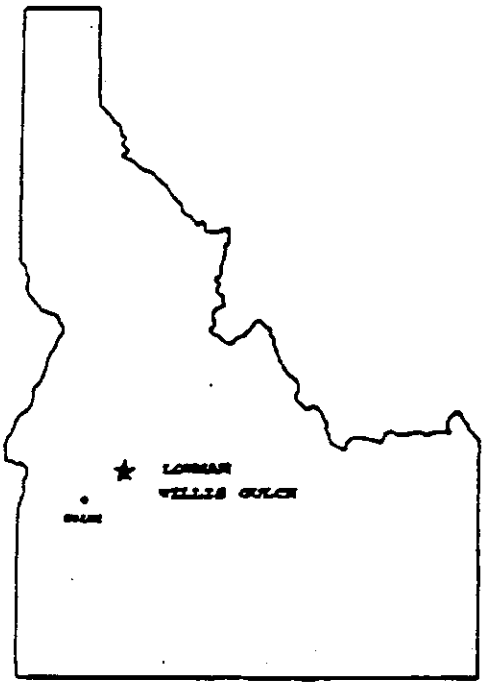

Figure 3 - Map of Idaho with wildfire locations.

The Haines Index is the first attempt to construct a formal fire-weather index based upon features of the lower atmosphere. Does it work? To answer that question, recent wildfires in central and southwestern Idaho (Figure 3) were investigated in an attempt to correlate the Haines Index and large fire growth. Central and southwestern Idaho fires were selected due to their proximity to the upper air station at Boise.

LOWMAN FIRE

The most recent wildfire studied was the devastating Lowman Fire of 1989. This fire was one of many which started on the Boise National Forest during an outbreak of dry lightning on July 26th. The fire spread only a short distance the following day, but by July 28th, fire activity began to increase. Extreme burning conditions developed the afternoon of July 29th. Crowning and spotting pushed the fire 5.75 miles to the northeast. The fire burned through the eastern edge of Lowman destroying 25 buildings and a number of vehicles, and closing State Highway 21. All residents of the small town of Lowman were evacuated. Fortunately there were no injuries or deaths. The fire continued to spread toward the northeast during the next 3 days, but at a slower rate. Cooler temperatures and higher relative humidities moved over the fire August 2nd, with very little acreage lost after that date. The size of the Lowman Fire (over 46,000 acres), it's extreme fire behavior, and the loss of homes and personal belongings will make the Lowman Fire one which will be remembered for many years to come.

The rate of spread (ROS) exhibited by the Lowman Fire is plotted with the Haines Index in Figure 4. The Haines Index (Figure 5), which was 6 on the morning of July 29th (from the 0600 MDT Boise radiosonde), indicated a high potential for large fire growth. At approximately 1400 MDT the fire made a rapid run toward the northeast at well over 75 chains per hour. Temperature at the time was between 90 and 95 degrees Fahrenheit with the relative humidity as low as 8 percent. Surface winds were measured at 5 to 10 mph with occasional gusts to 15 mph, but were much stronger near the fire front due to strong indrafts into the smoke column. The Haines Index fell to 5 the next three days, which still indicates a moderate potential for large growth. Although the rate of spread dropped to 25 chains or less per hour, the fire continued to move too quickly to fight effectively. The Index (Figure 6) dropped into the low and very low categories August 2nd, resulting in a significant drop in the fire's rate of spread (5 chains or less per hour).

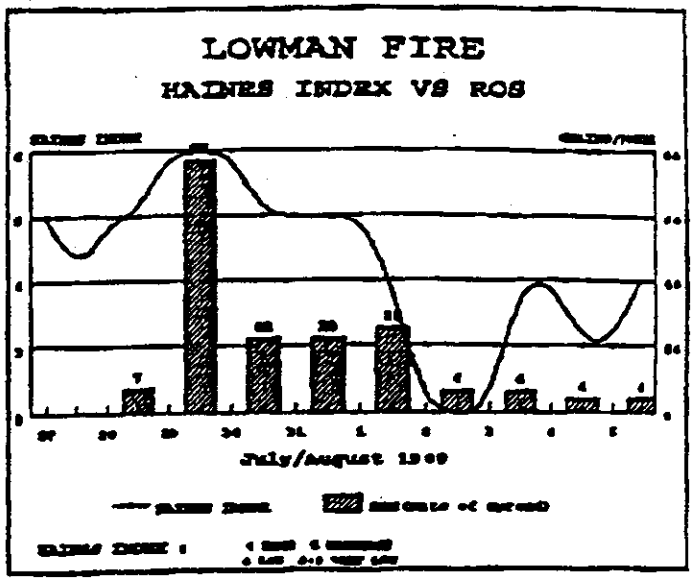

Figure 4 - Haines Index vx. rate of spread (ROS) for Lowman fire

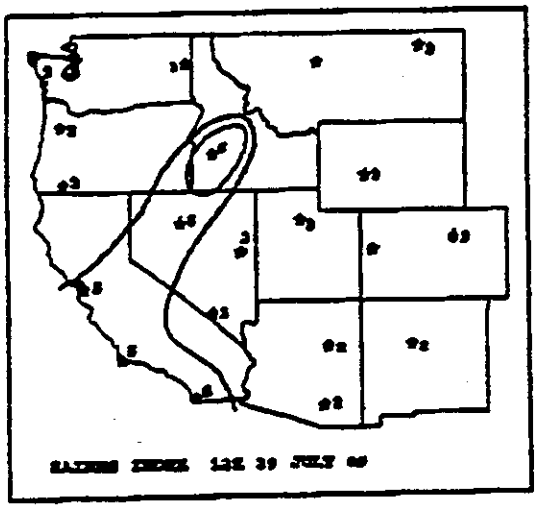

Figure 5 - Hainex Index map for 0600 MDT July 29, 1989. Solid contour indicates values of 5 or greater.

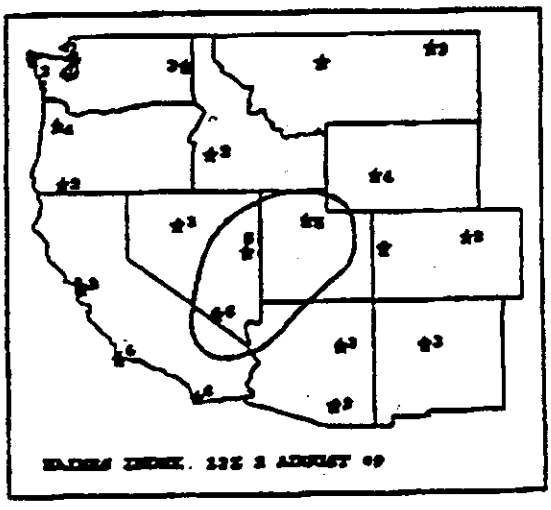

Figure 6 - Hainex Index Map for 0600 MDT August 2, 1989.

Extreme fire behavior, with crowning and long-range spotting, was exhibited by the fire when the Haines Index was 5 or 6, but when the Index lowered to 4 or less, fire activity significantly diminished.

WILLIS GULCH FIRE

The second fire studied, the Willis Gulch Fire, occurred in the Lowman area between July 26th and August 1st of 1988. This person-caused fire started around 1600 MDT on July 26th and spread rapidly up Willis Gulch into the mountains south of the Payette River. The high temperature at Lowman that day was 102 degrees Fahrenheit with a minimum relative humidity of 14 percent. The fire continued to spread toward the east on the 27th, resulting in the evacuation of an area of summer homes. The fire made only minor advances July 28th and 29th and was controlled on August 1st at 5,000 acres.

Figure 7 compares the rate of spread of the Willis Gulch Fire with the Haines Index. During the first two days, the fire made major runs to the east. Both days the Haines Index was 5 (Figure 8), indicating moderate potential for large fire growth. The fire

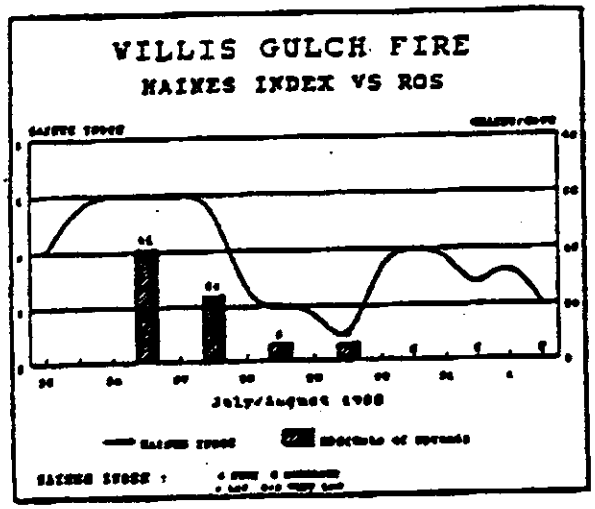

Figure 7 - Haines Index vs. rate of spread (ROS) for Willis Gulch fire.

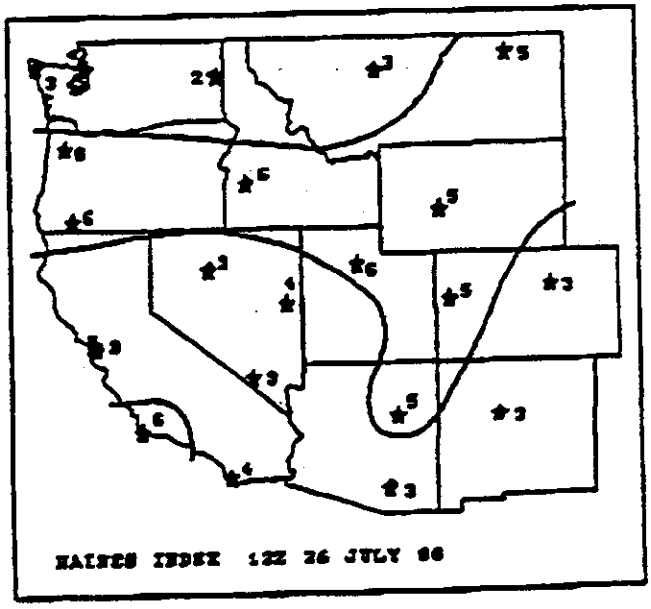

Figure 8 - Haines Index map for 0600 MDT July 26, 1988.

spread 1.8 miles in only a few hours the first day with a rate of spread of approximately 40 chains per hour. The second day, the fire spread another 1.8 miles, but this time over a longer burning period. The rate of spread diminished to 24 chains per hour with crowning and spotting still a major problem. Fire behavior drastically diminished beginning July 28th when the Haines Index dropped to 3 (very low potential of large growth). The Index remained low to very low July 29th through August 1st, essentially bringing the fire to an abrupt halt. This was in spite of the fact that the strongest 10,000 ft msl winds occurred over the fire on August 1st. In contrast, the fire's two major runs occurred when the 10,000 ft msl winds were light, 6 mph or less.

SUMMARY

The Haines Index, which combines instability and dry air, is a valuable indicator of the potential for large fire growth. Dry air affects fire behavior by lowering fuel moisture, which results in more fuel available for the fire and by increasing the probability of spotting. Instability affects fire behavior by enhancing the vertical size of the smoke column, resulting in strong surface winds as air rushes into the fire to replace air evacuated by the smoke column. This is the mechanism by which fires create their own wind. When the Index is 5 or 6, the probability of extreme fire behavior (i.e. crowning and spotting) significantly increases. Fire behavior is usually low, with only minimal fire growth, when the Index is 4 or less. Since wind is not a parameter, the Haines Index is best suited to plume-dominated fires. That is when the power of the fire is greater than the power of the wind or the atmosphere. The Index has yet to be tested on wind-driven fires, such as Santa Annas or Sundowners, when the power of the wind is greater than that of the fire.

During the 1990 fire season, the Boise Fire Weather Office included the Haines Index in the daily fire weather forecasts. A computer generated map of Haines Index values across the Western United States was also produced twice a day, based upon the 0600 and 1800 MDT upper air data. The Haines Index was then compared with the acreage burned on the Boise Fire Weather District to see if there was a correlation between days in which the index was high and the occurrence of large fires. Between July and September, the Haines Index was 6 (high potential for large fire growth) on only 6% of the days. Over 75% of the burned acreage occurred on these days. The Haines Index was 2, 3 or 4 (low or very low potential) 68% of the days. Only 7% of the acreage burned on those days. Needless to say, the Haines Index verified very well on the Boise Fire Weather District in 1990.

References

Brotak, E.A. 1976. Meteorological Conditions Associated with Major Wildland Fires. Ph.D. dissertation, Yale University, New Haven Conn. 163 pp.

Davis, R.T. 1969. Atmospheric Stability Forecast and Fire Control. USDA Forest Service, Fire Control Notes 30 No. 2: 3-4

Haines, D.A. 1988. A Lower Atmosphere Severity Index for Wildland Fire. National Weather Digest Vol 13, No. 2:23-27

Nimchuk N. and Janz B. 1984. An Analysis of Upper Ridge Breakdown in Historical Problem Fires. Alberta Forest Service Internal Report.

-PI-E SPRINGFIELD
-PI-E SWEETHOME
-PI-E THEDALLES
-PI-E TILLAMOOK
-PI-E TOLEDO
-PI-E VENETA
-PI-E WALLOWA
-PI-E, SALEM
-PROTECTION SALEM
-PUBLIC AFFAIRS
-UF PENDLETON
-UF WALLOWA
-UF-E ASTORIA
-UF-E COLUMBIA
-UF-E COOS
-UF-E DALLAS
-UF-E FG
-UF-E GP
-UF-E JD
-UF-E KLAMATH
-UF-E MEDFORD
-UF-E PENDLETON
-UF-E PHILOMATH
-UF-E PRINEVILLE
-UF-E ROSEBURG
-UF-E SANTIAM
-UF-E TILLAMOOK
-UF-E TOLEDO
-UF-E WALLOWA
SMOKE MGT ALL ODF

CC:
SUBJECT: August Precipitation
PRIORITY:
ATTACHMENTS:

OREGON WEATHER AND CLIMATE CONDTIONS
as of September 1, 1994
Mike Ziolko, Oregon Department of Forestry

Little rain fell throughout the state during August and the number of counties with state-declared drought emergencies increased. Many reporting stations recorded no rainfall. Water year totals dropped slightly once again and are in the 55-81% of average range. Northeast Oregon had the best monthly total on a percentage basis, and has the best water year totals as well. Temperatures throughout the state were close to average for the month.

Lengthy periods of below average precipitation continue at some stations. Crater Lake has had 41.54 inches of precipitation (63%) during its 13 consecutive months of below average precipitation. M rd has had 12 consecutive months of below average pitation. This ties for the longest period of below average rainfall which also occurred between July 1980 and June 1981. The rainfall deficit during these 12 months is 8.65 inches or 47% of the annual total. This was the first time since 1981 that not even a trace of rainfall had fallen during August at Medford.

Through the end of August there had been 77 consecutive days without measurable rainfall at Burns. 1994 has also seen the driest ever June, July and August at Burns. This is only the third time since 1938 that there has been no rain at Burns during both July and August and the first time since 1969.

No rainfall was recorded during July and August in Gold Beach, Grants Pass and Klamath Falls, either. Such an event (or only a trace of rain) has occurred five times in Klamath Falls since 1905; the last time being 1967. No rainfall in both July and August is not quite as uncommon in Grants Pass. The last two times it occurred were in 1986 and 1980. Also, such an occurrence was an annual event between 1927 and 1934.

Lengthy periods during which no significant rainfall has occurred are evident on both sides of the Cascades except in extreme northwest Oregon. Significant rainfall is defined here to be more than 0.5 inches in a 48-hour period west of the Cascades, or more than 0.25 inches in a 48-hour period east of the Cascades. Examples in certain areas are:

Location	# of days
Williams	191
Riddle	154
Medford	153
Roseburg	148
Klamath Falls	101
John Day	91
(Bend, Hood River, North Bend, Prineville, Powers, Eugene)	86

Drought indices remain in the moderately dry category throughout the northern and coastal areas of the state. Southwest Oregon, central and south-central Oregon are in the extreme category. Elsewhere, conditions are in the moderately to severely dry categories. The following counties have had drought emergencies declared by the Governor: Crook, Josephine, Jackson, Jefferson, Deschutes, Klamath, Sherman and Douglas.

The tables below show the precipitation status in Oregon through August.

OREGON PRECIPITATION

	Precipitation (through August 30)			
	August		Water Year 93-94	
Basin	Total	% of normal	Total	% of normal
Owyhee	.11	18	7.70	70
Grande Ronde	.18	29	11.88	77
Upr John Day	.18	22	11.73	81
Umatilla	.09	14	11.58	76
Upr Deschutes	.01	2	7.85	55
Mt. Hood	.05	7	19.12	70
Will. Valley	.05	4	38.10	67
Rogue-Umpqua	.01	2	20.15	58
Klamath	.00	0	9.90	57

Lake	.00	0	8.19	67
Harney	.04	6	7.48	65

ions (through August 31)

Astoria	1.49	112	54.53	86
Portland	.07	11	22.63	68
Salem	.05	7	25.22	67
Eugene	.00	0	35.67	75
Medford	.00	0	8.87	49
Pendleton	.00	0	10.06	88
K. Falls	.00	0	8.45	72
Burns	.00	0	5.81	62

Many stations reported no precipation during August. It is a short list of sites that did have rainfall. The list includes the following locations:

Bates	0.43	NA	Brookings	0.01	(1%)
Dufur	0.11	(22%)	John Day	0.11	(12%)
LaGrande	0.22	(25%)	Meacham	0.03	(36%)
Moro	0.07	(15%)	North Bend	0.12	(13%)
Hart Mtn	0.51	(83%)	Pilot Rock	0.08	(11%)

THE OUTLOOK?

Average September rainfall include the following totals (inches):

Astoria	2.91	Baker City	0.74
Brookings	2.15	Cave Junction	1.31
Corvallis	1.51	Drain	1.35
Elgin	1.06	Govt Camp	3.99
Hood River	1.13	Klamath Falls	0.55
Mitchell	0.74	Prineville	0.47
The Dalles	0.49	Wallowa	1.25

Long-range forecasts typically have little reliability especially during this time of the year, although the forecast for August was right on target. The 30-day forecast for September calls for near average temperatures and slightly below normal precipitation. The 90-day forecast through November is projecting temperatures to be near average and precipitation to be slighltly above average.

Please call if you need additional or more detailed climatological or meteorological information.

APPENDIX J

District Training Documentation

INVESTIGATION TEAM NOTE

The following list was provided to the investigative Team by Bill Cook, Contract Administrator, for the Hull Mountain Fire Incident. Cook had no information to indicate that either S. Maplesden or M. Davis had received the minimum required OR-OSHA training prior to their fireline assignments. Additional information can be found in the witness statement provided by B. Cook and Check-in forms.

From: Bill Cook
Contract Administrator
From the District.

8/26/94 Standard Report Page

Name	Mm	Dd	Yy
Bahn, Richard	8	10	92
Baker, Steve	8	6	92
Bartow, Clarence	8	5	92
Bradford, Carol	7	30	92
Brunar, Lois	8	6	92
Bryden, Bruce	8	16	93
Burdan, Darrell	8	6	92
Caldwell, Bill	7	30	92
Cherry, John	8	7	92
Clark, Delvin	8	7	92
Cleveland, Ronald	8	6	92
Cooper, Marc	7	30	92
Crawford, Gene	7	30	92
Dalton, Linn	8	6	92
DeBenedetti, Jon	8	5	92
Diggins, Edward	8	4	92
Eary, Jack	8	16	92
Ebelabe, Anjala	8	8	92
Ebary, Steven	7	30	92
Ford, Scott	8	10	92
Forrer, Eric	8	4	92
Frary, Michael	8	5	92
Freeman, Mark	8	5	92
Frick, Shawn Wayne	6	9	93
Gee, Greg	8	6	92
George, Gary	8	7	92
Gordon, James	8	3	94
Green, Karen	8	4	92
Hallmark, Roger	8	4	92
Hammond, Robert	8	5	92
Hanks, Delbert	8	4	92
Hansen, Mike	8	4	92
Hazzard, Theodore	8	6	92
Herbert, David	8	3	92
Hewitt, Janet	8	4	92
Hyde, Gregg	8	6	92
Jennings, William	8	5	92
Jones, Dean	8	5	92
Kalton, Randy	8	5	92
Kalton, Steve	8	5	92
King, Ralph F	7	30	92
Knight, Rick	8	6	92
Linville, Nancy	8	4	92
Linville, Richard	8	4	92
Low, George	8	5	92
Lucas, Tom	7	30	92
Mahannah, Connie	8	4	92
Mahannah, Ray	8	4	92
Manie, James	8	4	92
Manka, Glenn	8	5	92

Kuyfield, William - 8 5 92

Name	Mm	Dd	Yy
McCormick, Tim	8	6	92
McInnis, William	8	5	92
Mead, Richard	8	4	92
Meyer, Jacob	8	6	92
Miller, Cdy	8	4	92
Miller, Kenneth	8	5	92
Morales, Jose Manuel	7	30	92
Matho, Frank	8	6	92
Nelson, Gary	8	6	92
Olan, Gerald R.	2	12	93
Offenbacher, Richard	8	7	92
Stevenley, Cliff	8	4	92
[illegible] Robert	7	30	92
[illegible], Rick	8	7	92
Palmer, Tim	8	7	92
Pappe, Kevin	8	8	92
Peckham, Dave	8	6	92
Peckham, Mark	8	6	92
Peckham, Matt	8	6	92
Peckham, Rick	8	6	92
Rambo, Levi	6	9	93
Reaves, Tim	8	6	92
Riker, Robert	7	30	92
Rohan, Rick	8	5	92
Root, Larry	9	8	92
Rose, Kathy	8	4	92
Sanchez, Benjamin	8	7	92
Sanchez, Jose	8	7	92
Sauer, Arnd	8	5	92
Schwabauer, Jared	8	7	92
Sarak, John	2	7	94
Simms, Josh	8	6	92
Simpson, Tom	8	5	92
Smallwood, Mark	8	5	92
Stebbins, Gerald	8	6	92
Stewart, Rich	8	6	92
Stoner, Ron	8	7	92
[illegible], Dan	8	6	92
[illegible] Deborah	6	11	93
[illegible], Denny	8	6	92
Thompson, Randy	8	3	94
Thias, Felipe	8	7	92
Tomasini, Don	8	5	92
Tuerty, Mark	8	6	92
Tuttle, William	8	5	92

Vandagriff, Curt	7	30	92
Wallace, Darrell W.	7	30	92
Ward, Les	2	12	93
Warren, Chris	1	25	94
Warren, Rasco	1	25	94
Willis, Ronald	8	5	92
Wylie, Don	8	5	92

Name	Mm	Dd	Yy
Younce, Larry	8	4	92

APPENDIX K

Fire Incident Report

Radio Logs

e#: 94-190 Name: Hull Mtn Statistical Category: 1
strict: 71 Unit: 1

GEOGRAPHIC DATA AT POINT OF ORIGIN

Fire Location: Latitude: Degree's: 42 Min/Sec: 35.100
Longitude: Degree's: 123 Min/Sec: 0.000
Township/Range: 34S /03W Section: 25 - SWSE
County: 15

Protection Agency: 1 Federal Lands: 3 VARC: 3

Land Class at Origin: 1 T/G: T Minimum Assessment Track: N
Dual Assessment Track: N

Weather Zone: SW1

Fire Origin Land Owner: 50 BLM

PREVENTION DEMOGRAPHICS

Discovered By: 07 Chuck Thompson - FS Recon
Cause By: 12 General: 07 Specific: 705 Degree Certain: P

General Restrictions: 5 Industrial Restrictions: 3

ther: Warm, dry, calm. Burn Index: 34

Involve Operation: 1 Notification Number:

FIRE CHRONOLOGY

	Date	Time
Time of Ignition:	8/23/94	1400
Time of Discovery:	8/23/94	1418
Time of Reporting:	8/23/94	1418
Time of Initial Attack:	8/23/94	1444
Time of Control:	8/31/94	1900

FUELS/FIRE BEHAVIOR/SUPPRESSION ACTION/FIRE SIZE

Initial Attack By: 01 Attack Type: 3 Size at Attack: 2.00

Flame Length: 4 Behavior at initial Attack: 7 Fuel Model: H

Topography: 5 Aspect: 4 Slope: 2 Elevation: 2

Final Fire Class: G Acres: 7,990.00 Protected Acres: 7,990.00

R	FA	FR	FG	FT	FS	X

VARC Percent Acres Burned:

Fire#: 94-190 Name: Hull Mtn Statistical Category:
District: 71 Unit: 1

ACREAGE BURNED BY TYPE

Ownership	Commercial	Non-Commercial	Non-Forest	Other
State/Private	7,990.00			
Federal Lands				

ACREAGE BURNED BY PROTECTION CLASS

	I	II	Zone1	Other
Bureau of Land Management	2,200.00			
Industrial	2,180.00			
Small Woodland	3,610.00			
TOTALS	7,990.00	0.00	0.00	0.00

I. Private class 1 and 2 forest lands and public lands paying timber assessment rates.
II. Private class 3 forest lands and public lands paying grazing assessment rates.

COST RECOVERY AND DAMAGES

District Suppression Cost: 13,172.43
Emergency Fire Sup. Cost: 7,500,000.00
Private Company Cost: 0.00
Other Agency Sup. Cost: 1,000,000.00

Cost Recovery Fire: N
Will Have Damages: Y

Warning - VARC percent distributions <> 100

Jim Steele
- - - Prepared by - - -

Clifford C Eccles
District Forester

Rev. 4/83

FIRE INVESTIGATION SUMMARY REPORT
FOR ALL MAN-CAUSED FIRES

FORM
1-1-1-020
SECTION 1

CONFIDENTIAL

CONFIDENTIAL

This report includes three sections - supplements may be added as needed.
Section 1 - must be completed for all man-caused fires.
Section 2 - must be completed if the party(s) responsible for the origin of the fire, or responsible for control action on the fire, or responsible for every reasonable effort is known.
Section 3 - (Arson Fires) must be completed on all arson or incendiary fires.

District Southwest Oregon Fire Number 190

Fire Cause Incendiary Fire Name Hull Mtn

Responsible Party:

____ Known

Name(s) _____

Address(s) _____

X Unknown

Cost Estimates:

Regular	13172.43
Other	7500000.00
Total	7513172.43

____ Yes ____ No Recommend that responsible party(s) be billed for fire suppression costs.

____ District will bill. ____ * Request Salem Headquarters to bill.

Costs to be collected.

Regular	
Other	
Total	0.00

Fire Investigation Report:

1) Who made the investigation? Chuck Miller, Carl Roberts, Ryan Fields

2) Where is written investigation report filed? Medford

3) ____ Yes X No Did the investigation reveal the definite cause of the fire?

4) Give a brief summary of supporting evidence or circumstances you used to make this cause determination. See investigation report. Report to follow.

____ Yes X No Is the fire investigation complete at the time of filing this report?

Date 9/17/94

District Forester

* Where Salem is requested to bill, all investigative reports, forms, statements, etc. relating to the fire must be sent to the Prevention Section in Salem. Include a copy of form 1-3-5-209 Firefighting Cost Report to substantiate costs to be recovered.

1-68—300 Pads
.25/Pad

STATE OF OREGON—DEPARTMENT OF FORESTRY

RADIO STATION LOG

Sheet No. 2

District _____ Location _____

Base Station Call KOK 916 Relay/Repeater Call _____ 19__

Date	Indicate A.M. or P.M.	Time off	Station Worked	Nature of Message	Operator Signatur
7/25	1131a		Mdws. Staging -	3" volume pump w/ fitting materials	
				1600' 3" hose	
				10 gals. fuel for volume pump.	Gw
				Double male 3" Cam-lock	
				All this for Div. A (Ellis)	Cw
				For Div. C (Robinson) - 1 2000 gal. tender w/	
				short lines for	Cw
	1150a		To Templeton -	wants to discuss encroachment	
				a powerline through fire area / Templeton -	
				enroute to camp, will call them.	Cw
	1217		Mdws. Staging -	Order for Div. D - 3000' 1 1/2" hose	
				1200' 1" hose	
				12 Gated wyes 1 1/2"	
				12 1 1/2 - 1" reducers	
				12 1" nozzles	
				Deliver to Drop pt. 2a.	Cw
	1400		Carl Roberts → Lorenz	No Contact. (Over to mgmt.	
				point of origin).	
	1647		Robison	Need 2 D-8 dozers w/ lowboys to Dungans Rd. ASAP.	Gw
	1810		Thornton	Fire made run towards Meadows Rd. Some	
				spotting across the rd. Retardant was put	
				along the road. All spots are holding.	
				Structures are threatened at this time.	Cw
	1911		Affr. Myers -	Via phone - all areas threatened have been	
				contacted (mostly by Comm. & Rescue	
				personnel).	
	1729		Thornton	Notify county that retardant was dropped on	
				Meadows Rd and the road is slick.	Cw
25	18:08		Matzka	Staging area will be at Ramsey all supplies to	
				go there	Cw
25	18:10	Div. A	Lorenz	Needs Dozer with Lights for 4 20 man crews	Cw
25	1825		Gordon	Needs to contact Templeton ASAP	Cw
25	18:30		unknown	needs Sheriff at entrance of camp there was an accident	Cw
25	18:40		Belforon	is going to Schmidt meeting	Cw
25	19:04		Young	Restricting public traffic at Big Lake	
				Sardine Chetco	Cw
25	19:25		Young	Request for Low bed to move D-6 Dozer	Cw
25	19:40		Bothun	Request for ODF 300 Eug Center.	Cw
25	20:10		Vonl	75 men late for check 21:00	C

INSTRUCTIONS: Retain this sheet in station files for one year from date of last entry. If one operator assumes duty at this station for an entire shift, he shall sign on duty at the beginning of the shift, and sign off at end of shift. If various operators operate the station, signature must be shown for each entry on the log.

SP*35154-629

ZAC

1-66—200 Pads
25/Pad

STATE OF OREGON—DEPARTMENT OF FORESTRY

RADIO STATION LOG

Sheet No. 3

strict ..... Location .....

Base Station Call KOK 966 Relay/Repeater Call ..... 19....

Date	Indicate A.M. or P.M.	Time off	Station Worked	Nature of Message	Operator Signature
7-25	2001		Cotton	Where's E-91 / in Camp	
	2010		Barnett	- Contact Matt Tate on 966 Harrisons Crew, C-UD Jim Beard have him call his wife at home	
7-25	20:46		911	Report of Fire Spotted by Lady at 11175 Runaway Rd + Hill 11 mattlized (South of Ridge)	
7-25	2057		Staging	has a 225 Gal E-11B that is unassigned. Advised that Cotton could use it	
	2172		Balfour	Leading Camp Be in 30 Minutes	
7-25	21:26		Totey	Div. A. Placed order for E-91 - to Drop point 35	ca
7-25	21:46		Cotton	Resources Status Completed	ca
7-25	21.50		Finch	" " "	ca
7-25	21.50		Goody	" " "	ca
7-25	21:30		Totey	" " "	ca
	2233		Cushman	911 (1) Fire update North + East of Holcomb & Pelton	
	0055		Cushman	Have located E-91 - There's home safe	
	0100		Totey	E91 Eta 0200 will be at Drop point 35	ca
	0105		Barnett	Resources Statistics Completed	ca
	0136		Turnbull	needs to contact Pitman Forget Letter (x) has Oppo	ca
	0345		Pitman	placed order for supplies 4WD 4x4 truck	ca
	0400			Fire UP dates Received except Klive	ca
	04:30		Cotton	911 Call for Boy Cooper girl friend in Philly	ca
	0451		Totey	received update	
	0535		Totey	need 10 gal unleaded fuel botwee shaft thang	ca
	0601		Toby	NO Contact.	
	0602		FC ⇒ Toby	I'll set back to use Vetter ⇒ 2-3 case fusees drip torches may be a fix for idea for day how end of other hardware + equip for Thursday	
	0623		Air Ops ⇒	Power to main power lines are to be ~~down~~ shut down. at 0630 am at 8/26. Need priority flight for Rick Dreyer for Branch Director of U.S. and of Fire.	

→ Benson

INSTRUCTIONS: Retain this sheet in station files for one year from date of last entry. If one operator assumes duty at this station for an entire shift, he shall sign on duty at the beginning of the shift, and sign off at end of shift. If various operators operate the station, signature must be shown for each entry on the log.

SP*35154-629

K-5 ~73.05 4°

The Hull Mountain Fire was first reported by a USFS Recon plane on August 23, 1994, at 1418. The fire was immediately toned with units enroute at 1420.

The initial dispatch included 6 engines, 1 dozer, and 1 handcrew. Within 10 minutes, a medium helicopter was also enroute.

The first unit was on scene at 1444 with a sizeup of 5 acres. He stated it had jumped the road. At this time, he requested Airtankers, an additional dozer and tenders. At 1449, Orville Eary arrived on scene and requested 2 D-6 Dozers and 2-20 person handcrews.

v:\document\hull1

Form 9120–1
(December 1964)
(formerly 4–1449)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RADIO STATION LOG

CODE	Location	Radio Call Sign
RD – Radio Telephone LL – Landline Telephone VB – Verbal Message MS – Messenger Service		KOK962
	Transmitting Freqs: (circle) F1, F2, F3, F4,	Date 8/25

TIME (0001–2400)	STATION CALLED OR CALLING	INFORMATION	OPERATOR INITIAL
0140	Barnett	S+G Services 4X4 200 gal Engine W/ crew of 2	KW
		Brandon Conover 250 gal 4X4 w/2	
		6.64 Interface task force 250 gal 4X4 w/2	
		– need ETA for lunches Ramsey Evans 30 minutes	
0150	Gooding	Deliver to DP 50 (J4)	
		2000 ft 1½ in hose	
		2000 ft 1 in hose	
		20 1½ in gated Y's	
		30 1½ to 1 reducers	
		30 nozzles	
		30 gal foam	
		30 gal Mark 3 fuel mix	
		3 fold-a-tanks	
0150	Cushman	– Victim of house fire, Phil Gray.	
0602	Staging	Cect Day Shift. plan out to staging AS.O.	

K-7

1-66—200 Pads
25/Pad

STATE OF OREGON—DEPARTMENT OF FORESTRY

RADIO STATION LOG

Sheet No. ____

District Medford.

Location Fire Camp

Base Station Call Medford

Relay/Repeater Call DOVE

19...

Date	Indicate A.M. or P.M.	Time off	Station Worked	Nature of Message	Operator Signature
7/25	631		Hufstetler	IC + OPS looking for you. Want to see you in person.	
	0745		Meade Dragon	Resources work in, double shift - 10 (max) - Case of DP or gate rule.	
	754		Cushman	⇒ Young i needs to talk.	
	804		AirOps	⇒ No Contact	
	810		Cushman	⇒ Bragdon Canyon ⇒ Eng -93 mechanical problem Manifold and [illegible]	
	810		Lorenz.	⇒ 1st of radio assigned - No Contact - Bill Dr (Communications)	
	815		Thurber	⇒ Air division Supv - Confirm resources by 10 00.	
	900		Lorenza	Div A - No Contact.	
	850		Cline	DIV B - ~~Have~~ No Contact	
	850		Robinson	DIV C - will do.	
	850		Vaugan.	DIV D - will do.	
	854		Young	Div E - No Contact	
	830		Thurber	- What is the extra crew we [illegible] was sent to DIV A	
			Cushman	⇒ Well - Confirm change in Assignment from DIV D to DIV A.	
	830		Thurber	⇒ Bill needs to talk - [illegible]	
	840		Thurber	⇒ No Extra crew assigned to DIV A.	
	905		Young	7- drip torches 70 g of fuel. 2 pumps w/ kit 6- boxes flares 20 sat. fuel 3- 1500 - fold-a-tank 7000' 1½" hose 25 - sat y 1½" 5000' hose	

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SP-35154-659

75 1½-1" [illegible] nozzles.

K-8 [illegible] Cubic yards of Sand.

1-68—200 Pads
25/Pad

STATE OF OREGON—DEPARTMENT OF FORESTRY

RADIO STATION LOG

Sheet No. 2

District Medford Location Fire Camp

Base Station Call ..... Relay/Repeater Call ..... 19...

Date	Indicate A.M. or P.M.		Station Worked	Nature of Message	Operator Signature
		Time off			done
945			Meadows	⇒ Resources Order	✓
				1000' - 3/4" hose.	
				5 - nosels 3/4"	
				5 - Y's	
				5 - 1" to 3/4" reducer.	
				Meadows	
			Lorenz	⇒ ~~Hot~~ list - Confirming list -	✓
50			Wagner	low on action - have gr 5 supply	✓
				roll	
				Lead ⇒ powerline	
				2 - For to Drop at 35 -	
			Bernie	Sardine ⇒ R. Fork - Pink ribbon	
				off lead	
				ETA	
				ETD + ETA	
1C			Cushman	Mike Cuming or Makenah Heigh	Sent
				Camp net -	
1060			Meadows	Resource Order -	done
				2000' - 1½" h 8 - 1" nozzles	
				1000' - 1" h. 2 - Mark 3 + kit + fuel	
				4 - 1½" gate y's 10 gal mixed fuel.	
				Roger ⇒ Thorton will not meet w/ you ~~Wed~~	
				No Contact	
102			Lorenz ⇒	19 man crew on way ⇒ Staging, Ranger + N	
				Needs saw to pick them.	
				+ radios - 1, 4, 7, 10.	
				Chase 2, 5, 8	
				Young 3, 6, 9, ~~10~~, 11, ~~12~~, -16 done to Vaughan + Robinson	
1105			Meadows	⇒ have you had contact w/ thorton. -	
				- negative - IC's -	
			Young	⇒ ~~Base~~ tender BLM tender should be at	mea
				Burg - at 12 noon Private T owned by Andreason	

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SP*35154-829

Right F. to Sardine to 100.

that should be at meadow at 1300.

1-68—200 Pads
25/Pad

STATE OF OREGON—DEPARTMENT OF FORESTRY

RADIO STATION LOG

Sheet No. 3

District Medford Location Fire Camp

Base Station Call ..... Relay/Repeater Call 1

19....

Date	Indicate A.M. or P.M.	Time off	Station Worked	Nature of Message	Operator Signature
7/25	1006		Thorton	→ Cushman to call him.	
			Young		
	1030		Nuadon	Res DIVC - to Perry/Coos Station. 5000 - 1½" h 7000 - 1" h 5 - 1½" lg 5 - 1½" in in T's 10 1" nosles 2 - 3000 gal tenders.	
	1040	→		Bernie Boister. → Southern Sanitation — Cycles — recycleable items. Call the office if you 479-[redacted]5335 - [redacted] Sykes	
	1115		Young	Need to get other Scouts out - Sent 5 Scout down to Sarain for water to fill Ester-motors - Logs.	
	1120		Young	on the road to Stegzy - Tenders	
	1140		Thorton	→ Mike Bassetti	
	1220		Thorton	Plans #: 582-3891	
	1223		Belfour	Wesley - location Dussins Rd.	
			Heli Pass	- Resource - Bee traps. - 1-B spark 2-CJ's 2 - Fly swatters. an... 50' extension c... Cola -	

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SP*25154-629

1-68—200 Pads
25/Pad

620-P-6

STATE OF OREGON—DEPARTMENT OF FORESTRY

RADIO STATION LOG

Sheet No. 4

rict Medford Location Fire Camp

Base Station Call ..... Relay/Repeater Call ..... 19.....

Date	Indicate A.M. or P.M. Time off	Station Worked	Nature of Message	Operator's Signature
7/25	1320	Clien	=> NO Contact - need resources you have on Robison - Tender order is filled. - One tend at Camp is on way now.	no call
	1321	Thorton	Day shift order ~~for tomorrow~~	
			B Clien ✓ 1322	
			~~A~~ Lorenz ✓	
			C Robinson	
			D - Vaughan ✓	
			E - ~~Vaughan~~ Young - ✓ 1323	
	1340	Young	hold off on mechanic	
		Vaughn	Vaughn - Same as today ~~needs his bladder bags he~~ order yesterday like an additional dozer D-6.	
	1343	Flangan	S of Park is cross rogue Rvd small fire in medians.	
		~~Belfor~~		
	1358	Belfor	is needed at F.C.? Meadow / Diggins Your fire.	
	1440	Young	=> Bonnie at Staging for crew come and	
	1513	Thorton	mess from Mark Marcum => 4TF are in the area of duce in	
	1535	[redacted]Mike	=> relay to Staging - thorton contacted	
	1536	Belfor	=> call Mike => at 582-3918	

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SP-35154-620

1-68—200 Pads
25/Pad

629-P-9

STATE OF OREGON—DEPARTMENT OF FORESTRY

RADIO STATION LOG

Sheet No. 5

District ..... Location .....

Base Station Call ..... Relay/Repeater Call ..... 19.....

Date	Indicate A.M. or P.M.	Time off	Station Worked	Nature of Message	Operator's Signature
7/25	1650		thorton	→ John Lafferty of [illegible]-1770 located on Sands creek Rd at Gold Ray Estates has a pump in the Rogue River & will pump ≈ 190 gal/min. minute - is willing to give staff a Truck - Call	
			Staging	→ meadows →	
	1109		Lorentz	6 - 20 cleats 3000'-1½"-hose 3 - 3000 T 2-portata 2 - 1000 gal 2 mark 2 lat. 1 - Dozer 2000-1" hose 2 - TUFL 10 1" nosle 10 1½ y's 70 gal mix 10 - [illegible] - 1½"-1" plus his unfilled orders from today 7/25	
			Staging	→ which - Ramsey -	
	1628		Thorton	Marion → several acres outside line of SE Spreading meadows Rd area. notify - will call back w/ exact area	
	1645		Thorton	→ Meadow Rd - [illegible] hundred yards from Rd spot area.	
	1705		Lorentz	→ no contact.	
	1710		Staging	→ have Lorentz contractor. meadows	
	1712		Staging	→ deliver supplies to ~~Rice Area~~ Ramsey Staging. 821-2542	
	1735		ODF	ASAP 821-0668 — TV Station at meadow Rd	

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SP**35154-629

1-66—200 Pads
25/Pad

629-P-6

STATE OF OREGON—DEPARTMENT OF FORESTRY

RADIO STATION LOG

Sheet No. 1

rict ..... Location .....

Base Station Call ..... KOK 9166 ..... Relay/Repeater Call ..... 19....

Date	Indicate A.M. or P.M.	Time off	Station Worked	Nature of Message	Operator's Signature
25	0658A		To Mdws. Staging - No Contact		JW
	0720A		Young	1 Tender on Div. E - Need 11 more tenders (2000 gals)	
				Bring to nt. fork Sardine Crk.	JW
	0720A		To Vaughn - No Contact		JW
	0734		Barnett	Tell Time Keeping that 2 Frenko Reforestation crews (C-20 and C-21) showed up to the fire yesterday	
				without going to time keeping first.	JW
	0819		To Vaughn - Do you need more radios today? We gave 2		
				radios to the Umpqua Crews this morning.	
				Vaughn - Need 8 more today delivered to Drop Pt.	
				# 30.	JW
	0855		Reese →	Air Ops. update? / Airops. - 0945 ETA. Poor visibility	JW
	0903		Lorenz	Will get back to you in 30 mins. w/resources	
				Committed to Day Shift.	JW
	0904		Dan Bros →	Young - a P.L.H tender enroute. Do you need 3	
				additional? / yes - we can use them.	JW
	0907		Wagner	(Div. E) Call La Grande ODF or Connie's for ETA	
				of Connie's truck. Are they having problems?	JW
				Fire Camp - Connie's truck had a delay in Pendleton	
				last night. As of 0730 - Connie's truck in	
				Roseburg. Enroute to fire camp.	JW
	0932		To Templeton	Reese - No Contact.	JW
	0942		To Wagner	- Your truck (Connie's) is @ Camp. / Wagner-	
				Check w/ Bernie Boschler for Staging location	
				@ camp.	
	1003		Mdws. Staging -	8000' 1 1/2" hose	
				1000' 1" hose	
				4 Gated Wyes 1 1/2"	
				2 1" nozzles	
				2 Mark 3 w/ kits - additional 10 gal. fuel	
				To Robinson - Div. C.	JW
	1018		To Hunt -	Citizen reports another fire North of the rd.	
				block @ Perry and Valley Vista. Unknown	
				Size or exact location.	JW
	1052		To Robinson	- No Contact	JW
	1128		Hunt	What is time and place of public mtg. tonight? /	
				1900 hrs. @ Sams Valley Elementary School	
				on Corner of Tablerock Rd. and Hwy.	
				(Sams Valley).	JW

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SP*35154-629

1-48—200 Pads
25/Pad

STATE OF OREGON—DEPARTMENT OF FORESTRY

RADIO STATION LOG

Sheet No. 2

District _____ Location _____

Base Station Call KOK 916 Relay/Repeater Call _____ 19...

Date	Indicate A.M. or P.M.	Time off	Station Worked	Nature of Message	Operator Signature
/25	1131a		Mdws. Staging -	3" volume pump w/ drafting materials	
				100' 3" hose	
				10 gals. fuel for volume pump.	Gw
				Double male 3" cam-lock	
				All this for Div. B (Irving)	Cw
				For Div. C (Robinson) - 1 2000 gal. tender w/	
				short wheel base	Cw
	1150a		To Templeton -	wants to discuss encroaching	
				a power line through fire area. / Templeton -	
				enroute to camp. Will call them.	Cw
	1217		Mdws. Staging -	Order for Div. D - 3000' 1½" hose	
				1200' 1" hose	
				12 Gated wyes 1½"	
				12 1½ - 1" reducers	
				12 1" nozzles	
				Deliver to Drop pt. 3a.	Cw
	1400		Carl Roberts → Lorenz	No contact. (Over to map-recon	
				point of origin).	
	1647		Robison	Need 2 D-6 dozers w/ lowboys to Dugging Rd. ASAP.	Gw
	1910		Thornton	Fire made run towards Meadows Rd. Some	
				Spotting across the rd. Retardant was put	
				along the road. All spots are holding.	
				Structures are threatened at this time.	Cw
	1911		Aff. Myers -	Via phone - all areas threatened have been	
				contacted (mostly by Search & Rescue	
				personnel).	
	1928		Thornton	Notify County that retardant was dropped on	
				Meadows Rd. and the road is slick.	Cw
/26	18:08		Matzka	Staging area will be at Ramsay all appliances to	
				go there	Cw
/25	18:10	Div. A	Lorenz	needs Dozer with Lights to a 4 20 man crews	Cw
/25	18:25		Gordon	Needs to contact Templeton ASAP	Cw
/25	18:30		Unknown	needs Sheriff at entrance of camp there was an accident	Cw
/25	18:40		Belforuk	is going to School meeting	Cw
/25	19:04		Young	Restricting public traffic at Diamond Lake	
				Sardine Check	Cw
/25	19:25		Young	Request for Low bed to move D-6 Dozer	Cw
/25	19:40		Belforuk	Request for ODF 200 E49 Cutter.	Cw
/25	20:00		Von	75 man total for Okinuch 21:00	C

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SP*35154-629

ZAC

1-68—200 Pads
25/Pad

628-P-6

STATE OF OREGON—DEPARTMENT OF FORESTRY

RADIO STATION LOG

Sheet No. 3

rict ..... Location .....

Base Station Call KOK 966 Relay/Repeater Call ..... 19.....

Date	Indicate A.M. or P.M. Time off	Station Worked	Nature of Message	Operator's Signature
7-25	2001	Cotten	Where's E-91 in Camp	BC
	2010	Barnett	- Contact Matt Tate on Golf Harrisons Crew, C-42 Dan Bassel	BC
			Have him call his wife at home	BC
7:25	2046	911	Report of fire Spotted by Lady at 11175 Peavine Rd + Lit Unattended (South of Ridge)	CA
7-25	2057	Staging	has a 225 Gal E-11 that is unassigned. Advised that Cotten could use it	BC
	2122	Balfour	Leaving Camp Be in 30 minutes	BC
7-25	21:26	Totey	Div. A. Blackwoods (or Equip) - to Drop point 35	CA
7-25	21:46	Cotten	Resources Status Completed	CA
7-25	21.50	Finch	" " "	CA
7-25	21.50	Goody	" " "	CA
7-25	21.50	Totey	" " "	CA
	2233	Cushman	911 W/ fire update North + East of Holcomb + Pelton	BC
	1055	Cushman	Have located E-91 — There's no home sale	
	0100	Totey	E91 Eta 0200 will be at Drop point 35	CA
	0105	Barnett	Resources Statistics Completed	CA
	0136	Turnbull	needs to contact Pitman Forest Patrol (in his Area)	CA
	0245	Pittman	placed order for supplies & 4x4 truck	CA
	0400		Fire Up dates Received (except Olive)	CA
	14:30	Cotton	9A Call for Boy Cooper girl friend in Hilda	CA
	0451	Totey	received Update	BC
	0535	Totey	need 10 gal unleaded fuel before shift change	CA
	0601	Toby	NO Contact.	
	0602	FL ⇒ Toby	will set back to use	
		↓	Vetter ⇒ 2-3 case fuses	
			drip torches may be a x Hor idea for day	
			have end of other hardware +	
			equip for Thursday	
	0623	Air Ops ⇒	Power to main power lines are to be ~~down~~ shut down.	
			at 0630 am at 8176.	
			Need priority flight for Rick Dreyer for	
			Bureau Director of U.S. and of Fire.	

⇒ Benson

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SP*35154-629

K-15 173.05 4°

I-214 Air Operations

8-25-94

TIME	MAJOR EVENTS
9:07	N-656 TL Recon Fire
9:17	Request 2 Ships Div A Also Retard 25V 63G
9:30	656 HB
9:46	
9:52	25V LANDED @ HB
9:52	63G LANDED @ HB / Do to poor visibility
10:17	656 Inbound HB NINE TN SIDE
10:38	A 2= H[illegible]
10:42	63G Enroute Holcomb Spr
10:45	56 Recon
10:56	63G MADE contact C Flanigan O.N. Hotkins/Tim Fire could not Find Any Fires
10:57	636 working South END Visibility is Good Enough to work
11:25	656 Dropping off passengers, Rtn H/B
11:35	63G working South end, visibility improving
11:45	154TL to South end
11:46	656 @ HB
11:54	636 Return Base fuel
12:26	Request 25V to NW Corner from AA
12:27	25V off for NW Corner
12:54	AA KG IS Leaving H.B.
13:03	off Ground head South
13:14	154 Return to Base fuel
13:16	AA Returning to Base fuel
13:16	656 LIFTOFF, Phill
13:48	63G TAKEOFF
13:50	25V TAKE OFF
13:55	154 LIFTOFF
14:05	Robinson Report of spot outside Line 17 R SE CORNER
14:05	MAJOR blow up G-12 Visability good
14:10	63 up Retard Following
14:11	154 G.12
14:15	SPOT ACROSS LINE F-14, -16 M
14:26	656 INBOUND FOR HB
14:28	Begging to Drop Two more LIFTOFF From med Fo
14:31	25V TO HB Fake
14:40	25V Lifting.
14:44	ETA Twin Retardent
14:48	PROPERTY & HOME owner STARTed BACK FIRE on west SIDE

TIME	MAJOR EVENTS
1507	636 LANDED
510	484 INbound fuel
1512	484 @ HB fuel
1514	ETA 15 min. DROP
1515	636 LIFTOFF
1518	66 out of Redmen
1530	25V IN for fuel
1532	A-A S
1533	154 @ HR fuel
1536	SMOKE South of Table ROCK
1344	Tanker 66 Inbound to Willamette
1354	154 LIFTOFF SE
1601	484 LIFTOFF SE
1602	Retardant West
1622	63 INbound for Fuel
1634	25V IN FOR fuel
1635	25V HB fuel
1637	636 LIFTOFF
1654	656 HB Fuel
1655	Retardant Drop to slow Fire before tanker
1701	ETA AIRtanker North side Blow up
1703	25V check in Working NORTH
1709	656 Lift off A-A
	Lost HR 133 For Mecanical Reson *
1725	484 IN for fuel
1728	484 HR fuel
1729	25V HB Fuel
1732	25V LIFTOFF
1743	Spot 200 yards South of 25V. 15 mph wind —
1747	From Due East
1747	636 @ HB Fuel
1752	636 5 HR
1759	484 Lift off SE
1806	636 LIFTOFF SE 484 154
1825	25V Landing Fuel
	656 Landed
1830	51 NW En Route to
1833	51 NW @ HB
214 ICS 5-80	9. PREPARED BY (NAME AND POSITION)

TIME	MAJOR EVENTS
1834	154 HB Fule
1836	25V Lift off
1856	~~61NW~~ Liftof
1909	House on Point should think about EVACK
1919	656 @ HB out of time
1919	S1NW Radio check ok
1923	Mahoenie G air permission FOR Drop on houses E ol
	Powerline in Sec 29 - AIR OPPS. confirm c̄
	Lead 63 IF necessary, yes.
1929	25V HB Fule
1931	2 spot fire EAST of Mahoenie
1933	Lift off 25V
1934	61NW Liftoff
1934	656 Returning Landed HB
1951	656 Lifting in Route medows c̄ Phill H.
1958	656 Met c̄ A-A & Hovered FOR Picture
2002	Lead 63 Ask AA About house on Rige, Holding
	it alone now / Last Drop 50-50 chance on Savin
2004	W bound For HB
2006	Very Blow up on East WANT AIR support TO Da
2008	656 @ HB
	984 25V in bound
2019	25V 6TL Home bound

214 ICS 5-80

9. PREPARED BY (NAME AND POSITION)