

A dramatic scene of two firefighters in full white protective suits and helmets, standing in a pool of water. They are using a high-pressure hose to spray water onto a massive fire that is consuming the background. The fire is intense, with bright orange and yellow flames and thick, billowing black smoke that fills the upper portion of the frame. The overall atmosphere is one of a major industrial or structural fire incident.

Incident Rehabilitation on Scene

Are We Doing Enough?

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INTRODUCTION

- Approximately one-half of all firefighter fatalities and significant percentage of injuries are a result of stress and overexertion on firefighters involved in emergency operations and training exercises.
- Purpose of rehab operations is to provide rest for firefighters and receive medical attention and monitoring as required and given the opportunity to replenish fluids.

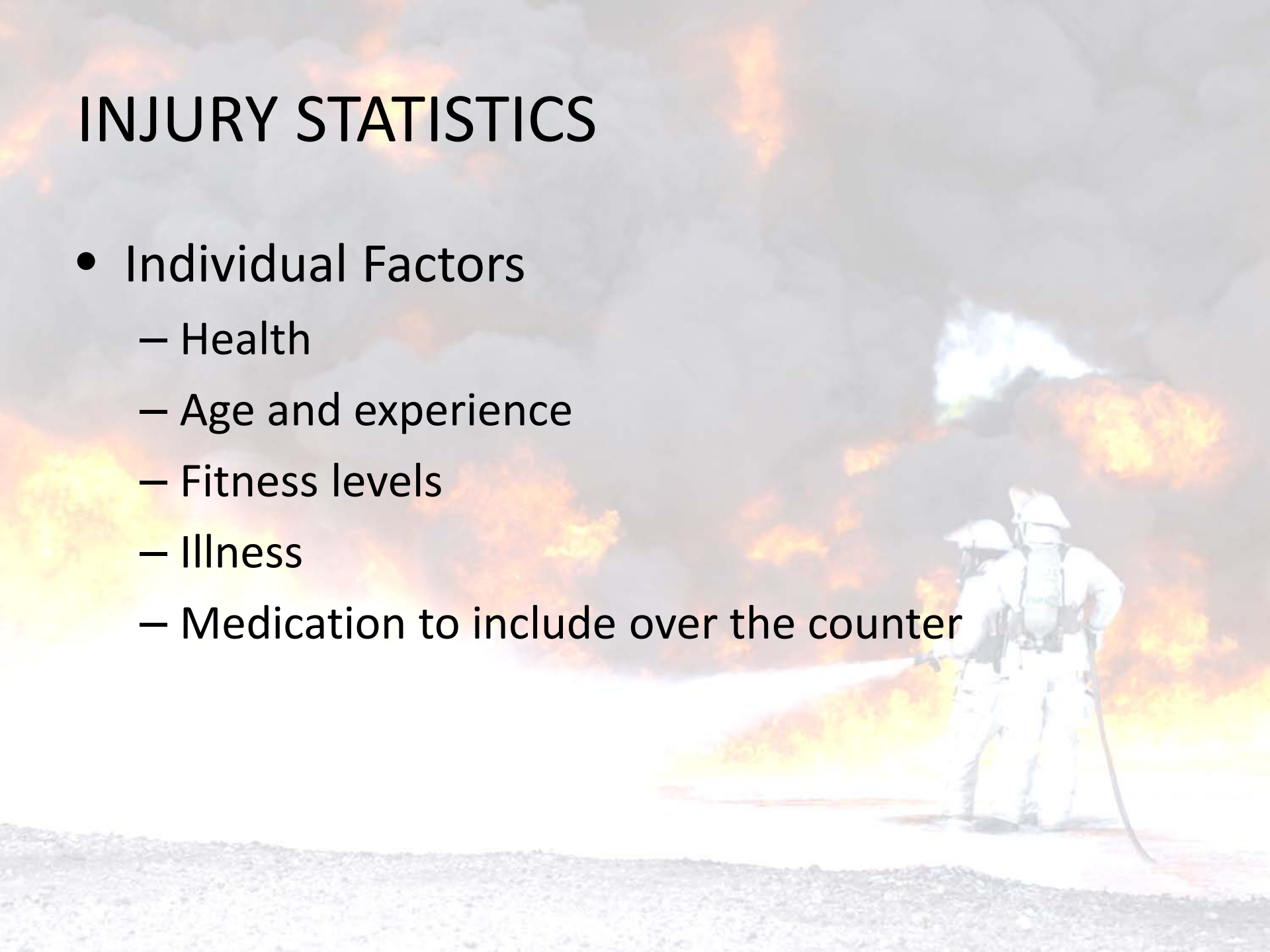


INJURY STATISTICS

INJURY		
YEAR	HEART ATTACK & STROKE	STRESS
1989	255	3040
1990	235	3505
1991	325	4630
*1992	335	2775
1993	295	3430
1994	330	3160
1995	345	2935
2010	175	2350
2011	255	1825
2012	265	2350

INJURY STATISTICS

- Individual Factors
 - Health
 - Age and experience
 - Fitness levels
 - Illness
 - Medication to include over the counter



INJURY STATISTICS

- Leadership Factors
 - Little or no rehab
 - Rehab called out to late
 - Lack of Safety Officer
 - Lack of EMS
 - Lack of accountability
 - Lack of communication



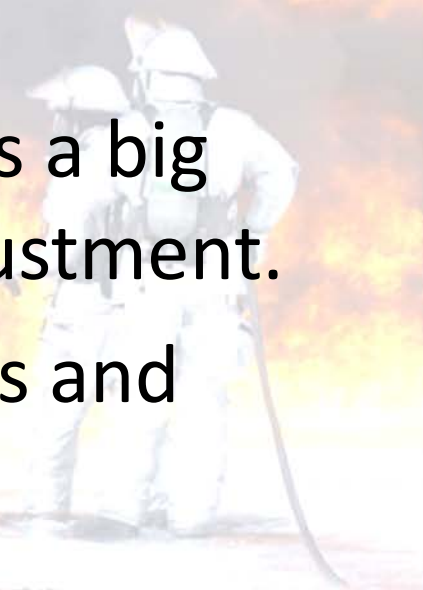
CONTRIBUTING FACTORS

- Thermal Stress
 - Environmental heat and cold
- Working environment
 - Interior/exterior fire conditions
 - Labor intensive
 - We have no choice
- PPE
 - A double edged sword



WHAT HAPPENED?

- 2004, triennial exercise – not available.
- 2007, triennial exercise – very little rehab.
- 2010, triennial exercise – rehab was requested but was too late.
- 2013, triennial exercise – rehab was a big improvement but needs minor adjustment.
- Found issues with past emergencies and exercises



HOW TO FIX THIS PROBLEM

- Fact finding
- SOGs/SOPs review
- Researched websites and publications
- How do other departments do business
- Brain storming
- Educating our people
- Pre-incident planning
- Evaluate



FACT FINDING

- Review past exercises and incidents
 - Did we have rehab
 - Was it adequate
 - What went wrong
 - What went right
- Review past rehab incidents
 - Accountability
 - Any injuries



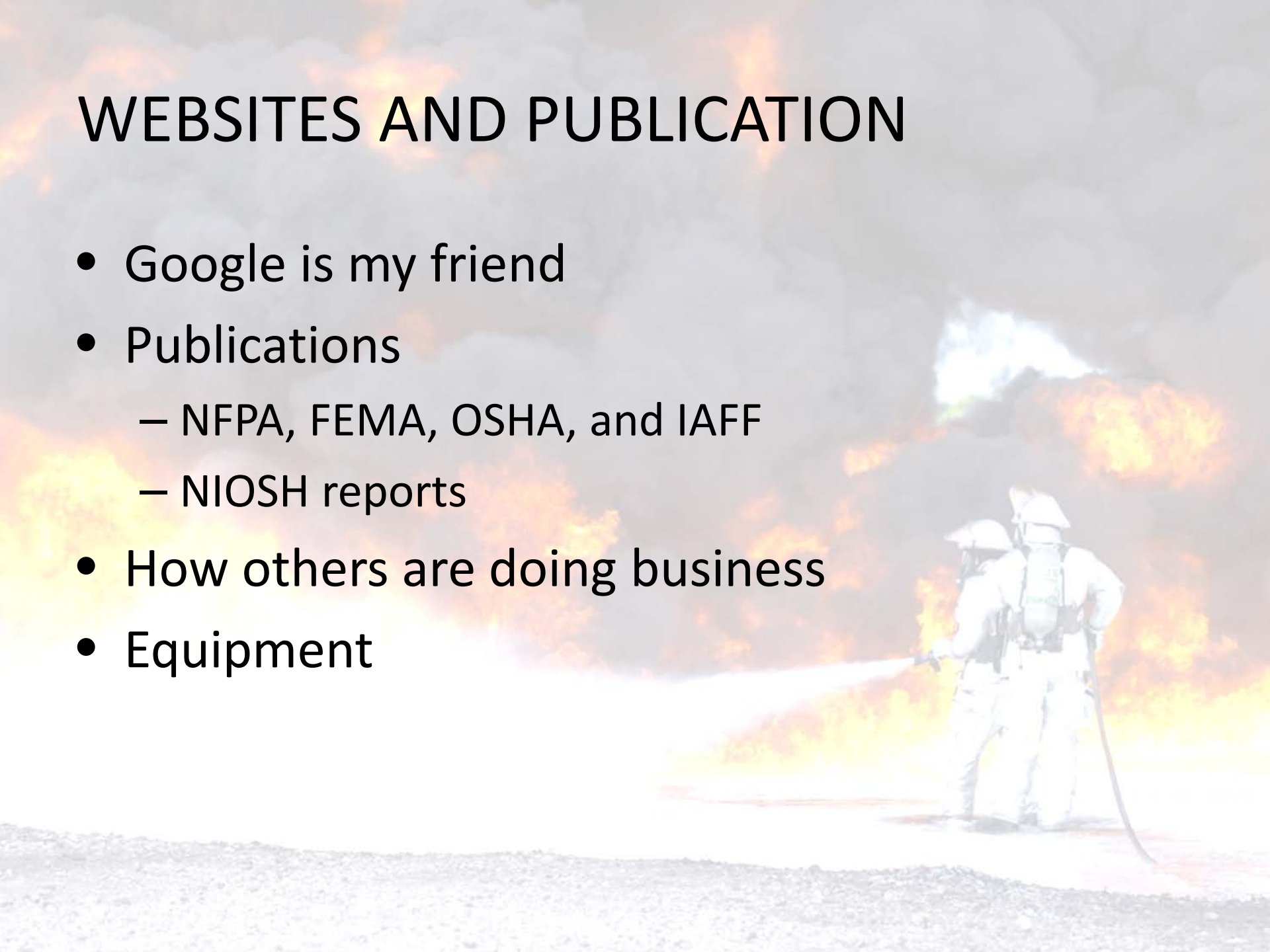
SOG/SOP REVIEW

- Looked at our own and mutual aid partners
 - Out-of-date, restricted, and/or vague
- Looked at other responding organization, academies, and fire schools
 - Some were better
 - Some were not so great
- Checked NFPA, and FEMA



WEBSITES AND PUBLICATION

- Google is my friend
- Publications
 - NFPA, FEMA, OSHA, and IAFF
 - NIOSH reports
- How others are doing business
- Equipment



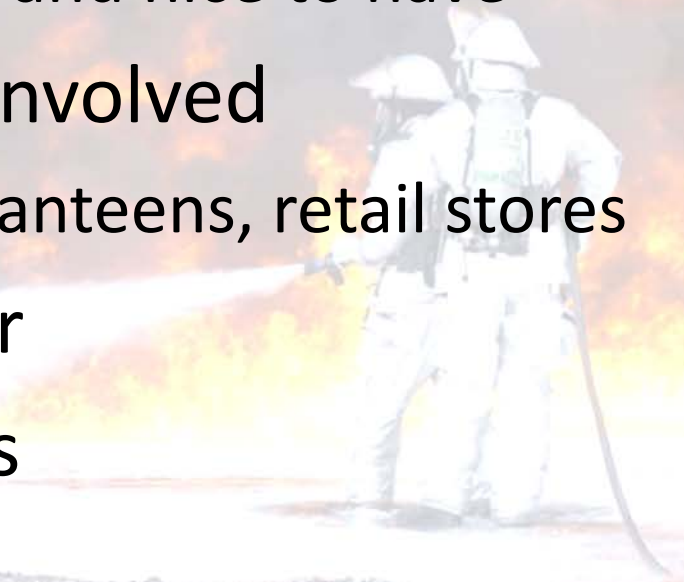
HOW OTHER DEPTS. DO BUSINESS

- Contacted other departments
 - Lot of good ideas
 - Also some were in the same boat or even worse
- What type of equipment
- Where do you conduct rehab
- Time frame
- Who is in charge



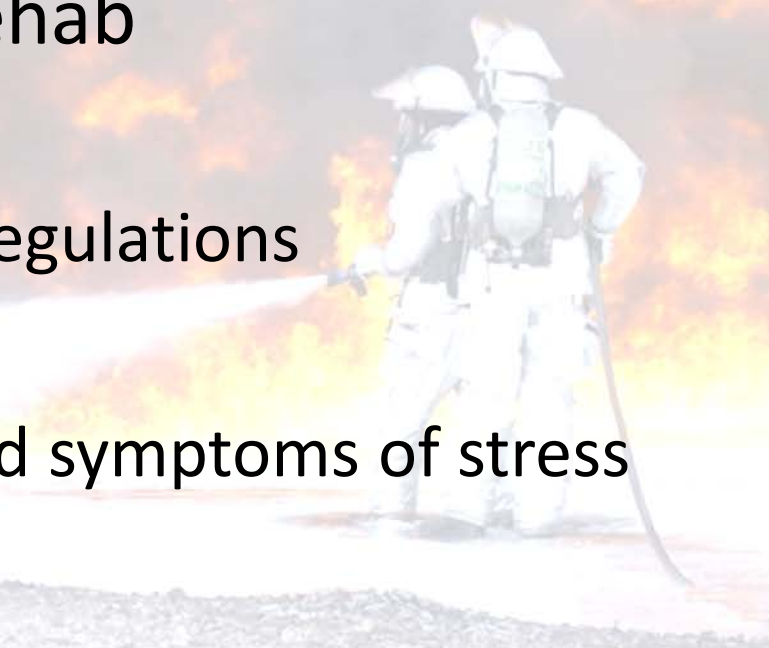
BRAIN STORMING

- Equipment – who had what
 - Alb. has the toilet facilities, BernCo has access to canteen, we have shower system
 - What equipment is a must and nice to have
- What other agencies are involved
 - Red Cross, food pantries, canteens, retail stores
- Different times of the year
- Possible incident locations

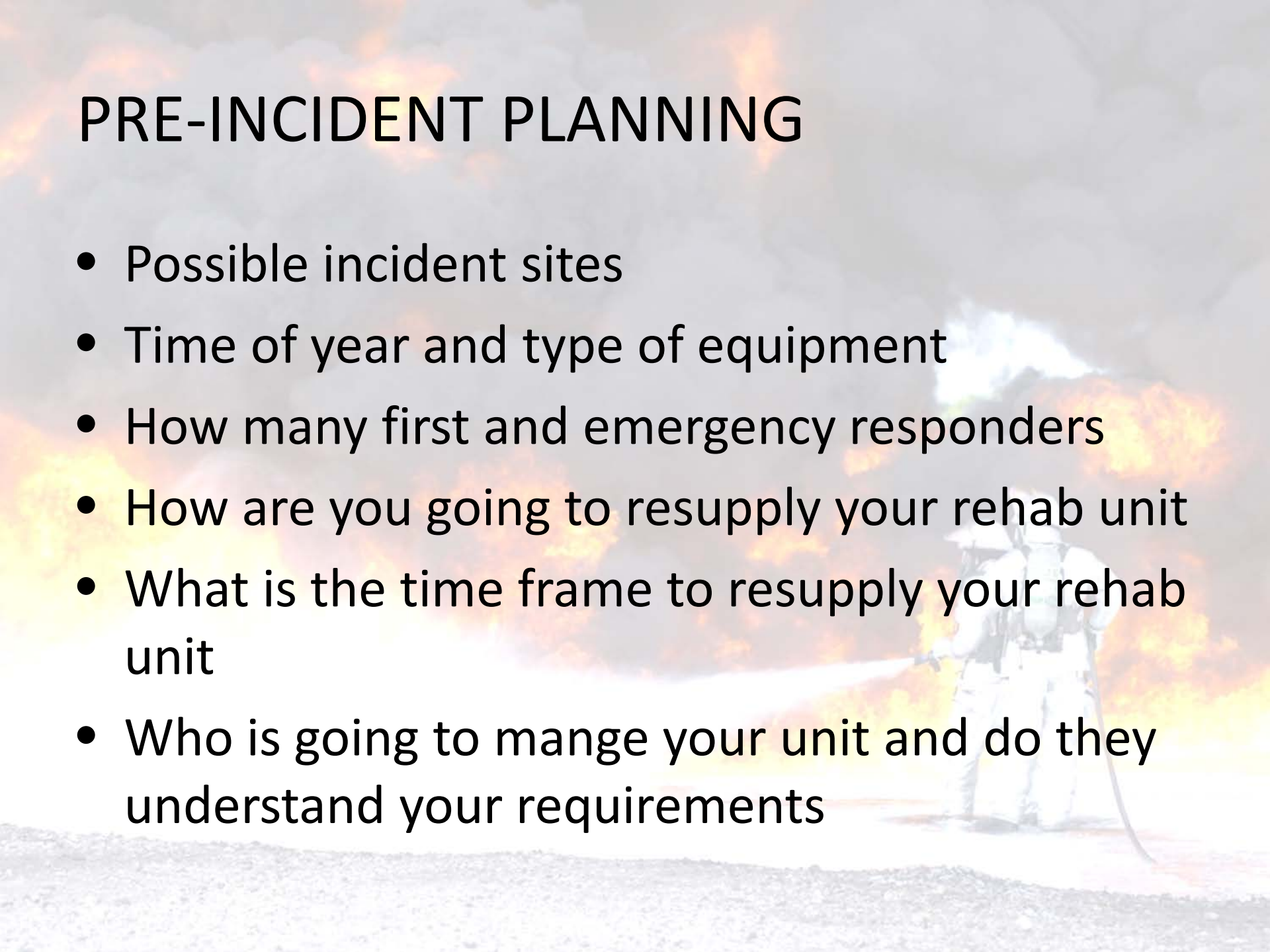


EDUCATING OUR PEOPLE

- Did not know what rehab was really about
 - For people who are weak or don't want to work
 - Free to enter and exit when they wanted
- Once they knew about rehab
 - Better understanding
 - Understanding laws and regulations
 - Understanding the risk
 - Better control on signs and symptoms of stress

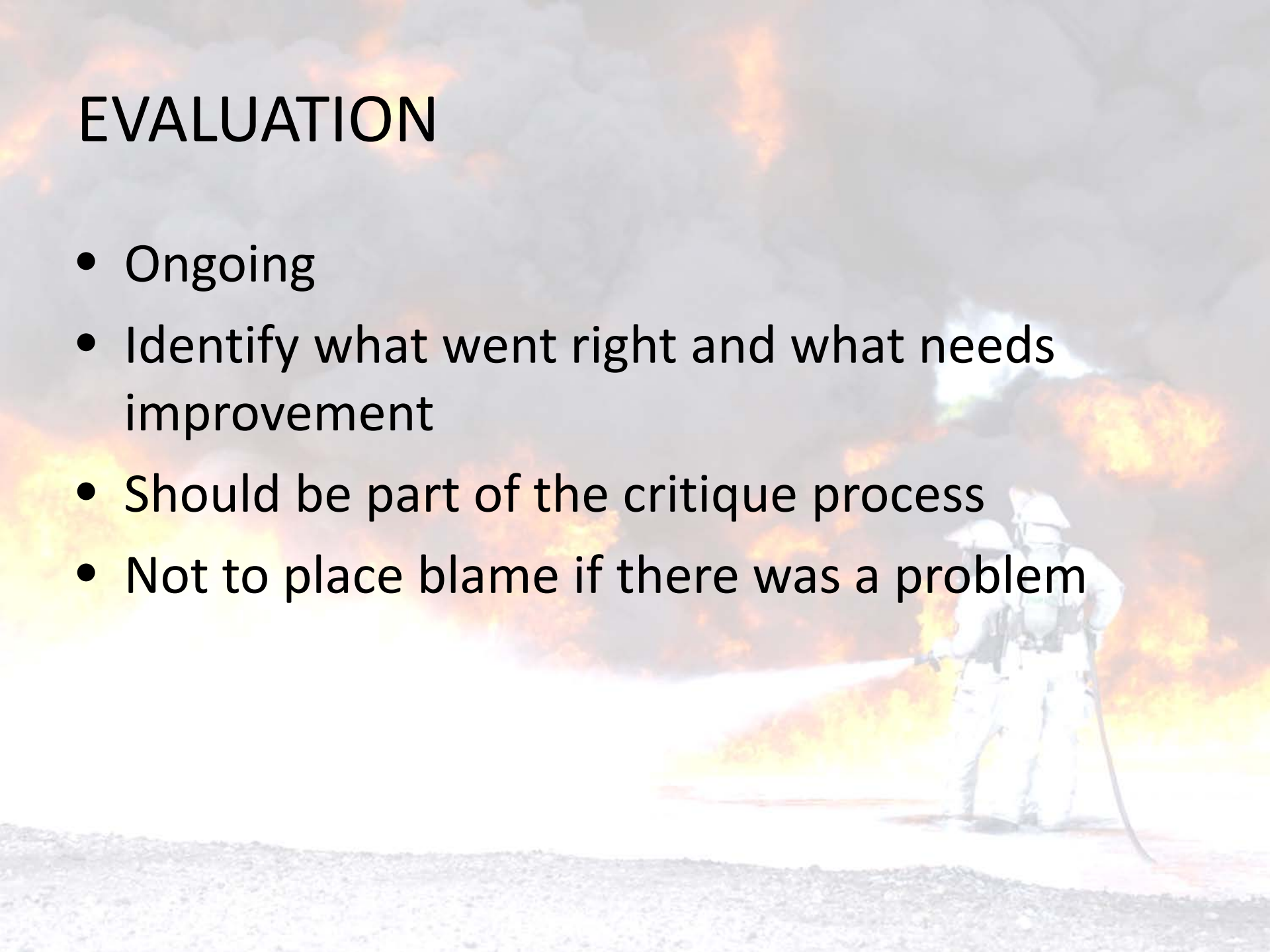


PRE-INCIDENT PLANNING

- Possible incident sites
 - Time of year and type of equipment
 - How many first and emergency responders
 - How are you going to resupply your rehab unit
 - What is the time frame to resupply your rehab unit
 - Who is going to manage your unit and do they understand your requirements
- 

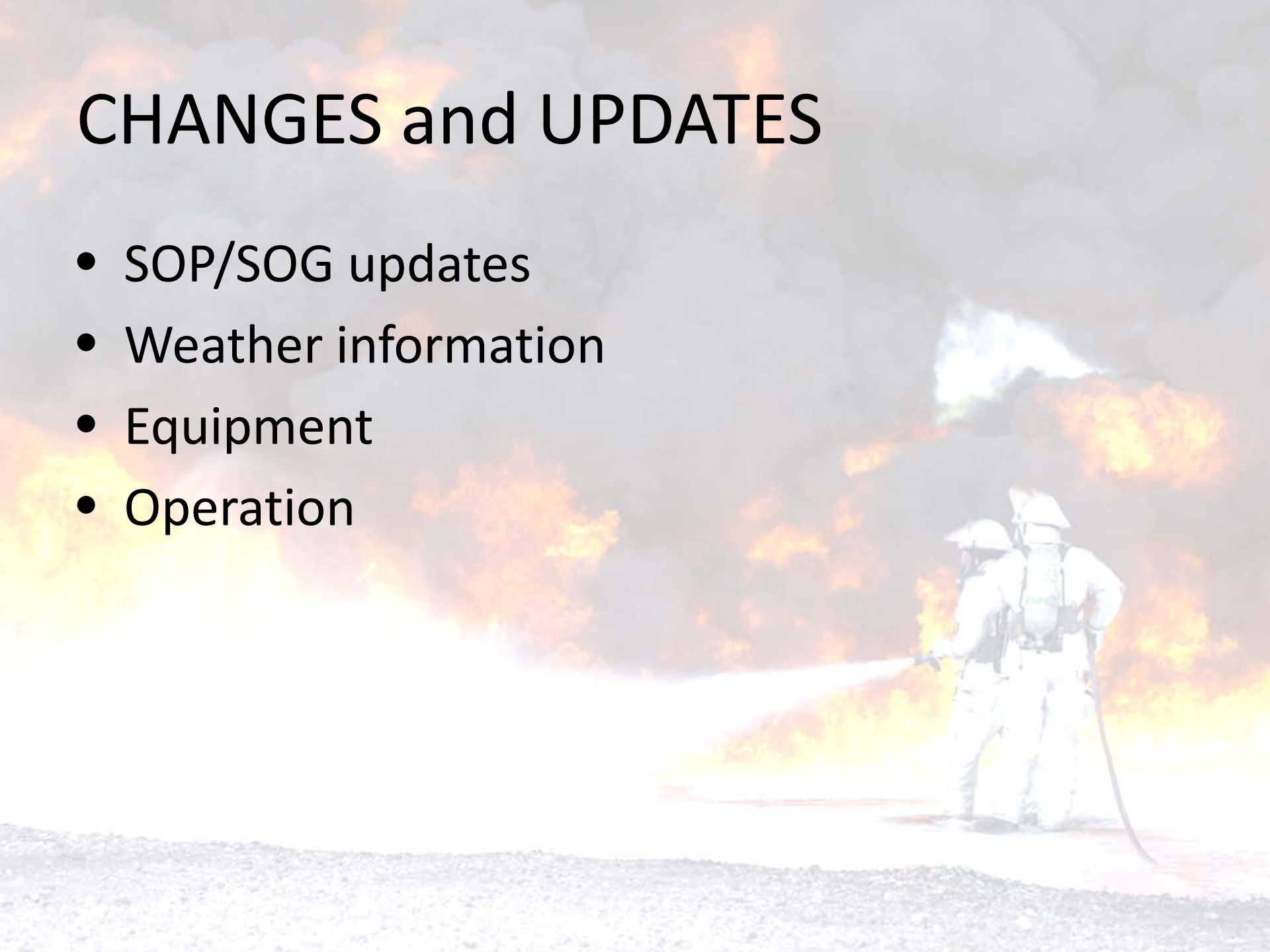
EVALUATION

- Ongoing
- Identify what went right and what needs improvement
- Should be part of the critique process
- Not to place blame if there was a problem



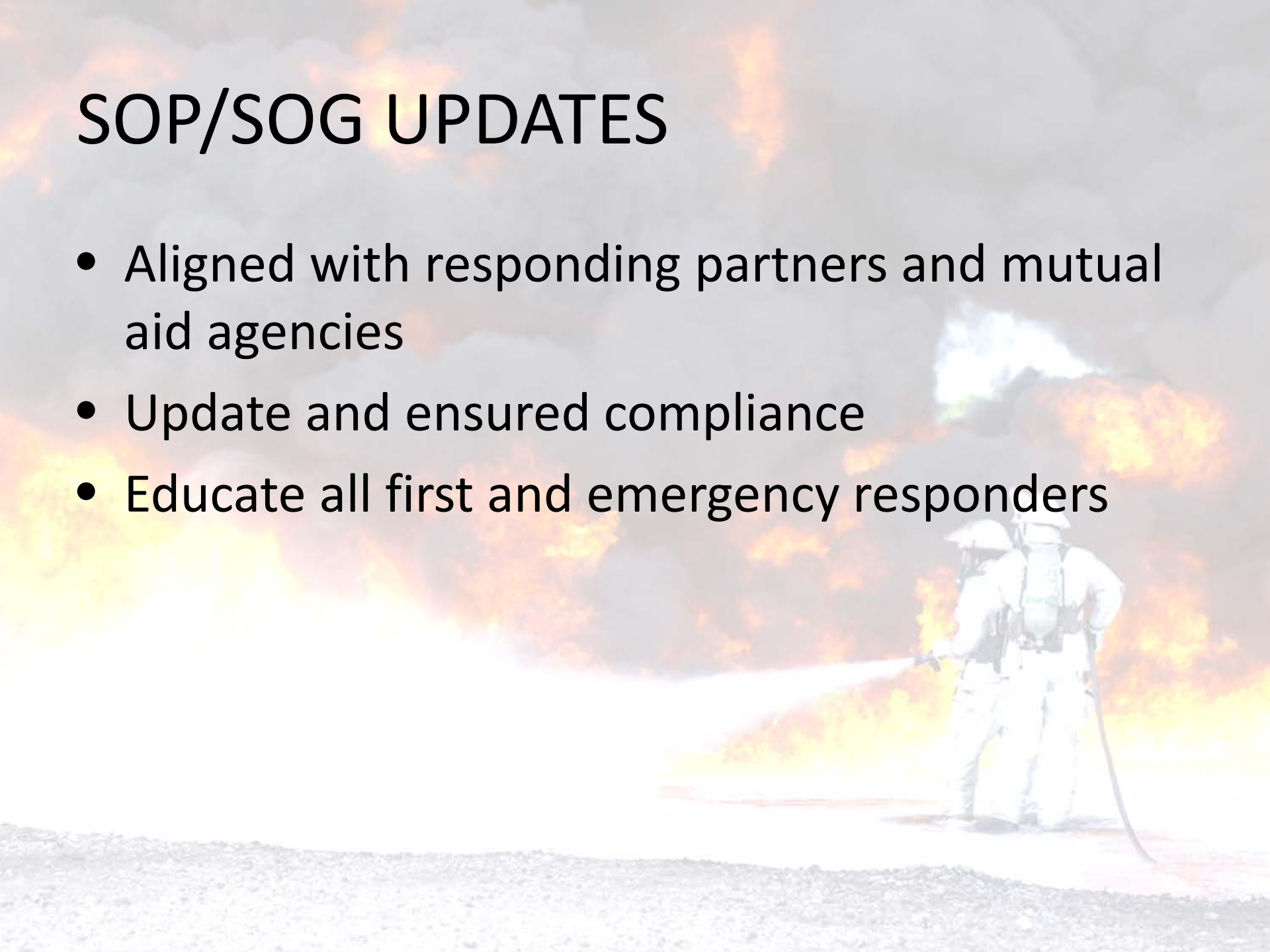
CHANGES and UPDATES

- SOP/SOG updates
- Weather information
- Equipment
- Operation



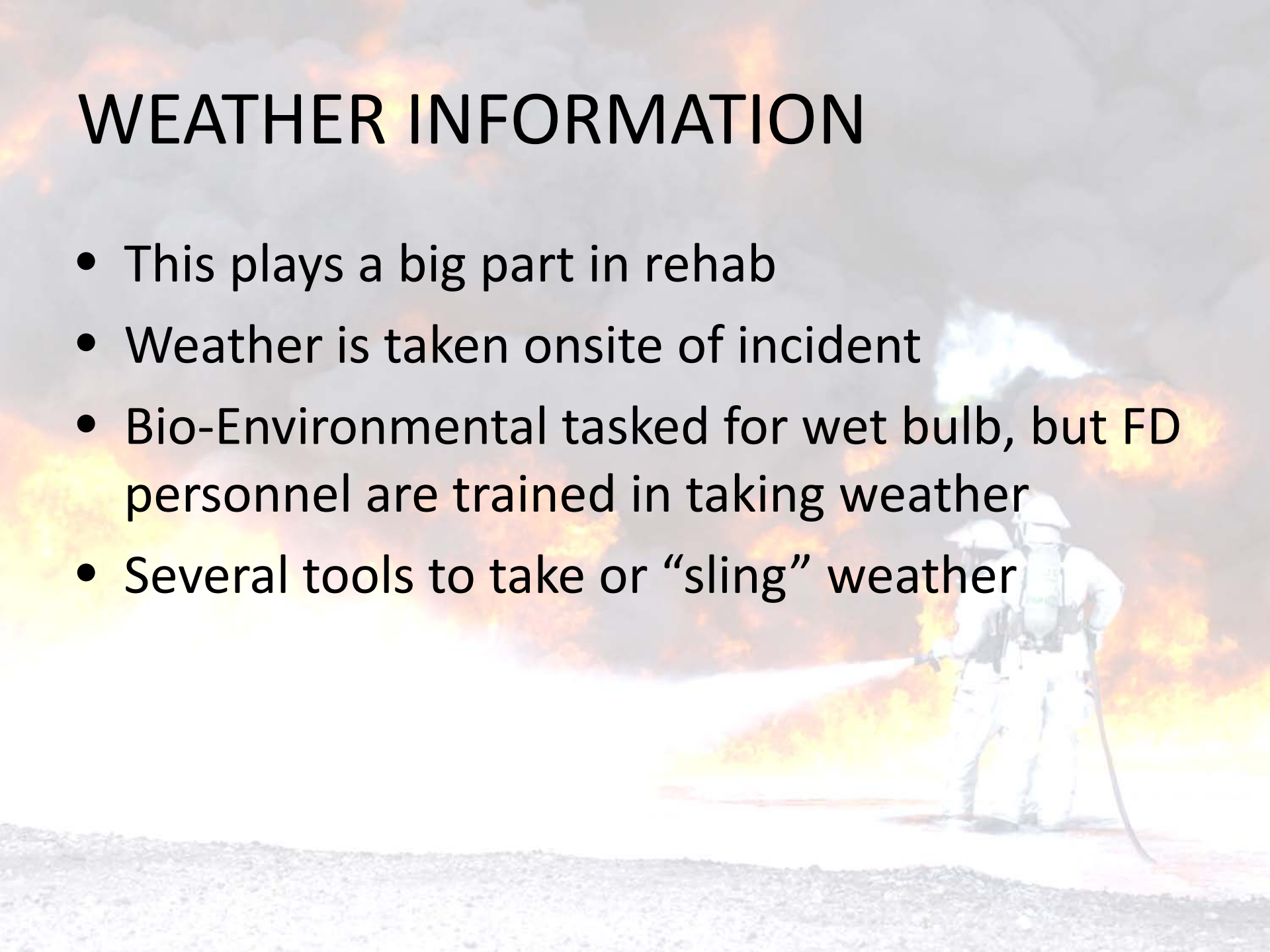
SOP/SOG UPDATES

- Aligned with responding partners and mutual aid agencies
- Update and ensured compliance
- Educate all first and emergency responders



WEATHER INFORMATION

- This plays a big part in rehab
- Weather is taken onsite of incident
- Bio-Environmental tasked for wet bulb, but FD personnel are trained in taking weather
- Several tools to take or “sling” weather



WEATHER INFORMATION



- Different weather meters available
- Some are specific such as lightning detection
- Some are multi-specific that can read temp, wind, Rh%, Barometer, and more
- Available in electronic and manual

WEATHER INFORMATION

Relative Humidity (%)

Air Temperature

°F	40	45	50	55	60	65	70	75	80	85	90	95	100
110	136												
108	130	137											
106	124	130	137										
104	119	124	131	137									
102	114	119	124	130	137								
100	109	114	118	124	129	136							
98	105	109	113	117	123	128	134						
96	101	104	108	112	116	121	126	132					
94	97	100	103	106	110	114	119	124	129	135			
92	94	96	99	101	105	108	112	116	121	126	131		
90	91	93	95	97	100	103	106	109	113	117	122	127	132
88	88	89	91	93	95	98	100	103	106	110	113	117	121
86	85	87	88	89	91	93	95	97	100	102	105	108	112
84	83	84	85	86	88	89	90	92	94	96	98	100	103
82	81	82	83	84	84	85	86	88	89	90	91	93	95
80	80	80	81	81	82	82	83	84	84	85	86	86	87

Heat Index
(Apparent
Temperature)

**With Prolonged Exposure
and/or Physical Activity**

Extreme Danger
Heat stroke or sunstroke highly likely
Danger
Sunstroke, muscle cramps, and/or heat exhaustion likely
Extreme Caution
Sunstroke, muscle cramps, and/or heat exhaustion possible
Caution
Fatigue possible

WEATHER INFORMATION

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity			
Caution	Extreme Caution	Danger	Extreme Danger
80 – 90F	Fatigue possible with prolonged exposure and/or physical activity		
90 – 105F	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or activity.		
105 – 130F	Sunstroke, heat cramps, and heat exhaustion likely with prolonged exposure and/or activity.		
130F or higher	Heatstroke/sunstroke highly likely with continued exposure		
Special Considerations			
Working in direct sunlight = Add 10 F			
Wearing full PPE (with or without SCBA) = Add 10 F			
Example			
<p>*Air Temperature 82F with Rh of 85% = Heat Index of 90F</p> <p>*Personnel working in direct sunlight = Add 10 F</p> <p>*Personnel working in full PPE = Add 10 F</p> <p>90F + 10F + 10F = 110 F Final Heat Index which is in the DANGER Category</p>			

WEATHER INFORMATION

WORK CYCLES

Adjusted Temperature	For workers with normal work clothes, conduct monitoring	For workers wearing impermeable protective clothing conduct monitoring
90°F or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90°F	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F	After each 150 minutes of work	After each 120 minutes of work

WEATHER INFORMATION



NWS Windchill Chart



		Temperature (°F)																	
		40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind (mph)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97	
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98	

Frostbite Times



30 minutes



10 minutes



5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

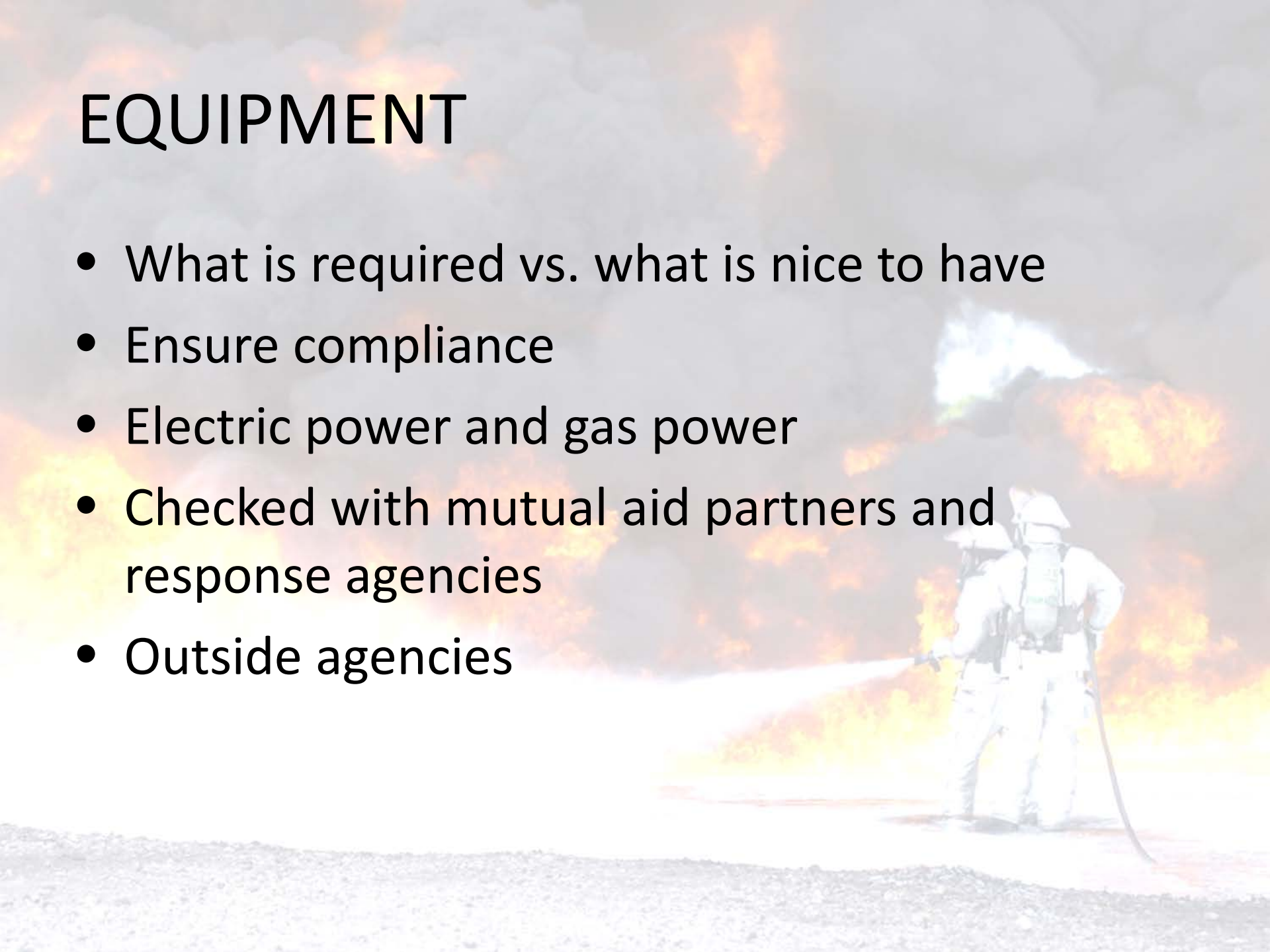
Effective 11/01/01

WEATHER INFORMATION

WIND CHILL INDEX									
	TEMPATURE								
Wind Speed, MPH	45	35	25	15	5	0	-5	-10	-15
5	43	32	22	11	0	-5	-10	-15	-21
10	34	22	10	-3	-9	-22	-27	-34	-40
15	29	16	2	-11	-25	-31	-38	-45	-51
20	26	12	-3	-17	-31	-39	-46	-53	-60
30	21	6	-10	-25	-41	-49	-56	-64	-71
40	19	3	-13	-29	-45	-53	-60	-69	-76
Wind Chill Temperature				Danger					
Above 25 °F (-3.9 °C)				Little danger for properly clothed person					
25 to -75 °F (-3.9 to -59.4 °C)				Increasing danger; flesh may freeze					
Below -75 °F (-59.4 °C)				Great danger; flesh may freeze in 30 seconds					

EQUIPMENT

- What is required vs. what is nice to have
- Ensure compliance
- Electric power and gas power
- Checked with mutual aid partners and response agencies
- Outside agencies



EQUIPMENT



- Blowers and misting fans
- Coolers
- Portable canopies and blow up tents
- Tables and chairs
- Trash cans
- Emersion chair and towels
- Heaters
- Generator
- Trailer(s)



EQUIPMENT

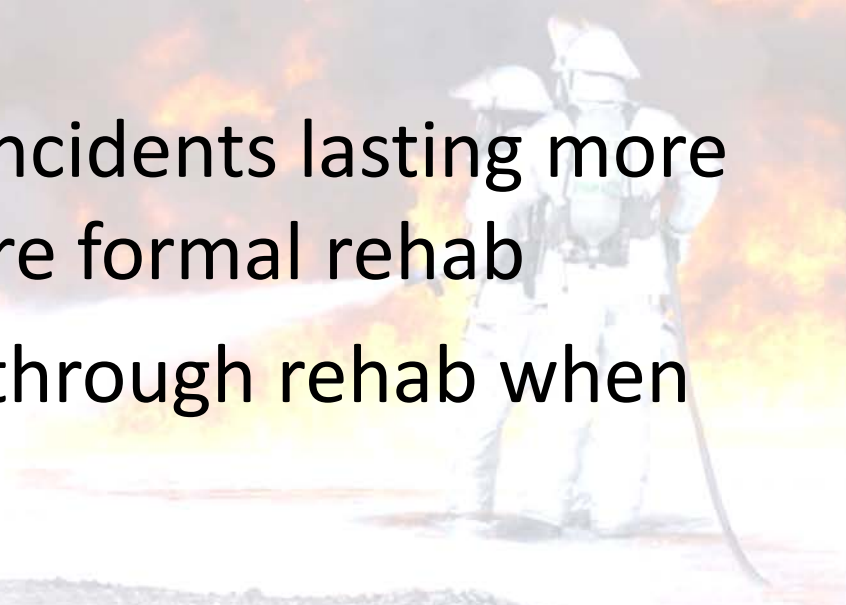


- Portable water tanks
- Toilet facilities
- Shower system
- Buses



OPS - IN/OUT PROCEDURES

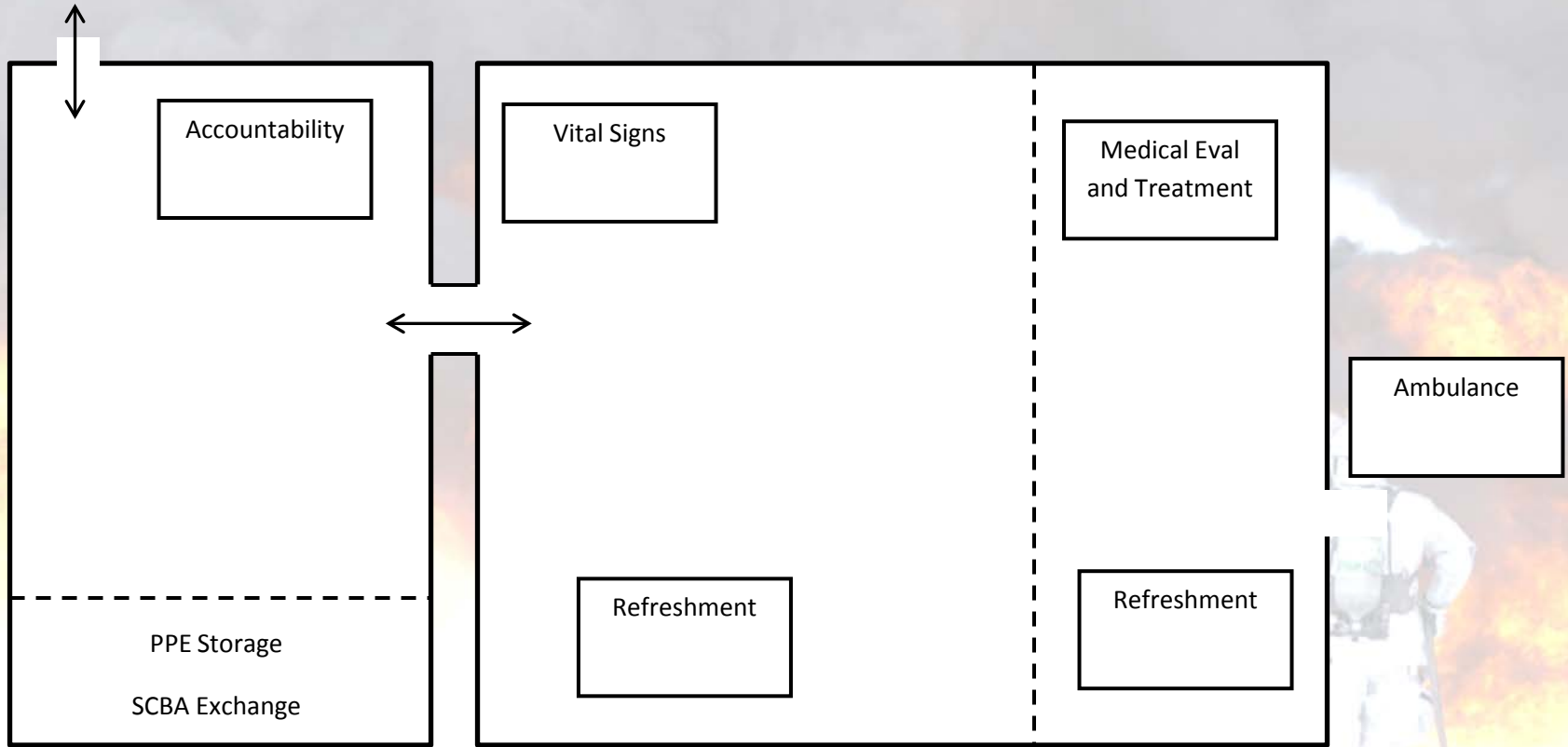
- Local EMS or MDG is in charge of EMS
- Safety Officer over looks operation
- A form of rehab is established for all exercises and incidents
- All major exercises or incidents lasting more than 2 hours will require formal rehab
- All personnel must go through rehab when established



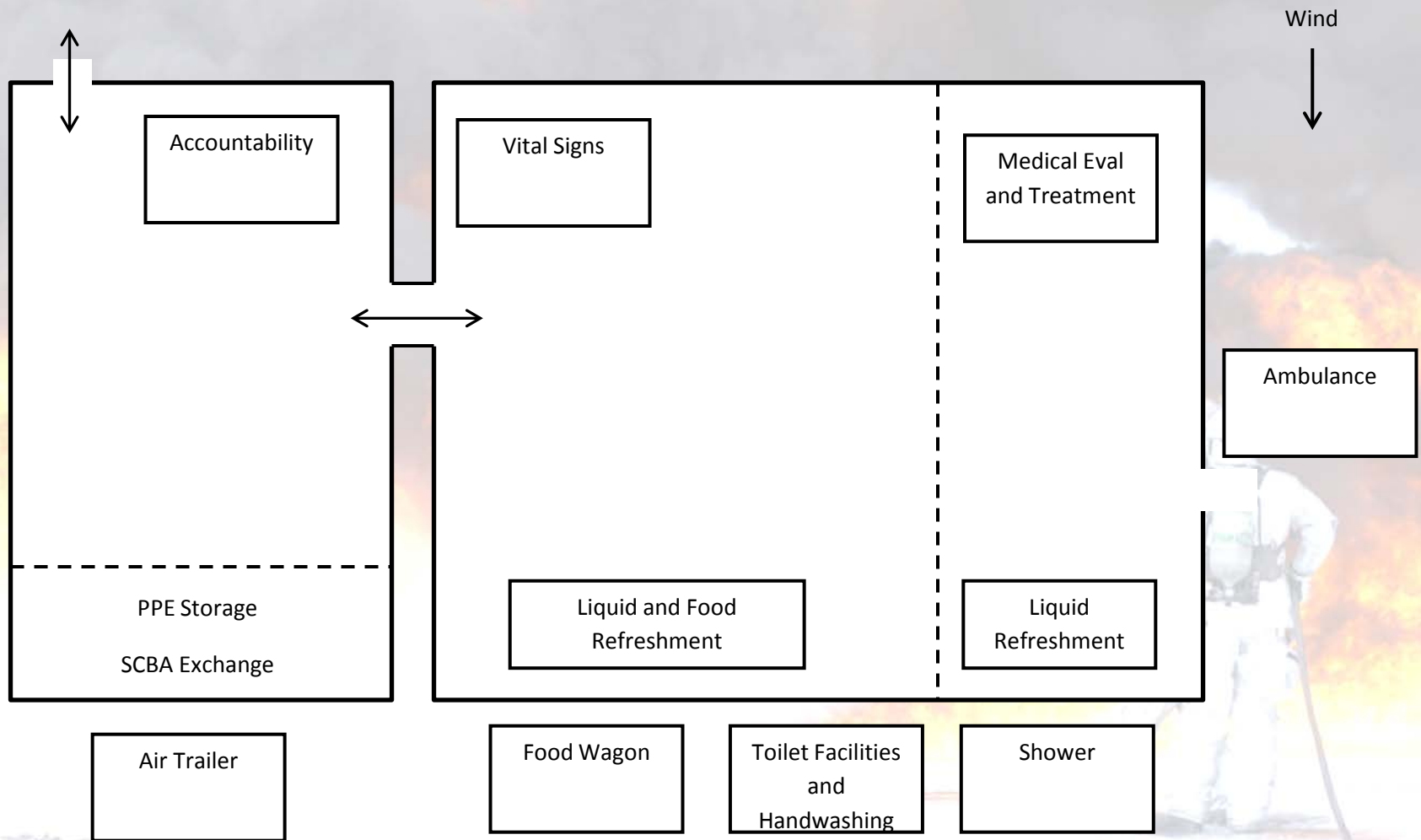
OPS - IN/OUT PROCEDURES

NAME (LAST, FIRST)		TIME		TIME		TIME		TIME	
		B/P		B/P		B/P		B/P	
		PULSE		PULSE		PULSE		PULSE	
POSITION		RESP		RESP		RESP		RESP	
INTERIOR OPS	EXTERIOR OPS	SpO2		SpO2		SpO2		SpO2	
		SpCO		SpCO		SpCO		SpCO	
EKG		TEMP		TEMP		TEMP		TEMP	
DISPOSTION	RETURNED TO STAGING/SERVICE	TRANSPORTED TO ER		Tx UNIT		HOSP			
NOTES:									
<p>HEART RATE: <110 = within normal limits on arrival <100 = within normal limits 5 min. after arrival TEMPERATURE: <100.6 = within normal limits If >100.6, monitor q 5 min until wnl If >100.6 after 15 min, consider transport If temp <100.6 but heart rate >110, increase rehab time RESPIRATIONS: <26 = within normal limits on arrival <20 = within normal limits 5 min. after arrival If >26 after 15 min, consider transport BLOOD PRESSURE: Systolic <150 Diastolic <100 = wnl on arrival Systolic <140 Diastolic < 90 = wnl 5 min after arrival If Systolic >140 or Diastolic >90 after 15 min, consider transport MENTAL STATUS: Should be alert, oriented on arrival If any alteration of mental status, TRANSPORT</p>									

OPS - IN/OUT PROCEDURES

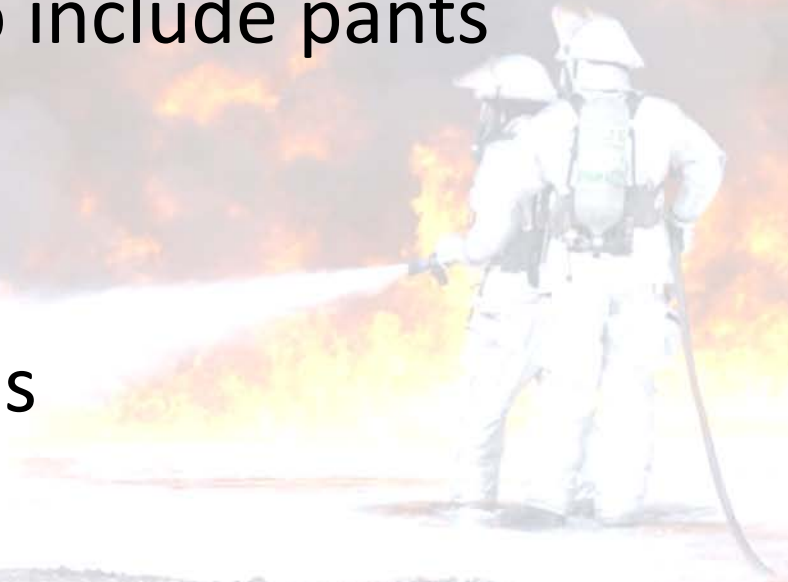


OPS - IN/OUT PROCEDURES



TIPS FOR EFFECTIVE REHAB

- Rehab starts before the incident
- Don't get beat up, take breaks and take them often
- Get out of your gear to include pants
- Medical monitoring
- Aggressive cooling
- Understand work cycles
- Buddy check



WHAT ARE YOU GOING TO DO?

- Review SOP/SOG
- Pre-incident planning
- Get ideas from the web and other depts.
- What equipment do you have and what does other agencies have
- Educate your responders
- Exercise and evaluate



THANK YOU AND STAY SAFE

- ARE WE DOING ENOUGH?
- Questions?

