# Risk Management Planning

**Richard J. Mangan**
**USDA FS, Missoula Technology and Development Center**

Risks are an accepted part of the business of wildland fire management, both on wildfires and on prescribed burns. If we wanted wildland fire personnel to work in a risk-free environment, we would have to avoid actions that entail "risk":

- Direct attack
- Helirappelling
- Igniting prescribed fires
- Smokejumping.

As Fire Managers, we know that a risk-free environment, or "no action," is not a viable option in a wildland fire program: lives would be threatened, valuable resources lost, and opportunities for applying prescribed fire would be foregone. Several other approaches can be used to address the risks that a wildland fire fighter must face on a daily basis:

• Acceptance—Recognizing the risk that fire personnel face from exposure to wildland fire smoke on prescribed fires and wildfires, and living with that risk without taking any action;
• Avoidance—Identifying those conditions that are potentially hazardous to personnel, and ensuring that no exposure occurs;
• Mitigation—Identifying those conditions that may present a risk to fire personnel, and taking steps to remove the adverse effects of those risks so that exposures fall within an acceptable range.

Mitigation, or "risk management," is the result all of us have hoped for during the past 6+ years of work, and is the expected product of this conference.

Before we decide how to mitigate the risks from wildland fire smoke, we need to have a quick reality check with the factors that come into play when we are involved with wildland fire:

First, what is our MISSION? Are we conducting a prescribed burn to enhance the natural resources in a smoke-sensitive area, or in an area where little or no public concern has been expressed? Is the resource we are protecting from the risk of wildfire an area of threatened or endangered plant or animal species, or general forest ground with no unique features? Is the area politically sensitive, or does it include areas of urban-wildland interface?

Are our PERSONNEL experienced and highly trained, or are they relatively inexperienced and unable to readily recognize the hazards of the wildland fire workplace? What has been their exposure to high concentrations of wildland fire smoke over the recent days, weeks, and months?

Are ECONOMICS of the fire area and the adjacent area an important concern? Is this fire adjacent to private land, or in a public area of extraordinary value? Are more costly mitigation measures acceptable to the Line Officer and the public?

What are the POLITICS affecting the fire operations? Is this a Prescribed Natural Fire in Wilderness threatening to escape prescription and cross the Wilderness boundary? Are you conducting a prescribed burn against the property boundary of a vocal opponent of Forest Service fire policies? What is the attitude of the local media toward fire, both prescribed fire and wildfire?

After all these factors have been fully addressed, it's time to start planning the risk management actions to ensure both the short- and long-term well being of our wildland fire personnel:

1. Identify the risk—Is it short-term exposure during periods of initial attack, moderate duration exposure during holding operations on a prescribed burn, or long-term exposure during an extended mop-up operation?

2. Evaluate the risk—How often does it occur? What is the severity of the exposure?

3. Implement risk control techniques—Eliminate the hazard, or mitigate the exposure to bring it within acceptable limits.

We have previously identified the risk: smoke, from both wildfires and prescribed burns. Our next step is to evaluate the risk to the firefighter's health, both from the perspective of a single exposure and over the long term. We must develop procedures to effectively monitor the exposure of the firefighters, keeping in mind that many of the effects of smoke exposure may not show up for many years and may be affected by outside influences such as tobacco use, other employment and/or hobbies, or environmental factors such as wood stoves.

Risk control is the next, and most complex step, in the risk management planning process. For fire managers dealing with the smoke from wildfires, our options are often more limited than when we deal with prescribed fire—but OPTIONS are the key in both scenarios:

• Both workers and management have a vested interest in doing a job safely, efficiently, and with a minimum of risk. Effective training to identify and mitigate risks is a critical first step.
• Strategy and tactics are the real-time, on-the-ground techniques that fire managers use on prescribed fires and wildfires to accomplish the mission and ensure the safety and well-being of the firefighters. It is possible to do both, but the burden is on the fire manager to prepare a plan that effectively "manages the exposure."

Remember, the "responsibility" for ensuring a safe work environment rests with us as fire managers. To redeem those responsibilities, we must do all the actions identified above: identify, evaluate, mitigate, and lastly, monitor success through a program that ensures that risk management efforts are effective.

The key aspect of a successful risk management plan is to "manage" the risk, the exposure, and the mitigation. The continued success of our fire management programs, and the health of our fire personnel, is at stake.

# Health Hazards of Smoke



**Mon. 4/7** Arrive, register, informal social

**Tues. 4/8**

0830 Welcome and Introductions - Dick Mangan, Brian Sharkey

0845 Defining the problem: The 1989 San Diego Study Plan - Darold Ward

0900 **Session 1. Hazards and Exposures**

Presentation: **Hazardous Emissions Review** - Darold Ward, IFSL

0930 Panel: **What we need to know about emissions.** Ward, Hao, Yokelson, Haddow

1000 Break

1015 Presentation: **Employee Exposure Review** - Tim Reinhardt, Radian Corp.

1045 Panel: **What we need to know about employee exposure.** Reinhardt, Ottmar, Reh, Choquette

1115 Discussion: **Hazards and Exposures: Implications for Risk Management**
Emissions and exposure panels and audience

1145 Lunch

1315 **Session 2. Health Effects and Risks**

Presentation: **Health Effects Review** - Brian Sharkey, MTDC

1345 Panel: **What we need to know about health effects.** Headapohl, Harrison, Sharkey

1415 Presentation: **Risk Assessment** - Tom Booze, Radian Corp.

1445 Panel: **What does it mean?**
Booze, Reh, Ottmar, Bordleon

1515 Break

1530 Discussion: **Health effects and risks: Implications for Risk Management**
Panel members and audience

1600 Panel: **The Firefighter's Perspective**
TBA

1630 Panel: **The Fire Managers Perspective**
Williams, Sullivan. Dowdy

1700 Adjourn

1900 Posters and Products - Reception (no host)

2000 Informal discussions with presenters, and panel members

---

**Wed. 4/9**

0800 **Session 3. From Risk Assessment to Risk Management: Designing the Risk Management Program**

Presentation: **Risk Management Program** - Dick Mangan, MTDC

0830 Panel: **From Health Habits to Tactics.**
Mangan, Vore, Govatski

0900 Presentation: **Monitoring Exposure** - Tim Reinhardt, Radian Corp.

0930 Panel: **What Will Work?**
Reinhardt, Reh, Golias, Leuschen

1000 Break

1015 Presentation: **Respiratory Protection** - Brian Sharkey, MTDC

1115 Panel: **What does the Firefighter Need?**
Weber, Johnston, Sharkey

1145 Lunch

1300 Presentation: **Surveillance and Research** - Bob Harrison, CDHS

1330 Panel: **What Could/Should be Done?**
Harrison, Headapohl, Reh

1400 Presentation: **Managing Risk Management** - Dave Aldrich, FS

1430 Panel: **Developing, Disseminating and Managing the Program.**
Aldrich, Mangan, Shook

1500 Break

1515 Open Forum - **What's Missing in Risk Management?**
Costs vs Benefits and other issues

1545 **Working Groups - Planning Session**
Tactics/Training - Mangan
Health Maintenance - Vore
Monitoring - Reinhardt
Respirators - Sharkey/Weber
Surveillance/Research - Harrison
Program Management - Aldrich

1700 Adjourn

1900 Working group discussion sessions

---

**Thurs. 4/10**

0800 Working Groups Meet

1000 Break

1015 Combined Groups Review Progress

1100 Working Groups Finalize Sections

1145 Lunch

1300 **Session 4. Risk Management Consensus Conference**
Identify and approve program elements
Assign responsibilities and target dates

1500 Wrap-up and Adjourn
(writing team remains)

---

**Working draft of risk management program to be prepared and distributed for comment.**

**Location:** Holiday Inn Parkside
Missoula, MT 59801

**Program Committee:** Darold Ward, IFSL
Roger Ottmar, PNW
Brian Sharkey, MTDC

**Organized by:** The NWCG Safety and Health Working Team, the Health Hazards of Smoke Technical Committe, and the Missoula Technology and Development Center.

# Conference Participants

Ann Acheson
USDA FS, AFA
200 East Broadway
P.O. Box 7669
Missoula, MT 59807

Dave Aldrich
USDA Forest Service
3833 South Development Ave.
Boise, ID 83705-5354

Tom Booze
RADIAN
10389 Old Placerville Road
Sacramento, CA 95827

Janice Bordelon
Florida DOF
3125 Conner Boulevard
Tallahassee, FL

Al Carriere
BLM
3833 South Development Ave.
Boise, ID 83705-5354

Lisa Choquette
California Prof. Fire Fighters
1780 Creekside Oaks, No. 200
Sacramento, CA 95833

Dan Corti
Environmental Health
University of Montana
Missoula, MT 59812

Laura Cox
Scott Aviation
309 West Crowell Street
Charlotte, NC 28204

Dan Francis
California DOF
1416 9th Street, Rm. 1354-4
P.O. Box 944246
Sacramento, CA 94244

Emil Golias
OSHA
1781 South 300 West
Salt Lake City, UT 84121

Dennis Haddow
USDA Forest Service
P.O. Box 25127
Lakewood, CO 80225

Wei Min Hao
USDA FS, IFSL
P.O. Box 8089
Missoula, MT

Robert Harrison, M.D.
California Dept. of Health
2151 Berkeley Way
Berkeley, CA 94704

Dana Headapohl, M.D.
Occ. Health, St. Pat's Hospital
West Broadway
Missoula, MT 59801

Steve Karkanen
USDA FS, Lolo NF
Building 24, Fort Missoula
Missoula, MT 59804

Tom Leuschen
USDA FS, Okanogan NF
1240 South 2nd Avenue
Okanogan, WA 98840-9723

Andrew Levinson
IAFF
1750 New York Ave. NW
Washington, D.C. 20006

Dick Mangan
USDA FS, MTDC
Building 1, Fort Missoula
Missoula, MT 59804-7294

Chuck McCammon
NIOSH
P.O. Box 25226
Denver, CO 80225

Lyle McKenzie
CDPHE
4300 Cherry Creek Drive
Denver, CO 80222

Todd Onken
USDA FS, Aerial Fire Depot
5765 Highway 10 West
Box 6, Airport Terminal
Missoula, MT 59802

Roger Ottmar
USDA FS, PNW
4043 Roosevelt Way NE
Seattle, WA 98105

Frank Quintana
USDA FS, Safety & Health
1621 North Kent Street
Arlington, VA 22209

Eric Rajala
USDA FS, Aerial Fire Depot
5765 Highway 10 West
Box 6, Airport Terminal
Missoula, MT 59802

Phil Range
BLM
3833 So. Development Ave.
Boise, ID 83705-5354

Tim Reinhardt
RADIAN
11711 SE 8th Street
Bellevue, WA 98005

Kathy Shell
BLM
HR-240, Building 50
Denver, CO 80225

Lyle Shook
USDA FS, Safety & Health
630 Sansome Street
San Francisco, CA 94111

Matt Silva
California Dept. of Forestry
1416 9th Sreet, Rm. 1354-4
P.O. Box 944246
Sacramento, CA 94244

Dan Sullivan
NPS
200 Chestnut Street
Philadephia, PA 19106

Mark Vore
USDA FS
3815 Schreiber Way
Coeur d'Alene, ID 83814-8363

Darold Ward
USDA FS, IFSL
P.O. Box 8089
Missoula, MT 59807

Bob Weber
3M Occupational Health
3M Center, Bldg. 260-3-02
St. Paul, MN 55144-1000

Bill Wiehagon
NIOSH
P.O. Box 18070
Pittsburg, PA 15236

Bob Yokelson
USDA FS, IFSL
P.O. Box 8089
Missoula, MT 59807

Greg Zschaechner
USDI
Box 6, Airport Terminal
Missoula, MT 59802

## Library Card

Sharkey, Brian, ed. 1997. Health hazards of smoke: recommendations of the April 1997 Consensus Conference. Tech. Rep. 9751-2836-MTDC. Missoula, MT: U. S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 71 electronic p.

In 1989 the National Wildfire Coordinating Group (NWCG), related agencies, employee groups, and specialists in occupational medicine, industrial hygiene, toxicology, and risk management developed a study plan to determine the immediate and long-term effects of exposure to forest fire smoke. The comprehensive plan proposed studies in the areas of emissions characterization, employee exposure, health effects, risk assessment, and risk management. In April 1997 a conference reviewed progress in each area, and reached consensus on the elements of a risk management plan that could be implemented within the existing fire management structure. This document includes the conference's recommendations for implementing the risk management plan and the papers presented at the conference.

Participants concluded that toxic emissions were present in smoke, that the incidence of exposure in excess of Occupational Safety and Health Administration permissible exposure limits was relatively low (fewer than 5% of prescribed fire cases, even less for wildfire), and that documented health effects were moderate and often reversible. Recommendations for risk management include changes in training and tactics to further minimize exposures, and monitoring to increase awareness of the health effects of smoke and to help limit exposure. Health maintenance recommendations are intended to prevent the spread of illness and ensure healthy immune function. Medical surveillance is needed to track exposures and further research is necessary to fill gaps in our understanding of emissions, exposure, and health effects.

**Keywords:** occupational hazards, safety at work, wildland firefighters.

**For additional technical information contact Brian Sharkey at:**
USDA FS, Missoula Technology & Development Center
Building 1, Fort Missoula
Missoula, MT 59804-7294
Phone: (406) 329-3989
Fax: (406) 329-3719
IBM: bsharkey/wo,mtdc
E-mail: bsharkey/wo_mtdc@fs.fed.us

**An electronic copy of this document is available on the Forest Service's FSWeb intranet at:**
http://fsweb.mtdc.wo.fs.fed.us

**An additional copy of this document may be ordered from:**
NIFC-PMS
3833 South Development Avenue
Boise, ID 83705
Fax: (208) 387-5573 or 5548