

US Department of Labor
Assistant Secretary for
Occupational Safety and Health
Washington, D.C. 20210

(Date received Feb 8, 1995)

Mr. Jack Ward Thomas
Chief
U.S.D.A. Forest Service
201 14th Street, S.W.
Washington, D.C. 20250

Dear Mr. Thomas

The Occupational Safety and Health Administration (OSHA) has completed its investigation of the fourteen firefighter fatalities on the South Canyon Fire in Colorado on July 6, 1994. Enclosed is a Notice of Unsafe and Unhealthful Working Conditions issued as a result of that investigation. This Notice is issued pursuant to Section 19 of the Occupational Safety and Health Act of 1970 and Executive Order 12196 of February 26, 1980.

The OSHA investigation was conducted independently of the joint Bureau of Land Management - U.S. Forest Service investigation in order to identify and recommend the correction of any systemic safety and health program deficiencies that may have contributed to the tragedy. In conducting our investigation we focused on the safety and health issues involved; we defer to the federal wildland fire community for expertise in strategy and tactics in wildfire suppression operations. Our principal focus was on whether those operations were conducted in a safe manner with adequate regard for the risks involved and for adherence to accepted operational and safety practices.

Based on our investigation and review of the circumstances surrounding the fatalities on the South Canyon Fire, we conclude that the primary cause leading to the deaths of the fourteen firefighters was that no one person was responsible for insuring the safety of the firefighters. The wildland fire community needs to adopt - and practice - a policy of zero tolerance for infractions of safety standards and procedures. During fire suppression operations someone must be responsible - and accountable - for assuring that operations are conducted safely. Change must start with management, from the top to the bottom of each agency involved in wildland fire. The willful and serious violations identified in the Notices issued today are symptomatic of the lack of management attention to insuring that firefighting operations are conducted with safety of firefighters as the primary goal.

We believe that the investigation conducted by the Bureau of Land Management and the Forest Service was professional and thorough. We commend the subsequent Interagency Management Review Team (IMRT) for its report and Corrective Action Plan. The work of the two groups is consistent with our conclusions. The three implications for management highlighted in the IMRT report must be given a high priority with the five federal wildland fire agencies if we are to avoid a recurrence of the tragedy of the South Canyon Fire. We further support the efforts agencies to address the more systemic issues of suppression preparedness, fuels management, and the wildland/urban interface. If those fundamental policy issues are not squarely addressed, the safety and health of firefighters will continue to be placed unnecessarily at risk.

Our goal is to assure that firefighters are provided with a safe and healthy environment in which to conduct their critical functions. We are prepared to assist and support you in furtherance of that goal.

Sincerely,

/s/

Joseph A. Dear
Assistant Secretary

Enclosures

U.S. Department of Labor
OCCUPATIONAL SAFETY AND ADMINISTRATION
DENVER AREA OFFICE
1391 SPEER BLVD., SUITE 210
DENVER, CO 80204
Phone: (303) 844-5285 FAX: 303-844-6676

Notice of Unsafe or Unhealthful Working Conditions

Inspections Number: 116185406
Inspection Date(s): 07/07/94-01/31/95
Issuance Date: 02/08/95

To:
Chief, U.S.D.A. Forest Service
201 14th Street, S.W.
Washington, DC 20250

The violation(s) described in this:

Notice is (are) alleged to have occurred on or about the day(s) the inspection was made unless otherwise indicated within the description given below.

Inspection Site:
South Canyon Fire
7 Miles West of Glenwood Springs
Glenwood Springs, CO 81602

This Notice of unsafe or Unhealthful Working Conditions (Notice) describes violations of the Occupational Safety and Health Act of 1970, the Executive Order 12196, and 29 CFR 1960, Basic Program Elements for Federal Employee Occupational Safety and Health Program and Related Matters. You must abate the violations referred to in this Notice by the dates listed unless within 15 working days (excluding weekends and Federal holidays) from your receipt of this Notice you request an Informal Conference with the U.S. Department of Labor Area Office at the address shown above.

Posting - The law requires that a copy of this Notice be posted immediately in a prominent place at or near the location of the violation(s) cited herein, or, if it is not practicable because of the nature of the employer's operations, where it will be readily observable by all affected employees. **This Notice must remain posted until the violation(s) cited herein has (have) been abated, or for 3 working days (excluding weekends and Federal holidays), whichever is longer.**

Notification of Corrective Action - You should notify the U.S. Department of Labor Area Office promptly by letter that you have taken appropriate corrective action within the time frame set forth on this Notice. Please inform the Area Office in writing of the abatement steps you have taken and of their dates, together with adequate supporting documentation, e.g., drawings or photographs of corrected conditions, purchase/work orders related to abatement actions, air sampling results, etc.

Employer Discrimination Unlawful - The law prohibits discrimination by any person against an employee for filing a complaint or for exercising any rights under this Act. An employee who believes that he/she has been discriminated against may file a complaint with the U.S. Department of Labor Area Office at the address shown above.

Informal Conference - An informal conference is not required. However, if you wish to have such a conference you may request one with the Area Director within 15 working days after receipt of this Notice. As soon as the time, date, and place of the informal conference have been determined please complete the enclosed "Notice to Employees" and post it where the Notice is posted. During such an informal conference you may present any evidence or views which you believe would support an adjustment to the Notice. In addition, bring to the conference any and all supporting documentation of existing conditions as well as any abatement steps taken thus far.

U.S. Department of Labor
Occupational Safety and Health Administration

Notice to Employees:

An informal conference (may) be scheduled with the Occupational Safety and Health Administration (OSHA) to discuss the Notice of Unsafe or Unhealthful Working Conditions (Notice) issued on 02/08/95. The conference will be held at the OSHA office located at OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, 1391 SPEER BLVD., SUITE 210, DENVER, CO 80204 on _____ at _____. Employees and/or representatives of employees have a right to attend an informal conference.

See pages 3, 4, and 5 of this Notice for information on employer and employee rights and responsibilities.

U.S. Department of Labor
Occupational Safety and Health Administration

Inspection Number: 116185406
Inspection Dates: 07/07/94 - 01/31/95
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Notice of Unsafe or Unhealthful Working Conditions

Company Name: U.S. Dept of Agriculture/Forest Service
Inspection Site: South Canyon Fire 7 Miles West of Glenwood Springs, CO

4) The fireline was not strengthened as construction progressed downhill (widening, line firing).

Among others, one feasible and acceptable method of abatement to correct this hazard is to follow the firefighting safety provisions contained in the Fireline Handbook by the National Wildfire Coordinating Group:

- a) Ensure that the Incident Commander identifies himself as such on all radio communications and adequately brief key personnel as to who the Incident Commander is.
- b) Adequate escape routes and safety zones must be provided for and identified to employees prior to engaging in fire suppression activities.
- c) Comprehensive weather forecasts and expected fire behavior information must be provided to employees engaged in fire suppression activities.
- d) Adequate lookouts must be used whenever there is the potential for fire spotting and fire blow-up. The lookouts must identify and communicate fire spotting and fire blow-ups to firefighters so that appropriate action can be taken.
- e) If downhill fireline construction is attempted the following precautions, among others, must be taken:
 - 1) Downhill firelines are not constructed adjacent to a chimney
 - 2) Downhill firelines are anchored at the top.
 - 3) Firelines are not constructed into dense fuels during potential blow-up conditions.
 - 4) Downhill firelines are strengthened (widening, line firing) as construction progresses.

Date by Which Violation Must be Abated: IMMEDIATE UPON RECEIPT

U.S. Department of Labor

Occupational Safety and Health Administration Inspection Number: 116185406

Inspection Dates: 07/07/94 - 01/31/95

Issuance Date: 02/08/95

Notice of Unsafe or Unhealthful Working Conditions

Company Name: U.S. Dept of Agriculture/Forest Service

Inspection Site: South Canyon Fire 7 Miles West of Glenwood Springs, CO

Citation 1 Item 2 Type of Violation: Serious

Part 1960.8(a) of the Basic Program Elements for Federal Occupational and Safety and Health Program Administration: The agency did not furnish employees employment which was free from recognized hazards that were causing or likely to cause death or serious physical harm in that the safety provisions of the NWCG Fireline Handbook were not enforced resulting in employee exposure to the hazards of burns, smoke inhalation, or death from fire.

At the South Canyon Fire near Glenwood Springs, Colorado:

The agency failed to provide sufficient management oversight to ensure that existing safe firefighting practices were followed:

- a) Management failed to provide the firefighters with comprehensive fire behavior information to include fuel type/moisture, topography, and local weather forecasts.
- b) Management failed to ensure that the evolution of the Incident Command system was commensurate with the fire threat.
- c) Even though fires in the surrounding area (Bunniger Fire and Paonia Fire), with similar fuels, were exhibiting extreme fire behavior, management failed to follow the safety practices for blow-up conditions.
- d) Management failed to conduct adequate workplace inspections of firefighting operations to include on-site, frontline evaluations. These evaluations must be conducted to ensure that established safe firefighting practices are enforced on fires of all classifications.

Among others, some feasible and acceptable method of abatement to correct this hazard are:

- a) Management must ensure that firefighters are provided with comprehensive fire behavior information to include fuel type/moisture topography, and local weather forecasts.
- b) Management must ensure that the evolution of the Incident Command system is commensurate with the fire threat.
- c) Management must ensure that the safety practices contained in the Fireline Handbook pertaining to blow-up conditions are followed.

U.S. Department of Labor

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Company Name: U.S. Dept of Agriculture/Forest Service

Inspection Site: South Canyon Fire 7 Miles West of Glenwood Springs, CO

d) Adequate workplace inspections of firefighting operations to include on-site, frontline evaluations must be conducted to ensure that established safe firefighting practices are enforced on fires of all classifications. When situations arise involving multiple agencies' responsibility for conditions affecting employee safety and health, coordination of inspection functions is required.

Date by Which Violation Must be Abated:

05/08/95

BOBBY E GLOVER

Area Director

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THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION'S INVESTIGATION OF THE SOUTH
CANYON FIRE

FEBRUARY 8, 1995

EXECUTIVE SUMMARY

The Occupational Safety and Health Administration (OSHA) has completed its investigation of the July 6, 1994 South Canyon Fire catastrophe which resulted in the death of fourteen firefighters, one from the Bureau of Land Management (BLM) and thirteen from the U.S. Forest Service (USFS).

Under the authority of Section 19 of the "Occupational Safety and Health Act of 1970" and Executive Order 12196 of February 26, 1980, OSHA conducted an independent investigation of the fatalities.

It is OSHA's position that management of both agencies failed to provide adequate oversight of the South Canyon Fire to ensure that the strategies, tactics, and objectives being used did not compromise the safety of the firefighters. Top level administrators throughout BLM and the USFS must take immediate action to correct the occupational safety and health program deficiencies in their organizations to avoid a recurrence of this tragic event.

OSHA has determined further that the agencies violated standard firefighting procedures, and failed to recognize and timely respond to numerous factors that, together, clearly identified the South Canyon Fire as highly hazardous to firefighting personnel. OSHA issued a Notice of Unsafe or Unhealthful Working Conditions alleging one willful (1) and one serious (2) violation of 29 CFR 1960.8(a), the Federal agency counterpart of the OSH Act's general duty clause. The following is a summary of the unsafe conditions or practices that led to the catastrophe.

1) The identity of the Incident Commander was not effectively communicated to firefighters.

2) Adequate safety zones and escape routes were not established for and identified to employees.

3) Available weather forecasts and expected fire behavior information were not provided to employees.

Under the OSH Act, a violation is willful if it is committed with either intentional disregard to the requirements of the law, or with plain indifference to employee safety. OSHA issued a willful violation here based on plain indifference to the law in that management officials were aware that conditions and Practices were hazardous to the safety and health of firefighters and made little or no effort to determine the extent of the problem or take corrective action.

The OSH Act defines a serious violation as one which, in the event of an accident, would have a substantial probability of causing death or serious physical harm.

4) Adequate fire lookouts were not used on the fire.

5) Hazardous downhill fireline construction (3) was performed without following established safe practices.

6) Management failed to provide the firefighters with comprehensive fire behavior information.

7) Management failed to ensure that the evolution of the Incident Command System was commensurate with the fire threat.

8) Management failed to heed the safety practices contained in the Fireline Handbook pertaining to blow-up conditions.

9) Management failed to conduct adequate inspections of firefighting operations, including on-site, frontline evaluations, to ensure that established safe firefighting practices were enforced on fires of all classes.

No penalties have been proposed in connection with these violations since OSHA has no authority to assess penalties against other Federal agencies.

3 Tactic of constructing a fireline from top of the ridge downward.

1. THE ACCIDENT:

On July 2, 1994, lightning ignited a single tree on Bureau of Land Management (BLM) land approximately seven miles west of Glenwood Springs, Colorado. The fire started at an elevation of approximately 7000 feet on a ridge in extremely steep, mountainous terrain. Fuel in the vicinity consisted of juniper-pinon mix with dense stands of Gambel oak. There was some grass ground cover. Fuel moisture was very low as a result of prolonged drought conditions in the area.

On July 4, a Forest Service/Bureau of Land Management team of seven firefighters arrived on Interstate 70 below the fire, but did not begin actual firefighting operations as it was late in the day and there was an arduous 2 1/2 hour hike to the fire site. A Red Flag Warning⁴ was issued by the National Weather Service. Fire size at this time was three to four acres.

The seven firefighters, led by a Bureau of Land Management Incident Commander, hiked to the fire the following day and began fire suppression activities which included cutting a helicopter landing site, or "Helispot," and constructing a fireline. A Red Flag Warning was again issued. Also on July 5, eight Smokejumpers from Montana parachuted to the fire site and helped with the fireline construction. The original fireline was overrun by advancing fire so a second line was begun. The Forest Service/Bureau of Land Management team hiked down the mountain that evening to conduct equipment repairs. The eight Smokejumpers continued to fight the fire until falling rocks forced them to cease firefighting operations and find a safe place to sleep on the mountain until morning. By this time the fire had grown to fifty acres.

On July 6, Red Flag Warnings were again issued by the National Weather Service along with a forecast of a passing cold front accompanied by shifting and gusting winds. The Forest Service/ Bureau of Land Management team hiked back to the fire site early in the morning to rejoin the Smokejumpers and construct a second helispot (Helispot 2). By noon, the Smokejumpers and the joint Forest Service/Bureau of Land Management team were joined by ten Hotshot firefighters from Oregon who arrived by helicopter to Helispot 2. Winds were gusting at up to thirty miles per hour by 1:00 p.m., and the fire, which had expanded to over 150 acres, was burning erratically, with frequent spotting across firelines, tree torching, and re-burning of some areas. At 3:00 p.m., ten more

4 Red Flag conditions normally require the combination of high to extreme fire danger (as determined by the National Fire Danger Rating System) and critical weather conditions (as determined by the Fire Weather Meteorologist).

5 Because the fire was on BLM land, BLM was the agency in charge, and therefore, the Incident Commander was a BLM employee.

Oregon Hotshots arrived at Helispot 2. Many of the firefighters were engaged in downhill fireline construction. The cold front moved through the area at 3:20 p.m., with strong winds gusting to forty-five miles per hour. The fire activity immediately intensified with flame heights reaching 100 feet. Between 3:30 p.m. and 4:30 p.m., the fire reached "blow-up" proportions. Driven by strong winds, fueled by tinder-dry vegetation, and magnified by the steep terrain, the fire spotted below the firefighters and raced up the hill at a speed of nearly twenty miles per hour with flame lengths reaching 300 feet. Of the forty-nine firefighters on the mountain at the time of the blow-up, fourteen (thirteen Forest Service and one Bureau of Land Management) were unable to reach safety and were overcome by the fire. The other thirty-five firefighters barely escaped with their lives.

2. THE INVESTIGATION:

The Occupational Safety and Health Administration (OSHA) Denver Area Office was notified of the accident on July 7, and dispatched three investigators to the scene the same day.

A joint Forest Service/Bureau of Land Management team also investigated the incident. The joint Forest Service/Bureau of Land Management team issued a report of their findings in August 1994. An Interagency Management Review Team (IMRT) was formed to followup on the initial investigative team's work. The IMRT issued a report which contained a corrective action plan and set time frames for implementation of many of the recommendations identified in the initial report.

Although the OSHA investigation was conducted independently of that investigation, OSHA participated as an observer during the initial phases of the joint team investigation. The independent OSHA investigation began with an onsite inspection of the fatality site and a review of various documents dealing with wildfire management and safety. At the site, inspectors took videotape, measurements, and made sketches. The interview process was delayed because the surviving firefighters were involved in fighting fires throughout the western United States. This necessitated OSHA inspectors going to the areas where these people were stationed and to the fires they were currently fighting. Over two thousand pages of interview statements were obtained from employees and managers. Additionally, an independent wildfire expert was retained to provide insight into firefighting operations. In total, OSHA investigators spent approximately 7 full months on this investigation.

OSHA did not concentrate its efforts on the technical aspects of the South Canyon incident; rather, OSHA focused on the occupational safety and health aspects of the incident. Further, OSHA did not question the decision to fight the fire -- that is a question best debated by the experts - instead OSHA focused on those decisions made relative to ensuring the safety of the firefighters once the decision was made to fight the fire.

OSHA's investigative team approached this investigation with a respectful somberness and a single-minded commitment to identify the cause of this tragedy and to recommend corrective actions to ensure that a catastrophe such as this does not recur.

3. THE INVESTIGATION FINDINGS:

A number of factors acted in cumulative fashion to create and intensify hazards to firefighters on the South Canyon Fire. Among those were a lack of adequate resources; dangerous weather, fuel, and terrain; failure to ensure that safe firefighting practices, as outlined in the 10 Fire Orders, the 18 Watch Outs, and the Common Denominators (6) were implemented; a lack of a clear chain-of-command; and a lack of effective management oversight.

OSHA has determined that the agencies violated standard firefighting procedures, and failed to recognize and timely respond to numerous factors that, together, clearly identified the South Canyon Fire as highly hazardous to firefighting personnel. OSHA issued a Notice of Unsafe or Unhealthful Working Conditions alleging one willful and one serious violation of 29 CFR 1960.8(a), the Federal agency counterpart of the OSH Act's general duty clause. The Notices to the BLM and the Forest Service read as follows:

CITATION 1 ITEM 1 TYPE OF VIOLATION: WILLFULL

1960.8(a) : The agency did not furnish employees with places and conditions of employment that were free of recognized hazards that were causing or likely to cause death or serious physical harm in that the safety provisions of the National Wildfire Coordination Group Fireline Handbook were not adequately enforced:

- a) The identity of the Incident Commander was not effectively communicated to firefighters.
- b) Adequate safety zones and escape routes were not established for and identified to employees.
- c) Available weather forecasts and expected fire behavior information were not provided to employees. This included weather (e.g., red flag warning, local forecast); fuels (e.g., types, density, fuel moisture); and, topography (e.g., grade, contours, elevation).

See Appendix A

- d) Adequate fire lookouts were not used on the fire. Employees engaged in fire suppression activities, including downhill fireline construction into dense fuels, were not in a position to view the entire fire front and, therefore, could not be aware of potential hazards such as fire spotting and fire blow-up.
- e) Hazardous downhill fireline construction was performed without following established safe practices and taking proper safety precautions. Unsafe practices included constructing downhill fireline adjacent to a topographical chimney; failing to anchor the fireline at the top; constructing downhill fireline into dense fuels during potential blow-up conditions; and failure to strengthen the fireline as construction progressed downhill.

RECOMMENDED ABATEMENT:

Among others, one feasible and acceptable method of abatement to correct this hazard is to:

- a) Ensure that the Incident Commander identifies himself as such on all radio communications and adequately briefs key personnel as to the identity of the Incident Commander.
- b) Provide and identify to employees adequate escape routes and safety zones prior to engaging in fire suppression activities.
- c) Provide comprehensive and timely weather forecasts and expected fire behavior information to employees engaged in fire suppression activities.
- d) Provide adequate lookouts whenever there is the potential for fire spotting and fire blow-up. Lookouts must identify and communicate fire spotting and fire blow-ups to firefighters so that appropriate action can be taken.
- e) When downhill fireline construction is attempted, the following precautions, among others, must be taken:
 - 1) Downhill firelines must not be constructed adjacent to a chimney.
 - 2) Downhill firelines must be anchored at the top.
 - 3) Downhill firelines must not be constructed into dense fuels during potential blow-up conditions.
 - 4) Downhill firelines must be strengthened as construction progresses.

CITATION 2 ITEM 1 TYPE OF VIOLATION: SERIOUS

1960.8(a): The agency did not furnish employees with places and conditions of employment that were free of recognized hazards that were causing or likely to cause death or serious physical harm in that management failed to provide adequate oversight of the South Canyon Fire to ensure that the strategies, tactics, and objectives being used did not compromise the safety of the firefighters.

- a) Management failed to provide the firefighters with comprehensive fire behavior information including fuel type, fuel moisture, topography, and local weather forecasts.
- b) Management failed to ensure that the evolution of the Incident Command system was commensurate with the fire threat.
- c) Management failed to heed the safety practices contained in the Fireline Handbook pertaining to blow-up conditions, even though fires in the surrounding area (Bunniger Fire, Paonia Fire) with similar fuels were exhibiting extreme fire behavior.
- d) Management failed to conduct adequate inspections of firefighting operations, including on-site, frontline evaluations, to ensure that established safe firefighting practices were enforced on fires.

RECOMMENDED ABATEMENT:

Among others, one feasible and acceptable method of abatement to correct this hazard is to:

- a) Provide comprehensive and timely weather forecasts and expected fire behavior information to employees engaged in fire suppression activities.
- b) Ensure that the Incident Command system evolution is commensurate with the fire threat, and establish a chain-of-command to ensure accountability for firefighters' safety.
- c) Adhere to the safety practices contained in the Fireline Handbook pertaining to blow-up conditions, especially when fires in the surrounding area with similar fuels are exhibiting extreme fire behavior.

- d) Develop and implement an effective inspection system of firefighting operations to include on-site, frontline evaluations to ensure that established safe firefighting practices are enforced on fires of all classifications. When situations arise involving multiple agencies' responsibilities for conditions affecting employee safety and health, coordination of inspection functions is essential. (7)

4. THE CONCLUSIONS:

The root cause of this catastrophe may have been best summed-up by wildfire expert, William Teie, who stated in his report to OSHA:

"If a knowledgeable fire manager had reviewed the strategy, tactics and operational objectives being used on the South Canyon Fire, timely revisions in the plan may have been made and the disaster avoided...Management must exercise its responsibility to see that the overall plans fit into overall management objectives and are safe."

It is essential that the agencies develop, implement, and evaluate an occupational safety and health program for wildfire suppression activities in accordance with requirements of section 19 of the OSH Act, Executive Order 12196, and the basic program elements prescribed in 29 CFR 1960. (8)

To better protect firefighters and prevent catastrophes such as the South Canyon Fire from recurring, there must be an increased level of oversight on incident management. The agencies' expectations for safe firefighting operations must be defined and shared with all agency personnel involved in firefighting. Agency administrators must ensure that the firefighters and Incident Commander recognize and are held directly accountable for safety, as paramount to fighting the fire. At every level of the organizations, compliance with the standard Fire Orders and careful observance of the "Watch Out" situations and Common Denominators must be promoted and enforced. The consequences of compromising these orders and guidelines must be made clear to all individuals involved in firefighting.

As previously stated, OSHA has concluded that the primary cause leading to the deaths of the fourteen firefighters was that no one person or group was responsible for ensuring the safety of the firefighters. During fire suppression operations someone must be responsible - and accountable - for

7 An internal safety evaluation of wildfire suppression activities performed in October 1992, which recommended that BLM and USFS management take steps to ensure the safety of firefighters, was ignored.

8 Key elements of an effective program are top management support, program planning, program implementation, and program evaluation.

assuring that operations are conducted safely. OSHA believes that BLM and USFS must develop a policy of zero tolerance for safety and health infractions. The key to avoiding a recurrence of this catastrophe is to assign safety and health responsibility to specific individuals involved in wildfire suppression activities, and to hold these individuals accountable for ensuring the safety of the firefighters at all times and under all conditions; in short, develop and implement an effective safety and health program, especially for wildfire suppression activities.

Change must start with management, from the top to the bottom of each agency involved in wildland fire suppression. The unsafe conditions and practices identified in the Notices being issued by OSHA are symptomatic of the lack of management attention to ensuring that firefighting operations are conducted with safety of firefighters as the primary goal.

OSHA believes that the joint investigation conducted by the Bureau of Land Management and the Forest Service was thorough and provided very reasonable and sound recommendations for change. The subsequent Interagency Management Review Team developed an excellent report and blueprint for change. In particular, the three implications for management highlighted in the IMRT report must be given high priority within the five Federal wildland agencies to avoid recurrence of the South Canyon tragedy. OSHA further supports the efforts of the agencies to address the more systemic issues of suppression preparedness, fuels management, and the wildland/urban interface. If those fundamental policy issues are not squarely addressed, the safety and health of firefighters may be placed unnecessarily at risk.

OSHA'S goal is to ensure that firefighters are provided with a safe and healthy environment in which to conduct their critical functions. OSHA stands fully prepared to assist the wildland agencies in the furtherance of this goal.

9 The three management implications are: (1) creating a passion for safety; (2) involvement of agency administrators; and (3) monitoring Performance and accountability.

APPENDIX A

10 FIRE ORDERS

- o Fight fire aggressively but provide for safety first.
- o Initiate all action based on current and expected fire behavior.
- o Recognize current weather conditions and obtain forecasts.
- o Ensure instructions are given and understood.
- o Obtain current information on fire status.
- o Remain in communication with crew members, your supervisor, and adjoining forces.
- o Determine safety zones and escape routes.
- o Establish lookouts in potentially hazardous situations.
- o Retain control at all times.
- o Stay alert--keep calm; think clearly; act decisively.

18 SITUATIONS THAT SHOUT "WATCH OUT"

1. Fire not scouted and sized up.
2. In country not seen in daylight.
3. Safety zones and escape routes not identified.
4. Unfamiliar with weather and local factors influencing fire behavior.
5. Uninformed on strategy, tactics and hazards.
6. Instructions and assignments not clear.
7. No communication link with crew members/supervisors.
8. Constructing line without safe anchor point.
9. Building fireline downhill with fire below.
10. Attempting frontal assault on fire.
11. Unburned fuel between you and the fire.
12. Cannot see main fire, not in contact with anyone who can.
13. On a hillside where rolling material can ignite fuel below.
14. Weather is getting hotter and drier.
15. Wind increases and/or changes direction.
16. Getting frequent spot fires across line.
17. Terrain and fuels make to safety zones difficult.
18. Taking a nap near the firelines.

COMMON DENOMINATIONS OF FIRE BEHAVIOR ON TRAGEDY AND NEAR-MISS FOREST FIRES

Most incidents happen on the smaller fires or on isolated portions of larger fires.

Most fires are innocent in appearance before the "flare-ups" or "blow-ups." In some cases, tragedies occur in the mop-up stage.

Flare-ups generally occur in deceptively light fuels.

Fires run uphill surprisingly fast in chimneys, gullies, and on steep slopes.

Some suppression tools, such as helicopters or air tankers, can adversely affect fire behavior. The blasts of air from low-flying helicopters and air tankers have been known to cause flareups.