

Chemical Facility Safety in an Era of Climate Change

Timothy F. Malloy

UCLA School of Law

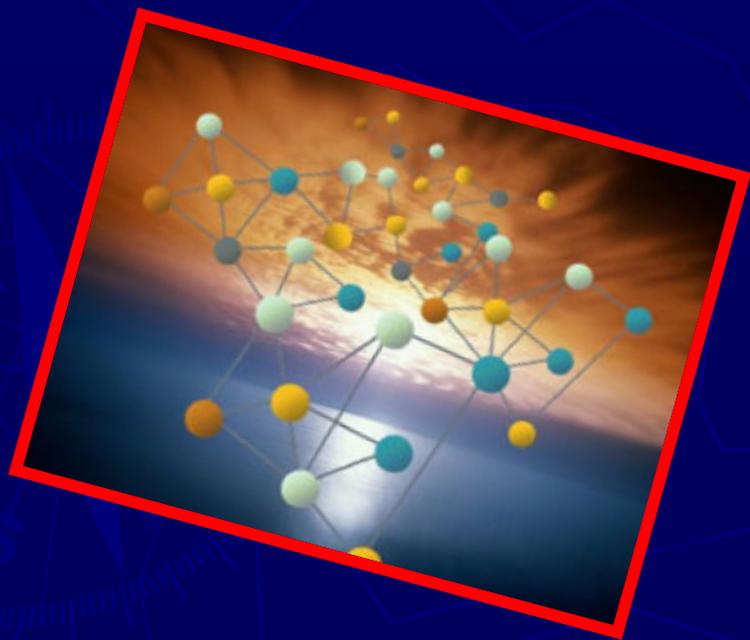
Sustainable Technology and Policy Program

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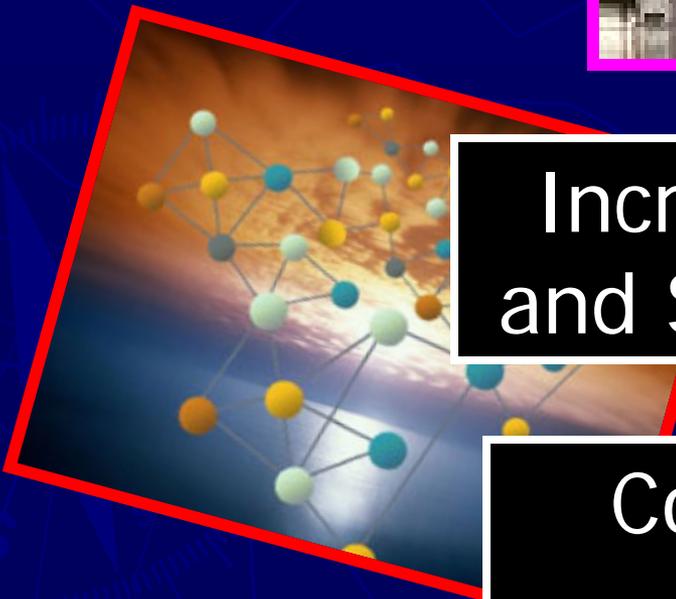
The Road Ahead

- ▶ The Problem
- ▶ Paradigm Shifting
- ▶ Regulatory Options on the Ground

80,000 Chemicals in
commerce



1,000 New Chemicals
each year

A 3D molecular model consisting of various colored spheres (white, yellow, blue, orange) connected by lines, representing a chemical structure. It is set against a background of a sunset or sunrise over a horizon. The entire image is enclosed in a red border.

Increased Frequency
and Severity of Storms

Coastal Flooding
Lightning

“Risk of an attempt . . .
in the foreseeable
future is both real and
credible.”





The Perfect Storm



"An ounce of prevention is worth
a pound of cure."



“What you don’t have, can’t
leak.”



The Benefits

- ▶ Enhanced, more resilient safety
- ▶ Greater reliability of process systems,
- ▶ Reduced regulatory costs,
- ▶ Improved communication and cooperation across different departments and disciplines within firms

“If you build it, they will come.”



Barriers to Prevention

- ▶ Information Gaps
- ▶ Cost Characterization
- ▶ Methodological Support
- ▶ Misconceptions
- ▶ Inertia
- ▶ Intra-firm Communication
- ▶ Firm Power/Political Structure

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Soft Law Options

- X** = Likely will overcome barrier
? = May overcome barrier depending upon design and implementation
— = Unlikely to overcome the barrier

	Industry Programs	Agency Guidance and Alerts	Information Clearinghouse
Information Gaps	+	+	+
Inertia	?	—	—
Intra-firm Communication	?	—	—
Firm Power/Political Structure	?	—	—
Cost Characterization	+	?	?
Methodological Support	+	+	+
Misconceptions	+	+	+

Regulatory Options

“You manage what you measure.”



Regulatory Options

▶ Mandatory Planning

▶ TURA

▶ Enhanced Mandatory Planning

▶ Contra Costa ISO;
NJ TCPA

▶ Permitting

▶ Safety Case

"The devil is in the details."



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- The background of the slide is a dark blue color with a faint, light blue graphic. On the left side, there is a compass rose with a dollar sign (\$) positioned near its base. The compass rose has several lines radiating from its center, and the dollar sign is placed to its left. The overall aesthetic is professional and business-oriented.
- ▶ Reflexivity Capacity of the Firm
 - ▶ Institutional Capacity of Agency
 - ▶ Goal Alignment
 - ▶ Level of Agency Resources

“Show me the money!”

Safety Case

- ▶ Systematic hazard evaluation framework;
- ▶ Agency acceptance of the firm's "case" for safety;
- ▶ Application of the As Low as Reasonably Practicable (ALARP) standard; and
- ▶ Continuous improvement