



Appendix A

HAZARD ASSESSMENT

Excessively Hot Climates

George Bunker

George Bunker, Inc.

04/02/2022

Certification of Hazard Assessment

Heat Stress Associated with High Heat Work Environments

Identifying PPE and Best Work Practices



1.0 Purpose

This hazard assessment specifies the risk and hazards of working in a high heat environment, the PPE that should be utilized and other protective measures required to provide the highest level of safety to George Bunker (the company) employees.

2.0 Scope

The assessment specifically focused on the region of the West Texas oilfields and George Bunker operations in Winkler, Ward and Loving counties in construction, drilling, workover, completions, and production operations.

Table of Contents

1. Purpose
2. Scope
3. OSHA Enforcement
4. Extreme Heat and the Risk of Heat Stress in West Texas
5. Conclusion
6. Heat Index

3.0 OSHA Enforcement

Although there is not a specific regulatory standard that requires flame resistant clothing (FRC) for workers in oil & gas operations, OSHA practices enforcement activities under regulatory statute in citing 29 CFR 1910.132(a), regardless of the fact that the courts have ruled that the act of citing this standard constituted “improper rulemaking under the aegis of an enforcement standard.” [See Sec’y of Labor v. Petro Hunt LLC, OSHRCJ, No. 11-0873 \(June 2, 2012\).](#)

In a memo dated March, 19 2010 OSHA lays out their [requirements for wearing FRC](#). Within the memo OSHA states “Where appropriate, CSHOs shall cite 29 CFR 1910.132(a) for the failure to provide and ensure the use of FRC in oil and gas drilling, well servicing, or production-related operations when there is a potential for flash fire hazards as discussed below.

Drilling Operations

- FRC is usually not needed during initial rig up and normal drilling operations prior to reaching active hydrocarbon zones, unless other activities warrant their use, e.g., fracing a previously drilled well while rigging a well in close proximity.
- A potential for flash fire exists once active gas or hydrocarbon zones are reached. Appropriate FRC shall be worn by exposed employees working on the well site prior to drilling into identified gas or hydrocarbon zones. CSHOs should verify that employees are wearing FRC in advance of reaching such zones.
- Appropriate FRC should also be worn when there is a history of fluid or gas kicks from underground producing zones.
- Once FRC is identified for use as provided above, employees should wear appropriate FRC until the final casing is cemented and the well is effectively closed.



Well Servicing Operations

FRC should be worn during well servicing or workover operations, such as:

- Pulling wet string tubing
- Snubbing tubing
- Swabbing operations
- Fracturing or perforating the well
- Using bridge plugs or packers
- Open hole work
- Flow testing, blowing down or venting the well
- Plugging an abandoned well
- Flowback operations
- Cementing
- Stimulation
- Wireline operations
- Any operation working with wellhead or wellbore under pressure

Production-Related Operations

The potential for flash fire also exists in production-related operations that fall outside of drilling and well servicing. FRC should be worn during production-related operations, such as:

- Equipment openings (e.g., line breaking or valve changes)
- Gauging
- Transfer of hydrocarbons
- Maintenance operations on production equipment
- Hot work operations
- Tank heating
- Using open flame
- Start-up operations"

4.0 Extreme Heat and the Risk of Heat Stress in West Texas

According to the Centers for Disease Control and Prevention, in the West Texas oilfields heat stress is commonly experienced by workers exposed to extreme heat and can result in [heat stroke, heat exhaustion, heat cramps or heat rashes](#). The U.S. Bureau of Labor Statistics (BLS) reports that "exposure to environmental heat" caused [177 deaths](#) and 13,580 cases of days away from work in the private sector workforce from [2003 to 2008](#). In relation, the BLS reported 140 workers killed in [fire and explosions](#) between 2003 and 2012. Although there is ample evidence to support the fact that flame [resistant clothing](#) contributes to the number of heat related illness and fatalities, there is no data to support flame resistant clothing would or could prevent death in any of the 140 fatalities suffered from fire or explosion. More so, it has been widely established that the frequency rate of less serious injuries increases during the [hot summer months](#) of June, July and August, lending credibility that in the early stages of heat stress, a person might become irritable or start to have [difficulty concentrating](#), which places



him or her at an increased risk of injury from an accident. The following table relates the average annual number of US fatalities from heat stress vs fire and explosion in the US:

	Heat Stress	Fire & Explosion
Average Number of Fatalities	29.5	14

Based on historical data, company experience and regional industry specific experience, when the heat index is 91 degrees or above, George Bunker workers are at greater risk on a day to day basis from heat stress related injuries and fatalities due to specifically, the body's inability to cool itself.

One of the leading contributors to the body's ability to cool itself in an outdoor environment is sweat and dry air, so it stands to reason that the greatest inhibitor to the cooling of the body is clothing and humidity. Although OSHA references NFPA 2012 and 2013 in the letter of interpretation "[Enforcement Policy for Flame-Resistant Clothing in Oil and Gas Drilling, Well Servicing, and Production-Related Operations](#)" this recommended practice has not been [incorporated by reference](#), instead it is a [consensus standard](#).

Heat stress can be attributed to external factors like temperature, but other factors such as workplace uniforms also can contribute to the impact of these sources of heat. [A worker may not consciously realize the effect of his or her garments on core body temperature.](#)

[The CDC recommends wearing "light-colored, loose-fitting, breathable clothing"](#) to avoid trapping in excess heat. Considering how FR clothing can affect a worker's thermal comfort is essential when evaluating, specifying, and purchasing flame-resistant garments for workers who will be active in a high heat environment.

Providing appropriate thermal protection while also ensuring heat stress relief is a complicated process. These two functions actually work against one another- thermal protection tries to shield us against a wide range of thermal exposures, while heat release seeks to prevent our bodies from becoming overheated.

It is not the intention of George Bunker to test OSHA when it comes to their stance on this issue, rather, OSHA directives, known hazards, company and industry experience as well as existing and potential controls have been considered to create a simple no nonsense solution that serves to satisfy all parties without compromising the safety of our employees.

5.0 Conclusion

In an effort to protect the employees of George Bunker, this Hazard Assessment has considered a wide range of data, information, company history and industry knowledge and experience to conclude that when the heat index is 91 degrees or higher (refer to the heat index table in section 6), George Bunker employees during routine operations are at a greater risk of injury due to heat stress. It is also recognized that the donning of FR shirts with long sleeves will contribute substantially to the overheating of the body and prevent the body's ability to evaporate the heat. It is recommended that the company implement the following minimum recommendations to reduce the risk associated with heat stress.

Construction

- FR clothing is not required for normal day to day operations.
- Workers should dress appropriate for site conditions and weather.



- Light weight clothing, short sleeve shirts and white [hard hats](#) is appropriate when the heat index is 91 degrees or higher.
- Where there is a specific hazard of flash fire, where engineering controls cannot be deployed to provide adequate protection, appropriate FR clothing shall be donned and serve to cover all susceptible surfaces of the body including the respiratory function of the worker. In such a situation steps must be taken to protect employees from heat stress, regardless of the temperatures or heat index of the work environment.
- Employees shall maintain compliance with the company Heat Illness Prevention program.

Drilling, Workover, Completions, Production, Maintenance, and Other Support Services

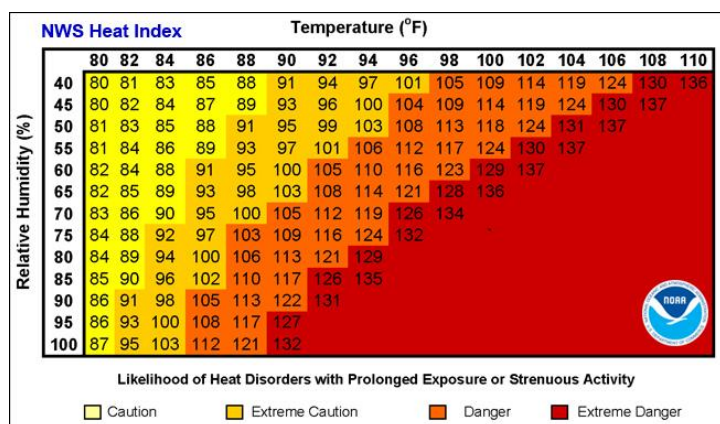
When the heat index is 90 degrees or less

- FR jeans shall be worn.
- Long sleeve FR shirts shall be worn.
- The outermost garment shall be FR.
- Employees shall maintain compliance with the company Heat Illness Prevention program.

When the heat index is 91 degrees or higher

- FR jeans shall be worn.
- Light weight short sleeve FR shirts shall be worn.
- The outermost garment shall be FR.
- Light weight safety shoes are recommended.
- Where there is a specific hazard of flash fire, where engineering controls cannot be deployed to provide adequate protection, appropriate FR clothing shall be donned and serve to cover all susceptible surfaces of the body including the respiratory function of the worker. In such a situation steps must be taken to protect employees from heat stress, regardless of the temperatures or heat index of the work environment.
- A white [hard hat](#) shall be worn.
- Employees shall maintain compliance with the company Heat Illness Prevention program.

6.0 Heat Index



Source: <https://www.weather.gov/safety/heat-index>