



Wyoming State  
Carbon Sequestration Working Group  
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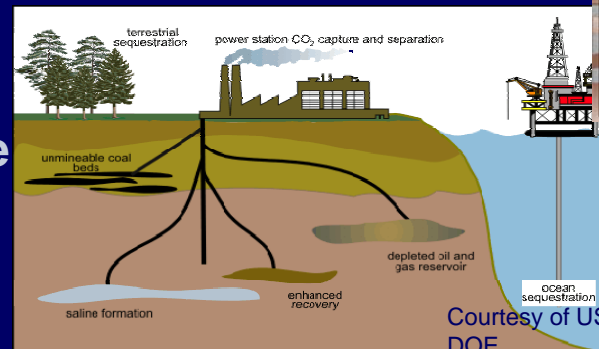
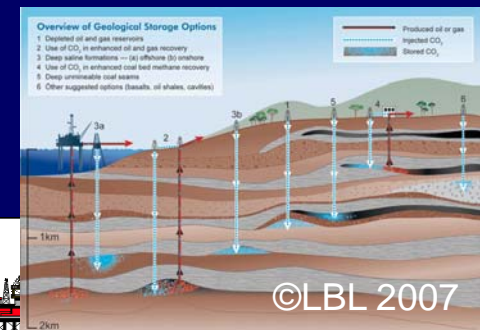
# Liability Risk Management Framework Options CCS

*Public Good and  
Private Asset Protection –  
Balancing Opportunity and  
Risk in the Face of Global  
Change*

Lindene Patton  
Chief Climate Product Office  
Zurich Financial Services



Sleipner CO2 Injection Project ©MIT and Sleipner Sta



# Risk Management: Short and Long Term

THEORY

**Liability**  
Risk management is predicated on:

- Understanding the process or operation
- Forecasting the range of possible outcomes,
- Determining what influences and drives the outcomes
- Recognizing that forecasts can be wrong,
- Identifying the consequences of being wrong,

And then,

*Identification of existing tools / models, their applications and limitations is critical*

- Limiting the magnitude of the consequence(s) or finding ways to hedge the bet . . . *Mitigation of moral hazard can mean the difference between success and failure*

# Risk Management:

STARTING POINT

## *Short and Long Term Liability*

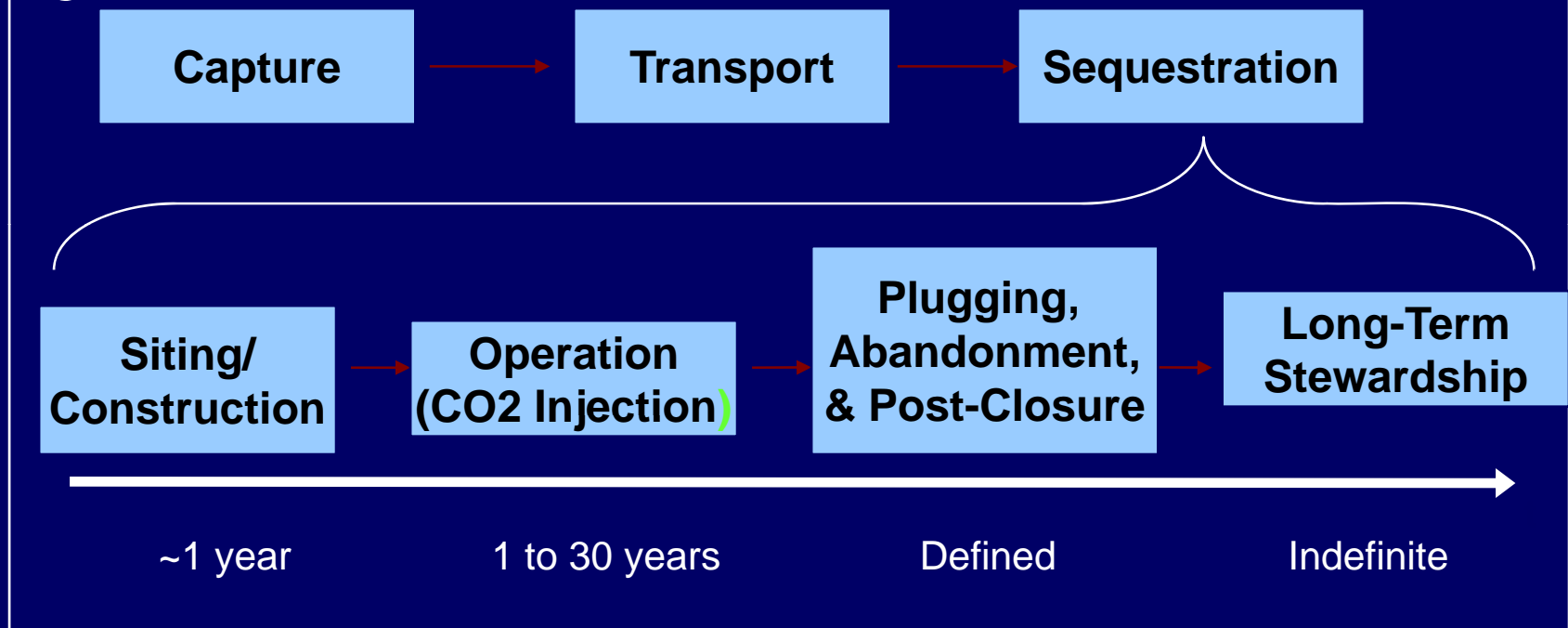
Common Language is essential ? Are you sure you

have risk ? Of what?

- Non-performance / default? Underperformance? Defect? Other contractual liability? Tort Liability for Bodily Injury (BI), (first party) Property Damage (PD), Ecological / Natural Resource Damage? Endangered Species Issues?
- **Moral Hazard** – Will the party be better off in the event of loss / failure? Is the party indifferent, and therefore won't try to prevent or mitigate certain losses? Is the party motivated to increase the risk because it bears none of the risk ?
- **FINANCIAL RESPONSIBILITY** – To whom, for what? When?
- **LIABILITY** – Statutory? Common law? Civil law jurisdiction?
- **HARM / INJURY** – BI or PD or other?
- **DAMAGES** – Nature? Type?
- **INDEMNITY** – Contractual? Governmental? First dollar? Excess of retained amount? Insurance? Public / Private?

# GS Project Life Cycle

SCOPING

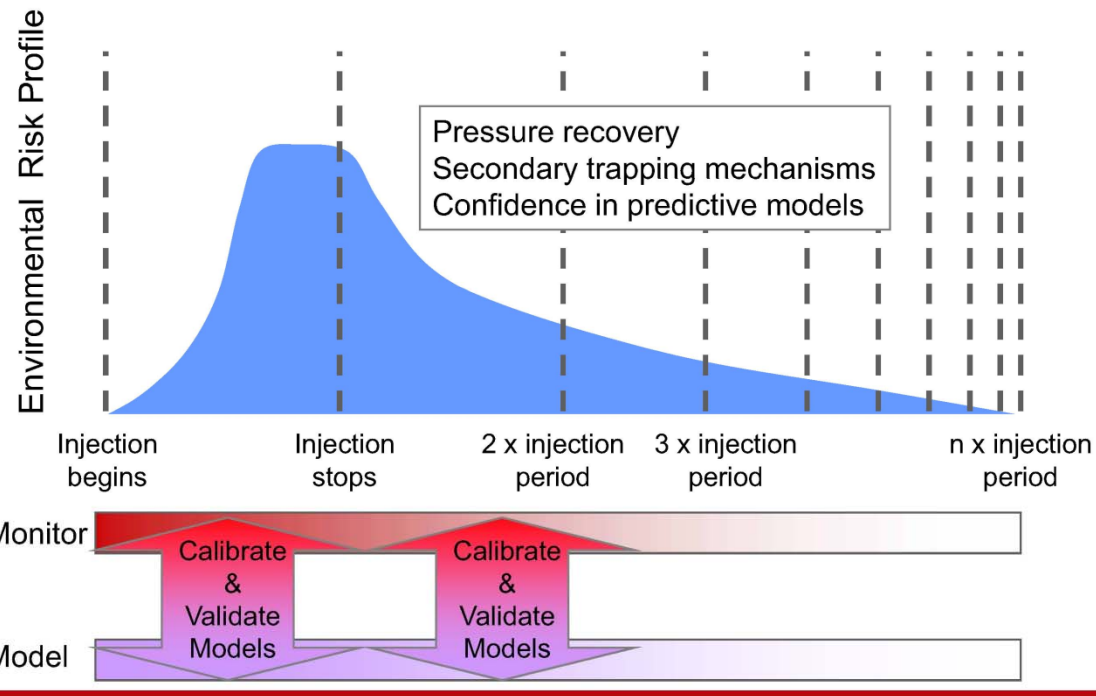


Industry Sectors – Utility v. EOR/EGR

Early movers (pilots) v. commercial-scale deployment

Existing statutory implications

# Risk Profile for GS Sites

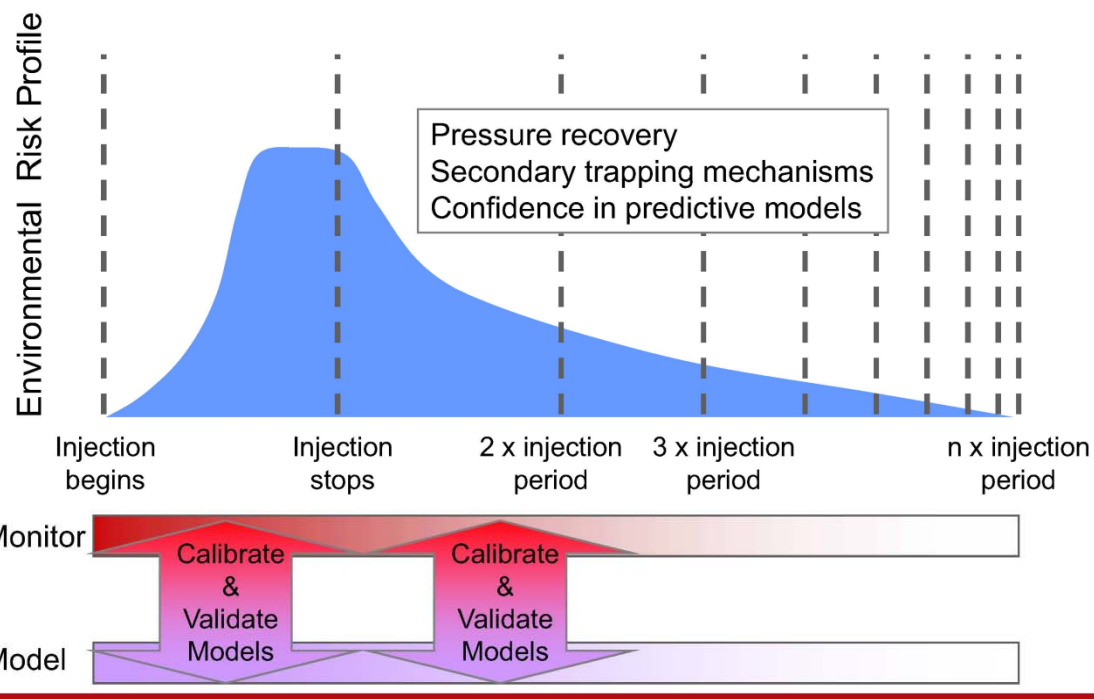


**KEY CRITICAL POINT:** Shape of the curve will vary by GS site

Early movers (pilots) will site in favorable zones; LEAVING GREATER RISKS FOR LATE COMERS

**Liability frameworks** must balance incentives that foster early deployment with the potential for adverse site selection (with increasingly risky profiles) due to **moral hazard** as commercial-scale deployment evolves.

# Risk Profile for GS Sites



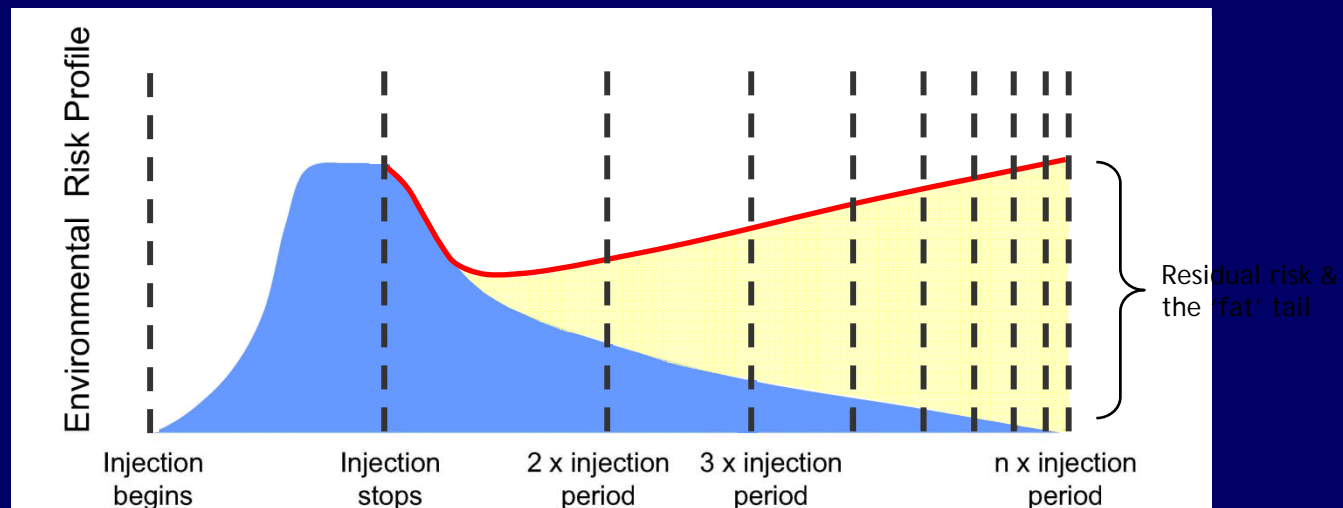
**FOR RISK MANAGEMENT PURPOSES – THIS IS 2 DIMENSIONAL SLICE OF A 3 DIMENSIONAL RISK. It is a statistical, fictional representation.**

**The vertical-axis represents frequency for a single site.**

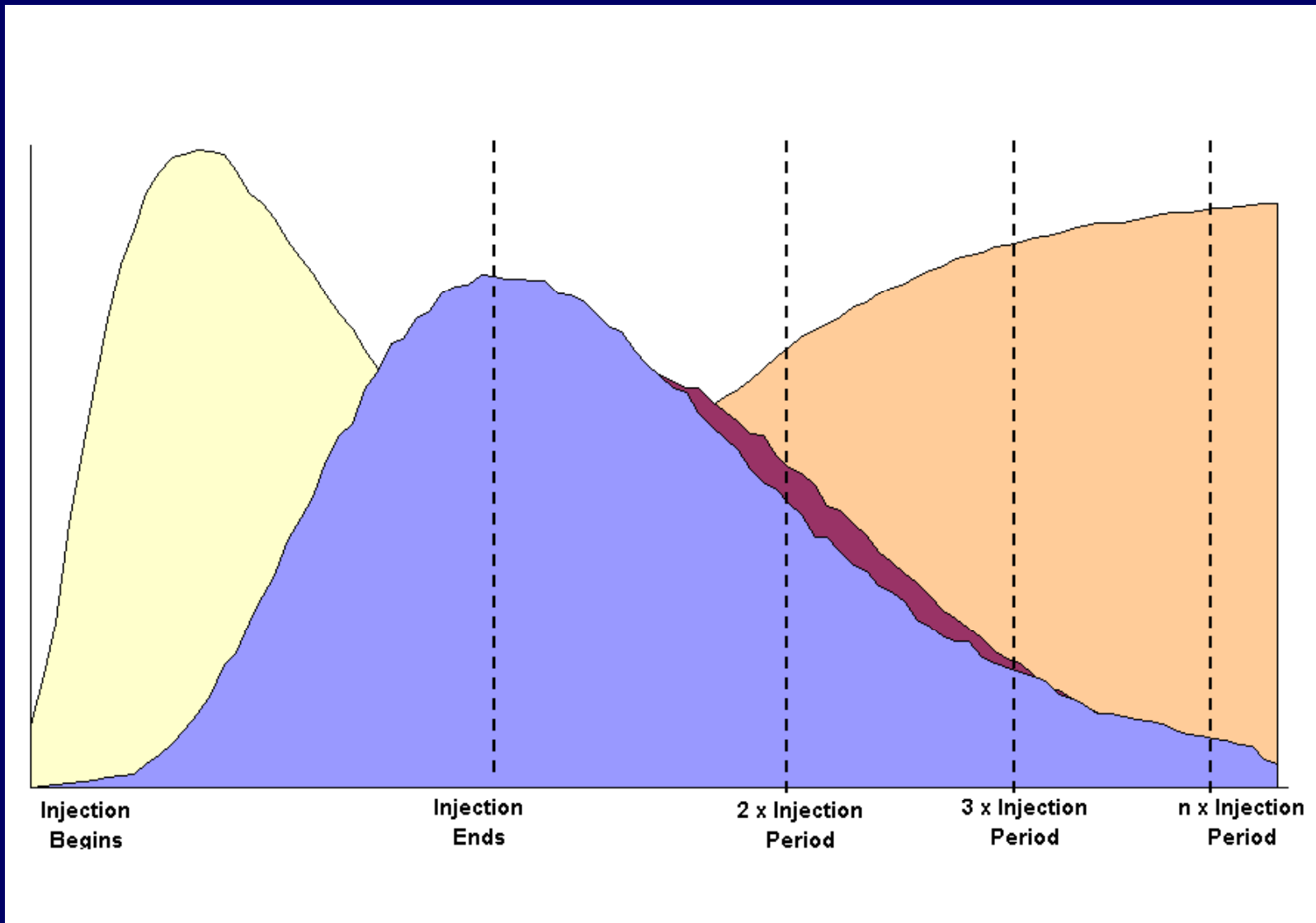
**The horizontal-axis represents severity for a single site**

# Risk Profile for GS Sites PROFILE RISK

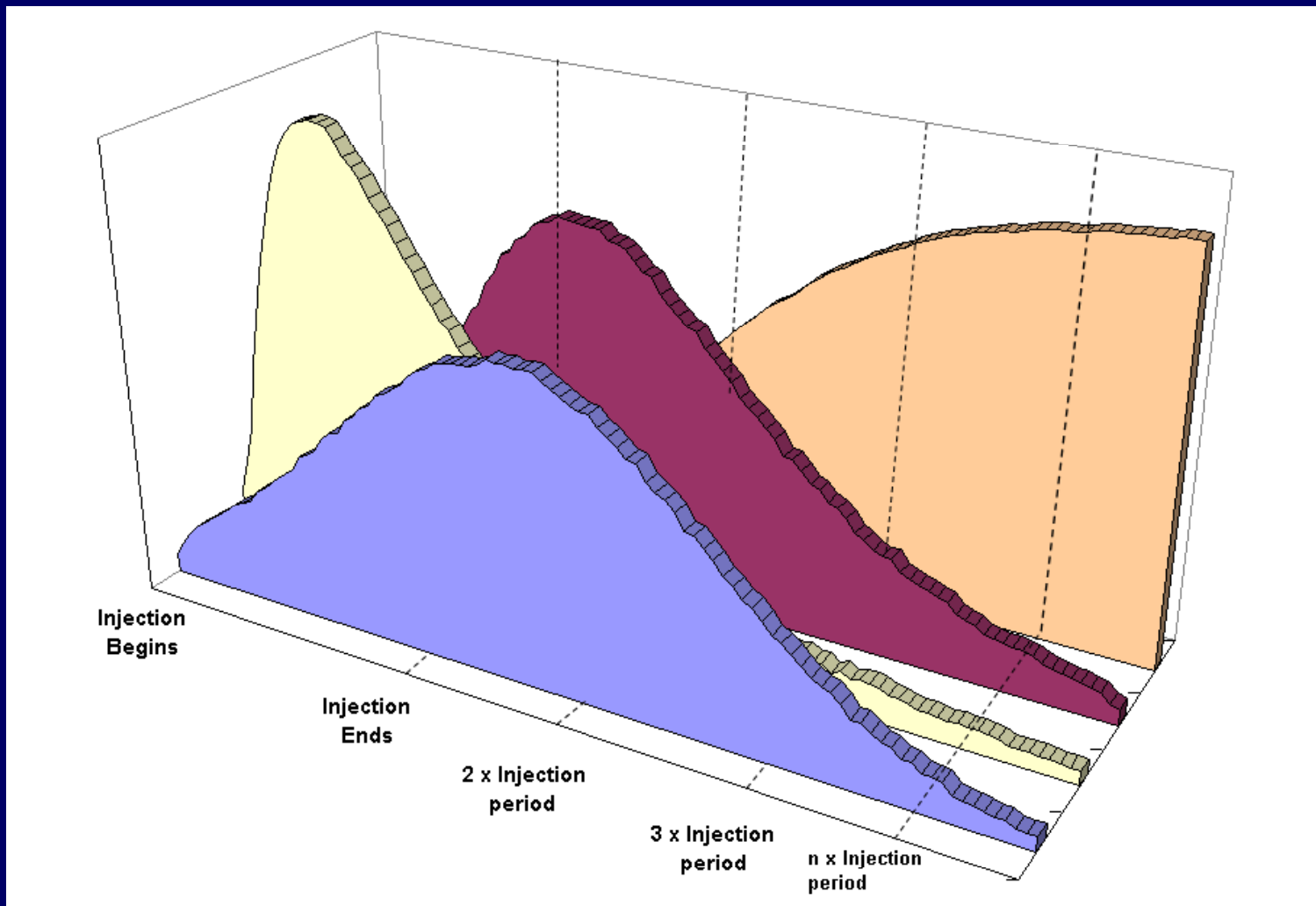
Figure 3. A Different Risk Profile for CCS Sites



To estimate the pool of losses, sum the area for every site in the pool.  
In other words,, make this 3-dimensional, spin it sideways, and consider  
What happens with a **FAT TAIL** ...



Hypothetical / Fictional Risk Profile “Pool” of Four (4) CCS Sites



For Discussion Purposes - Fictional Financial Impacts of  
"Pool" of CCS Sites with Differential Risk Profiles

# Liability

(Uncertainty of Interplay with Existing Statutes )

CONSIDER  
VARIABLES

- **Numerous Potential Claimants, Causes of Action.**
  - Nuisance, trespass, negligence, other torts
  - Statutory liability (local statutes; potential “cap” of Cap-and-Trade)
  - Contractual and “New” Potential Carbon Market Exposures – required purchase of offsets, penalties / fines
- **Spans Multiple Sovereign Authorities**
  - Jurisdiction, nature of the harm and attendant damages will interact to determine liability, compensability, and which (if any) party can transfer, release or assume liability.

# Financial Responsibility (Certainty of a Sort...)

- **An effective liability (risk) management framework will assure funds are available to pay for the necessary activity to:**
  - **Minimize potential for releases** from the containment zone over the long-term (post operational acts and confirmed stabilization); and
  - **Detect problems** before they adversely impact public welfare or the environment (MMV).
- **The remaining challenge?** Corrective (remedial) action, and to the extent necessary how compensatory damages will be redressed & up to what limit?

# Liability (Risk) Management Options

Financial Responsibility Mechanisms	GS Project Phases		
	Operation (CO <sub>2</sub> Injection)	Closure & Post-Closure	Long-Term Stewardship (after prescribed post-closure)
<b>Third-Party Instruments</b> (Trust Funds, LOCs, Insurance, Bonds)	✓	✓	✓
<b>Self-Insurance</b> (Financial Test, Corporate Guarantee)	✓	✓	X
<b>Private/Public Frameworks</b> Trust/Compensation Funds Insurance Models	X	X	✓

# Notable Liability Frameworks:

Each Has Strengths and Weaknesses; Risk Profile is Key

## <Public / Private Frameworks>

1957 | Price-Anderson  
Nuclear Indemnity

1968 | NFIA  
Indemnity/Risk Pool

2002 | SAFETY ACT  
Risk/Litigation Management

## <Compensation (Trust) Funds>

1974 | SDWA  
UIC Program

1980/1986 | CERCLA/SARA  
Superfund

1990 | TAPAA/OPA  
OSLTF / TAPLF

2007 | IRGC / IOGCC  
State Compensation Funds

# Suggested CCS RM Framework

- **Operational Phase** – Siting, Operation (Compression & Injection), Delimited Closure
  - Single Goal Financial Instruments – Surety Bonds, Insurance, Letters of Credit, Self-Insurance (Financial Test, Corporate Guarantee)
  - Cost Estimation Requirements
  - Delimiting Requirements for Issuing Institutions
- **Long-Term Stewardship Phase** – Post-Injection, Post-Site Certification
  - Three-Part Solution – Safety Board, CCS Trust, Enabling Legislation

# Suggested CCS Framework

## PART 1. CCS SAFETY BOARD

**Design Goal.** Ensure siting/operating decisions that consider risk and minimize potential for residual injury at time of CCS site transfer.

### **Attributes.**

Private/Public board,  
chartered as a government  
corporation.

Comprises no less than 9  
members – technical, legal,  
financial, state/federal

Term limits no less than 6  
years

### **Charge.**

Approve siting for CCS projects,  
including 'go' v. 'no-go' decisions.

Oversee design and management of  
CCS projects.

Serve as arbiter for existing agencies  
authorized to address CCS project  
issues of technical safety, economics,  
climate and ecology.

Certify completion of key project  
milestones (e.g., site closure, post-  
closure).

Accept eventual title to CCS sites.

Maintain financial and administrative  
management authority over **CCS**  
**National Trust**

# Suggested CCS Framework

## PART 2. CCS NATIONAL TRUST

**Design Goal.** Ensure availability of funds to pay for future (un)expected costs of long-term care and delimited compensatory damages.

### Attributes.

Financed through a combination of:

- Initial authorizing funds
- A flat per unit fee on CO<sub>2</sub> sequestered during the life of the CCS facility; and/or
- A transaction fee for carbon trades.

Fee collection suspended when trust reaches a maximum dollar threshold.

Fee collection resumes when balance falls below minimum.

Balance of funds mandated between a maximum (ceiling) and minimum (floor) financial threshold.

### Charge.

Address prospective risk, not known existing loss.

Provide funds to pay for long-term care expenses associated with corrective action and delimited compensatory damages resulting *after* the CCS facility is released from its post-closure obligations.

Ensure trust balance and fund contributions map to expected value of expenses/financial consequences likely to be incurred over the long term.

Trust balance should be re-evaluated when actual site-specific monitoring data become available, but no less frequently than every 3 years.

# *Suggested CCS RM Framework*

## **In additional to CCSSB and the National Trust, ADDITIONAL ENABLING LEGISLATION should:**

Establish Liability  
Provisions

Identify Damage  
Thresholds

Require Evidence of  
Financial Responsibility

Provide for CCSSB Oversight  
Authority

Allow for Sovereign Access to  
Funds in the CCS National Trust

Address Miscellaneous Receipts  
Act Issues / Similar Statutory limits

# CCS, Liability Management and Insurance: Where Do We Go Next ?

- Insurance Is The Business of Risk and Risk Management
- Create process to mitigate moral hazard; make permitting entity and others who benefit from the operation PAY / LIABLE for the risk created
- Improved data quality ----→ improved certainty in modeling
- Improved certainty in modeling -----→ increased availability of capital
- Available capital -----→ innovation
  - Support “adaptation” to Global Change
  - Coverage for increased risk
  - Coverage for previously excluded
  - Coverage for “new” risks
  - Coverage for “new” opportunity

