Human Factors
What is involved?
Why Do I Need It?

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Human Factors

- PSM Guide regarding Human Factors (HF)
- What is included in an effective HF process.
- An opinion about some incidents that may have been prevented or mitigated had an effective HF process been practiced

There will be a test
This is one definition. It captures the essence of the purpose of API 750 – Management of Process Hazards.

**Read the Definition**

What has been known at Irving as “Loss Management” is now referred to, pretty universally, as Process Safety Management. Loss Management or Loss Prevention or is now more narrowly focused and pretty much confined to the activities of the Fire and Security folks.

Other definitions are shorter or longer but say essentially the same thing. In a nutshell PSM is:  
*next slide*
But, you say, we already do that pretty well. This is true but here are some reasons to get a lot better at it.

Next Slide
Here are the elements of a PSM process.
Human Factors

Overall, what is involved?
• Operator-process/equipment interface;
• Administrative control versus engineering control;
• Human error assessment.

Human Factors
What is it?

“Human Factors” is the term given to a wide range of human activity; however, the ultimate goal of human factors studies is to manage human error so the risk to people, property and the environment remains acceptable.

Human beings play a major role in all aspects of design, construction, operation and maintenance of a facility. During each of these phases human errors will occur and must be addressed.
Human Factors
Operator-process/equipment interface

1. Each company/business/facility shall have a system in place to address human factors at the design, construction and operational phases of a project.

2. Each business/facility shall assess human interactions with the facility as part of the design process.
Workplace Design
- Facility layout
- Workstation configuration
- Accessibility
Human Factors  
Operator-process/equipment interface

3. Human factors assessment shall address computerized control systems that can confront operators with unmanageable amounts of information during an upset condition (alarm management).

4. The human factors assessment system shall examine the following interfaces for potential problems:
   a) Alarm display;
   b) Information display; and
   c) Ergonomics.
Easy accessibility to safety critical and frequently used equipment reduces likelihood of human error.
Human Factors
Operator-process/equipment interface

5. Each facility shall conduct task analyses to determine what can go wrong during a task, how it can be reversed through human recovery and, failing that, how the potential problem areas can be controlled.

6. Each business/facility shall have a strategy with respect to the use of administrative versus engineering controls.
Human Factors
Human error assessment

7. Each facility shall assess the potential for human errors throughout the facility lifecycle including design, construction, commissioning, operation and maintenance.

8. Each business/facility shall have access to competent resources for human error assessment.
Human Factors

Human error assessment

9. Human factor reviews shall consider approaches to reducing human error that include:
   a) Written guidelines and procedures;
   b) Human factor audits;
   c) Written communications; and
   d) Design of operator-process/equipment interface.
Panels to be laid out in the same order as the equipment they control

Information Transfer
- Labels/signs
- Instructions
- Procedures
- Communications
- Training
- Decision making
Human Factors
Operator-process/equipment interface

10. Human factors assessment should address:
   a) confusing equipment,
   b) positioning of dials,
   c) colour coding,
   d) different directions for on/off,
   e) cultural norms,
   f) labelling,
   g) etc.
Signs and Labels

Stereotype for location of on/off buttons is violated. “On” should be on top “Off” Should be on the bottom

Use of hand written labels should be avoided

Push buttons could be color coded as well.
Human Factors

Administrative control versus engineering control

11. When administrative controls are implemented in preference to engineering controls, the facility should have a system to review the effectiveness of the administrative controls at a future date to ensure they remain effective.
Human Factors
Human error assessment

12. Human error reviews shall include factors such as:
   1. Understanding,
   2. Judgment,
   3. Motivation,
   4. Education,
   5. Training,
   6. Stress,
   7. Fatigue,
Stress?

“Well, it’s a delicate situation, sir... sophisticated firing system, hair-trigger mechanisms, and Bob’s wife just left him last night, so you know his mind’s not into this.”
Are there Human Factors threads in the following incidents? What might they be?
Human Factors thread?

Phillips – Pasadena
Human Factors thread?

Piper Alpha
Human Factors thread?

BP Texas City
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Questions?