



United States
Department of
Agriculture

Forest
Service

WO

To: 7120 Equipment Development and Test

Date: JUN 20 1984

Subject: R-8 Fire Fatalities

To: Lee Northcutt
Manager, MEDC

Enclosed is the investigation report on the recent fire fatalities in Region 8.
We thought you might be interested in the contents; please return it to this
office when you are done.

HAROLD L. STRICKLAND
Assistant Director of Engineering

Enclosure

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MULTIPLE FIRE FATALITIES ACCIDENT REPORT

Rainbow Springs Fire

April 25, 1984

Mena Ranger District

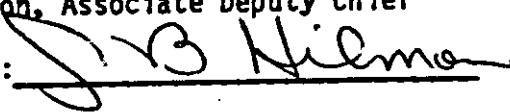
Ouachita National Forest

Region 8

Chief Investigator:

J.B. Hilmon, Associate Deputy Chief

Signature:

A handwritten signature in cursive script, appearing to read "J.B. Hilmon", written over a horizontal line.

Investigation Team:

John Chambers, WO Aviation and Fire Management
Tom Kerns, WO Engineering
Penny Goodstein, WO Safety and Health Group
Richard Ames, Regional Safety and Health Manager
Jim Stevens, WO Safety and Health Group

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Subject: 6730 Safety Management Information System

ACCIDENT BRIEF

AT APPROXIMATELY 5:00 PM ON WEDNESDAY, APRIL 25, TWO FOREST SERVICE EMPLOYEES WERE KILLED WHILE DOZING A FIRELINE ON THE MENA RANGER DISTRICT, OUACHITA NATIONAL FOREST. THE VICTIMS WERE BOTH FORESTRY TECHNICIANS FROM THE POTEAU RANGER DISTRICT, OUACHITA NATIONAL FOREST.

THURMAN PAUL KEENER, JR., AGE 40, AND JAMES H. FRIZZEL, AGE 34 WERE USING A TRACTOR TO CONSTRUCT A FIRELINE WHEN THE SECTION OF LINE THEY WERE BUILDING BLEW UP WITH GREAT INTENSITY. BOTH VICTIMS DIED OF ASPHYXIATION AND BURNS.

THE INCIDENT OCCURRED ON THE RAINBOW SPRINGS FIRE FOUR MILES SOUTHWEST OF MENA, ARKANSAS.



J. B. HILMON
Chief Investigator

INVESTIGATION NARRATIVE

Actions Prior to Team Arrival

Kenneth Rose, FMO on the Kiamichi RD, and a Level IV law enforcement officer, initiated the investigation. Kenneth was investigating the origin of the fire when he heard of the accident. Eddie Morris was sent to photograph the accident scene.

The bodies were removed from the site by the local Coroner and Sheriff, and the site was then secured by District personnel.

CHIEF'S INVESTIGATION

The team departed Washington at 7:00 a.m. on Thursday, April 26, and was met at the Little Rock, Arkansas airport by Region 8 personnel. Arrived Mena Ranger District by rental vehicle at approximately 4:00 p.m. Team member John Chambers arrived later that day from Boise, Idaho. Ouachita Forest Supervisor, John Orr, Mena District Ranger Scherrer, and Rainbow Springs Fire Boss, Joe Blair, met and briefed the team on the accident.

Chief Investigator, J. B. Hilmon, briefed the team on the objectives of the investigation and the investigation process. Team assignments were made as follows:

J. B. Hilmon:

- Issue accident brief
- Make task assignments
- Coordinate with Region and Forest
- Make or authorize all media releases
- Chair regular team meetings
- Control and release of accident scene
- Interview witnesses

Jim Stevens/Penny Goodstein:

- Prepare accident brief
- Records management
- Coordination with WO, PM, and A&FM
- Obtain Coroner's and Sheriff's reports
- Record investigation process
- USDA reporting requirements
- Diagram accident scene
- Briefing for Chief and Staff
- Accident Review Board
- Assemble final report
- Draft transmittal letter

John Chambers:

- Fire behavior
- Fire management
- Fire training and qualifications
- Weather

Tom Kerns:

- Equipment operation and maintenance
- Damage to equipment
- Operator qualifications
- Sequence of events

Richard Ames, Regional Safety and Health Manager, was appointed to the team to continue liaison work with the Forest and Region. Richard also did the photography work at the scene. Malcolm Jowers, District Ranger Chestatee R.D., Chattahoochee-Oconee NP assisted in fire behavior determinations.

J. B. Hilmon then briefed Jim Watson, Forest Public Information Officer's representative, on his responsibility to coordinate with him any release of information concerning the investigation.

Friday morning, April 27, the team, accompanied by Edwin (Sonny) Johnston, Ken Rose, and Eddie Morris visited the accident site. Following a general overview, specific observations of the terrain, fire suppression strategy and implementation, equipment involved, and all other physical evidence were made and documented.

The team then returned to the District Office where witnesses were interviewed and records researched. At the Poteau District Office the District Ranger was interviewed and the victims' personnel records reviewed.

J. B. Hilmon reviewed the status of the investigation with the team on Friday evening. The investigation was determined to be essentially complete. The development of findings and causes was then addressed by the team.

Saturday, April 28, the team departed Mena and met in Atlanta, Georgia to brief Acting Regional Forester, Jim Webb. The team then returned to Washington to brief Chief and Staff, and finalize the accident report.

FINDINGS

Personnel

1. Both victims were experienced and qualified for positions assigned.
2. Some overhead personnel on the fire were not qualified for positions assigned.
3. The Mena District had not held a fire school during the past year.
4. Shift lengths were within standards.
5. Fatigue did not appear to be a factor.
6. Personnel on the fire considered the situation to be routine until fire blew up.
7. Fire personnel were unable to explain the severe fire behavior experienced.
8. Cause of death determined to be asphyxiation and burns.

Fire Behavior

1. A classic chimney situation existed. Topography, fuel, and wind combined to create the potential for an intense blow-up condition.
2. Severe fire behavior occurred during the blow up.
3. Rapid transition from "routine fire" condition to blow up.
4. Extreme rate of spread during blow up resulting in very short time for reaction by victims, precluding escape or deployment of shelters.
5. The burning index was 47, the manning class was Extreme.
6. The fire occurred during relatively severe fire weather for the spring fire season, and on the most severe day of the season.

Fire Management

1. Mena and Poteau District personnel interviewed believe that the Forest initial action policy is to control wildfires quickly, at the smallest acreage reasonably possible. The revised fire suppression policy has not been fully implemented in the Region.
2. Personnel interviewed felt that no resource damage, other than to felled merchantable timber and pulpwood, was occurring as a result of the fire prior to the blow-up.
3. Fire suppression strategy was to control the fire at minimum acreage, in a safe manner. The primary tactic was indirect attack with dozers and firing crews.
4. Initial manning and subsequent reinforcement was consistent with the fire manager's expected needs. Containment by the first evening was expected.

5. Personnel on the fire were not aware of the "Manning Class E Day" or of the 30-40 acre fire that day in the east zone of the Forest.
6. The potential for a blow up situation was not recognized by personnel on the fire.
7. Personnel on the fire were not aware of fire in the drainage below the line on the west flank.
8. The west flank tractor line was improperly located on the windward (fire) side of the ridge at the accident site, firing operations had not begun.
9. Following fire blow up, proper actions relating to safety of personnel on the fireline were taken and a Regional overhead team requested.
10. The Zone Aerial Observer was assigned to a detection mission, observing the fire on two brief occasions.
11. The radio communications network on the fire was operational.

Equipment

1. All protective clothing except apparently for tractor operator's fire pants, were present. (Levi Strauss jean brads found at site of body)
2. Remains of a fire shelter were found with the body of the tractor boss.
3. Presence of tractor operator's fire shelter could not be established.
4. Fire shelters were not deployed.
5. No apparent mechanical deficiencies associated with tractor.
6. The Forest had prepared a Safety and Health Hazard Analysis for firefighting and prescribed burning.

Weather

1. The Palmer Drought Index indicated a mild drought (2 rating) in the area.
2. The Cumulative Severity Index increased steadily since April 10, to 115 on April 25 (highest this calendar year).
3. Relative humidity was significantly lower on April 25 than previously, this calendar year. Fuel stick readings of 4 were also lowest this year.
4. Wind was South-Southeast at 30+ mph. The highest readings this calendar year.

SUPPORTING DATA

- A. Sequence of Events**
- B. Fire Environment**
- C. Site Investigation**
- D. Witness Statements**
- E. Records**

**SEQUENCE OF EVENTS
For April 25, 1984**

<u>Time</u>	<u>Activity</u>
13:55	Fire reported by aerial observer
14:11	FS personnel (Mena RD) arrive at fire Joe Blair assigned as Fire Boss
14:23	Poteau RD tractor dispatched
14:30	Mena tractor starts to build west flank fireline
15:21	Poteau tractor arrives at fire
15:21 - 15:40	Mena dozer completed west flank fireline
16:00	Fire Boss directs Poteau tractor to dead-head up west flank fireline built by Mena tractor
16:05	Aerial observer reports fire, "Not as hot"
16:20	Fire Boss directs Poteau tractor to return via west line
16:25	Mena tractor operator observes Poteau tractor at northwest corner of the fireline
16:30	Fire Boss observes blow up and tries, unsuccessfully, to contact Poteau tractor
16:55	Tractor and one body found Fire Boss notified
17:05	Fire Boss orders all personnel off the fire Ambulance requested
17:10	District Ranger orders Regional overhead team
17:15	Body of second victim found

84
RAINBOW
SPRINGS (2)

Causes

= :

1. The potential for a blow up situation was not recognized by personnel on the fire.
2. A classic chimney situation existed.
3. Extreme rate of spread during blow up resulting in inadequate time for reaction by victims, precluding escape or deployment of shelters.

Fire Environment

FIRE ENVIRONMENT

Weather

Weather information taken at 1300 hours on 4/25 at Muse, Oklahoma, approximately 30 miles west of the fire, was:

Clear day	Burning Index 47
Temperature 82 degrees	Ignition Component 78
Min. temp 66 degrees	Manning Class E (Extreme)
R. H. 27%	Cumulative Severity Index (CSI) 115
Max RH 60%	Fuel Moisture Sticks 4
Wind SW, 30 mph	

All-fire weather elements reached their highest severity level to date for 1984 on April 25. The C. S. I. had increased steadily since April 1. The Palmer Drought Index was 2 (moderate drought). A large high pressure area was located over the Southeastern states. Low relative humidity combined with high winds resulted in the fire weather on April 25th being significantly more severe than any previous day in 1984. On the morning of the 25th, a fire in a plantation in the East zone reached 30 to 40 acres prior to being controlled by abundant and close resources.

Fire weather information for April 25 was transmitted to the West Zone Dispatcher at Mena, Arkansas, shortly after 1300 hours. The Dispatcher states that he broadcast "I have a Manning Class E day" shortly after receiving the weather. Overhead on the fire did not receive the transmission.

Winds at the point of origin were S-SE at approximately 15-20 mph, prevailing winds further up the slope were estimated at 30 mph.

Prevailing wind velocity was accelerated by the venturi effect of the proximity of Dallas and Potter Mountains. Winds flowed directly up the drainage to the east of the left flank and through a small saddle in the crest (a chimney effect).

Fuels

The fire originated within a short-leaf pine clear cut unit. Harvesting was begun two months prior to the fire, however, operations were soon suspended due to wet haul road conditions. Harvesting had been resumed shortly before the day of the fire. Most of the felled material was still in place. Characteristically, there was no provision for slash treatment in the contract.

The vegetation type is mixed hardwood and short-leaf pine. Hardwoods predominate the drainages and short-leaf pine the ridges.

Topography

Elevation at the fire's origin, near the base of Dallas Mountain, is approximately 1300 feet, the crest approximately 1800 feet elevation. Fire activity resulting in the fatalities occurred on the S-SW aspect of the mountain on slopes ranging from 35 to 50 percent.

The predominate lateral ridge, on which the left flank fireline was located, averages 35 percent in slope. Side slopes in the area of the blow up increase from 40 percent near the top of the ridge to 50 percent near the drainage bottom. The ridge top is narrow, rounded, and approximately one-half chain wide.

The drainage to the east of the ridge is "U" shaped from its mouth up to the first branch. The secondary drainages are "V" shaped.

Potter Mountain lies adjacent to Dallas Mountain to the southwest. The venturi effect created by the topographic relationship of these two prominent features was a significant factor in the behavior of the fire.

FIRE BEHAVIOR

The Rainbow Springs Fire was reported at 1355 by the Zone Aerial Observer. The size was reported to be 3-4 acres, burning hot. At this time the fire was burning within a short-leaf pine clearcut unit.

It was later learned that a logger had attempted to control the fire by making several passes with a skidder when he discovered it at about one acre in size. He suffered minor facial burns on one side of his face in the process.

The fire was approximately 10 to 12 acres in size when Fire Boss Joe Blair arrived. It had already reached the top of the mountain. Rate of spread to that point was approximately 40 chains per hour.

The fire was again observed at 1605 by the Aerial Observer who reported that it was not as hot (the fire was then burning outside the cutting unit.) The rate of spread in the pine type at this time is estimated to be 40-50 chains per hour, flame lengths at 6-7 feet, and fireline intensity at 300-400 BTU/Ft./Sec. Personnel on the fire were not particularly concerned about the fire's behavior, considering it a routine situation. Containment was expected by evening.

At approximately 1630 the fire blew up. Probable fire behavior leading up to and during the blow-up is described as follows:

The fire had spread westerly around the lower portion of the mountain. Upon reaching the drainage next to the west flank it began to spread up the "U" shaped canyon through hardwoods (the fire was now in the lower reaches of the chimney). The fire continued to move up the drainage bottom within predominately hardwood vegetation until it reached the steeper "V" shaped draws about mid-way up the mountain. The fire then spread out of the hardwoods and began to run upslope toward the northwest. After running 2-3 chains, the fire crowned, overrunning the victims as it ran to the saddle

at the top of the mountain. Rate of spread during the blow-up is estimated at 400 chains per hour, flame lengths at 40-50 feet, and fireline intensity in excess of 1,500 BTU/Ft./Sec. The time interval from the beginning of the fires run to the victims location is estimated to be 45 seconds or less. The time interval from time of crowning to the victims location is estimated to be 10 seconds or less.

The fire continued to burn intensely until at least 2100 hours, it was contained at 0530 on 4/26 at 450 acres. It was declared controlled at 2000 hours the same day.

FIRE MANAGEMENT

The Rainbow Springs Fire was reported at 1355. Initial suppression action was implemented immediately. Fire Boss Joe Blair, Mena R.D. Timber Management Officer, arrived at 1411 and established a staging area, remaining there where he had a general view of the fire area. Suppression strategy was to control the fire at minimum acreage in a safe manner. Tactics implemented were indirect attack with tractors to be followed by firing crews burning out from the dozer line. The fire organization consisted of Fire Boss, Line Boss, and specific resources.

The plan of attack was to:

1. utilize a temporary spur road along the foot of the mountain as the base fireline.
2. to construct a dozer line up the ridge on the/west flank, east across the crest of the mountain if possible and down the east flank.
3. to have firing crews burn out the dozer line thereby containing the fire.

Line Boss Barney Sherrer scouted the route prior to line construction arriving at the northeast corner of the fire.

The Fire Boss sent the Mena R.D. tractor with operator Terry Lunsford and Tractor Boss Joe Walston down the temporary spur road from the staging area at about 1430 to construct line up the west flank, a dozer blade in width. The tractor operator constructed the line, using short leap-frog passes, in order to be pushing down hill. When he neared the top of the ridge, the operator walked the tractor to the top and constructed line downhill to meet the line previously constructed.

The Mena R.D. Tractor unit then returned to the top of the ridge and began walking the tractor across the top of the mountain to construct a line down the east flank. When the terrain became too rough, the Mena tractor turned around and returned to the Northwest corner of the fire. The Mena dozer then began constructing line down the North side of the mountain.

At approximately 1521, the Poteau R.D. tractor unit arrived at the staging area with Operator James Frizzel and Tractor Boss Paul Keener. The Poteau tractor unit was deployed at the base of the fire, then instructed by the Fire Boss to walk the tractor up the west flank to meet Joe Walston and assist the Mena R.D. tractor unit, doing no blading enroute.

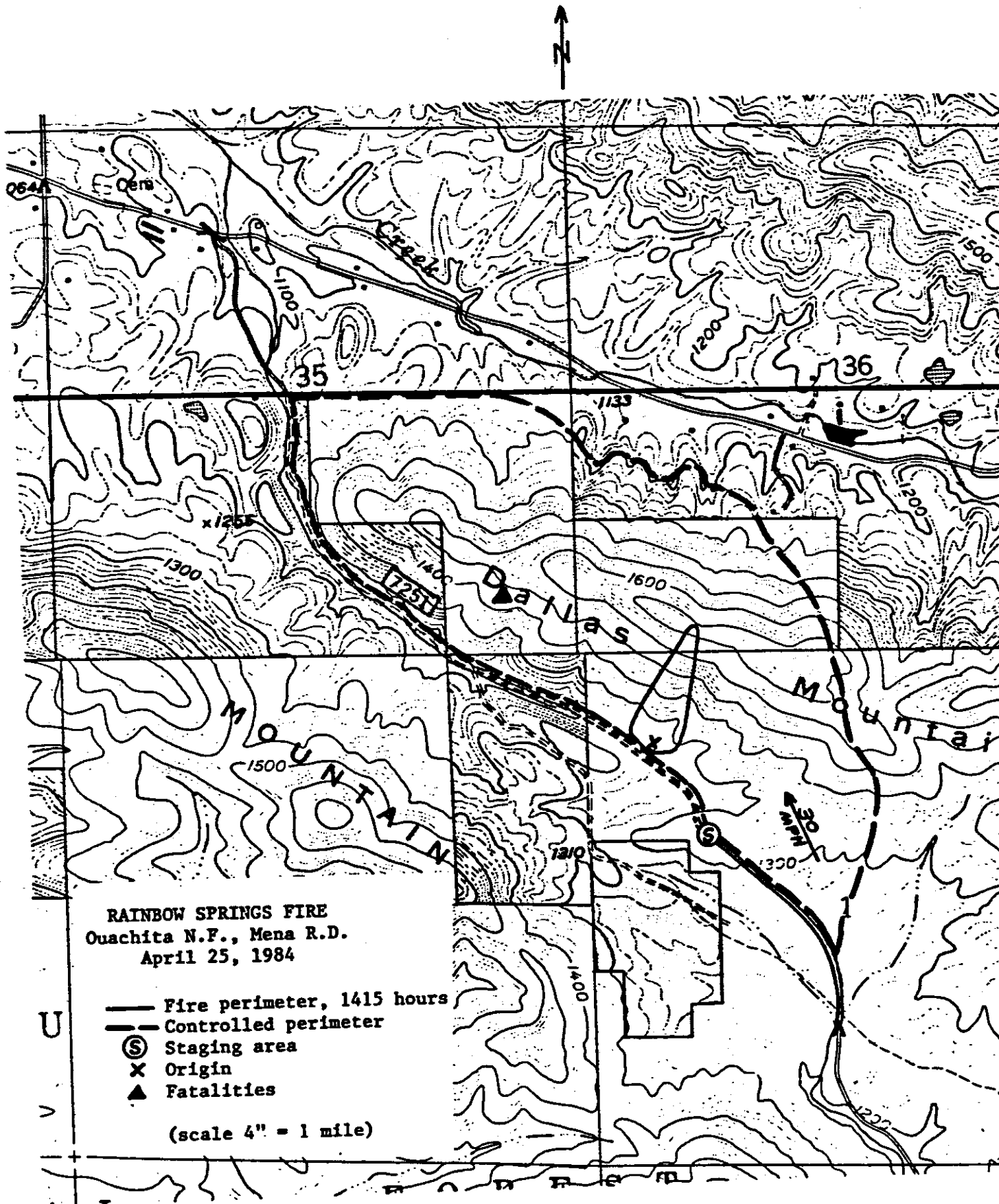
During this time a 12 person crew from the Poteau R.D., with Crew Boss Jim Mawk, had arrived at the staging area. The Fire Boss instructed Mawk to take the crew and a drip torch up the line on the west flank. Part of the crew was to burn the west line out from the top down and part of the crew was to construct a handline easterly along the ridge top and burn out. On the way up the west flank, Mawk noticed a gap in the dozer line approximately 20 feet wide which was reported to Mena R.D. Tractor Boss Walston when they met at the top of the ridge.

At approximately 1620 the Line Boss called the Fire Boss suggesting that one tractor unit could best be used on the lower section of the right flank. The Fire Boss instructed the Poteau Tractor Boss to turn around and return, retracing the same route. This was the last contact that the Fire Boss had with the Poteau Tractor Unit. Joe Walston informed Tractor Boss Keener of the need to tie-in the break in the line on the way down. Firing operations had not yet begun.

The Poteau Tractor Unit had proceeded approximately 3 chains down the west flank when the blow-up occurred at approximately 1630. It is estimated that the fire was 50 to 60 acres in size at this time.

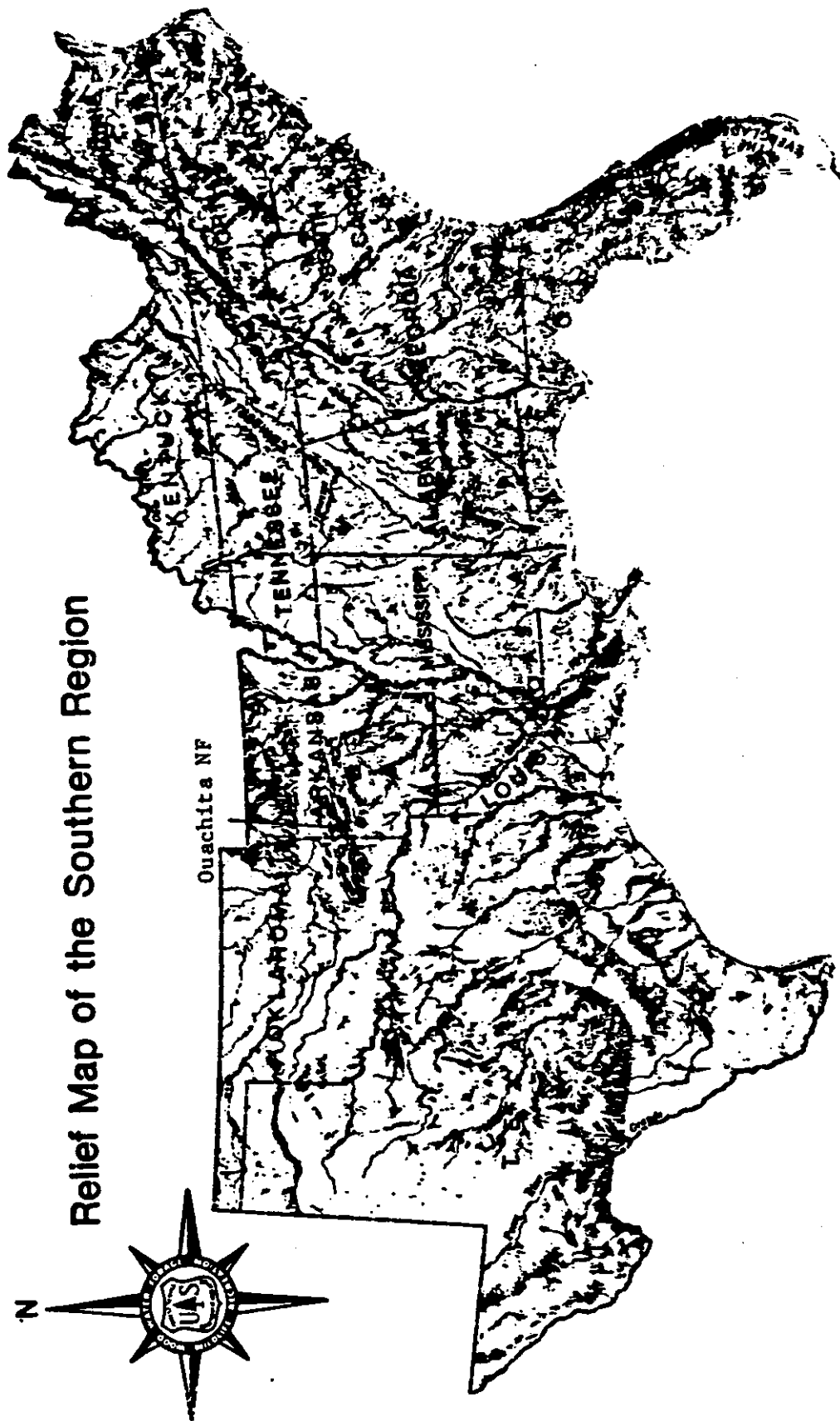
Fire Boss Blair observed a tremendous blow-up about mid-slope on the west flank. He immediately attempted to contact all crew bosses to make sure that everyone was safe; he was unable to contact the Poteau Tractor Unit. Approximately, 20-25 minutes later (1655) Fire Boss Blair was notified by Jim Mawk that the tractor and one man with serious injuries had been found, the Fire Boss then requested an ambulance.

Fire Boss Blair called all crews away from the line at 1705 hours. The District Ranger ordered a Regional Overhead Team at 1710. At 1715 the Fire Boss was informed by Mawk that the second man had been found.



Site Investigation

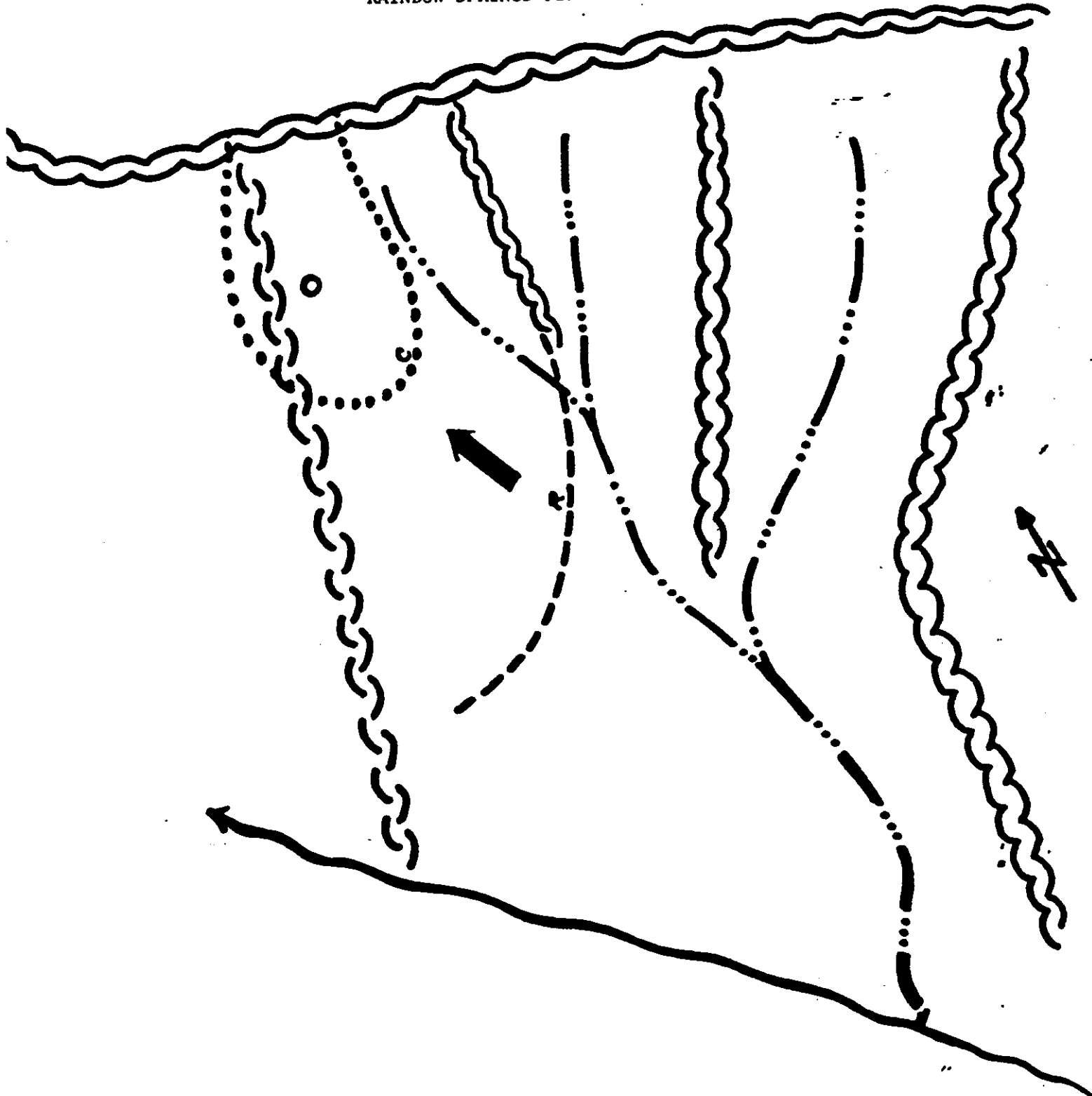
Relief Map of the Southern Region





ACCIDENT SITE

RAINBOW SPRINGS FIRE BEHAVIOR



- ~~~~ Ridge
- ...- Draw
- ← Stream
- Direction of blow-up
- Running
- ... Crowning
- Victims initial location
(Scale = Approx. 4":10 ch.)

30 MPH
Wind

PROBABLE VICTIMS' ACTIONS

From an investigation of the accident site, the following is the most plausible scenario that the Investigation Team can reconstruct of the victims actions at the time of the blow up (see Accident Site diagram).

As the Poteau Tractor Unit proceeded down the line on the west flank, either the sound or the smoke from fire in the drainage caught their attention approximately the same time that they reached the break in the line. The tractor was backed up approximately 20 feet into the break and the motor shut off as the Tractor Boss and operator discussed the situation and/or tried to determine what the situation was. Tractor Boss Keener was standing behind the tractor, radio in his hand. Tractor operator Frizzel was sitting on the tractor, in neutral, with his foot on the brake and the blade up.

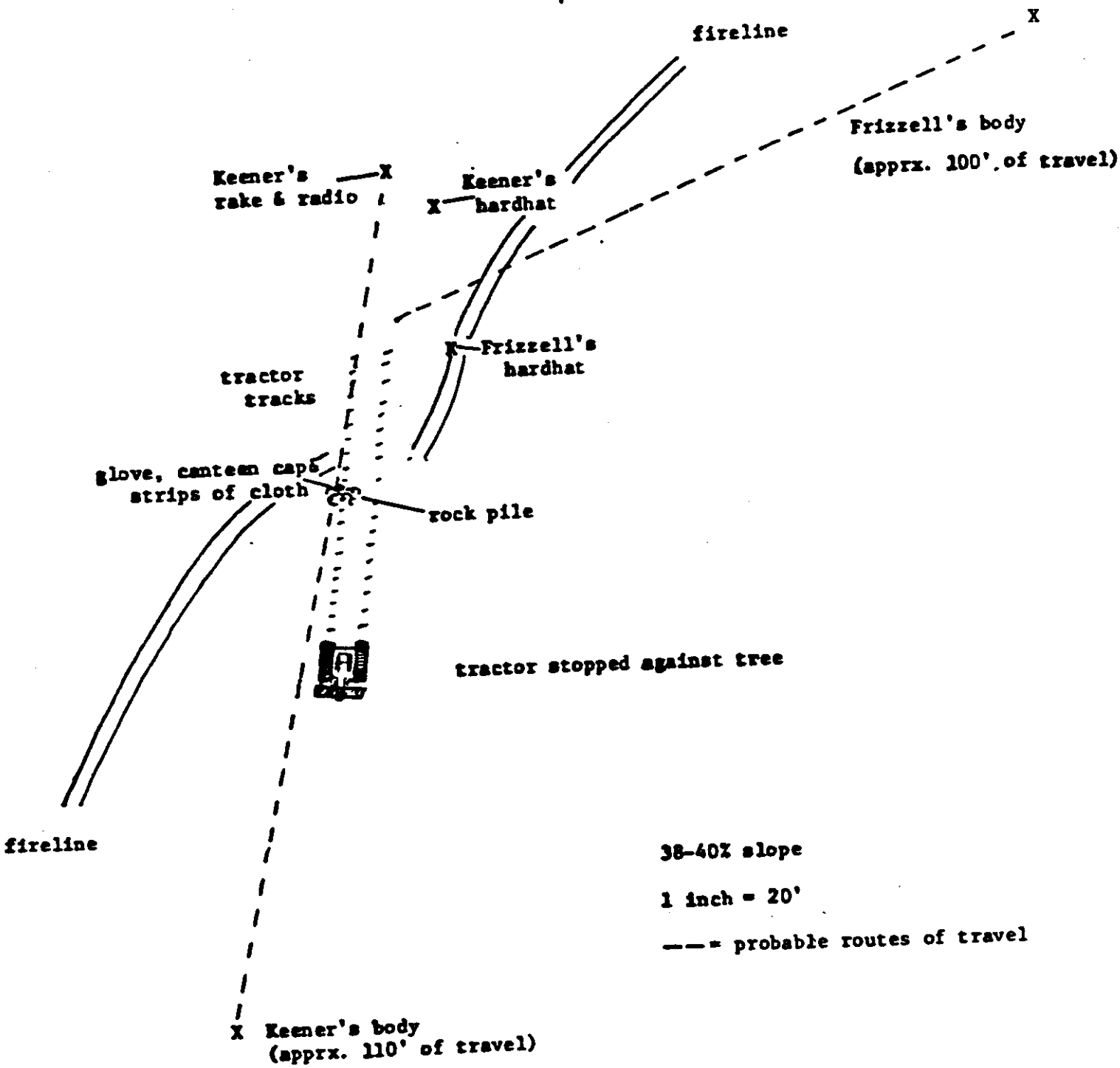
When the fire came out of the drainage it was preceded by an intense blast of heat moving principally in a horizontal direction ("fixed" limb, needle, and leaf positions remaining after the blow-up graphically record the direction and sequence of the event). See Rainbow Springs Fire Behavior Diagram.

The tractor was facing directly into the blast which reached the victims almost immediately. The operator jumped off the left side of the tractor and continued, essentially in a straight path, for approximately 100 feet.

Tractor Boss Keener was shielded from the initial intensity of the blow-up somewhat by the tractor. When the tractor operator left the tractor, it began to roll toward the fire. Keener apparently decided to remain behind the tractor rather than to try to escape in another direction. Keener remained behind the tractor as it moved approximately 20 feet down the slope crossing the fireline where its progress was impeded briefly. Keener took momentary shelter behind the tractor in the mineral soil of a root wad (a glove, canteen cap, and torn strips from a fire shirt found there indicate that he may have been trying to cool himself down at the time). The tractor then gained momentum as it pushed through material at the edge of the fireline. The tractor traveled down slope for another 20 feet before it came to rest.

Keener, losing his "shield" and receiving increasing radiant heat and falling embers, attempted to escape down the ridge, reaching a small patch of oak reproduction.

ACCIDENT SITE



38-40% slope

1 inch = 20'

--- = probable routes of travel

direction of blow up

EQUIPMENT

Poteau Tractor

The Poteau tractor, #521-7649, was found headed downslope, resting with the blade against an 11 inch DBH pine tree. The tractor was in neutral, the engine not running, and the throttle in the extreme idle position. The blade had contacted the tree about 18 inches above the ground. Tracks indicated the tractor rolled about 45 feet down the 38-40 percent slope, ran over at least two 8 inch DBH trees, and came to rest against the pine tree. The pine tree root wad was sprung 4 to 6 inches.

The tractor hour meter read 1499.3. Fuel level was 7 to 8 inches below the top of the dip stick. All wiring, hydraulic lines, and fuel lines were intact. The tool box located behind the operator's seat was damaged by fire. The contents had burned, but the residue indicated it contained an aerosol can and brittle, wire mesh remnants of unidentified origin. The only other damage evident was a scorched seat. After release by the investigation team, the tractor was started and appeared to operate normally. Although the vehicle use book and maintenance records were not available, visual inspection and subsequent operation indicated adequate maintenance of the tractor.



Photo taken downhill (South) toward tractor.
Frizzell's hardhat shown resting on fireline.



Photo taken to the East to show degree of slope.

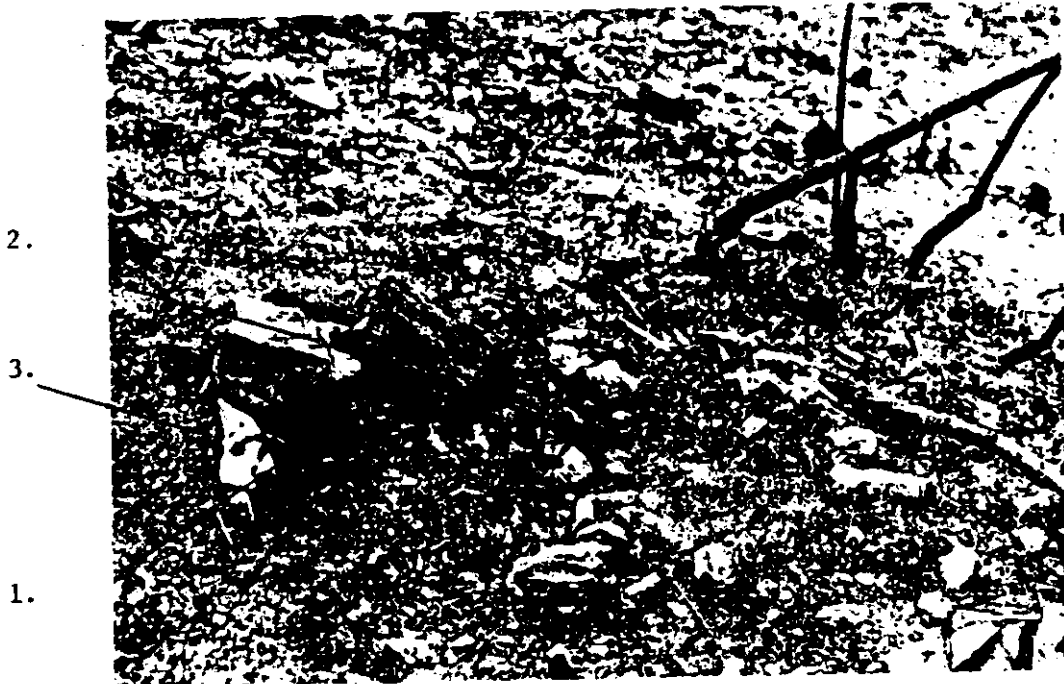


Root wad/rock pile
where Keener may have
taken temporary refuge.

Photo taken South from berm of the dozer line
Tractor tracks visible in foreground.



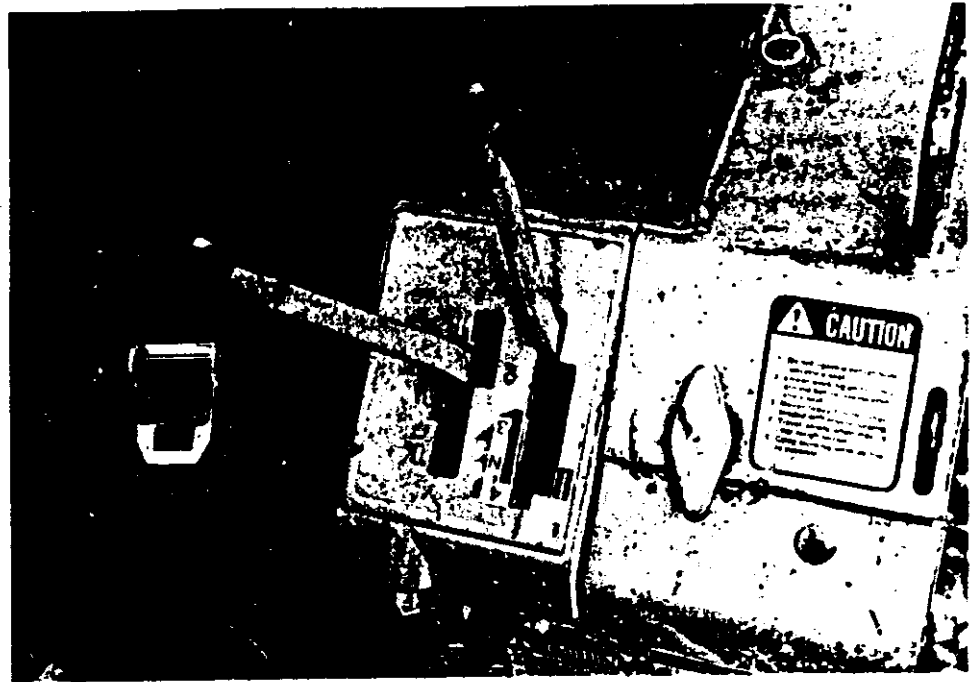
Photo taken Northeastward. Final
resting place of tractor. Blade
penetration was approx. two inches.



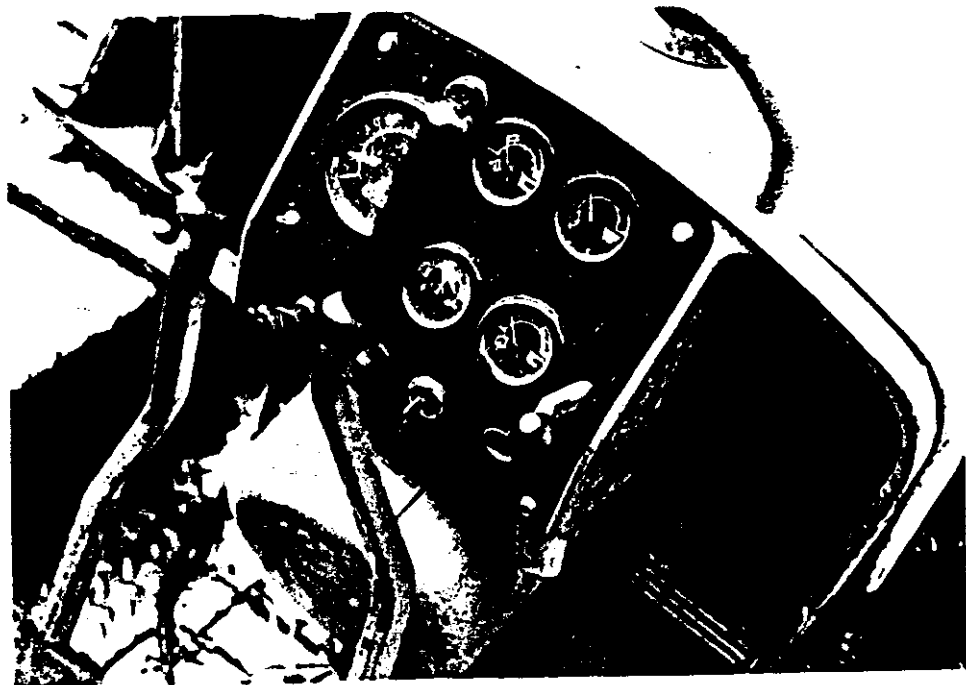
Rock pile where Keener may have taken temporary refuge.
1. Glove 2. Canteen Cap 3. Fire Shirt
Material



Looking Northeast along lower segment of fireline.
Investigators standing at gap in fireline.



Tractor controls as found in neutral.
Note minor fire damage to seat, seat
belt, and paint.



Tractor controls showing throttle in
idle position. Note absence of fire
damage.



Position of pine needles evidences
lateral run of fire.



Edge of blow up as indicated by upswept
position of pine needles.



Marked evidence of intensity and direction of blow up as reflected by position of pine needles (above) and hardwood leaves (below).



Witness Statements

RAINBOW FIRE

Statement of Investigation

At approximately 1528 on Wednesday, April 25, 1984, the West Zone Dispatcher called for a fire fighting crew from the Kiamichi R.D.. Kenneth Rose, FMO on the Kiamichi R.D., informed the dispatcher that he had a 12 man crew leaving the Big Cedar Work Center enroute to Mena, Arkansas.

The Kiamichi crew arrived in Mena, AR at approximately 1555 and met Mike Hoover at the intersection of HWY 71 and Reine street. Hoover led the crew into the staging area when we arrived at 1634. As we were unloading our gear at the staging area (approximately 1640) we could see a blow-up with an intense heat buildup along the west plow-line. The Kiamichi crew, with Richard Hudson as crew boss, left the staging area at approximately 1645 enroute to the west line.

At the same time (1645), Kenneth Rose, Ron Perisho, and Eddie Morris left the staging area and began investigating the fire's origin. The investigation had barely begun when radio traffic between Jim Mawk and Johnny Ray indicated that the Poteau R.D. dozer was in trouble. At 1655, Jim Mawk notified the fire boss that they had found the dozer and one man. He indicated that one man had suffered serious injuries.

At 1700 hours, Joe Blair, Fire Boss, called all the crews away from the line to safety. He emphasized that fighting the fire was not a priority, but that safety was the priority. At 1715, Jim Mawk notified the Fire Boss that they had located the second man with the dozer. Jim Mawk then brought his crew down from the fire. The fire boss asked Jim Mawk by radio if there was any good news concerning the second man. Jim's answer was negative.

At approximately 1715, Kenneth Rose and Ron Perisho returned to the fire boss at the staging area. Kenneth sent Eddie Morris with a polaroid camera to locate the scene of the accident and begin taking pictures.

Eddie Morris walked north to the top of the mountain. Once there, he walked eastward, and then westward to locate the fireline. Eddie called Jim Mawk by radio and requested directions to the fireline. Jim instructed Eddie to go westward along the ridge to the fireline.

Eddie walked westward until he encountered dozer tracks along the ridge. It was apparent at that point that the dozer had walked eastward along the ridge from the plowed line. Eddie followed the tracks until they returned to the plowed line and then along the plowed line to the dozer.

Eddie Morris arrived at the Poteau dozer at approximately 1800 hours. He found the body of Paul Keener and began taking pictures of the dozer and the body. At approximately 1805, Jimmy Jacobs (Chief Deputy Sheriff, Polk County) and Jewell Watkins arrived at the scene and began investigating the accident for the Sheriff's department. At approximately 1815, Jacobs removed Keener's wallet to make identification and gather needed information.

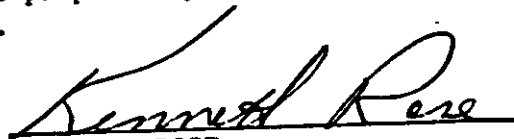
Kenneth Rose, Gary Rose, and Carrol Rainwater arrived at the scene at approximately 1830. They located the body of James Frizzel. Pictures were taken and then Eddie Morris began sketching the site of the accident. At approximately 1840, Charles Quillin, Polk County Coroner, arrived at the scene.

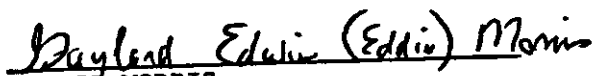
At 1915 hours, the bodies were placed into bags and taken from the scene to waiting ambulances. The bodies arrived at the ambulances at approximately 1930 hours and taken to Beasley-Wood Funeral Home.

Kenneth Rose, Eddie Morris, Barney Sherrer, and Glen Majors left the staging area at approximately 2000 hours enroute to the Mena R.D. office.

The above statement was prepared by Kenneth Rose and Eddie Morris on April 25, 1984 at 2200 hours.

SIGNED:


KENNETH ROSE


EDDIE MORRIS

RECORDS

Victim's Fire Qualifications
Tractor Operator's Qualifications
Fire Overhead Qualifications
Daily Activity Log
Daily Large Fire Report
Individual Fire Report
Escaped Fire Situation Analysis
Fire Behavior Worksheet
Cumulative Severity Index
Palmer Drought Index
Fire Danger and Fire Weather Record
Safety and Health Hazard Analysis
Sheriff's Report
Coroner's Report
Newspaper Articles
Friday Newsletter Item

OVERHEAD QUALIFICATIONS

Joe Blair - Fire Boss

Qualified Fire Boss III & Sector Boss.

Served as Fire Boss III on 3 fires in 4 1/2 years on Mena R.D.

Bill Sherrer - Line Boss

Qualified Tool Manager

Prior qualifications: Fire Boss III & Sector Boss

Mike Barron - Aerial Observer

Qualified Firefighter

Zone Aerial Observer for last 1 1/2 years, no formal training in this position.

Joe Walston - Tractor Boss

Qualified Squad Boss

No formal training as a Tractor Boss

James Mawk - Crew Boss

Qualified Crew Boss

Paul Keener - Tractor Boss

Qualified Squad Boss

Prior qualifications: Fire Boss III, Sector Boss, Crew Boss, Tractor Boss.

James Frizzell - Tractor Operator

Qualified Squad Boss

Prior qualification: Firefighter.

DAILY ACTIVITY LOG

DAILY ACTIVITY DIARY

WEATHER (Report other weather changes currently below)

Temp Humidity Wind Speed Visibility

USDA-Forest Service

Date 4-25-84

Forest Quachita

Name of station West

Name of employee GLE

History of CONVERSATIONS and OBSERVATIONS

(To record time and events only if necessary)

(Always show clearly if message was TO or FROM you)

Messages To or From

When (if any)

Activity Index

Time (24-hour)

Person

Motion

Activity Index	Time (24-hour)	Person	Motion	Messages To or From When (if any)	History of CONVERSATIONS and OBSERVATIONS (To record time and events only if necessary) (Always show clearly if message was TO or FROM you)
	0800	GLE	D-3		10-8
	1238	BARNER	11-2		4-3 March 23765 SMS
	1257		11		Kingdoodle - west
	1302	TRINIA	TRINIA		4-2 47-78
	1319	BARNER	11-2		Haw Creek - west
	1322		11		Saramora - East
Fire	1353		11		Fire near 7-3-31 - in Bar
	1356	QUACHITA	11-11		10-8 to Fire 2 People
	1406	FARMER	11-1		10-8 to Fire
	1411	GLE	11-4		arrived to Fire
	1423	PAUL	11-15		Blower & 3 men 10-8 to
	1426	TERRY	11-12A		at Fire overbooking now
	1434	BARNER	11-2		4-3
	1502		11		Kingdoodle - west
	1521		11		Haw Creek west
	1525	COLE	D-3		(LIVERY) Have approx 42 people Comm

DAILY LOG A. 1)

WEATHER (Report other weather changes currently below)

Temp: _____ Wind: _____ Visibility: _____

4-25-64

at Quachita
 nr of station Westone Dispatches
 nr of employees (see log)

THESIS OF CONVERSATIONS AND OBSERVATIONS
 (To avoid bias and errors use a recorder)
 (Always show date, time, location and TO or FROM post)

Time (24-hour)	Messages To or From Whom (if any)	Person	THESIS OF CONVERSATIONS AND OBSERVATIONS
1521	711-20	Bred	4 men from Potomac & flow on fire
1523	K-12	Rosen	12 men & flow 10-8 to Fair
1534	air-2	Barron	Sycamore - East
1538	M-8	Jim	4 men from Potomac arrived on fire
1605	air-2	Barron	Reports fire not as hot - 10-7 air pad
1634	K-12	Rosen	10 men on fire now
1652	M-12	Barron	Klamachi F. flow & 1 man on fire
1704	P-11	Harvey	12 men 10-8 to mena fire
1705	M-2	Blair	Called Am. for mena fire have injuries
1710	M-1	Barnes	Wants overhead team
1711	K-2	Coll	Called Somy for overhead team
1720	D-3	Coll	Sounds like crew carrying up line
1822	D-3	Coll	Called Elbe Head for Digger
1832	M-2	Joe	Wants 20 more people
1833	K-2	Randy	We'll send job. Corps crew

(OVER)

DAILY LOG A. DIARY

USDA - Forest Service
 WEATHER (Report other weather changes currently below)

Temp	Humidity	Direction	Velocity	Pressure

Date 4-25-54
 Forest Quachita
 Name of station West Zone Dispatcher
 Name of employee GCS

Messages To or From
 Wagon (if any)

Activity Incess (1 to 24)	Time (24-hour)	Station	Person	Diaries of Conversations and Observations (Use several lines and reverse side if necessary) (Always state clearly if message was TO or FROM you)
	1902	m-2	Joe	Requested Special forecast for tonight
	1902	D-2	Randy	Will get forecast for me
	1949	S-3	Calvin	Called for us to go to memo office
	1947	D-2	Randy	Reports Job Club Crew is leaving Center now
	2005	M-2	Joe	Crew going back to work centers
	2215	D-2	Hoover	Caddo 12- job crop 10-19 fire
	2240	CHD-12	Dewey	announced fire "Job Corp"
	2305	M-12	Barton	10-19 Memas
	2327	D-3	Mike	
4-26-84	0336			
	113			
	2012			
	201			

all lines tied together around fire

DAILY LARGE FIRE REPORT
(See Instructions on Reverse)

1. NAME OF FIRE RAINBOW SPRINGS		2. ORIGIN: DATE _____ TIME _____	
3. REGION 08	4. FOREST 09	5. DISTRICT WENA	

6. LOCATION: TOWNSHIP 3S RANGE 31W SECTION 1			7. LANDMARKS DALLAS RIDGE		
--	--	--	-------------------------------------	--	--

8. CAUSE (Statistical)	9. FUEL TYPE PINE HARDWOOD #9	10. RESOURCE OR PROPERTY THREAT			
------------------------	---	---------------------------------	--	--	--

11. THIS REPORT:	1st DAY	2nd DAY	3rd DAY	4th DAY	5th DAY
Date	4/26	4/27	4/28		
Time	0800	0600			
12. ACRES BURNED:					
NF	370	370	370		
Other inside	80	80	80		
Other outside					
Total	450	450	450		
13. CHAINS LINE BUILT	279	279	279		
14. CHAINS LINE TO BUILD	0	0	0		
15. ESTIMATED CONTROL					
Time	0800	0800			
Date	4/27	4/27			
16. CONTROLLED (actual)					
Time		2000?			
Date		4/26			
17. DAMAGES: Timber - MBM		15,000			
Timber	\$ 15,000	15,000			
Watershed	\$ 5,000	5,000			
Other	\$	25,000			
18. WEATHER:					
Temperature	84	84			
Windspeed & Direction	30 S	35 E			
R/H - lowest	27	62			
Danger-Rating	E	A			
19. RESOURCES ON FIRE:					
Men	68	145			
Dozers & Plows	4	1			
Ground tankers	2	1			
Helicopters					
Air tankers					
20. COST TO DATE	\$12,000	33,500			
21. ESTIMATED TOTAL COST	\$ 35,000	35,000			

22. REMARKS: Injuries, Fatalities, Loss of Equipment, Structural Loss, Law Enforcement and Weather Outlook.

REPORT PREPARED BY:	TITLE:
---------------------	--------

DAILY LARGE FIRE REPORT (cont.)

OBLIGATION ESTIMATE COST

23. FIRE FIGHTING RESOURCES	F.S. RESPONSIBILITY				OTHER AGENCY UNITS
	NUMBFR OF UNITS	FF COST		TOTAL COST	
		HOUR	DAY		
A. LABOR - Mutual Aid (First 24 Hours)					
B. " Military					
C. " Job Corps				6,500	
D. " County Inmates					
E. " F.S. Hot Shots					
F. " F.S. Regulars				10,600	
G. " Other (Casuals, EFF Inmates, Etc.)					
H. EQUIPMENT - DOZERS				900	
I. " Transports and Lubers					
J. " Tankers					
K. " Airplanes (Recon., Lead Plane, Etc.)					
L. AIR TANKERS - Large (B-17, PBY AF) Specify					
M. " " Medium					
N. HELICOPTERS - Large (205A, Etc.)					
O. " " Medium (204B, Ranger, Etc.)					
P. " " Small (G3B, 12E, Etc.)					
Q. TRANSPORTATION - Home to Camp & Return				3,500	
R. RETARDANT (Gal)					
S. OTHER ITEMS					
T. COST THIS DAY - DATE: 4/27/84 0600				21,500	
U. PREVIOUS TOTAL ADJUSTED TO ACTUAL COST				12,000	
V. TOTAL FF COST TO DATE				33,500	

INSTRUCTIONS
(REF: FSM 5184.2)

Report by telephone, teletype, or facsimile to the Regional Fire Coordinator by 0900 daily all class D and larger fires (unless primarily grass type, in which case report for class E and larger) burning on land under Forest Service protection, or other lands when the Forest Service is taking suppression action. First report on a fire will cover the period from start of the fire to the next 0600; thereafter, the report will cover the 24 hour period ending at 0600 daily fire is reported under control. Use separate column for each date. Show all previous days reports until fire is controlled. The Regional Office will send the report of class E and larger fires by teletype or facsimile to the Fire Coordinator at BIFC by 1200 Mountain Time.

Regional Foresters will provide guidance in cost estimating as needed.

If fire burns more than one day, report each previous day/days data. Example: If fire burns 4 days show data for 1st, 2nd and 3rd day in first 3 columns and report 4th day. This gives fire managers a day by day cumulative picture of fire action, without having to look at several reports.

USDA - FOREST SERVICE

INDIVIDUAL FIRE REPORT

FIRE NAME
Rainbow Springs

MANDATORY ITEMS: CLASS A 1-33 CLASS B 1-34 CLASS C 10 G 1-44

RANGER FIRE NO
4

REGION FIRE NO

State (2-3) AR	County (2) Polk	Forest (4-5) Ouachita	District (6-7) Mena	Supervisor (8-10) No.
Fire started on (11) Nat. For 1	Month (12) April	Day (13-14) 4	Year (15) 25	Watershed No. (16-23) 11031000
Statistical Cause (25) Equipment Use 2	General Cause (26) Timber Harvest	Specific Cause (27-28) Skidder Blade	Class of people (29) Contractor 3	

14. Origin	DATE		ELAPSED TIME
	Mo.	Day	
15. Discovered (Item 15 minus 14)	04	25	13 25
16. First attack (Item 16 minus 15)	04	25	16 16
17. First Reinforcement (Item 17 minus 16)	04	25	09 09
18. Fire Controlled (Item 18 minus 16)	04	26	03 00
19. Fire Out			

27. Slope Average slope 50-59%	(30)
28. Aspect Southwest	(60)
29. Elevation P. of O. 1300	(61)
30. Cover type - vicinity of origin Pine-harvest area	(62-63) 01
31. Fuel type - vicinity of origin	(64-69) MM32
32. Cost Class	(70) 1

20. Discovered by (Class) Location Aircraft observer	(46) 7
21. First Attack by (Kind) (Amount) Ground Force Hand Tools 4	(47-48) 44
First Reinforcements (Kind) (Amount) Dozer 1	(49-50) 11
23. Maximum No. Personnel	(51-54) 172
24. Value Class at Origin	(55) 8
25. Fire danger IC-78 BI	(56-57) 47
26. Special Weather feature 30 MPH "G"	(58) 9

33. Location
Scale: **2.54** inches = 1 mile

see attached

Location description	
a. Town-ship (71-74)	3S
b. Range (75-78)	31W
c. Section (79-80)	01
d. Meridian	
Alternate description for lands not covered by GLO survey	
e. Latitude (72-75)	
f. Longitude (76-80)	

34. Acres burned	NATIONAL FOREST LANDS (11-16)	OTHER LANDS INSIDE (17-21)
a. Noncommercial forest		
b. Commercial forest (1) Natural	370	80
(2) Plantation		
Nonforest		
35. Volume of timber destroyed (MBM)	(54-59) 100	(60-64) 0

36. Total area when controlled	(65-70) 450
37. Fuel type prevailing on burned area	(71-76) MM22
38. Topography (vicinity of origin)	(77) 8
39. Highest Fire Danger	(78-79) 47
40. Critical Weather Feature	(80) 9

Remarks (Continue on reverse if required)

Investigation of cause is continuing. Preliminary investigation indicates the fire may have been started by a skidder blade striking a rock. Two fatalities occurred at approximately 1630 on 4/25 during a blow-up. Location of accident was SESE Sec. 35, T2S, R31W.

Submitted (Signature) Jim Murch FB	Date 4/27/84	Approved (Signature) 43	Date
(Acting) District Ranger		(Acting) Forest Supervisor	

INDIVIDUAL FIRE REPORT (cont)

Value of Resources Damaged or Destroyed (Code in hundreds of dollars)	N.F. LANDS (1)		OTHER LANDS (2) INSIDE FS PROTECTION	
	Dollars	Code	Dollars	Code
Timber	\$30,000	[11-15] 00300	0-	[16-20] ----0
2. Other (non-timber)				
a. Watershed	5,000	[21-25] ----50	0	[26-30] ----0
b. Recreation		[31-34] -----		[35-38] -----
c. Range & Wildlife				
d. Improvements				
e. Other non-timber				
f. Total non-timber (a to e incl.)	5,000	[39-43] ----50		[44-48] -----
3. GRAND TOTAL (Items 41 and 42f)				
4. Acres burned by Value Class	Value Class	Acres		Acres
	[49]	[50-54] ----370		[55-59] ----80
	[60]	[61-65] -----		[66-70] -----
	[71]	[72-75] -----		[76-79] -----

ESCAPED FIRE SITUATION ANALYSIS

5130.31--3

TITLE 5100 - FIRE MANAGEMENT

EXHIBIT 1

ESCAPED FIRE SITUATION ANALYSIS (Report Number FS-5100-Z)

REGION: 8 FOREST: QUICKHITA EFSA NUMBER 1 of 1 DATE: 4/25 TIME: 2330

I. FIRE SITUATION:

Fire Name: Rainbow Springs Current Size: 290 Fuel: 2, 9, 11 Fire Behavior: Blew up late afternoon Not doing much now

Narrative (attach description of the existing local and regional fire situation): _____

II. FOLLOW UP:

The selected alternative shall be reviewed prior to each shift change to determine if it is still valid. If not, new EFSA will be developed.

1. Shift Review:

By: [Signature] Date & Time: 4/26/84 1400
By: [Signature] Date & Time: 4/27/84 1030
By: _____ Date & Time: _____

Decision to make a new EFSA.

By: _____ Date & Time: _____

2. Evaluation of Selected Alternative:

IMMEDIATELY AFTER THE FIRE IS CONTROLLED, THE ACTUAL FIRE SHOULD BE EVALUATED AGAINST WHAT WAS PLANNED AND APPROVED.

A. Final Size: _____ Estimated Suppression Costs \$ _____

Net Resource Value Change \$ _____

B. Evaluation Criteria Compliance: _____

Alternative Approved for Implementation:

Signature: SS G.W. Kelley Deputy Forest Supervisor Date: 4/25/84
Line Officer Title

2200
Time

*Must agree with Form FS 5100-29.

ESCAPED FIRE SITUATION ANALYSIS (cont.)

5130.31--4

TITLE 5100 - FIRE MANAGEMENT

Exhibit 1--Continued

III. EVALUATION CRITERIA:

For each category, develop the line officer's decisions on specific objectives, expressed as measurable criteria, to be used in the selection of the preferred alternatives.

Check those criteria which MUST be met.

CRITERIA	MUST
Economic: Smoke Cost	
Timber Loss	
PROTECTION OF STRUCTURES	✓
PROTECTION OF PROPERTIES	
Additional Loss of life	✓
Environmental	
Threatened & Endangered	
VISUAL	
Social: FIRE FIGHTER SAFETY	✓
Public Concern	
PUBLIC SAFETY	✓
Additional Loss of life	✓
Other:	

Approved By: _____
Line Officer

ESCAPED FIRE SITUATION ANALYSIS (cont.)

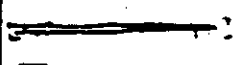
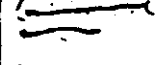

TITLE 5100 - FIRE MANAGEMENT

5130.31--5

Exhibit 1--Continued

2 control options exist at this time - See MAP
 B - Hand line along North slope - midway on slope
 A - Doser line further North on slope - near gov. building
 (partly on private)

IV. ALTERNATIVES (See instructions on back)

	Alternatives			
	A	B	C	D
General Plan of Control (Strategic)	Doser line	Hand line		
Specific Plan of Control (Tactical)	 5 100' hoses 60 men (3 crews) 2 Pumps	 3 100' hoses 60 men (3 crews) 2 Pumps		
Probability of Success %	90%	50%		
Est. Control Time	0800 4/27	1800 4/27		

TITLE 5100 - FIRE MANAGEMENT

Exhibit 1--Continued:

VI. EFFECTS

	Alternatives			
	A Przer	B HAND	C	D
1. Size (Predicted final size in acres)		300		
2. Market elements:				
Timber	---	--		
Improvements	-	-		
Recreation		+		
Wilderness	++			
Wildlife		--		
Fish	--			
Water				
Forage				
Sum of Net Value Change	\$ -4	\$ -4	\$	\$
3. Non-market elements:				
Air	=	=		
Visual	++	+		
Fuels				
Threatened & Endang. Sp.				
Sum of Net Value Change	\$ 0	\$ -1	\$	\$
4. Social elements:				
Firefighter Safety	-	---		
Employment				
Public Concern	-	--		
Public Safety				
Cultural				
Other				
Sum of Net Value Change	\$ -3	\$ -7	\$	\$
5. Suppression Costs	\$ 36,800	\$ 49,600	\$	\$
6. Cost plus net value change	\$ -7	\$ -12	\$	\$

INSTRUCTIONS

- (1) Evaluate only the significant economic, environmental or social elements in this fire area. Only those economic, environmental and social effects which result from impact on planned or existing uses should be included as value changes.
- (2) Enter dollar values if possible using the best available information when estimating net value change. Value change may be positive (+) or negative (-) but record only the net + or - value.
- (3) If dollar values are not possible use + or - symbols, they may range from --- to + for positive change and from --- to - for negative change.
- (4) Cost plus net value change is calculated as the sum of net economic value change, the net environmental value change, plus net social value change, plus the suppression costs (suppression costs are always negative (-)).

ESCAPED FIRE SITUATION ANALYSIS (cont.)

5130.31--8

TITLE 5100 - FIRE MANAGEMENT

Exhibit 1--Continued

VII. EVALUATION

Each alternative is evaluated against the same criteria developed in Section II. Review all pertinent data previously developed which relate to the criteria.

Criteria	Alternative			
	A	B	C	D
Economic:	1	1		
Environmental:	1	1		
Social:	2	0		
Other:				

4 2

KEY

- 0 - Does not meet criteria
- 1 - Partially meets criteria
- 2 - Fully meets criteria

ESCAPED FIRE SITUATION ANALYSIS (cont) 30.31--9
TITLE 5100 - FIRE MANAGEMENT

Exhibit 1--Continued

VIII. SELECTED ALTERNATIVE

Selected Alternative: A

Explanation (document the rationale, criteria, value change, available resources, etc., for selection of this alternative):

Public information direction (for keeping public informed of situation) shall be developed as appropriate.

•-FSM 1/81 AMEND 62-•

ESCAPED FIRE SITUATION ANALYSIS (cont.)

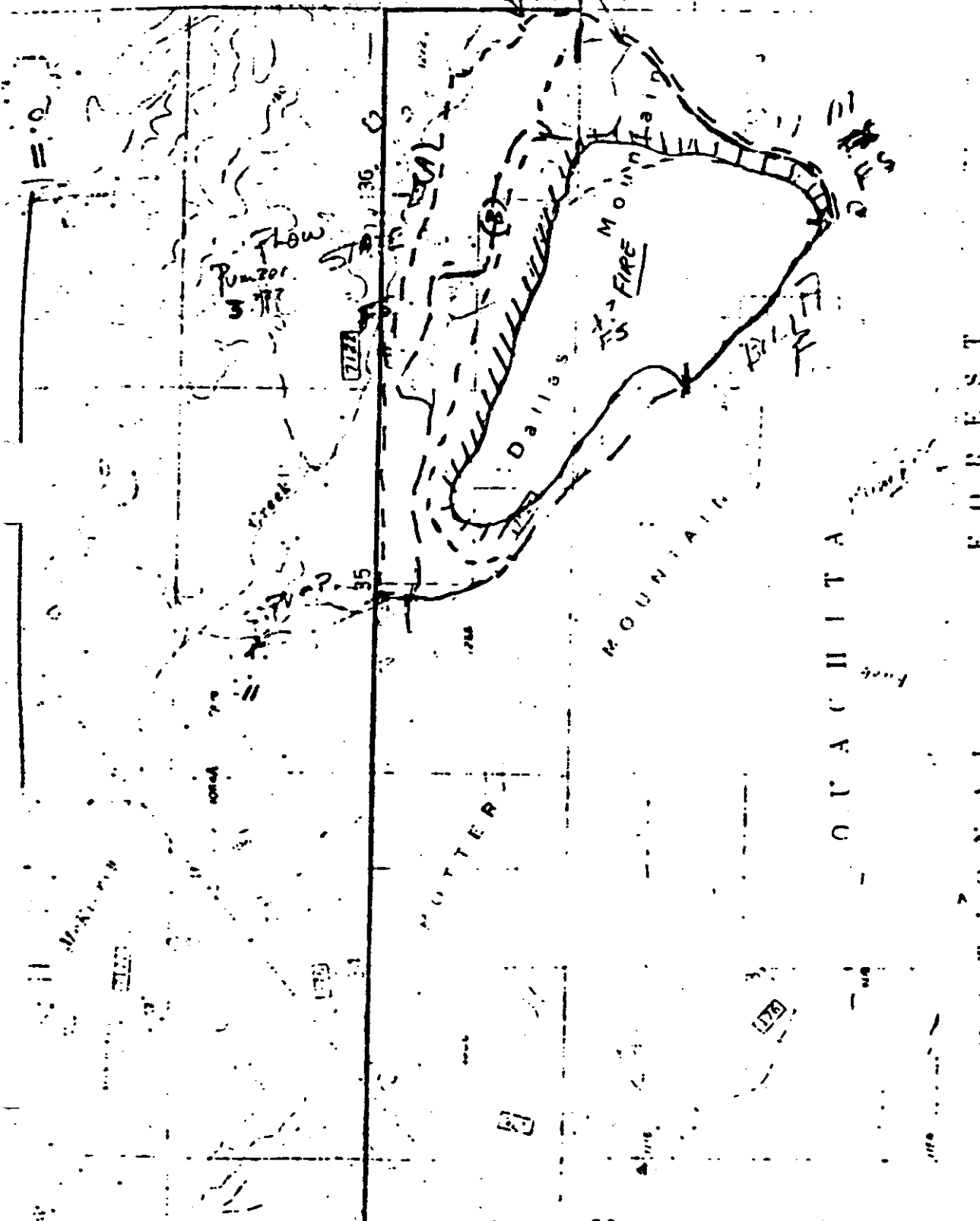
This fire began at approximately 1300 on 4/26/84. Fuel moisture was extremely low and weather was as follows: Temp 82° RH-27% 10 mi. - 47. Wind 30 mph from S.W. The BI was 47 and Ignition component was 78 - CLASS E Manning Day. District crews began suppression efforts at about 1415 and by 1600, total of 45 men were on the fire. Nothing but the ordinary occurred until sometime between 1630 and 1645 when the fire apparently blew up resulting in 2 fatalities. At that time suppression on the fire ceased. The overhead was called and all began arriving. The FIRE BOSS began directing fire suppression activities. At this time suppression activities continue and containment estimated at 0800 4/26/84.

ESCAPED FIRE SITUATION ANALYSIS (cont.)

Alternative (B)
Alternative (A)

Area

1955
20



Blowout Mountain

QUACHITA NATIONAL FOREST

FIRE BEHAVIOR WORKSHEET

Name of fire RAINBOW SPRINGS FIRE Fire Behavior Officer MALCOLM JOWERS Sheet 1 of 1
 Date 4/26/84 Time 1550 Proj. Period Date 4/25/84 Project time from 1400 to 1700

Overlay label		↓	↓	↓	↓	
1	Projection point	9	9	9	4	9
2	Fuel model	100	100	100	100	100
3	Fuel model proportion, %	30	40	30	40	30
4	20-foot windspeed, mph	.4	.4	.4	.6	.4
5	Wind reduction factor	2	2	2	0	2
6	Shade (0=0-10%; 1=10-50%; 2=50-90%; 3=90-100%)	2	2	2	0	2
7	Dry bulb temperature, °F	82	82	82	82	82
8	Relative humidity, %	27	27	27	27	27
9	Fine dead fuel moisture, % or 1 H TL FM, %	5	5	5	5	3
10	10 H TL FM, %	6	6	6	6	4
11	100 H TL FM, %	7	7	7	7	5
12	Live fuel moisture, %	-	-	-	200	-
13	Midflame windspeed, mph	12	16	12	24	12
14	Windward slope, % (W) -or- Maximum slope on flank, % (F)	40	40	10	40	40
15	Projection time, hr	1.0	1.0	1.0	1.0	1.0
16	Map scale, in/mi -or- Map conversion factor	2.64	2.64	2.64	2.64	2.64
17	Map scale, in/mi -or- Map conversion factor					
18	Map conversion factor					
19	Effective windspeed, mph					

more wind 40 mph at 20' LESS slope 10% opening made ↓ down-up using 1/2 TI-59 reg. no.

	Keystroke							
20	Rate of spread, ch/hr	A	ROS	42	67	40	416	52
21	Heat per unit area, BTU/ft ²	R/S	H/A	390	390	390	2560	448
22	Fireline intensity, BTU/ft/s	B	INT	302	481	287	19538	431
23	Flame length, ft	R/S	FL	6	8	6	42	7
24	Spread distance, chains	C	SD	42.3	67.3	40.1	416.3	52.4
25	Map distance, inches	R/S	MD	1.4	2.2	1.3	13.7	1.7
26	Perimeter, chains	D	PER	104	158	99	938	129
27	Area, acres	R/S	AREA	44	71	42	1078	68
28	Ignition component	E	IC	58	58	58	61	79
29	Reaction intensity, BTU/ft ² /min	R/S	IR	2523	2524	2524	11595	2901

FIRE : FUEL MOISTURE CALCULATIONS

- a. Projection point
- b. Day or night (D/N)

	D/N	D/N	D/N	D/N	D/N
a.					
b.	(D)N	D/N	D/N	D/N	D/N

DAY TIME CALCULATIONS

- c. Dry bulb temperature, °F
- d. Relative humidity, %
- e. Reference fuel moisture, %
(from Table A)
- f. Month
- g. Exposed or shaded (E/S)
- h. Time
- i. Elevation change
B = 1000'-2000' below site
L = ±1000' of site location
A = 1000'-2000' above site

c.	82				
d.	27				
e.	4				
f.	APR				
g.	(E)S	E/S	E/S	E/S	E/S
h.	1400				
i.	(B)A	B/L/A	B/L/A	B/L/A	B/L/A

j. Aspect

k. Slope

- l. Fuel moisture correction, %
(from Table B, C, or D)
- m. Fine dead fuel moisture, %
(line e + line l)
(to line 9, other side)

South
35-40%

l.	1				
m.	5				

NIGHT TIME CALCULATIONS

- n. Dry bulb temperature, °F
- o. Relative humidity, %
- p. Reference fuel moisture, %
(from Table E)

n.					
o.					
p.					

Use Table F only if a strong inversion exists and a correction must be made for elevation or aspect change.

- q. Aspect of projection point
- r. Aspect of site location
- s. Time
- t. Elevation change
B = 1000'-2000' below site
L = ±1000' of site location
A = 1000'-2000' above site

q.					
r.					
s.					
t.	B/L/A	B/L/A	B/L/A	B/L/A	B/L/A

- u. Correction for projection point location (from Table F)
- v. Correction for site location (L) (from Table F)
- w. Fuel moisture correction, %
(line u + line v)
- x. Fine dead fuel moisture, %
(line p + line w)
(to line 9, other side)

u.					
v.					
w.					
x.					

FIRE CHARACTERISTICS CHART

4/25/84

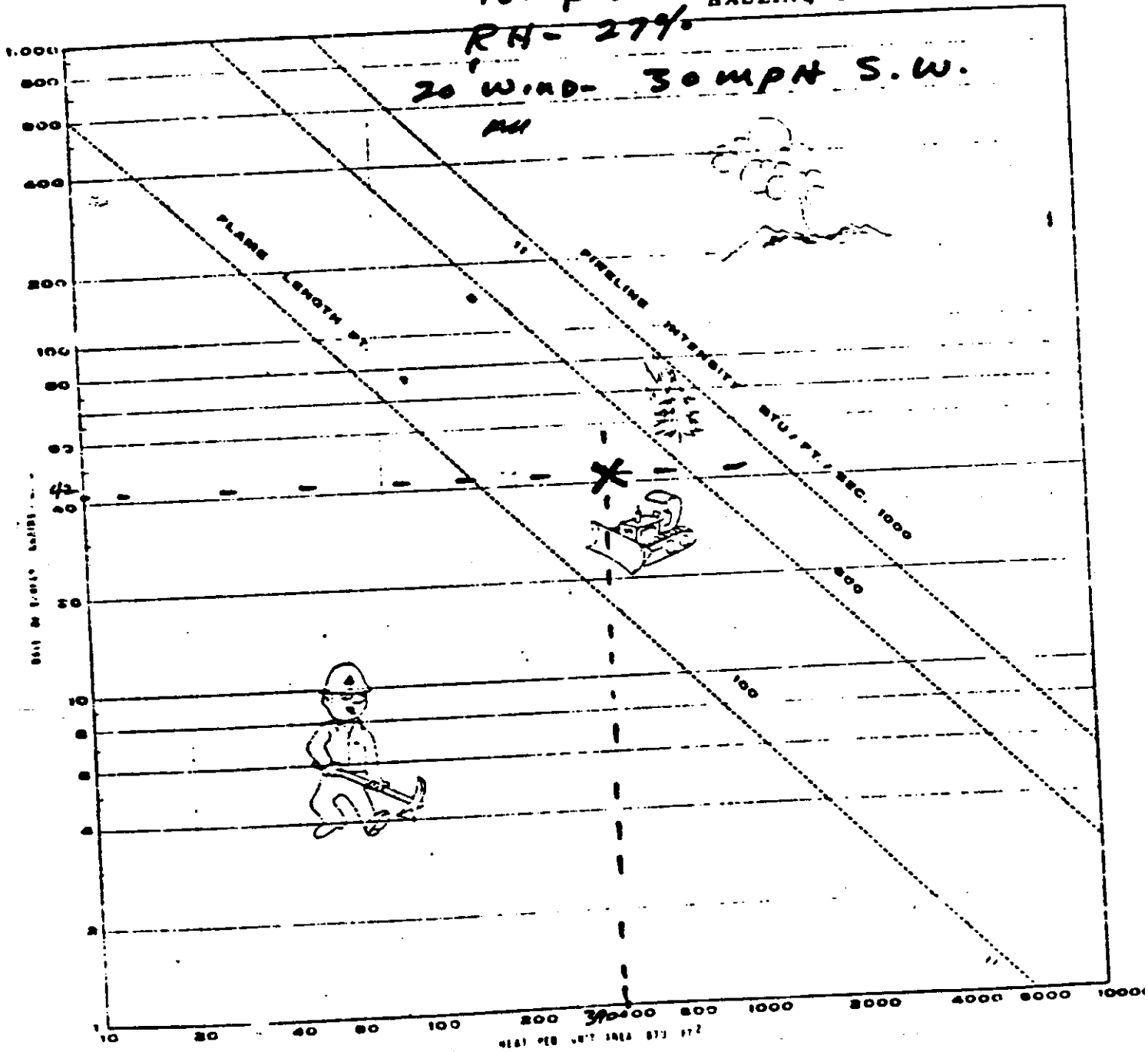
RAINBOW SPRINGS FIRE

TEMP 82 "HAULING CHART"

RH - 27%

20' WIND - 30 MPH S.W.

MH



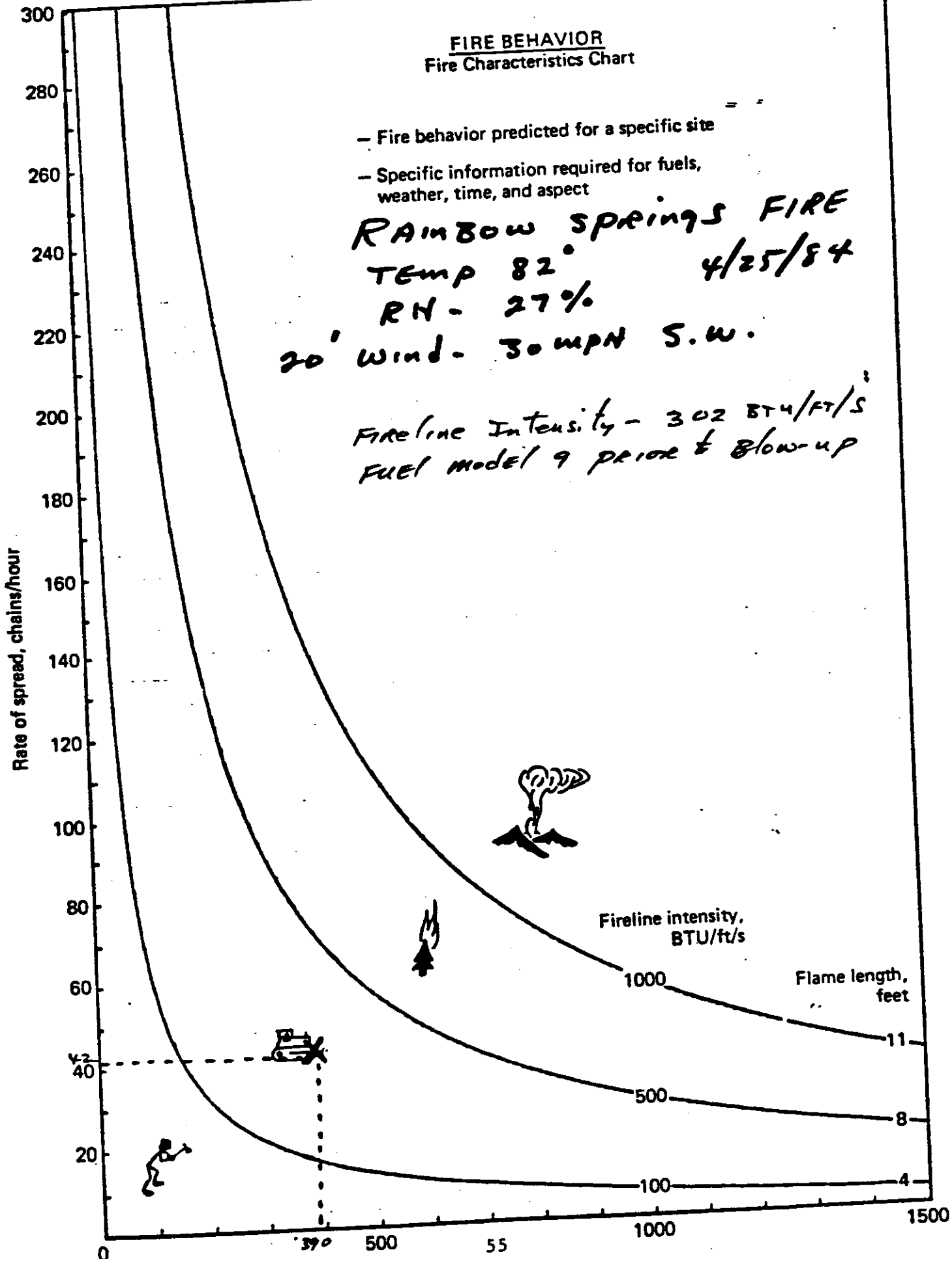
Fireline Intensity - 302 BTU/FT/S
Fuel model 9 - Pines & Blow-up

FIRE BEHAVIOR
Fire Characteristics Chart

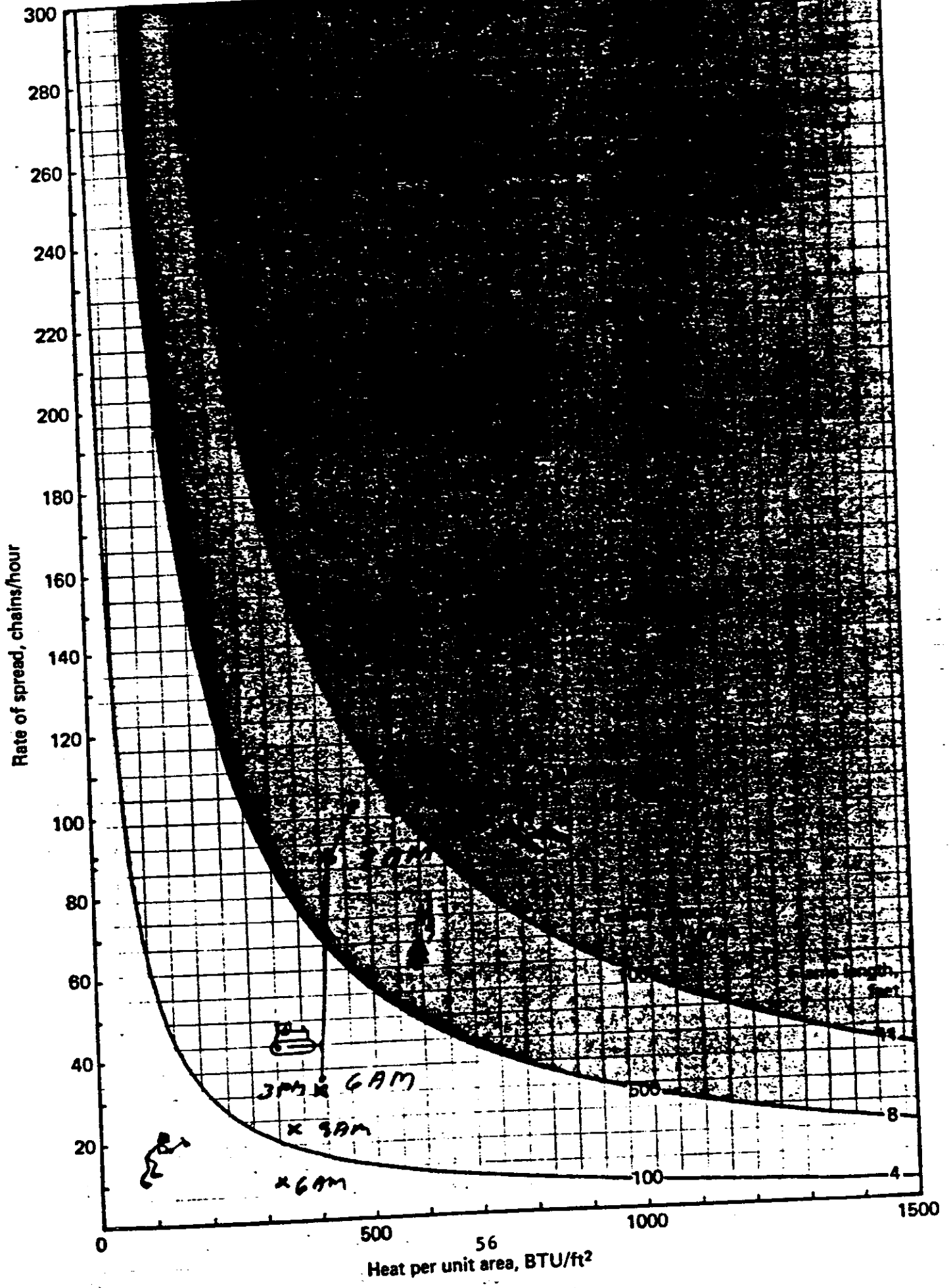
- Fire behavior predicted for a specific site
- Specific information required for fuels, weather, time, and aspect

RAINBOW SPRINGS FIRE
 Temp 82° 4/25/84
 RH - 27%
 20' Wind - 30 mph S.W.

Fireline Intensity - 302 BTU/FT/S
 FUEL MODEL 9 prior to blow-up



FIRE BEHAVIOR WORKSHEET (cont.)



CUMULATIVE SEVERITY INDEX

USFS
Agency

District

MUSE Station
APR. Month
84 Year

Day of the Month	24-hour Rainfall (Measured Amount)	Net Rainfall (Adjusted Amount - See Instructions)	Air Temperature Maximal Temp. <input type="text"/> Dry-bulb Temp. <input type="text"/>	Cumulative Severity Index Yesterday, etc. as reduced by Net Rainfall (Col. 5)	Severity Factor From Table <input type="text"/>	Col. for Today Col. 5 plus Col. 6	Current Stage of Severity
1	2	3	4	5	6	7	8
1	0	0	13	1	1	1	1
2	.28	.28	50	1	2	3	0
3	.10	.30	64	0	4	4	0
4	0	0	46	4	0	4	10
5	0	0	53	4	0	7	0
6	0	0	50	4	1	11	0
7	.13	0	60	11	1	12	2
8	.23	.61	50	6	2	14	0
9	.10	.10	53	5	1	15	0
10	0	0	64	3	4	19	0
11	.15	0	50	7	1	20	0
12	0	0	72	11	1	21	0
13	0	0	76	21	10	31	0
14	0	0	56	31	10	41	0
15	0	0	59	32	10	42	0
16	0	0	60	37	10	47	0
17	0	0	67	40	10	50	0
18	0	0	72	46	9	54	0
19	0	0	72	50	8	62	0
20	0	0	72	62	10	72	0
21	.15	0	78	20	11	81	0
22	0	0	55	81	2	83	0
23	0	0	65	83	5	83	0
24	0	0	80	88	14	102	1
25	0	0	82	102	13	115	1
26	0	0	80	115	13	115	1
27	0	0	84	128	15	143	1
28							
29							
30							
31							

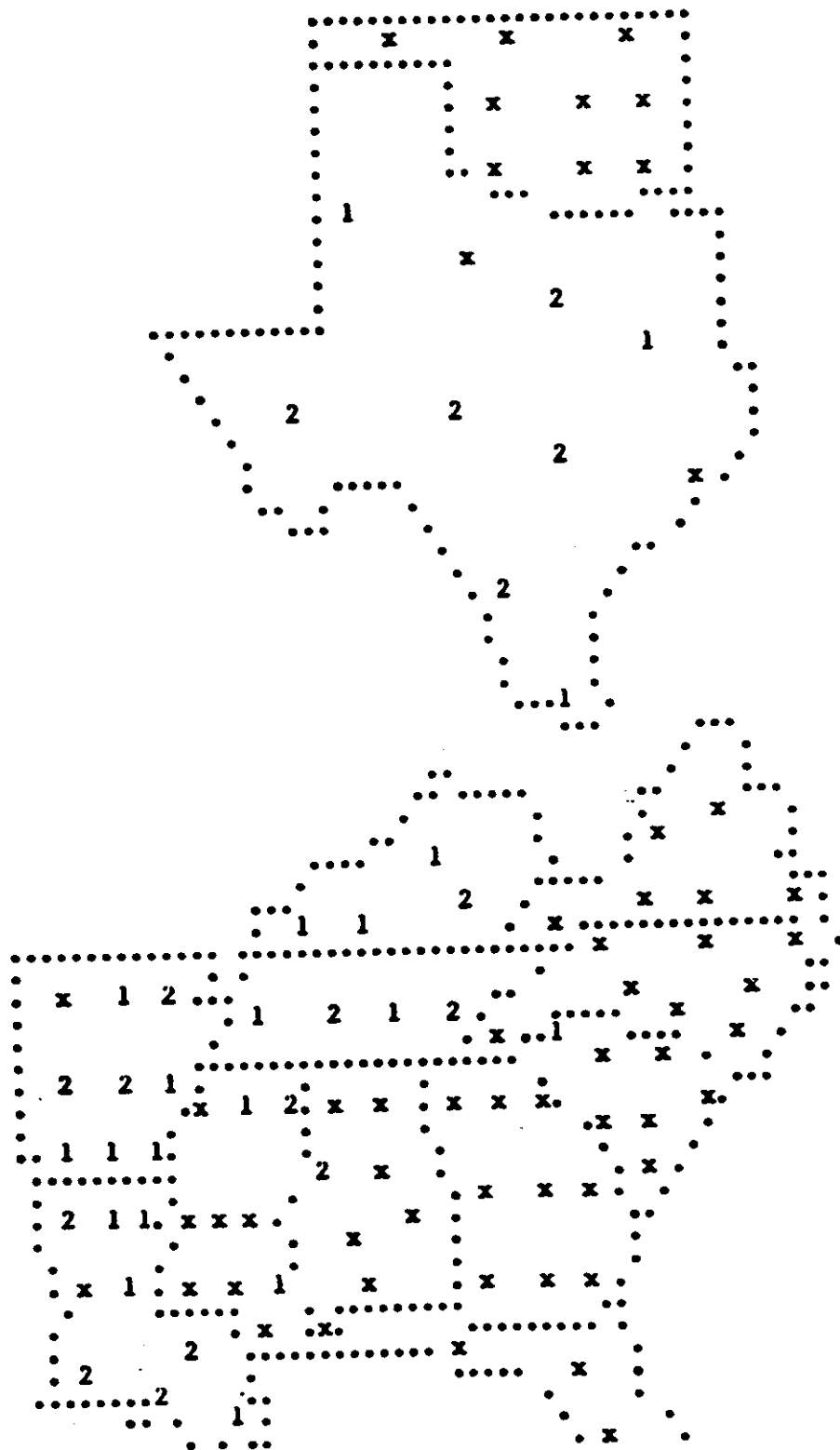
Figure 1 -- Cumulative Severity Index

PALMER DROUGHT INDEX

REGION 8

Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi,
 N. Carolina, Puerto Rico, S. Carolina, Tennessee, Texas, and Virginia
 (BASED ON FOREST SERVICE REGIONS)

DROUGHT CONDITIONS BASED ON PALMER DROUGHT INDEX



- 1 = NEAR NORMAL
- 2 = MILD DROUGHT
- 3 = MODERATE DROUGHT
- 4 = EXTREME OR SEVERE DROUGHT
- x = MOIST SPELL

Numbers are located in the approximate center of the climatic division.

SAFETY AND HEALTH HAZARD ANALYSIS

U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE SAFETY AND HEALTH HAZARD ANALYSIS (Instructions on back and reference FSM 6740)		1. Identify Job or Project to be Analyzed Fire fighting and Prescribed burning		2. Location Ouchita National Forest		3. Highest Level of Organization R-8	
4. Name of Analyst B. J. Henderson		5. Job Title of Analyst Safety Manager		6. Date Prepared 1/10/84			
7. Sequential Steps		8. Hazards		9. Factors		10. Action to Eliminate Hazard	
Recruitment	Physical Condition: age	(a) 35	(b) 10	(c) 6	(d) 10	(e) 61	Specify if personal protective equipment (PPE) is required—kind, type, amount—PPE may be purchased if amount is 300.
Training	Lack of knowledge about fire behavior	35	10	4	3	52	All fire fighters and prescribed burners will receive appropriate training for their fire duties.
Clothing and Protective Equipment	Not using PPE provided	40	10	9	10	69	All fire fighters and prescribed burners will wear hardhat, fire resistant shirt and pants, eye protection, gloves. Must carry fire shelter for emergency use. Required to wear non-skid sole boots. (*Employee furnishes own footwear)
Escape and Lookout Plans	High hazard areas; blowup, rolling logs, fallint trees, and rocks.	40	5	5	0	50	All fire fighters and prescribed burners will be told the location of escape routes.
11. Analysis Approved (Signature) <i>[Signature]</i>		12. Title Forest Supervisor		13. Date 1/15/84		FS-6700-7 (9/79)	

Retention of this form is optional.

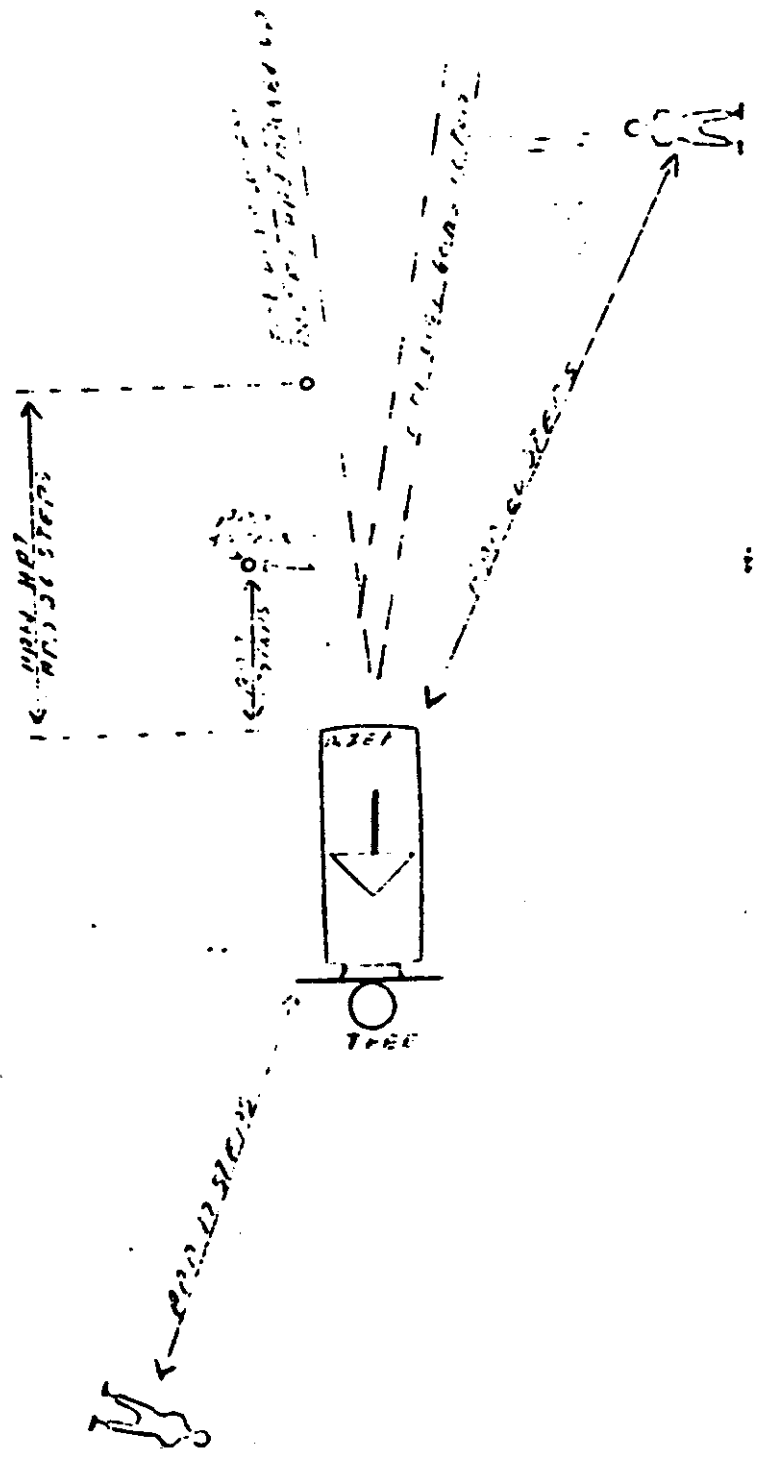
SHERIFF'S REPORT

On April 25th, 1984, at approximately 4:45 P.M. I received a radio message from the Polk County Sheriff's Office. They stated that two forrest service employees had been killed when a dozer had overturned while they were fighting a fire southeast of Mena. The forrest service had requested a deputy.

I responded to the call and arrived at the end of a log road at approximately 5:07 P.M. I then walked up a fire trail leading to the top of a mountain. Approximately 150 yards from the top I found a 450-C John Deere dozer in a burned over area. The key was in an off position and the blade was up against a tree. Approximately 17 steps in front of the dozer was one body in a kneeling position. I looked at his wallet and the name in it was Paul Keener. We later located another body approximately 60 steps behind the dozer, badly burned. Directly behind the dozer there were two hard hats, one approximately 7 steps, the other approximately 26 steps. I later found out from the forrest service the man behind the dozer was James Frizzell, believed to be the dozer operator. It didn't appear either man had attempted to use his fire blanket. The ground was burned over, also the leaves and pine needles in the trees were burned which indicated the fire had crowned out over them. I couldn't tell if James Frizzell had a small pack with him that contained his fire blanket or not because he was so badly burned. James Keener had his but it had not been opened. It appeared to me that the men had been caught in the fire suddenly and did not have time to take action to prevent them from being burned. I also noticed the wind was blowing about 20 or 25 M.P.H. and changing directions often.

Jimmie Jacobs
Deputy Sheriff
Polk County

SHERIFF'S REPORT (cont.)



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