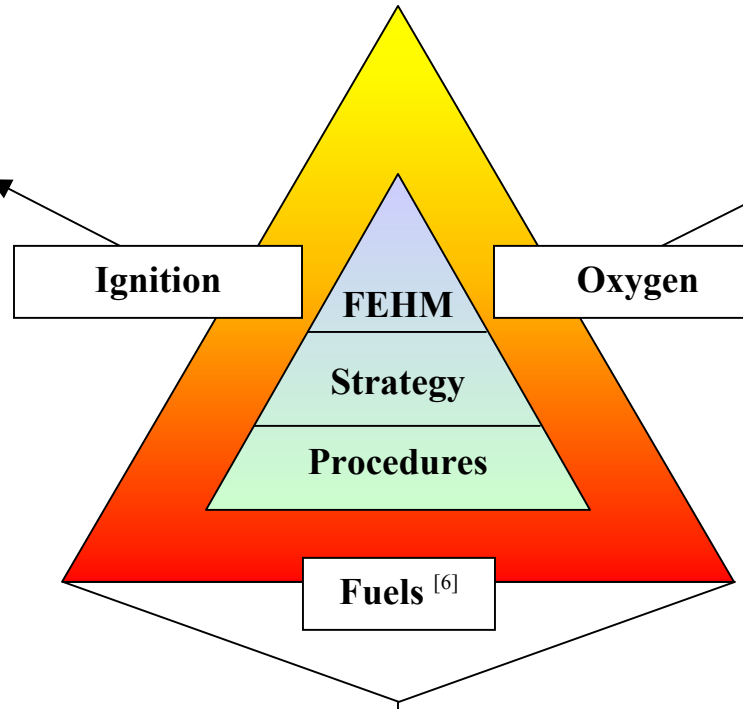
Preventing Fires and Explosions:
Understanding the Fire Triangle

Heat / Ignition Sources [5]

1. Hot Work
2. Other Open Flames (i.e. Flare Stacks, Burners, Torches)
3. Electric Arcs and Sparks (i.e. non-explosion proof equipment)
4. Static Electricity
5. Hot Surfaces
6. Friction and Mechanical Sparks
7. Chemical Reactions and Sparks
8. Spontaneous Combustion
9. Pyrophors (i.e. Iron Sulphide)
10. Pressure / Compression Ignition (Dieseling)
11. Sudden Decompression
12. Catalytic Reactions



Oxygen Sources

Planned Introduction of Air
- Air-based operations
- Air Purging

Unplanned Introduction of Air
- Underbalanced operations
- Swabbing & other operations that create a vacuum
- Pockets of air created during the installation and servicing of Equipment
- Oxidized (Weathered) Hydrocarbons
- Oxidizers
- Chemical Reactions
- On-Site Generated Nitrogen
- Tank Drawdown

Release of Hydrocarbons into Air

Gases

- Natural Gas
- Hydrogen Sulphide
- LPG Gases (Including propane and butane)
- Are the other relevant gases (i.e. hydrogen, acetylene)

Liquids / Vapours

- Crude oil / Condensate
- NGL liquids
- Hydrocarbon based frac fluids
- Gasoline, Diesel & other fuels
- Methanol

Chemicals

- Solvents and cleaning agents
- Special compounded hydraulic fluids & lubricants
- Chemicals used for well servicing and stimulations

Solids

- Lubricants
- Sealants,
- Packings, “O” rings, diaphragms and valve seats
- Paints and Coatings