API CO2 Pipelines Policy & Programs

PRCI 2024 Research Exchange
San Diego, CA
February 28, 2024

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American Petroleum Institute

DOE Grant Opportunities

Pipeline Infrastructure Development

Communication & Education

Communications, Advocacy & Education

- Benefits of Pipeline Campaign
- State General Assembly advocacy &legislative response

Polling / Modeling Refresh

- Refresh polling & modeling in Q3 to evaluate the effectiveness of BOP messaging
- Consider expansion to include H2 & increase in CO2

Permitting

Federal

- Advocacy to CEQ Phase 2 NEPA reform
- Monitor & respond to any potential NWP proposals

State & local

- Advocacy against harmful eminent domain & permitting legislation
- Monitor & respond to local zoning ordinances

Stakeholder Engagement

Public Engagement & Awareness

RP 1185

- Comment Resolution
- RP 1185 outreach / roll-out
- Implementation resource development & support

RP 1162

- PHMSA advocacy on IBR
- Continued implementation through website

Conservation

Energy for Ecosystems (E4E)

- Launch Program Website
- Build out toolkit
- Establish Reporting Framework
- Track projects & maturity

Pipeline Safety & Security

Regulations & Legislation

PHMSA Reauthorization

- 2020 implementation
- 2023 Advocacy for API priorities

Regulatory - Safety

- Monitor & Respond to Natural Gas, HL & LNG regulations

HL Reform, Idle Pipe, CO2 Pipelines & Repair Criteria

Regulatory-Security

- Comment on ANPRM regs
- Continue facilitating field visits with TSA leadership

Strategic Plan & Safety Standards

API–LEPA Pipeline Excellence Strategic Plan (2023- 2025)

- Organizational& Workforce Excellence
- Innovation& Technology
- Engagement & Awareness
- Cybersecurity Threats
- Safe & Sustainable Energy Future

Significant Standards

Safety - RP 1185, RP 1176, RP 1187, RP 1173

Security – RP 1164 implementation & maintenance

Climate & Low Carbon Energy

Low Carbon Policy & Technical

R&D

- R&D through PRCI EFI & CO2 Taskforce
- Engagement with DOE & PHMSA on R&D Alignment

Regulations & Standards

- Develop RP for CO2 Pipeline Safety
- Drive narrative around CO2 reg update

Training

- Finalize build-out of CO2 ER curriculum with National Association of State Fire Marshals

Climate

The Environmental Partnership

- Strengthen operator participation
- Initial reporting of 2023 data for 2024 annual report

Workforce Development & Diversity

- Workforce Development Strategy: Develop and execute workforce development strategy to include education, recruitment and retention initiatives
- Pipeline Conference: Advance phase 2 of Workforce/DEI&A initiative into the 2024 API Pipeline, Control Room and Cybernetics Conference
- Diverse Supplier Resources: There are a variety of non-profit organizations focused on developing and promoting diverse suppliers. These organizations typically provide their own certifications and databases for corporate engagement.
- Engage Directly with Diverse Stakeholders: Our stakeholder allies are interested in hearing from you directly and are always looking to advance individual company engagement.

The “Energy” Behind Carbon Capture and Storage

Energy Transition

ExxonMobil plans to increase carbon capture at LaBarge

ExxonMobil initiated the process for engineering, procurement, and construction contracts as part of its plans to expand carbon capture and storage (CCS) at its LaBarge, Wyo. ...

OGJ editors — Oct. 21, 2021

Energy Transition

Air Products to build Louisiana blue hydrogen plant, CCS system

Air Products & Chemicals Inc. is developing a 750-MMscfd blue hydrogen complex near Burnside, Ascension Parish, La.

OGJ editors — Oct. 15, 2021

Energy Transition

Consortium lets drilling contract for North Sea Greensand carbon storage

The Nini Joint Venture, operated by INEOS Oil & Gas Denmark and Wintershall Dea AS, has entered a framework agreement with Maersk Drilling for Phase 2 of the Greensand offshore...

OGJ editors — Oct. 14, 2021

Energy Transition

Harbour Energy wins UK North Sea C

UK Oil and Gas Authority has awarded a CO_2 app
Energy. Harbour’s V Net Zero proposal would reu

OGJ editors

Energy Transition

Talos, Freeport LNG to develop Gulf Coast CCS project

Talos Energy Inc. and Freeport LNG Development LP intend to develop a carbon capture and sequestration project, the Freeport LNG CCS project, immediately adjacent to Freeport ...

OGJ editors — Nov. 16, 2021

Energy Transition

PETRONAS, Technip Energies establish framework for carbon capture collaboration

PETRONAS and Technip Energies signed a heads of agreement (HoA) establishing a collaboration framework for the further development and commercialization of carbon capture technologies...

OGJ editors — Nov. 15, 2021

Energy Transition

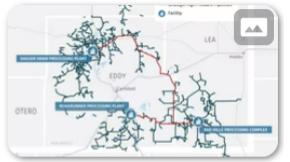
Woodside to invest $5 billion in new low carbon energy projects

Woodside Petroleum Ltd. plans to invest US$5 billion in new low-carbon energy projects over the next 2 decades while still supporting its petroleum business, including the benefits...

Rick Wilkinson — Dec. 8, 2021

Energy Transition

Lucid Energy advances plan to develop Permian’s largest CCS project



Robert Brelsford — Jan. 11, 2022

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Pathway to Reaching Climate Goals

Increasingly recognized: there is no pathway to reach global climate targets without carbon capture technology.

Why Carbon Capture?

- Could play a key role in achieving net-zero GHG emissions in manufacturing and industry (hard-to-abate sectors)
- Provide low-carbon dispatchable power
- Enable low-carbon hydrogen production at scale
- US geology provides for abundant sequestration opportunities
- Meet increasing demand for low-emissions products, carbon-derived products, and carbon offsets

The *Inflation Reduction Act* increased the tax credit value for both capture and storage as well as utilization to levels that unlock economically viable opportunities to develop CCS/CCUS at scale

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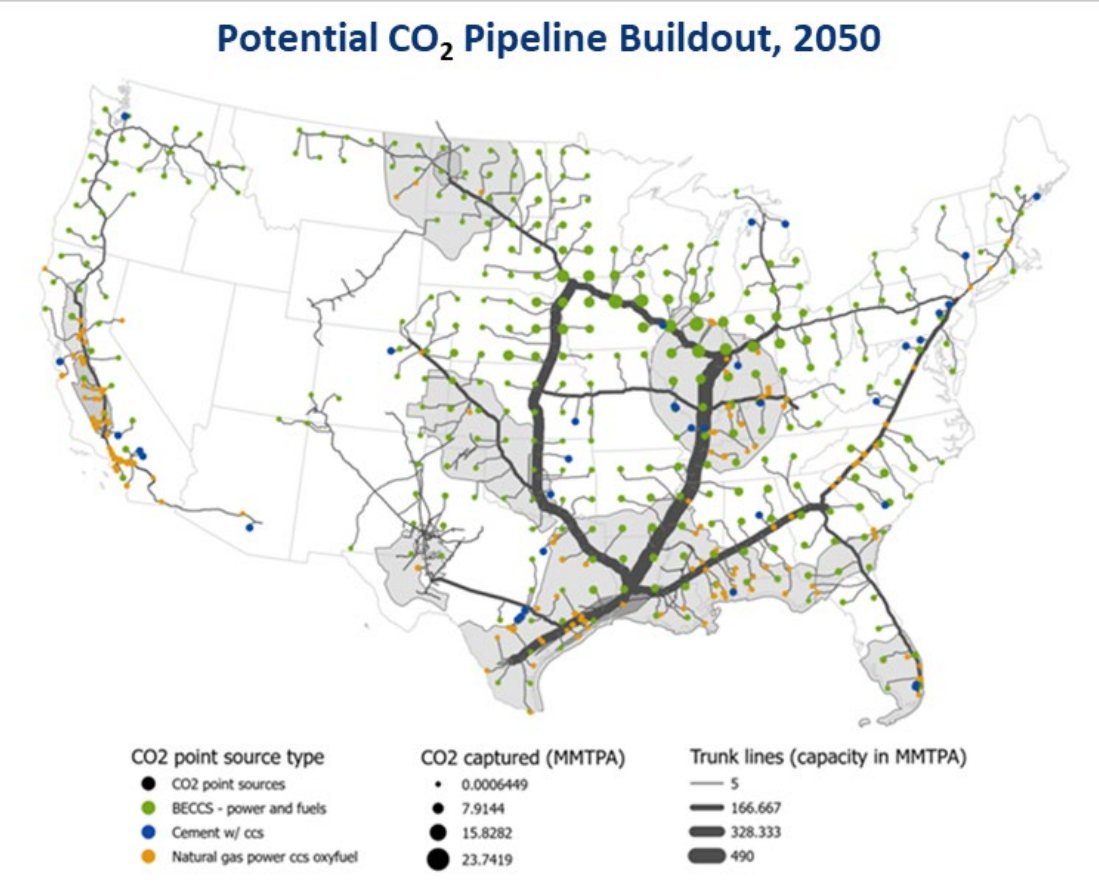
API Midstream Low Carbon Energy Focus

- **Scope**
  - All issues related to the transportation and storage of low carbon energy sources from the oil and natural gas industry
- **Purpose**
  - Provide strategic and tactical direction and guidance to API as it advocates for and supports the development of a robust infrastructure system for low carbon energy initiatives of the US oil and natural gas industry
- **Key Considerations**
  - US and Global activities – coordination with other SDOs, e.g., ASME, ISO, IOGP, etc.
  - Positioning API to be the leading resource
  - Leverage existing efforts and programs (e.g., eminent domain, integrity management, etc.)
  - Holistic approach to addressing gaps (i.e., research, standards, regulations, etc.)



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Technology & Innovation Lead to Improvements in CO2 Pipeline Safety

	Industry Roadmaps	PRCI	API	49 CFR §192*
		GTI	ASME	
		OTD	AMPP	49 CFR §194*
	Company ERM	NYSEARCH	CSA	
		PHMSA	ISO	49 CFR §195
	Public Policy	DOE	NFPA	
		Academia		
	Strategic Research Priorities			

* CO2 pipelines are not currently regulated under these Parts

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Driving Safety of CO_2 Pipelines

- **Research & Development**
  - Recognition that additional research is needed to inform any future rulemaking
  - Extensive ongoing work through USDOT, USDOE, PRCI and Emerging Fuels Institute

  API taking a leadership role in shaping direction of R&D to support standards development

- **Standards**
  - Understanding landscape and gaps in standards and leading practices and driving updates to support expanded use of hydrogen and CCS development
  - CO_2 emergency response tactical guide created and published

  API actively working on new CO_2 pipeline standard and updating others as appropriate

- **Regulations**
  - PHMSA regulates H_2 pipelines under 49 C.F.R. Part 192
  - PHMSA regulates supercritical phase CO_2 pipelines under 49 C.F.R. Part 195 & moving forward with regulations for gas-phase CO_2 pipelines

  API to review and comment on CO_2 Pipeline Safety NPRM (at OMB)

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Pipeline Safety
STARTS WITH YOU

API Pipeline Standards

Pipeline SMS

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INTEGRITY

RP 1110 Pressure Testing of Steel Pipelines for the Transportation of Gas, Petroleum Gas, Hazardous Liquids, Highly Volatile Liquids, or Carbon Dioxide

RP 1133 Managing Hydrotechnical Hazards for Pipelines Located Onshore or within Coastal Zone Areas

RP 1160 Managing System Integrity for Hazardous Liquid Pipelines

Std 1163 In-line Inspection Systems Qualification

RP 1176 Assessment and Management of Cracking in Pipelines

Bull 1178 Integrity Data Management and Integration

TR 1179 Hydrostatic Testing as an Integrity Management Tool

RP 1181 Pipeline Operational Status Determination

RP 1183 Assessment and Management of Dents in Pipelines

RP 1188 Hazardous Liquid Pipeline Facilities Integrity Management

CONSTRUCTION, INSPECTION, AND REPAIR

RP 1111 Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines

UNDERGROUND STORAGE

RP 1115 Design and Operation of Solution-mined Salt Caverns Used for Liquid Hydrocarbon Storage

RP 1170 Design and Operation of Solution-mined Salt Caverns Used for Natural Gas Storage

RP 1171 Functional Integrity of Natural Gas Storage in Depleted Hydrocarbon Reservoirs and Aquifer Reservoirs

PUBLIC SAFETY AND DAMAGE PREVENTION

RP 1102 Steel Pipelines Crossing Railroads and Highways

RP 1109 Marking Liquid Petroleum Pipeline Facilities

RP 1162 Public Awareness Programs for Pipeline Operators

TR 1166 Excavation Monitoring and Observation for Damage Prevention

GATHERING LINES

RP 80 Definition of Onshore Gas Gathering Lines

RP 1182 Construction, Operation, and Maintenance of Large Diameter Rural Gas Gathering Lines

MANAGEMENT SYSTEMS

RP 1160 Managing System Integrity for Hazardous Liquid Pipelines

RP 1173 Pipeline Safety Management Systems

RP 1174 Onshore Hazardous Liquid Pipeline Emergency Preparedness and Response

RP 1175 Pipeline Leak Detection - Program Management*

RP 1177 Quality Management Systems for Steel Pipeline Construction

CYBERNETICS AND CONTROL ROOM

RP 1130 Computational Pipeline Monitoring for Liquids*

TR 1149 Pipeline Variable Uncertainties and Their Effects on Leak Detectability

Std 1164 Pipeline Control Systems Cybersecurity

RP 1165 Pipeline SCADA Displays*

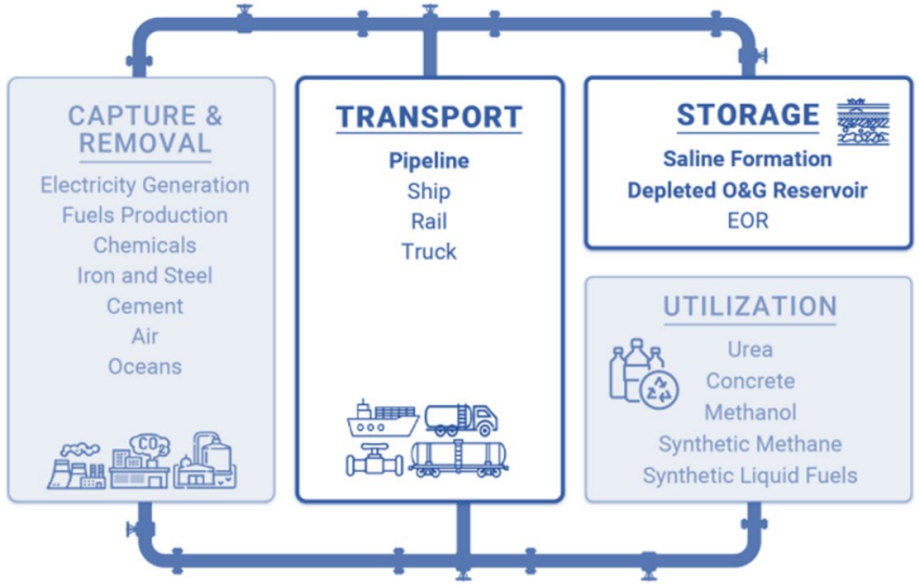
RP 1167 Pipeline SCADA Alarm Management

RP 1168 Pipeline Control Room Management

RP 1175 Pipeline Leak Detection - Program Management*

Low Carbon Energy Infrastructure Subcommittee (LCEIS)
CO_2 Pipelines

- **Pipeline Safety**
  - DOE & PRCI CO_2 pipeline safety workshops – industry roadmaps developed & consistent
  - PRCI CO_2 pipelines SOTA Report – how to we address gaps through PRCI and partner with others
  - EFI – Champion level membership in 2023 & 2024
    - Integrated API GIS Team into PRCI R&D Programs
    - Linking R&D with standards – API, ASME, AMPP
  - API CO_2 Pipeline RP – coordinating with ASME, AMPP, DNV, ISO, IOGP, others as appropriate
  - CO_2 Pipelines as a Strategic Research Priority and API-LEPA 2023-2025 Strategic Plan – *Safe and Sustainable Energy Future*
  - Continuing to work on revisions to existing standards or the need for new standards – repurposing and new construction
    - Monitoring PRCI, PHMSA & DOE R&D programs
    - Pipeline safety, materials, measurement, pipeline operations, and underground storage
  - DOE Funding Opportunity Announcements



Source: Labor Energy Partnership, "Building to Net-Zero: A U.S. Policy Blueprint for Gigaton Scale CO^2 Transport and Storage Infrastructure," June 2021

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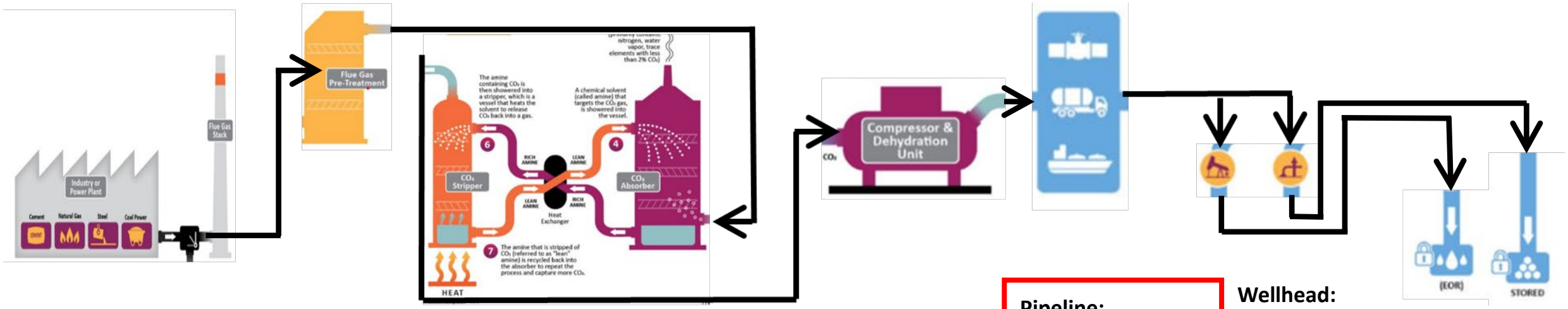
API CO_2 Pipeline RP vs. PRCI Guidelines



Balance of Plant:
- Ducting
- Purification
- Waste Handling
- WHRU
- Process Control
- Utility

Capture Island:
- Technology providers
- Performance
- Efficiency
- Reliability

Balance of Plant (Cont'd):
- Compression
- Dehydration
- Process Control
- Chemical Mgmt

Pipeline:
- Wall thickness
- Dispersion
- Overpressure protection
- Inspection
- Corrosion control
- Impurities
- LDS
- Coordinate API Guidance
- Gathering system design

Wellhead:
- Materials
- Control philosophy
- Inspection

Subsurface:
- Geology
- MMV

Overall:
- Permitting matrix, ERP, safe handling procedures

Source: PRCI CO2 Task Force (B. Vonau)

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Low Carbon Energy Infrastructure Subcommittee (LCEIS)
CO_2 Pipelines

- **Permitting**
  - Significant challenges to CO_2 pipeline permitting
  - Midwest states public opposition
  - Preemption, eminent domain, setback, and other state and local issues
- **Emergency Response**
  - Published Tactical Guidelines for CO_2 Emergency Preparedness/Response
  - NASFM Training Portal
  - Texas A&M TEEX CO_2 pipeline training
- **Public Engagement and Education**
  - Working with all stakeholders
  - RP 1185 – will be an important element of CO_2 pipeline infrastructure build out
  - Roll-out and "How To" guidelines
  - Benefits of Pipeline Campaign

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Thank you for the opportunity to share information on this important industry topic.

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