OVERVIEW OF INHERENT SAFETY AND SECURITY

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OUTLINE

- Big picture
- Management systems
- Meaning of *inherent* safety / security
- Role and importance of inherent safety / security
- Inherent safety / security and government legislation and regulations

"There are many ways of going forward,
but only one way of standing still."
Franklin D. Roosevelt

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THE BIG PICTURE

- Safety and security are two *sureties* that companies must manage to stay viable
  - Along with profitability!
- All sureties should be addressed by a *management system*

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EXAMPLES OF MANAGEMENT SYSTEMS

SURETY	SPECIFICATION	EDITIONS
Quality	ISO 9000	1987, 1994, 2000
Process safety	CFR 1910.119	1992
Environmental protection	ISO 14001	1996
Occupational health and safety	BSI OHSAS 18001	1999
Information security	BS 7799:2	2002
Pollution prevention, distribution, product stewardship, process safety, employee health and safety, security, and community awareness and emergency response	ACC Responsible Care® Management System (RCMS)	2003
Cyber security - chemical sector	CIDX	2004
Food safety	ISO 22000	2005
Occupational health and safety	ANSI Z10	2005
Control system security	ISA SP99	2006

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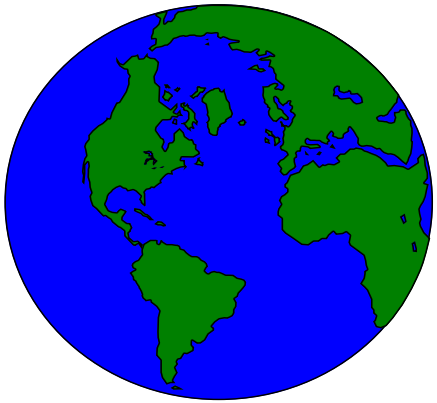
SIGNIFICANCE OF MANAGEMENT SYSTEMS

ISO 14001 was in use by about 37,000 organizations in 112 countries in 2001.



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KEY ELEMENTS OF SECURITY MANAGEMENT SYSTEMS

- Risk and vulnerability assessment
- Security measures and safeguards
- Security procedures
- Emergency response and crisis management
- Reviews, audits and inspections
- Etc.

Process Security Management Systems: Protecting Plants Against Threats, P. Baybutt, Chemical Engineering, Vol. 110, No. 1, pps. 48 - 55, January 2003.

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SECUREGUARDS AND SAFEGUARDS

- Prevention
  - ***Inherent safety***
  - Physical security
  - Information security
  - Computer security
- Detection
  - Chemical releases
  - Monitoring process variables
- Control
  - Materials tracking, accounting and screening
  - Secure shutdown procedures
- Mitigation
  - Chemical antidotes
  - Engineered safeguards
  - Emergency response
- Buffer zones

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MEANING OF INHERENT SAFETY / SECURITY

- Ideally safety and security should be designed into a plant
  - “benign by design” approaches
- *Inherent safety* approaches reduce or eliminate process hazards
  - in ways that are permanent and inseparable from the design
- *Inherent security* approaches reduce or eliminate process threats and vulnerabilities in a similar way

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INHERENT SAFETY APPROACHES

Method	Example
Intensification	Minimization of inventories of hazardous materials
Substitution	Replacement of hazardous materials with safer materials
Attenuation	Use of hazardous materials under the least hazardous conditions
Limitation	Changes in designs or conditions to reduce potential effects
Simplification	Reduction in process complexity to reduce the opportunity for error
Other means	Using designs that avoid potential domino effects

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INHERENT SECURITY APPROACHES

- See afternoon presentation

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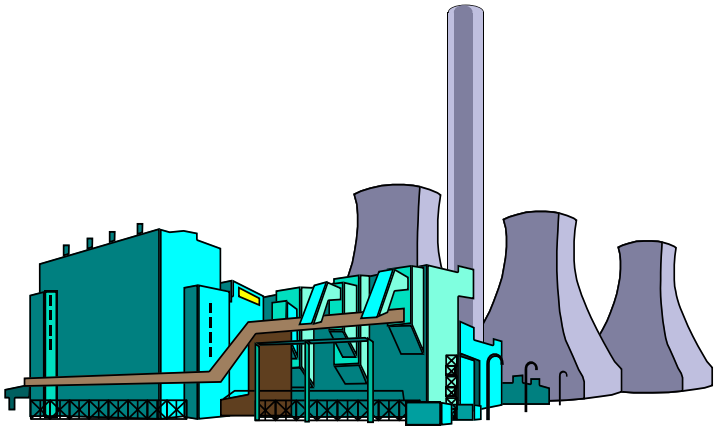
ROLE AND IMPORTANCE OF INHERENT SAFETY / SECURITY

- Inherently safer approaches eliminate or reduce hazards
  - Using measures that are considered to be an integral part of the process



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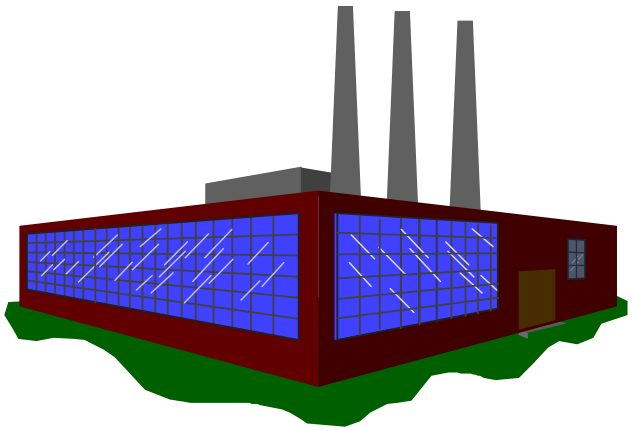
ROLE AND IMPORTANCE OF INHERENT SAFETY / SECURITY (CONTD.)

- Traditional safety approaches add safeguards in layers after hazards have been identified
  - Often reduces the risk
    - But adds complexity, costs, and potential for unrecognized hazard scenarios



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ROLE AND IMPORTANCE OF INHERENT SAFETY / SECURITY (CONTD.)

- Application of inherently safer approaches does not necessarily eliminate the need for layered safeguards
  - Preferred first approach for managing risks from accidents
- Same is true for inherent security

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INHERENT SAFETY / SECURITY AND GOVERNMENT LEGISLATION AND REGULATIONS

- Regulators favor inherent safety / security approaches, e.g.
  - Lautenberg / Obama Chemical Security and Safety Act, March, 2006
  - New Jersey, Best Practices Standards at TCPA / DPCC Chemical Sector Facilities November, 2005
- Inherently Safer Technology is a key element in both

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SUMMARY

- Inherent safety / security makes sense
- Challenge is in implementation
- Prescriptive approach not likely to work
- Need performance-oriented, risk-based method

"The only real mistake is the one from which we learn nothing."

John Powell

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FURTHER INFORMATION

- Technical papers on safety and security:

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