

Consolidated CO₂ Research and Development Roadmap



R&D Topics by Proponent	CO ₂ Specifications	Equations of State (EOS) Refinement	CO ₂ Pipeline Fracture Mechanics Modeling	Dispersion/Safety Modeling and Trials	Non Metallics	Social Acceptance	CO ₂ Pipeline Operation	Industry Guidelines and Technical Standards
Pipeline Research Council International (PRCI) Emerging Fuel Institute (EFI)	Guidance on impurity threshold ranges (1)	Review/Refine EOS in CO ₂ Service (4)	Full Scale Fracture Propagation test in gas phase CO ₂ (9)	CO ₂ Dispersion Modelling (24)	Non-metallic compatibility in CO ₂ service (30)	Social Acceptance Primer (31)	ILI Tool Performance in dense phase (32)	Wood JIP: Industry Guidelines for Setting the CO ₂ Spec. for CCS Chains
	Evaluation of Odorants for CO ₂ Service (2)	CO ₂ Water & Acid Solubility and impurities (5)	Effect of CO ₂ ductile-brittle fracture initiation trans T (10)	HSE Skylark JIP CO ₂ Dispersion Trials			Metal loss assessment criteria for CO ₂ service (33)	DNV CO ₂ SafePipe JIP: CO ₂ specification, fracture control, ductile to brittle fracture, non-metallic materials
	PMSA CAAP/RA Characterize Expected CO ₂ Composition	Corrosive impacts of trace components (6)	Guidelines for crack arrest design (11)					
	PRCI Gap 0 Project Characterize Expected CO ₂ Composition & Develop Guidelines for CO ₂ Specifications	Ohio University CCT JIP CCS Corrosion	Cracking & Corrosion Fatigue in CO ₂ /H ₂ O/CO (12)					
	DNV CO ₂ Met. Quality CO ₂ Metering Guidance	IFE KDC-IV JIP Dense Phase CO ₂ Corrosion	DNV CO/CO ₂ Cracking in CO ₂ Pipeline JIP					
		NETL JIP: Equations of State, Corrosion, CO/CO ₂ Cracking						
Natural Resources Canada (NRCan)			Addressing Corrosion Challenges under Supercritical CO ₂ Pipeline Transportation and Permanent Storage (13)				Risk-based integrity management of CO ₂ pipelines (34)	
			Fracture arrest control of dense-phase CO ₂ pipelines (14)					
National Research Council (NRC)			Advanced evaluation of corrosion and solvent degradation in CO ₂ capture systems					
CSA Group	Fluid Specification, Composition and Corrosion (3)		Material selection and fracture control (brittle and ductile) (15)	Emergency Planning and Dispersion (including consequence modelling) (25)				Identify potential topics to be addressed in the 2027 edition of CSA Z662 (41)
European Pipeline Research Group (EPRG)			Fracture mechanical requirements for gaseous CO ₂ (16)					
			Unstable fracture propagation control (17)					
			Fracture initiation control (18)					
			Corrosion and stress corrosion control (19)					
C-RET Technologies		Didsbury Gas Dynamic Test Facility - shock tube and other tests to better define EOS for mixtures (7)	Fracture propagation and arrest testing at CF8 Suffield (20)	Development of Quantitative Risk Assessment (QRA) tools for CO ₂ pipelines. expanding PIRAMID risk-based integrity assessment and maintenance planning software tool to include CO ₂ (26)				
Energy Transition Hub - Alberta Energy Connections Canada		Effects of low temperatures on the operating environment (8)	Corrosion and materials issues in CO ₂ capture, processing, compression, transport and injection (21)	Safety (27)			Deterioration (acidification, mixing CO ₂ streams) (35)	Metal design and/or modifications (alloys, fracture toughness) (42)
			Rapid depressurization (modeling) (22)	Newell County Test Facility - test CO ₂ releases to atmosphere in facility settings (28)			CO ₂ Leakage and Detection (36)	Coatings/linings (43)
			Improvement in small-scale material toughness characterization. Comparison of traditional low energy Charpy V-Notch (CVN) to high energy Drop Weight Tear Test (DWTT) (23)	Large-scale outflow and dispersion tests at CF8 Suffield (29)			Pipeline inspection (Pigging issues in high pressure environments) (37)	
							Emergency Response Programs (38)	
							Material compatibility (for repurposing) (39)	
							Small diameter pipe (<16") (40)	