



Carbon Capture & Sequestration

Managing Risks for CCS Deployment
Insurance for commercializing CCS

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1. Overview of Environmental Risks by Project Phase
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Discussion Points

Overview of Environmental Risks by Project Phase



Risk Transfer Solutions by Project Phase

Project Phase	Key Exposures	Loss Scenarios
Siting	<ul style="list-style-type: none"> Historic pollution at CCS sites with current or former uses that involve <ul style="list-style-type: none"> Industrial Manufacturing Mining Energy (All Streams) 	<ul style="list-style-type: none"> Cleanup requirements for the following: <ul style="list-style-type: none"> Any historic pollution conditions exacerbated by the CCS project Any pollutants released from construction and drilling equipment
Area of Review and Corrective Action	<ul style="list-style-type: none"> Unknown pollutants or sources of drinking water could be in the region around the injection area 	<ul style="list-style-type: none"> Third-Party Bodily Injury and Property Damage claims from neighboring residents whose drinking water was contaminated by historic pollution at CCS sites
Well Construction	<ul style="list-style-type: none"> Disturbing subsurface soils with historic pollution conditions Pollutant dispersal during a well blowout Spills or releases of vehicular and drilling fluids Process and flowback water from well 	<ul style="list-style-type: none"> Natural Resources Damages claims to the extent any groundwater, surface water or land held in public trust is damaged by CCS activities

Risk Transfer Solutions by Project Phase

Project Phase	Key Exposures	Loss Scenarios
Injection / Operation / Monitoring	<ul style="list-style-type: none"> Exacerbating historic pollution through: <ul style="list-style-type: none"> Formation failure Seismic activity and/or subsidence CO2 leakage 	<ul style="list-style-type: none"> Cleanup requirements for the following: <ul style="list-style-type: none"> Any historic pollution conditions exacerbated by the CCS project Any CO2 leakage leading to groundwater acidification Third-Party Bodily Injury and Property Damage claims from neighboring residents whose drinking water was contaminated by CO2 leakage Natural Resources Damages claims for groundwater acidification
Injection Well Plugging	<ul style="list-style-type: none"> Pollutant dispersal arising from well control 	
Post-Injection Site Care and Site Closure	<ul style="list-style-type: none"> Undetected long-term CO2 leakage 	
Long-Term Care	<ul style="list-style-type: none"> Undetected long-term CO2 leakage 	

Risk Transfer Solutions

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Risk Transfer Solutions

PLL

- Covers owners/lessors of CCS sites for the following:
 - Onsite/Offsite Cleanup
 - Third-Party Onsite/Offsite Bodily Injury and Property Damage
 - Onsite/Offsite Natural Resources Damage
 - Transportation Liability (1st and 3rd Party)
 - Waste Disposal Liability (Non-Owned Disposal Sites)
 - First-Party Business Interruption and Extra Expense
- Coverage Terms:
 - Coverage for pollution occurring after policy inception for terms of 1 to 5 years, depending on market
 - Coverage for pollution conditions present at CCS sites prior to policy inception for terms of 3 to 10 years, depending on market
 - Up to \$300MM in capacity available
 - Coverage available on a claims-made and reported basis only
- Underwriting Data required:
 - Copy of the Class VI Underground Injection Control Permit and all Exhibits / Attachments
 - Copy of a Phase I Environmental Site Assessment or equivalent documentation for the CCS injection site
 - Audited financials for the First Named Insured

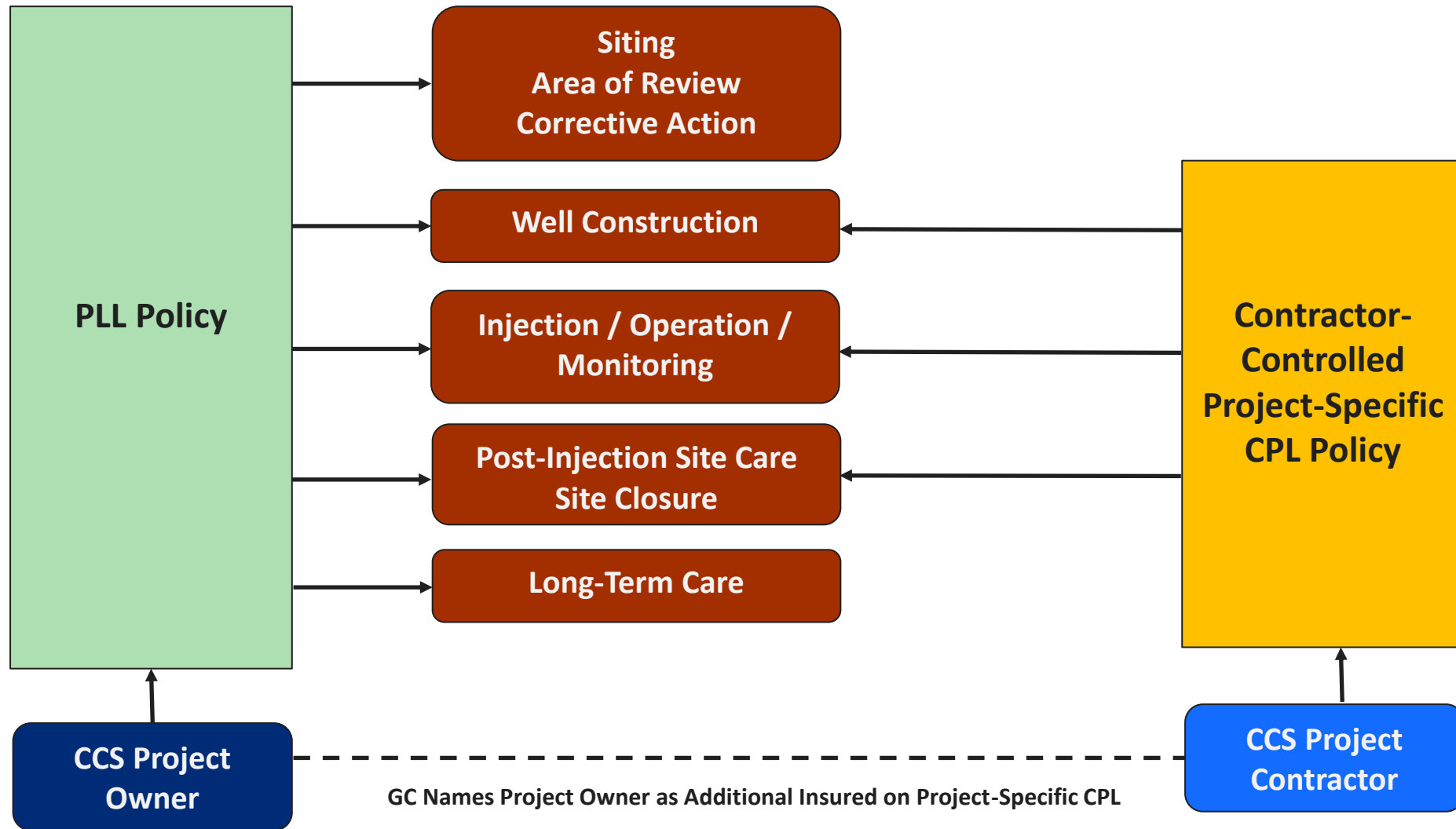
Risk Transfer Solutions

CPL

- Covers project owners and contractors performing work at CCS sites for the following:
 - Third-Party Cleanup Costs, Bodily Injury and Property Damage for Pollution Conditions on, at, under or migrating from the project site
 - Onsite/Offsite Natural Resources Damage
 - Transportation Liability (1st and 3rd Party)
 - Waste Disposal Liability (Non-Owned Disposal Sites)
- Coverage Terms:
 - Coverage can be written on a project-specific basis for individual or collective phases of a CCS project
 - Project terms of up to 5 years available, with 10-year terms for Completed Operations
 - Up to \$300MM in capacity available
 - Coverage available on an occurrence basis
 - Policy can be structured as an Owner-Controlled program
- Underwriting Data required:
 - Total estimated CCS project hard costs for each phase
 - Complete project timeline
 - List of all contractors at all tiers
 - Copy of the Master Contract
 - Audited financials for the First Named Insured

Risk Transfer Solutions

Sample CCS Program Structure – PLL for the CCS Project Owner / CPL for CCS GC



ADVANTAGES:

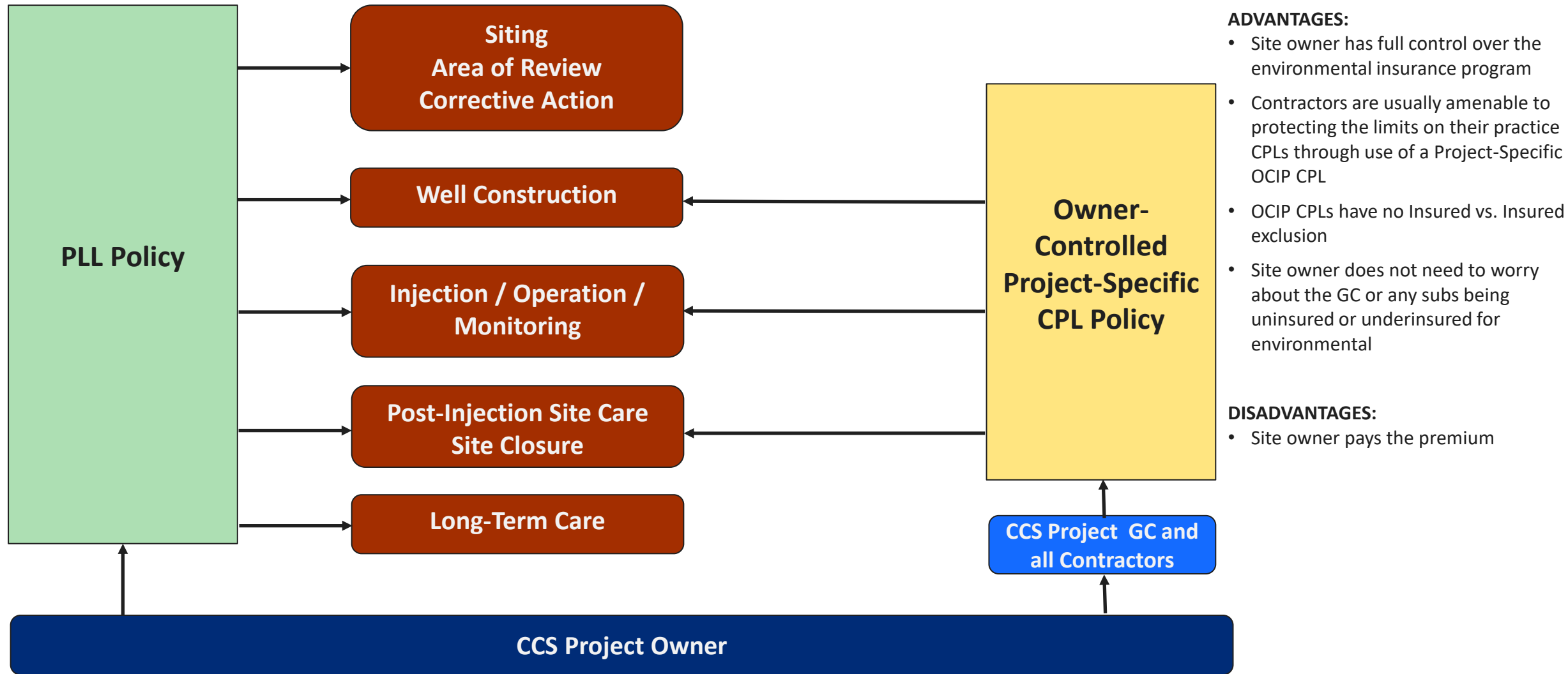
- Site owner covered for owner liability exposures
- Additional layer of protection from construction risks and long-tail exposures through an occurrence-based contractor insurance program with a 10-year tail for Completed Operations
- Contractor procures the program and pays the premium

DISADVANTAGES:

- General Contractor may be underinsured or uninsured for pollution risk in their CPL
- CPL may be a practice program sharing limits with other jobs
- Contractors and subs at lower tiers may not have adequate environmental insurance

Risk Transfer Solutions

Sample CCS Program Structure – PLL and OCIP CPL for the CCS Project Owner



ADVANTAGES:

- Site owner has full control over the environmental insurance program
- Contractors are usually amenable to protecting the limits on their practice CPLs through use of a Project-Specific OCIP CPL
- OCIP CPLs have no Insured vs. Insured exclusion
- Site owner does not need to worry about the GC or any subs being uninsured or underinsured for environmental

DISADVANTAGES:

- Site owner pays the premium

Financial Assurance Considerations and Solutions

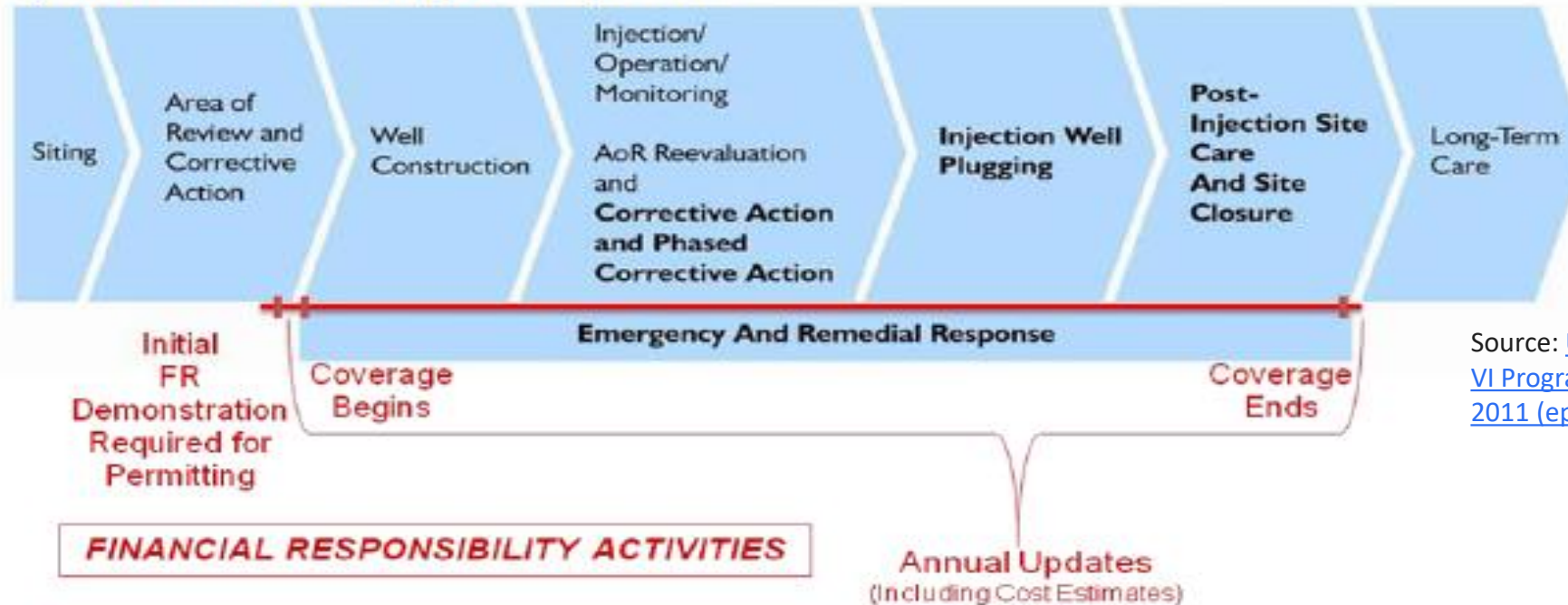


Financial Assurance Considerations and Solutions

Overview

- CCS requires an Underground Injection Control Class VI Permit
- All Class VI Permits require a demonstration of financial responsibility during multiple phases of the project as a condition of issuance and a plan to achieve it must be submitted as part of the application process
- The intent of financial responsibility is to guarantee that the applicant has a dedicated funding source to address cleanup costs required by a pollutant release

Figure 2: GS Financial Responsibility Timeline



Source: [Underground Injection Control \(UIC\) Class VI Program Financial Responsibility Guidance July 2011 \(epa.gov\)](#)

Financial Assurance Considerations and Solutions

Mechanisms Approved by EPA per Project Phase

- Trust Funds
- Surety Bonds
- Letter of Credit
- Insurance
- Self Insurance
- Escrow Account.
- Any other instrument(s) satisfactory to the Director

Approved methods
(in order of EPA
preference):

Source: [Underground Injection Control \(UIC\) Class VI Program Financial Responsibility Guidance July 2011 \(epa.gov\)](#)

Table 4: Recommended financial responsibility instruments for GS activities (relative ranking)¹⁰

Corrective Action	Injection Well Plugging	Post-injection Site Care and Site Closure	Emergency and Remedial Response
1. Trust Fund	1. Trust Fund	1. Trust Fund	1. Insurance
2. Letter of Credit	2. Letter of Credit	2. Insurance	2. Letter of Credit**
3. Surety Bond	3. Surety Bond	3. Financial Test and Corporate Guarantee*	3. Surety Bond**
4. Escrow Account	4. Insurance	4. Surety Bond	4. Financial Test and Corporate Guarantee*
5. Financial Test and Corporate Guarantee*	5. Financial Test and Corporate Guarantee*	5. Escrow Account	5. Trust Fund
6. Insurance	6. Escrow Account	6. Letter of Credit	6. Escrow Account

*Financial tests and corporate guarantees present the lowest direct costs to owners or operators, but the highest risk to the public.

**Letters of credit and surety bonds are likely most appropriate for emergency and remedial response during operation phases.

Financial Assurance Considerations and Solutions

Insurance

Advantages:

- Can be the most cost-effective and administratively favorable way to demonstrate financial responsibility
- Can be added to in-force PLL policies in certain circumstances, or as a hybrid program with a PLL that provides traditional risk transfer
- Most carriers understand the concept - financial responsibility via pollution insurance is commonly used under the Resource Conservation Recovery Act for the following:
 - Facilities that treat, store and/or dispose of hazardous wastes
 - Facilities with active, in-use Underground Storage Tanks
 - Waste disposal sites with Closure / Post-Closure obligations

Challenges:

- Requires specialized insurance policy language that effectively makes the carrier the insured in the eyes of the regulators and exposes them to performance obligations and possible regulatory sanction
- Financial responsibility provisions require the insured to reimburse the carrier for any payments made under these provisions – carriers will underwrite to the insured's financials as much as the risk
- CCS is not a nascent technology but the proposed large-scale deployment of CCS for use in carbon mitigation is a nascent trend; carriers are applying a great deal of caution in their approach that may not seem commensurate with the actual risk

Financial Assurance Considerations and Solutions

CCS Activities and PLL

Project Phase	CCS Activities	Viability of PLL Insurance
Siting	n/a Activities limited to site assessment and site acquisition (if applicable)	<ul style="list-style-type: none">Financial responsibility not required but PLL is recommended to address potential historic pollution issues at sites with prior industrial, mining or all-stream energy usePLL can also tee up the financial responsibility with the insurance carrier prior to submitting the application
Area of Review and Corrective Action	Permitting	<ul style="list-style-type: none">CCS owner will need to identify and possibly secure all necessary financial responsibility before submitting applicationIf insurance will be used, <u>it will need to be in place and a compliant certificate issued by the carrier at the time of submitting the application</u>

Financial Assurance Considerations and Solutions

PLL

Project Phase	CCS Activity	Viability of PLL
Well Construction	Site Prep, Drilling and Construction	<ul style="list-style-type: none"> • PLL is best suited to demonstrate financial responsibility for <u>Emergency and Remedial Response</u> required at all stages of the activity • Carriers will apply an endorsement to the PLL for the following: <ul style="list-style-type: none"> • A Financial Responsibility / Financial Assurance Claim filed by the regulator against the carrier for Onsite and Offsite Cleanup Costs and Emergency Response Costs incurred in accordance with the Emergency and Remedial Response Plan filed with the UIC Class VI Permit
Injection / Operation / Monitoring	CO2 Injection Reevaluate Area of Review Evaluate Wells and Address Deficiencies	
Injection Well Plugging	Flush Injection Wells Perform Testing Plug Injection Well	
Post-Injection Site Care and Site Closure	Geochemical Sampling Pressure Monitoring Geophysical Monitoring Plug Monitoring Wells	
Long-Term Care	Site Monitoring	
		<ul style="list-style-type: none"> • Financial responsibility not required but PLL is recommended to address long-term cleanup liability, toxic tort and Natural Resources Damage



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