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October 1, 1994

Bobby Glover
Area Director
US Department of Labor
Occupational Safety and Health Administration
1391 Speer Blvd., Suite 210
Denver, CO 80204

Dear Bobby,

Attached are the notes from which I briefed you and your staff last week. I hope they assist you in your analysis of the tragedy on the South Canyon Fire. If I can be of any further assistance, don't hesitate to call.

Sincerely,


William C. Teie

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3415

The South Canyon Fire

July 6, 1994, near Glenwood Springs, Colorado

An Analysis of What Happened

- o Even before the South Canyon Fire started, firefighters in the area had plenty of indicators that the 1994 fire season was going to be worse than normal. *The Palmer Drought Index showed the area in an extreme drought condition, the number of fires was well above normal, and a larger percentage of the fires were exceeding the normal size.*
- o The conditions specific to the South Canyon Fire were: *the fire was located in very steep, rugged terrain; because of the other fires in the area, firefighting resources were limited; the fire was doubling in size ever 12 hours; trees were torching as the fire backed down the slopes.* Again, all signs that this was not a routine fire.
- o The fire was managed as an initial attack incident, even though it was into the fourth burning period when the tragedy occurred. *The incident commander did request additional firefighting forces, but he did not request additional overhead personnel to assist in the management of an ever growing incident.*
- o As the fire conditions changed (size of the fire and fire behavior increased) the strategy of a direct attack from the top of the ridge did not change. *Some of the specific conditions that should have been considered: firefighting resources were being delayed (hotshot crew delayed in getting on the fireline in a timely manner); fire beginning to reburn with extreme burning conditions (100 foot flame lengths noted by smoke jumpers); there was no nighttime relative humidity recovery (fire doubled in size each night); and they were having to deal with spot fires and continually losing line.*
- o Early in the fire fight, the strategy of a direct attack from the top of the ridge was proper, but as the fire moved down the steep slopes, the strategy could be questioned, especially since most of the special rules for this type of attack were compromised. *This condition should have "raised flags." There are also no indications any of the personnel that were aware of the forecasted wind considered it a real threat. There did not appear to be any sense of urgency even when the order to evacuate the area was given!*
- o There is some indication that some of the firefighters on the line were not sure who was in charge. *The Jumper in charge discussed this with one of the other jumpers asking if he wanted to take over. Part of this can be attributed to the fact that the incident command system did not appear to be used on this incident. If ICS had been used, there would not have been any confusion as to who was in charge.*

3416

- o The firefighters were generally confident that they could construct the necessary fireline and control the fire. There were discussions over the number of fire orders that were being compromised. *Because there were no lookouts posted, the firefighters had no idea what was happening around them and especially below them. Without adequate safety zones, they were not able to protect themselves from the firestorm that was to engulf them. Everyone underestimated the impact that a 45 mph wind would have on the fire behavior and the rate at which the fire would move through the oaks and reburn the area.*

At about 4 pm, July 6, the fire behavior on the south side of the fire (below the firefighting force) became extreme. The fire started a major run up the canyon toward the north. It then spotted directly below 12 of the retreating firefighters. This spot, pushed by a 45 mph west wind, moved up the ridge with tremendous speed, trapping the firefighters on the fireline, just below the ridge.

It is not uncommon that firefighters routinely compromise one or more of the fire orders when fighting fire. But, when they do, they usually compensate with increased vigilance and safety measures. In this case, many of the fire orders were compromised, and the cumulative effect spelled disaster. **The three most significant fire orders compromised were: lack of safety zones; no lookouts; and, disregard for the predicted weather change and the impact it would have on fire behavior.**

Preventive Measures

Firefighting is inherently dangerous. That is why it is usually conducted by highly trained and skilled firefighters. Mistakes will happen and people will be hurt. But, in an effort to try to prevent this type of tragedy occurring again, the following measures could be implemented:

- o Request that the National Weather Service, working with the National Wildfire Coordination Group, differentiate "red flag" alerts for life safety from those for lightning. There were several comments by firefighting personnel, that "the red flag warning was one of several during the week." No one ever said that there was a quota for red flag alerts, but the idea of placing special emphasis on life safety alerts should be explored.
- o Forestry agencies have used a Fire Danger Rating System for years to give a numerical factor to the fire weather potential. The system is presently so cumbersome that it has little or no meaning for the firefighter. The system should be refined so that it gives the responding firefighter a simple, but meaningful description of the fire potential he or she will be facing.

- o A change in weather is involved in most changes in fire behavior. The firefighter needs a better working knowledge of how changes in weather will influence fire behavior and the way he or she fights fire. Weather influences fire behavior; actual and predicted fire behavior dictate strategy and tactics; firefighters select strategy and tactics.
- o It is relatively easy to learn and recite the 10 standard fire orders and the 18 situations that shout watch out. Applying them appears to be a problem. The federal forest agencies should expand on its "Standards for Survival" training program to drive home the impacts of compromising the fire orders. This training should be mandatory for all supervisory personnel.
- o There are indications that the roles and responsibilities of the various dispatch centers are not clear. This may lead to orders for firefighting resources not being filled or duplicated, vital weather information not being passed on, etc.
- o The Incident Command System was not used. There was concern in the minds of several firefighters as to who was in charge. If the ICS identifier system had been used, there would have been no doubt who was the incident commander. Also, if ICS had been utilized, the crews may have been provided better logistical support (feeding would have been better) and specific line assignments would have been made.
- o There is a need to provide an increased level of management oversight on incident management. 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. This is not to say, that there should be an erosion of the authority and responsibility of the incident commander, but that management must exercise its responsibility to see that the overall plans fit into overall management objectives and are safe. The fire management officers, as representatives of management, should be given the responsibility to provide this oversight. This will require that they have expertise in fire protection operations and the various job descriptions be changed to require it..
- o There needs to be a clearer understanding of the role of the fire shelter: what it can and cannot do, and what constitutes a safety zone. Simple, practical guidelines need to be taught, so that each and every firefighter knows and understands them.

General Comments

These are general comments directed to the management of OSHA. They are from the prospective of a fire manager looking from the outside in, and as a fire manager looking to prevent a similar type incident in the future:

- o There are enough fire orders, watch outs and general policies. Some may say that there are too many. The need is to understand what they all mean and how they all interconnect and tie together. The mistake that lead to this tragedy was that no one concerned themselves with the cumulative impact of compromising several of the basic rules of firefighting. OSHA should concentrate on the safety issues and not get into the specific strategy and tactics. This is an issue for the fire agency.
- o During the last 15 years, many fire fighting agencies have placed less and less emphasis on firefighting experience and training in the filling of fire management positions because of other pressing issues (affirmative action, consent decrees, etc.). This will eventually impact management's ability to provide adequate oversight of incident management.
- o The working relationship between OSHA and the federal firefighting agencies is non-existent. This isn't the way it should be and is counterproductive even when all the concerned agencies have the same overall goal, a safe working environment. OSHA should meet with the FS/BLM representatives as soon as possible to begin to discuss the various findings and items that may be included in the notice. This will begin to open up a working dialogue and start building a much needed level of trust. There will unfortunately be future accidents and subsequent investigations. OSHA could be party to the agency investigations and still maintain its mandate to remain independent.
- o The including of the notice item dealing with the fact that the Forest Service has not filed their annual safety plan should be handled separately and not be included in the notice for the South Canyon Fire. This issue had no influence on the outcome of this fire.
- o The question was raised, "did the management in both the Forest Service and Bureau of Land Management know that its firefighters routinely violated the fire orders and did they ignore this fact?" Those managers that understand what it takes to fight fire, knew that from time to time, fire orders were compromised, and they were concerned. Over the years safety has been stressed. The Forest Service conducted a full review of its firefighting operations called "Safety First." This review results in the establishment of specific safety policies and staffing patterns. There was a full review of air operations that included local, state and federal agencies that use aircraft in wildland fire fighting.

The federal agencies have developed a full range of training aids that deal with fire weather, fire behavior and survival. Wildland protective clothing and the fire shelter are all products of the Forest Service.

The issue is that there is still room for improvement, not so much in the tools and policies, but in attitudes of firefighters. We shouldn't restrict the "can do" attitude, but we need to raise the level of concern over the impacts of compromising fire orders and ignoring situations that shout watch out. We know the rules, we must believe "it may happen to me, and I'm not going to let it."