Fire and Explosion Hazard Management (FEHM)

The following extracts from a presentation given at an international oil and petrochemical safety conference illustrate the main concepts behind effective Fire and Explosion Hazard Management (FEHM):
FIRE AND EXPLOSION HAZARD MANAGEMENT

A formalised approach to establish a SITE - SPECIFIC, RATIONALISED, RELEVANT and COST - EFFECTIVE policy to reduce potential fire and explosion consequences.

FIRE AND EXPLOSION HAZARD MANAGEMENT

Why is it needed by the operator?

Fire and Explosion consequence reduction can be achieved in many ways :-

Fire prevention, fire detection, emergency shutdown, passive protection, active systems, salvage etc.

As every facility works in its own special environment, it is important to develop the optimum, cost - effective incident consequence reduction strategy/policy taking into account local conditions, the plant’s criticality and an incident’s potential effect on life safety, the environment, asset value, continued operations and company image.
Previously, fire protection practices used in high risk industries have been very prescriptive in approach and not based on the real needs of a particular facility. However, due to major incident experience, internationally recognised authorities such as NFPA (U.S.A.) and HSE (U.K.) have set a requirement for “goal setting” performance based standards within a “Safety Case”.

Consequently, it is now recommended that fire responders assess and justify requirements for cost effective fire protection resources based on credible major incident scenarios.
FIRE AND EXPLOSION HAZARD MANAGEMENT

LEGISLATOR AND OPERATOR BOTH RISK BASED

NO CONFLICT!

FIRE AND EXPLOSION HAZARD MANAGEMENT

HOWEVER!

Policies based on only meeting legislation are not necessarily appropriate or sufficient.
FIRE AND EXPLOSION HAZARD MANAGEMENT

**Legislator Concerns**
- Personnel Safety
- Societal Safety
- Environment
- National interests

**Additional Operator Concerns**
- Asset Loss
- Business Interruption
- Public image
The Solution:

FIRE AND EXPLOSION
HAZARD
MANAGEMENT

Based on evaluation of credible scenarios
Objective
To establish, in an auditable way, a formal, site-specific justified and cost effective fire and explosion damage mitigation policy appropriate to the criticality and overall needs of the facility

Methodology
Fire and Explosion Hazard Management using fire scenario analysis

Criticality factors
Life Safety
Environment
Continuity of Operations
Asset / Investment value
Public image

FIRE AND EXPLOSION HAZARD MANAGEMENT

Identify fire hazards
Develop fire scenarios
Evaluate escalation consequences
Select scenarios for further analysis
Develop provisional policy
Compare response options
Select cost-effective option
Finalise response policy / strategy
Provide response resources
Prepare to use resources
Test resources
Maintain resources
Review / update policy

Iterate
**FIRE AND EXPLOSION HAZARD MANAGEMENT**

- **Ignition Sources**
- **Hazardous Materials**
- **Incident Descriptions**

**CONSEQUENCES**
- Life Safety
- Environment
- Business Interruption
- Asset Value
- Other Issues

**HAZOP/QRA/INCIDENT EXPERIENCE**

- **Evaluate Alternative Prevention, Protection & Mitigation Measures**
- **Compare Risk Reduction Options**

**FIRE ENGINEERING**
- Fire Modelling
- Cost Benefit Analysis

**POSSIBLE INPUT TOOLS**
- HAZOP
- QRA
- INCIDENT EXPERIENCE

**FIRE ENGINEERING**
- Design Standards
- Codes of Practice

**IMPLEMENT**
- Preplanning
- Exercises
- Fire Training
- Update

**EQUIPMENT MAINTENANCE**

**FEHM Scenario Based Review**

**Deliverables**

- **Scenario Worksheets**

  - Formalised, Cost-Effective and Justified Incident Response Policy

  - **Pre-Fire Plans**
**FIRE AND EXPLOSION HAZARD MANAGEMENT**

Extreme cases:

- **Burndown Policy**
  No damage mitigation measures.

- **Total Protection**
  Full automatic shutdown.
  Comprehensive passive protection.
  Sophisticated automatic fire and gas detection/protection systems.
  Full portable/mobile equipment back-up.

In practice, most facilities will adopt a policy somewhere between the two extremes.