

Strategic Management of GHG Emissions from Oil and Gas Operations

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Presentation Overview

- Compliance & Voluntary Initiatives
- Example Facility
- Regulatory Requirements
- Voluntary Reductions and Reporting
- Government Funding
- Emission Reduction Opportunities
- Compare Economic Outcomes
- Cross-Disciplinary Learning
- Emissions Management Strategy
- Questions



Overview - Compliance and Voluntary

- Regulatory requirements:
 - Monitoring and inspections
 - Facility-specific vent gas limits
 - Equipment-specific vent gas limits
 - Emission intensity reduction requirements
 - Reporting, verification, and record keeping
- Voluntary initiatives:
 - ESG/Sustainability reporting
 - Net-zero targets
 - Government funding
 - Access to carbon markets



Example Facility

- “Company X”
- Multi-well gas battery and compressor station
- Review approaches for emissions management



Applicable Regulatory Requirements

- AER Directive 060
 - Monthly Fuel, Flare, Vent Reporting
 - Fugitive Emissions Management Plan (FEMP)
 - Methane Reduction Retrofit Compliance Plan (MRRCP)
 - Triannual Fugitive Emissions Surveys
 - Annual Compressor Seal Vent Testing
 - Annual Methane Report
- Alberta TIER Regulation
 - Baseline Reporting & Verification
 - Annual Reporting & Verification
 - Annual Emission Intensity Reductions



Voluntary Reductions and Reporting



- Voluntary Reporting
 - ESG Reporting
 - Access to Sustainable Investment Portfolios and Funds
- Voluntary Emission Reductions
 - Net-zero Targets
 - Access to Carbon Markets

Government Funding

- Provincial Funding
 - \$25 MM – Methane Technology Implementation Program (MTIP)
 - \$10MM – Baseline and Reduction Opportunity Assessment (BROA) Program
 - \$17MM – Alberta Methane Emissions Program (AMEP)
- Alberta Offset System
 - Emission Reductions from Pneumatic Devices
 - Upcoming/Flagged Protocols
- Federal Funding
 - \$750 MM NRCan ERF – Onshore & Offshore



Multiple Disciplines

Field

- Field Operations
- Engineering
- Instrumentation Specialists
- Emissions Measurement Technologists
- Fugitive Emissions Inspectors
- Third-party Sampling and Laboratory

Reporting

- Production Accountants
- Environmental Compliance Manager
- Third-party Verifiers

Strategy

- Emissions Management Consultant
- Financial Analysts



Emission Reduction Opportunities

- High-bleed Pneumatic Controllers
- Gas-driven Pneumatic Pumps
- Reciprocating Compressor
- Active Surface Casing Vent Flow



Emission Reductions - Pneumatics

High-Bleed Level Controllers



- Convert to Low-Bleed
- Instrument Air
- Vent Gas Capture

Gas-Driven Pneumatic Pump



- Device Electrification
- Instrument Air
- Vent Gas Capture

Funding Options - Pneumatics

Controllers:
High to Low
Bleed
Conversion

- MTIP Funding
- Alberta Offsets

Chemical
Pump:
Device
Electrification

- MTIP Funding
- Alberta Offsets



Emission Reductions – Compressor & SCVF

Reciprocating Compressor



- Vent Gas Conservation
- Vent Gas Destruction
- Ongoing Measurements

SCVF



- Cement Squeeze
- Ongoing Monitoring

Emissions Management Options – Compressor & SCVF

Compressor Vent Gas

- Annual Compressor Seal Vent Testing
- MTIP Funding:
 - Vent Gas Conservation
 - Vent Gas Capture and Destruction

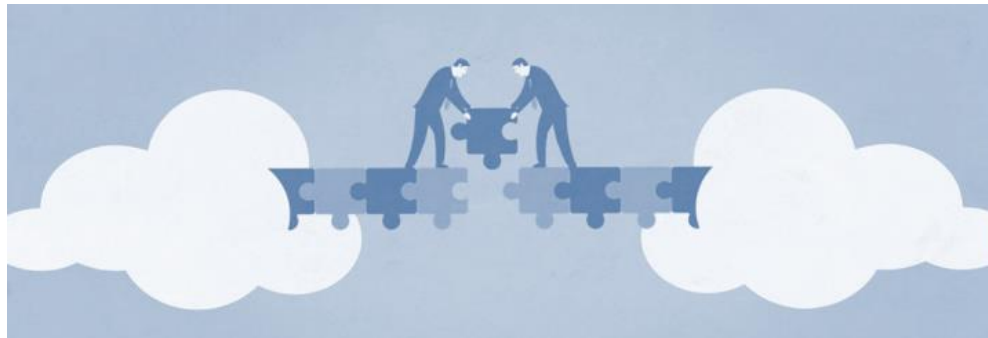


Surface Casing Vent Flow

- Biannual SCVF Testing
- MTIP Funding:
 - Cement Squeeze

Cross-Disciplinary Learning

- Engage Affected Disciplines
- Consider Compliance Options
- Minimize Costs
- Create Efficiencies
- Prepare for Evolving Regulatory Landscape
- Identify Options for Best Net Returns



Emissions Management Strategy

- Regulatory Requirements
- Voluntary Initiatives and Targets
- Options for Funding
- Implications on Compliance Obligations





Questions?
Thank You!

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