A New Technology For Flare Mitigation

Crusoe Energy Systems Inc.

Cully Cavness
Co-Founder, President and COO

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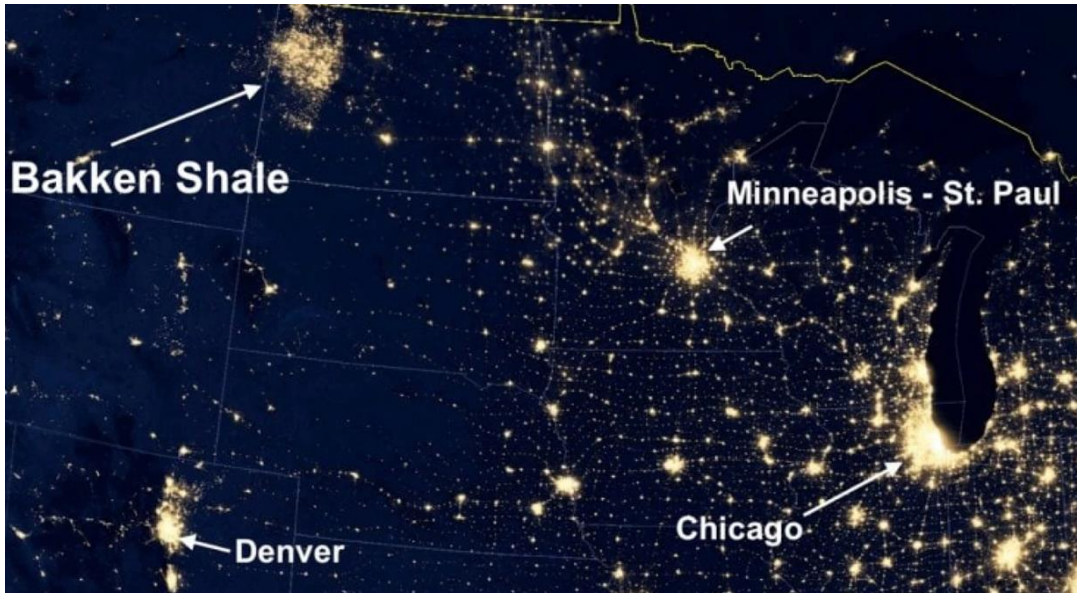
200-500 million cubic feet of gas flared daily in North Dakota



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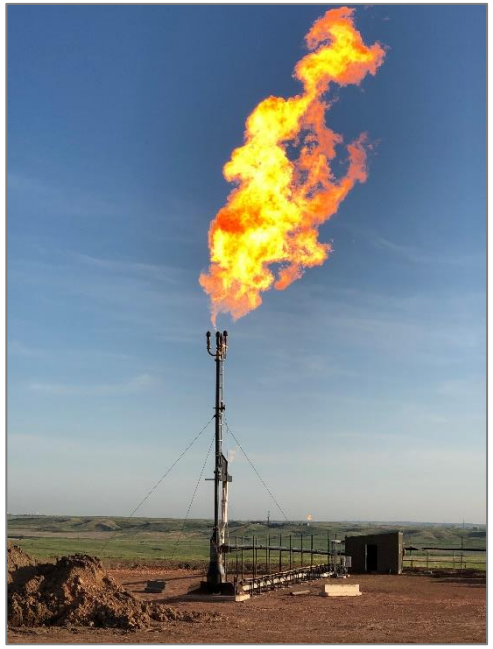
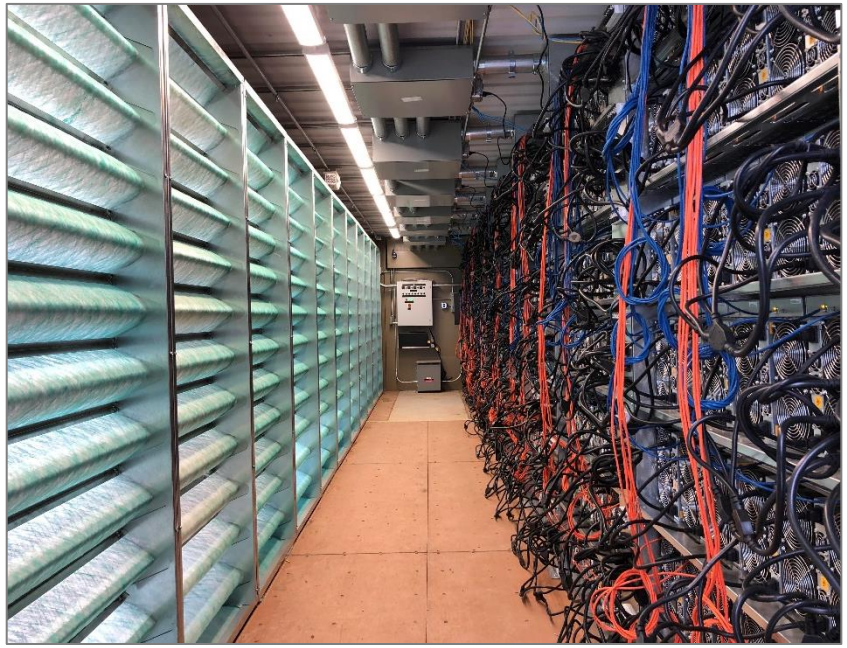
The Digital Flare Mitigation Solution

- Crusoe converts "stranded" natural gas into electricity for energy-intensive computing at the well site
- Digital Flare Mitigation® solves critical regulatory and environmental challenges for oil and gas companies by achieving beneficial use, reducing flaring and reducing emissions

Crusoe's Objective: help operators solve the regulatory and environmental challenges of stranded and uneconomic gas





Why Digital Flare Mitigation?

- ✓ Modular design allows for rapid turnkey deployment and mobilization
- ✓ Highly scalable up to many mmcfd
- ✓ High reliability with few failure points

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Digital Flare Mitigation

Stranded Gas

Power Generation

Energy-Intensive Computing

Remote Networking

- The Digital Flare Mitigation® system is a mobile and modular assembly of power generation, computing and remote telecommunications components optimized specifically for stranded gas resources
- Designed for portability, rapid commissioning, rugged oilfield conditions and modular scalability

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DEPLOYMENTS COMPLETED IN JUST DAYS

Easy Integration, Compact Footprint

Step 1: Connection Point	Step 2: Generator	Step 3: Compute Module	Step 4: Startup
Operator provides simple manifold and valve to existing gas line Typically, manifold directly onto line leading to flare	Crusoe provides generator system, delivered on portable trailer or skid	Computing modules delivered by truck Satellite antennae installed and aligned after delivery	Computers connected to generator Generator start up Flare becomes back-up gas plan
1-2 Days	***1 Day***	***1-5 Days***	***1 Day***

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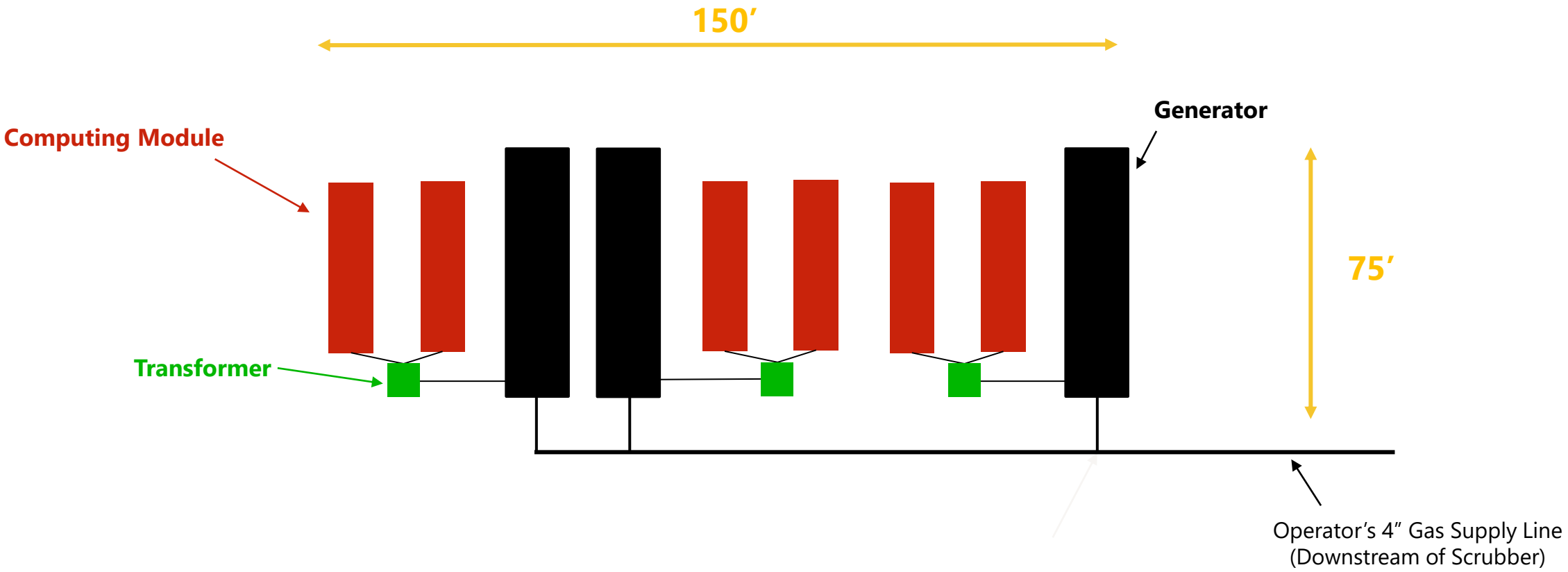
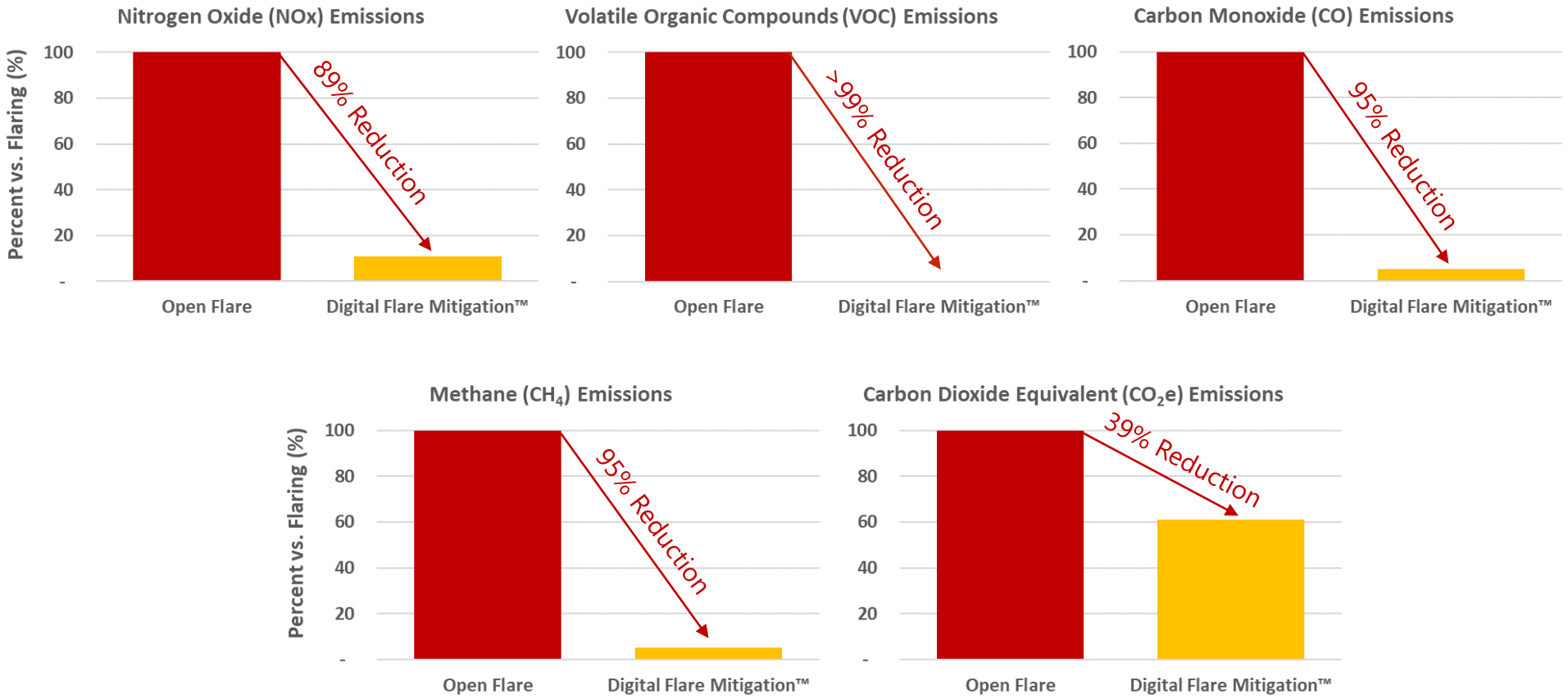
Site Diagram w/Skid Generators



900 Mcfd total: each 300 Mcfd package requires 50’ x 75’

Crusoe Reduces Emissions

- Relative to flaring, Crusoe's Digital Flare Mitigation® technology achieves deep reductions in emissions of methane, volatile organic compounds (VOCs), nitrogen oxides (NOx), carbon monoxide (CO), smog-forming compounds and CO2-equivalent greenhouse gasses.



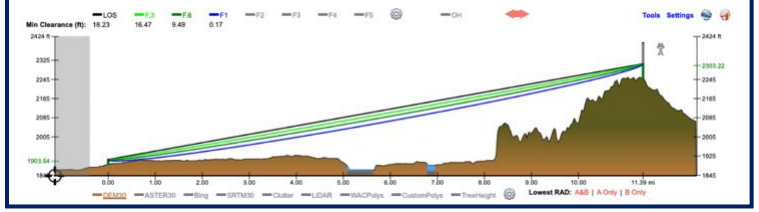
Analysis prepared by independent third-party emissions consultant for illustrative 1,800 Mcfd project with 1,500 MMbtu/mcf gas composition using U.S. EPA and ND DEQ methodologies.

Crusoe Digital Pipeline™ Architecture

Satellite: 40+ connections, redundant satellites

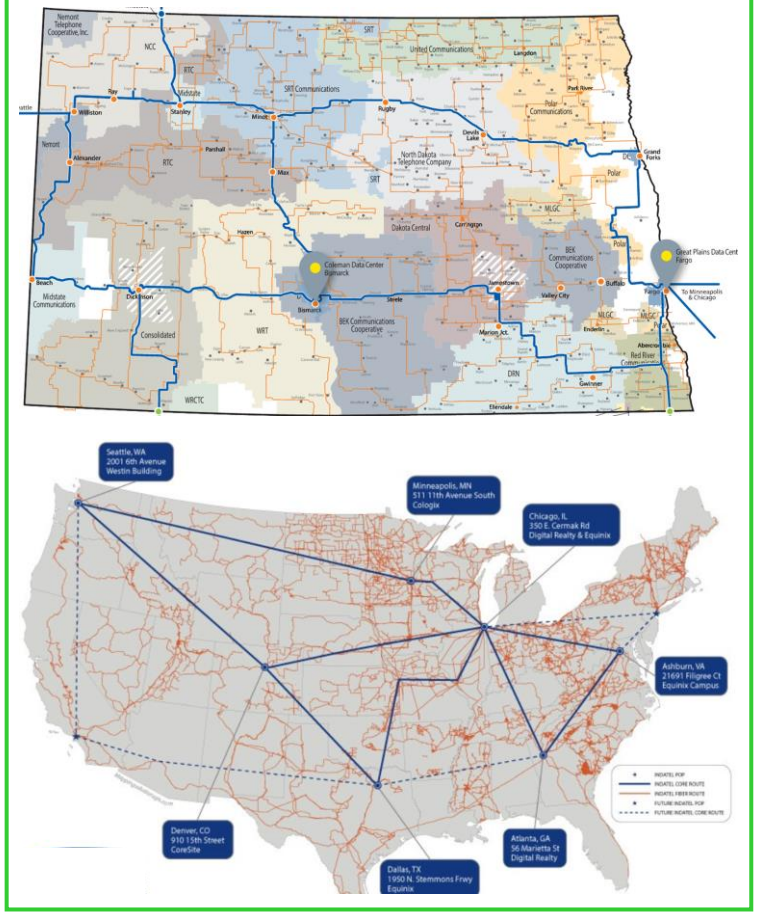
30 to 100 Mbps, ~600ms latency

Wireless: hybrid microwave and millimeter wave



150 to 600 Mbps, <10ms latency (1-way)

Fiber: combining private and public circuits



1 to 10 Gbps, <10ms latency (1-way)

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Use Cases for Digital Flare Mitigation®

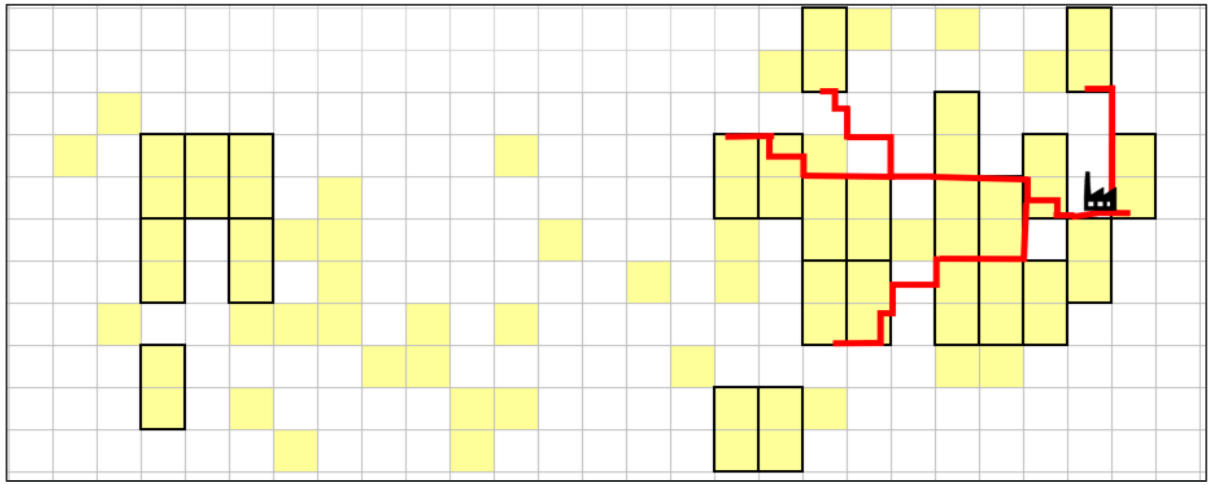
Existing Flare Gas

Scalable gas-capture alternative for producing wells that are currently flaring

USE CASES

- ✓ Producing wells without midstream infrastructure
- ✓ Delayed pipeline arrival
- ✓ Extended gas plant downtime
- ✓ Pipeline capacity challenges

Development Flexibility



Gas offtake plan for future wells to be drilled outside existing infrastructure

USE CASES

- ✓ Drilling exploratory or step-out wells ahead of pipeline build
- ✓ Satisfy expiring leases outside of existing infrastructure service areas

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Case 1: Right-of-Way Issues

Topography

Badlands and other natural features have caused midstream challenges for years

Surface Owner Challenges

Inability to get Right-of-Way agreement for some gathering systems or pipelines

Severe topography has no impact on DFM effectiveness

Digital Flare Mitigation® :

- ✓ Alternative gas solution if traditional infrastructure is delayed or not available
- ✓ Allows for development and production from otherwise stranded areas

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Case 2: Midstream Constraints

- Constraints in compression or processing capacity can leave a well without gas takeaway for extended time periods

- Extended Gas Processing Plant Downtime
- Interruptible Gas Contracts
- Compressor Station Issues
- Downstream Capacity Limits

Digital Flare Mitigation® :

- ✓ Allows operator to continue producing oil despite midstream constraints while preventing regulatory or emissions violations
- ✓ Operates reliably and independently of downstream infrastructure availability

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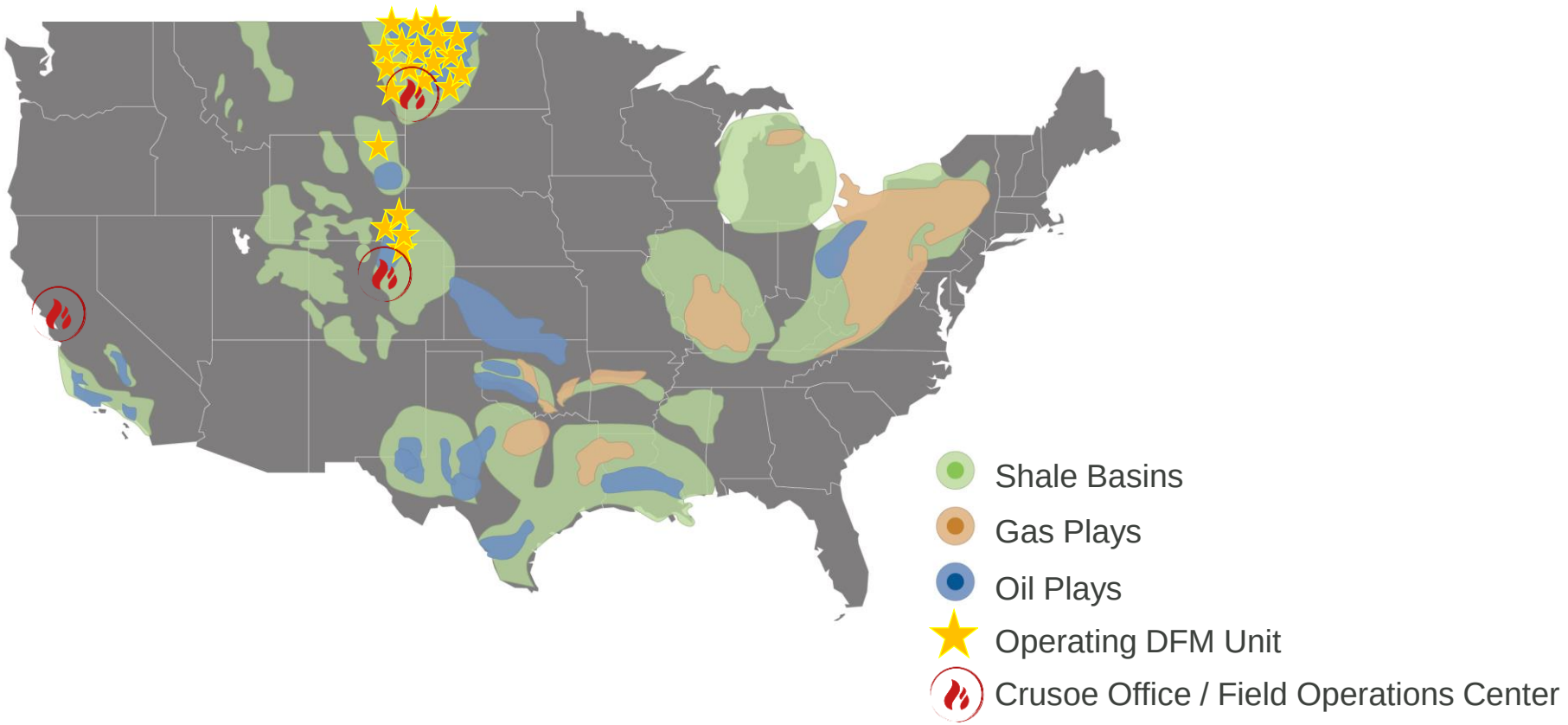
Case 3: Exploration Wells & Delineation

Digital Flare Mitigation® :

- ✓ Prevents flaring while evaluating performance of exploration wells
- ✓ Allows operator to more quickly and flexibly delineate acreage position
- ✓ Easy mobilization allows DFM to act as stop-gap prior to arrival of pipeline

Focused on the Bakken

- Crusoe's primary area of operations is the Bakken, with additional activity in the Powder River Basin and Denver Basin. We are proud to employ a large and growing staff in our Williston operations center.



Crusoe's Background

- **Operating since 2018**
  - 38 Digital Flare Mitigation® systems operating in Powder River Basin (WY), Williston Basin (ND and MT) and DJ Basin (CO and WY)
  - Ongoing simultaneous multi-basin operations
  - Operations centers in Williston, ND and Aurora, CO
- **Only one minor recordable safety incident in company history**
- **Approved MSAs with multiple publicly traded oil and gas companies**
  - ISN & PEC third party verification of safety procedures and training policies
- **Crusoe consults with leading regulatory and permitting firms to ensure compliance and positive stakeholder engagement**
- **Operations & business development teams assembled from high-quality E&P and service companies including:**

CRUSOE OPERATIONS TEAM

Ken Parker, VP Facilities Engineering, Operations & Safety Manager
- 25 years of midstream, compression and facilities experience domestically and internationally
- Lifetime safety record: EMR of 0.2 vs. industry average of ~0.6-2.0

Debbie Meeks, Williston Basin Operations Manager
- 35 years of gas-powered engine and generator experience for upstream and midstream companies

Travis Rynestad, Lead Electrician
- Master electrician with 25 years of oilfield electrical systems experience

Nick Corredor, Deployment Manager
- Field operational leadership roles within hydraulic fracturing service companies

Total field operations staff of more than 25 individuals provides reliable and continuous support throughout multiple basins

PIONEER NATURAL RESOURCES
LIBERTY OILFIELD SERVICES
MESA SOLUTIONS
CAMINO
Williams
BAKER HUGHES
Crestwood MIDSTREAM PARTNERS LP
WHITING
BG GROUP
Anadarko
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Management Team, Organization Structure

NITIN PERUMBETI
(CTO)

MATTHEW DENEZZA
(CFO)

CHASE LOCHMILLER
(CEO & Co-Founder)

CULLY CAVNESS
(President & Co-Founder)

Software / Networking

CAGRI AKSAY
(VP Software Engineering)

SYLVAIN VAILLANCOURT
(Director of Network Architecture)

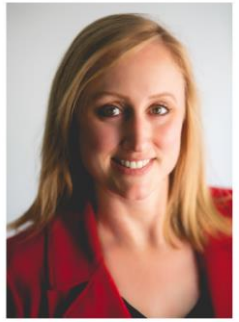
Finance

JAMIE ZYNGER
(Controller)

MARIAM NAZEMI
(Senior Financial Analyst)

MARK NOWAKIWSKY
(Financial Analyst)

Operations / Engineering



SHAYLA MARTIN
(Project Engineer)

KEN PARKER
(VP Facilities Engineering & Operations)

PHIL ARCHER
(Project Engineer)

BROOK KIMBER
(Director of Purchasing & Logistics)

DEBBIE MEEKS
(Basin Manager-Mechanical & Administration)

NICK CORREDOR
(Field Operations Manager)

Business Dev.

ANDREW LIKENS
(VP Business Development)

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Senate Bill 2328

- **Creates an extraction tax credit to reduce flaring with Onsite Flare Mitigation Systems**
  - Capped at $6,000 per well per month
  - Maximum of 12 months
  - Sunsets in 2023
  - Language prevents abuse and ensures that pipelines will continue to be first resort
- **Helps operators overcome installation costs of flare mitigation systems**
  - Piping and plumbing gas lines, valves, etc.
  - Dirt work
  - In the current environment, many operators can't justify even modest capex unless there is a clear near-term return
- **Generates many economic benefits for ND, often in excess of the cost of the tax credit**
- **Attracts a new industry to North Dakota: high performance data centers**
  - Jobs, skills and training that people are excited about
  - Supports service industries (electrical, logistics, roustabout, fabrication, dirt work, suppliers)
- **Proactive move ahead of potential legislation from new administration in Washington**
- **In line with state's goals to reduce waste and flaring and protect the environment**

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