Cultivating Safety: From Dig-in to Action in Improving Pipeline Safety

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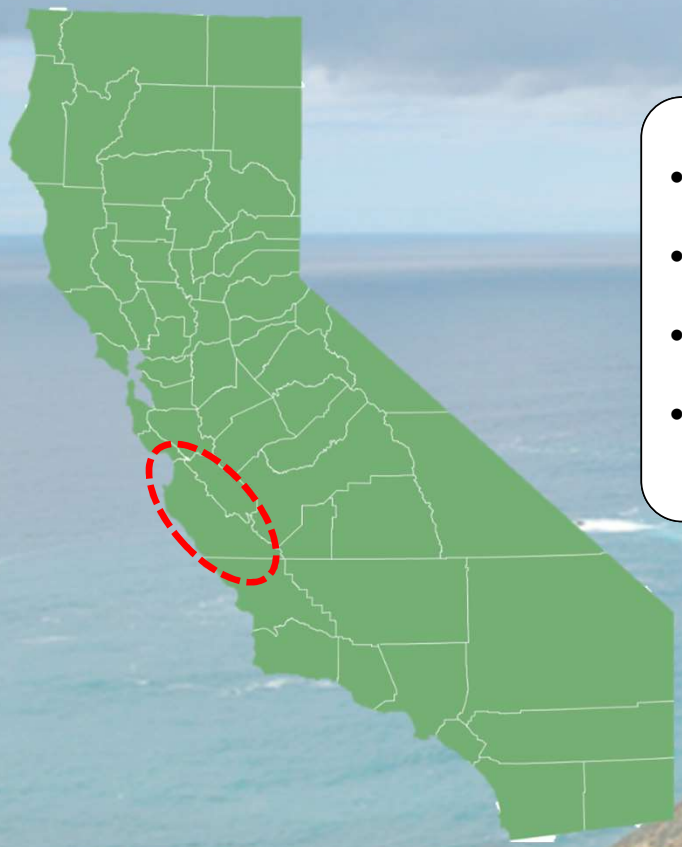
Overview

Company Background

One of the largest combined Gas & Electric Utilities in the United States	
Transmission Miles	5,654
High Consequence Areas / 710 Miles	1,334 / 362
System Internal Inspection (“Piggable”)	58%
System Pressure Tested	94%
Facilities	9 Compressor Stations 3 Storage Facilities 450 Regulation/Metering Stations
Customer Base	4.7 Million customer meters served in Northern & Central CA

Regional Challenges



- Central Coast – Monterey County
- Longest coastline by county
- >3 million visitors annually
- Year-round crop production

August 9-18th 2024 Monterey Bay Car Week

10-day car show with shows, races, auctions, and unveilings

More than 85,000 out of area visitors

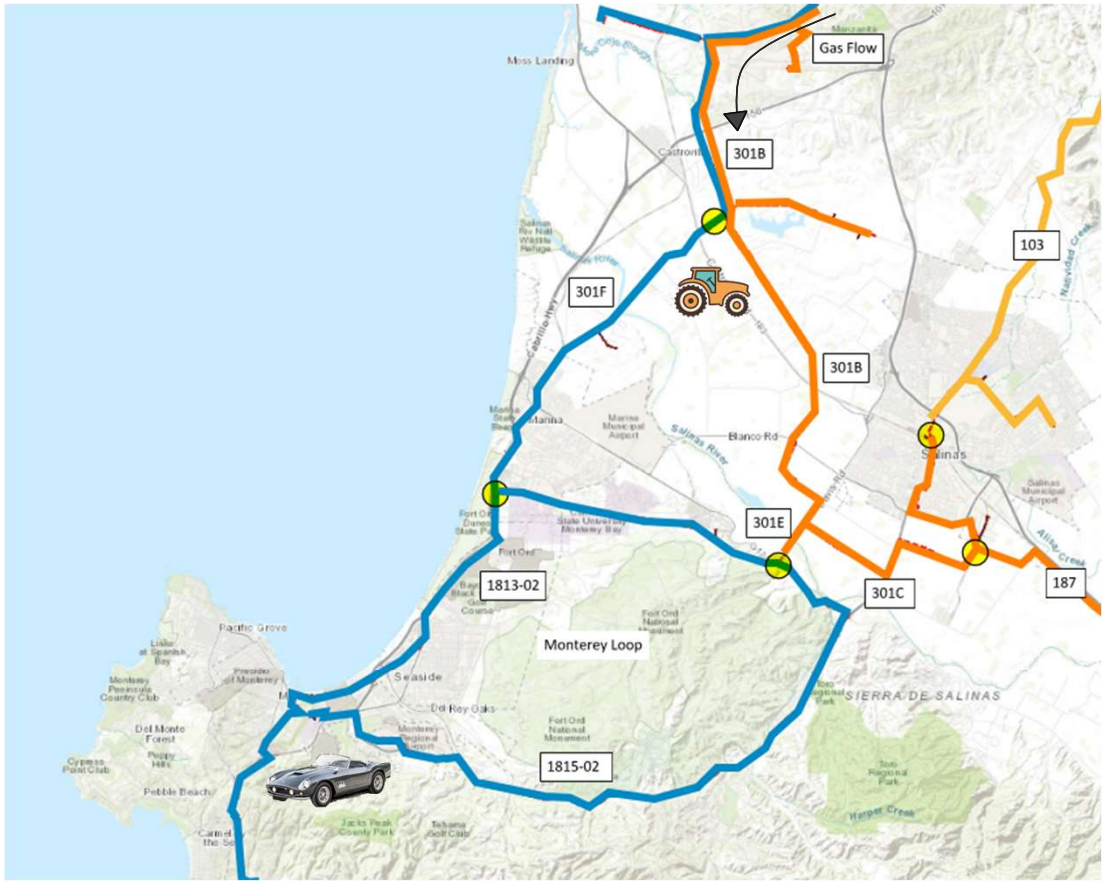
1,143 cars auctioned
Average price per car $476K

Most expensive car sold ~$17.1M 1960 Ferrari 250 GT SWB California Spider

Car sales exceeded $392M in 2024

Normal System Operation

- 301F through 8th and 1st Street Station is the primary feed to Monterey Loop
- 301B/301E through Davis-Res Station is the secondary feed into Monterey Loop
- 301B and 301C to Harkins Station supports 187 and 103 to California Station



Line Strike

- Thursday **8/15/2024** at 12:46 pm the 16” line was struck
- No injuries
- Expired Underground Service Alert (USA) ticket
- Pipeline markers on both sides of field (~250-ft)

Photo of plume

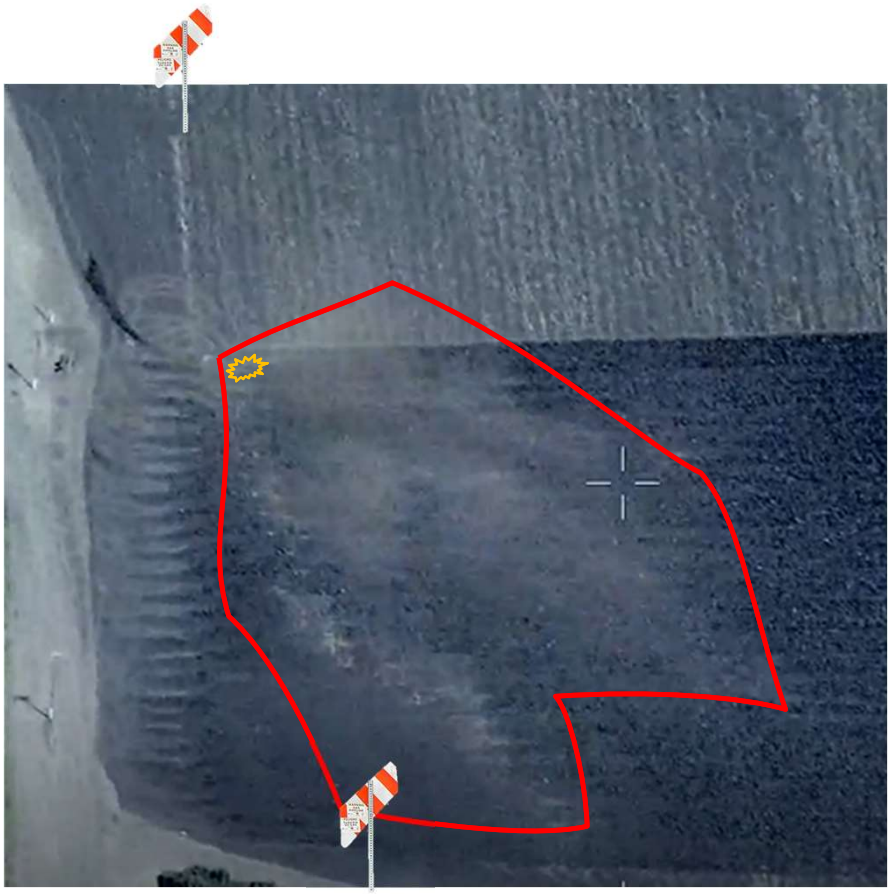


Photo from PG&E Aerial Patrol highlighting soil displacement

Line Strike

Hitch-mounted hydraulic plow

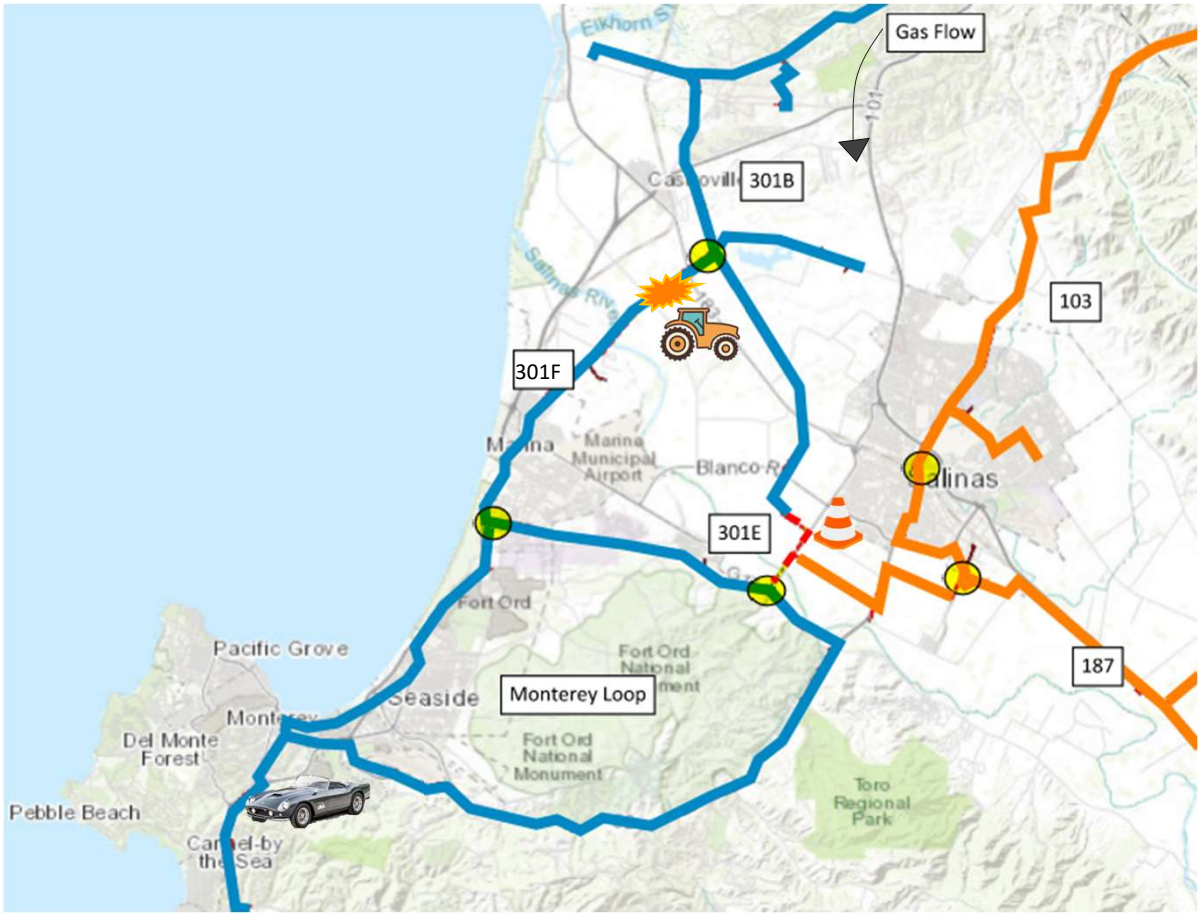
Line Strike

Plow depth up to 2-ft

Broken share point with inverted moldboard

Emergency System Operation

- The Monterey Loop was only fed from one trunk line, 301F
- The backup feed (301E and a portion of 301B) was out of service for a replacement project
- Line 301F was struck and SCADA recorded a pressure drop of 18 psig
- Gas continued to flow through 301F to supply Monterey Loop

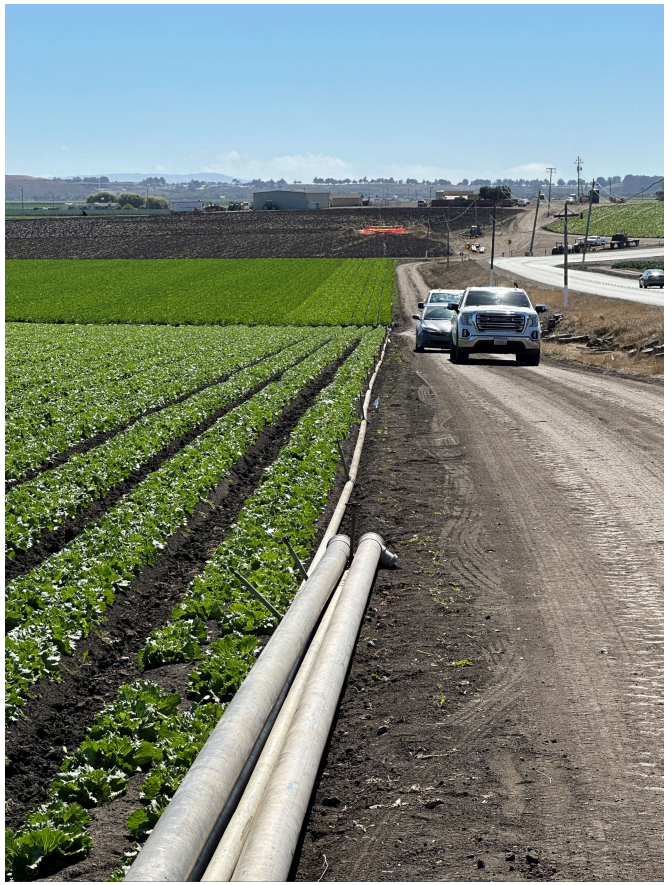


System configuration when dig-in occurred

Driving Decisions

Key Operation Data Points:

- L-301F only source for Monterey Loop
- An outage would significantly impact customers
- LNG setup was 6.6 mmscfd, with a 24-hour timeline (half of PG&E fleet)
- Restoring flow on L-301E fastest way to stabilize the system and workforce
- Isolated from the public
- Safe for gas venting
- Protect backup feeds with enhanced aerial patrol



Understanding the Plume

Structures & Exclusion Zone

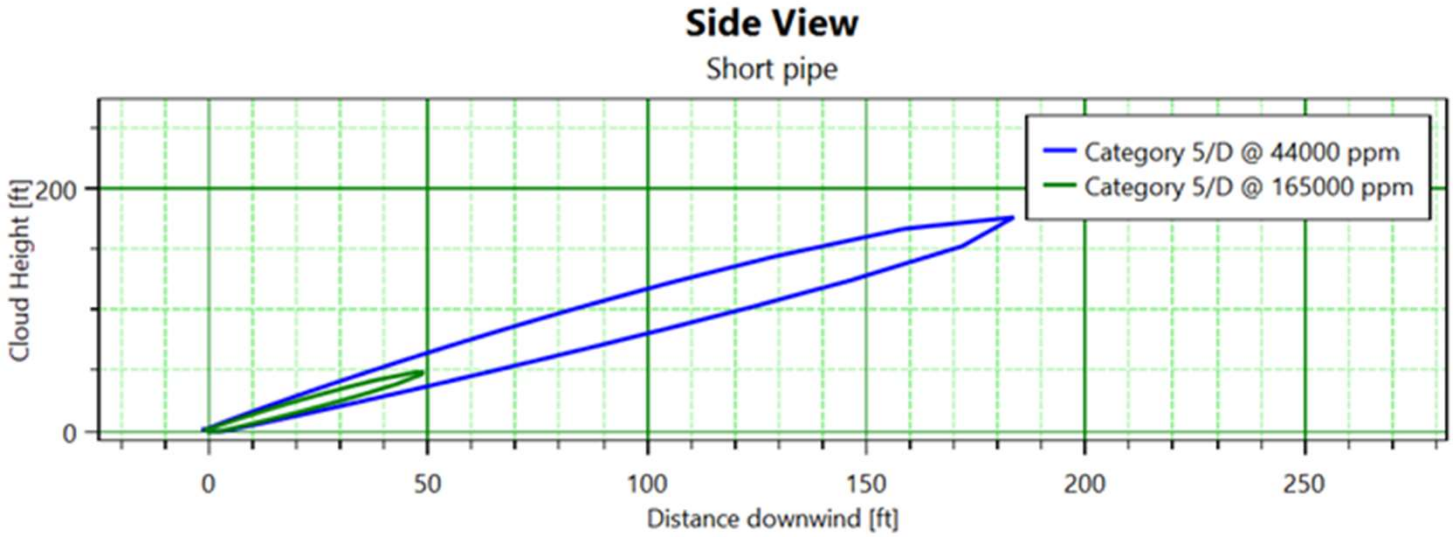
- 12KV line ~100’
- Structure ~450’
- Exclusion zone

Sizing of the Loss / Damage

- No upstream metering present
- Soil displacement
- Hole size assumed to be 2 inches

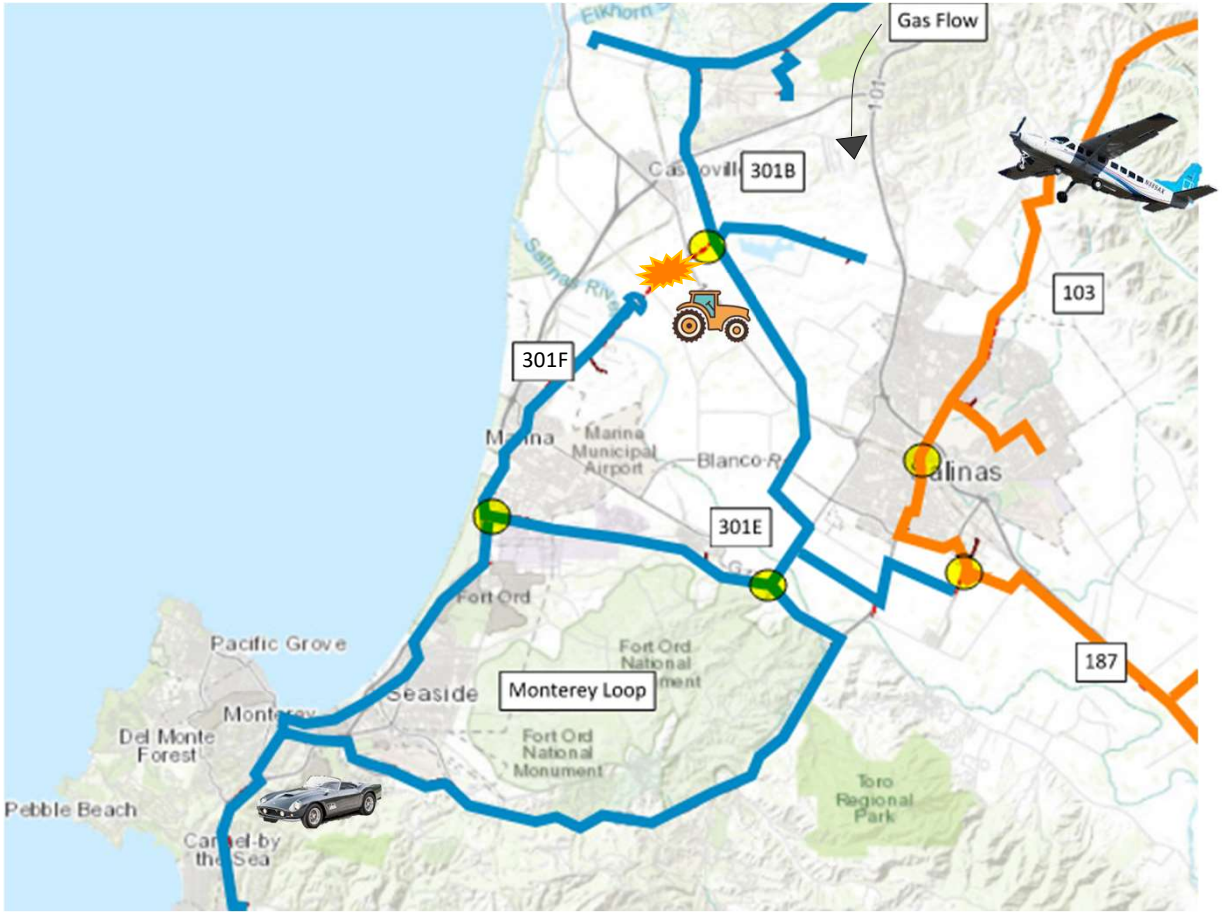
Assumptions for the Plume

- Weather
- Hole size and clock position
- Gas release volume



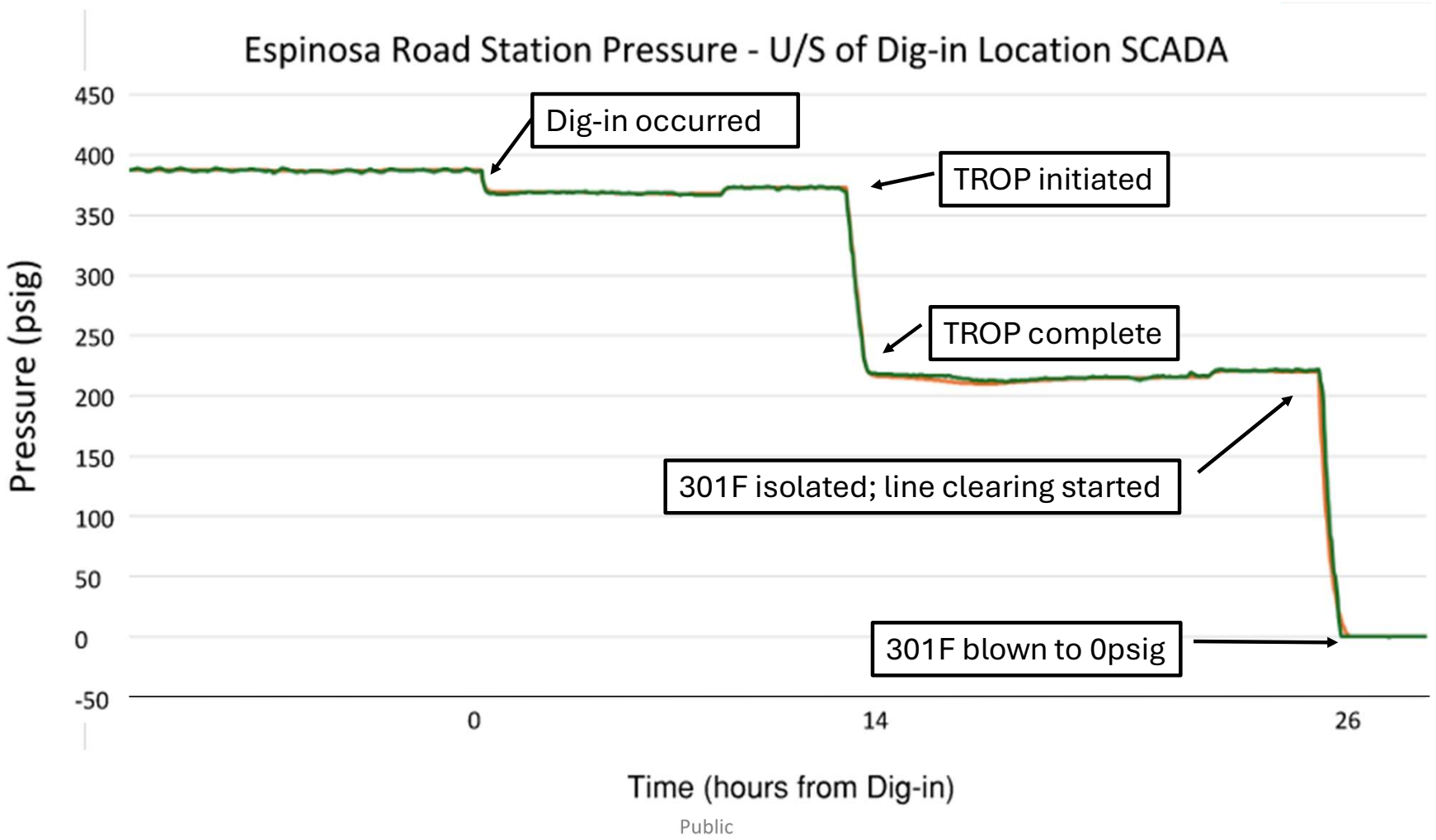
Emergency System Operation

- A Temporary Reduction of Pressure (TROP) was completed
- The isolated sections of 301E and 301B were brought back to service
- The isolation of the dig-in location was able to begin
- Daily prescribed aerial patrol of backup feed



System configuration during dig-in repair

Emergency Timeline



Active Damage

Active Damage

Historical Damage

Emergency Resources

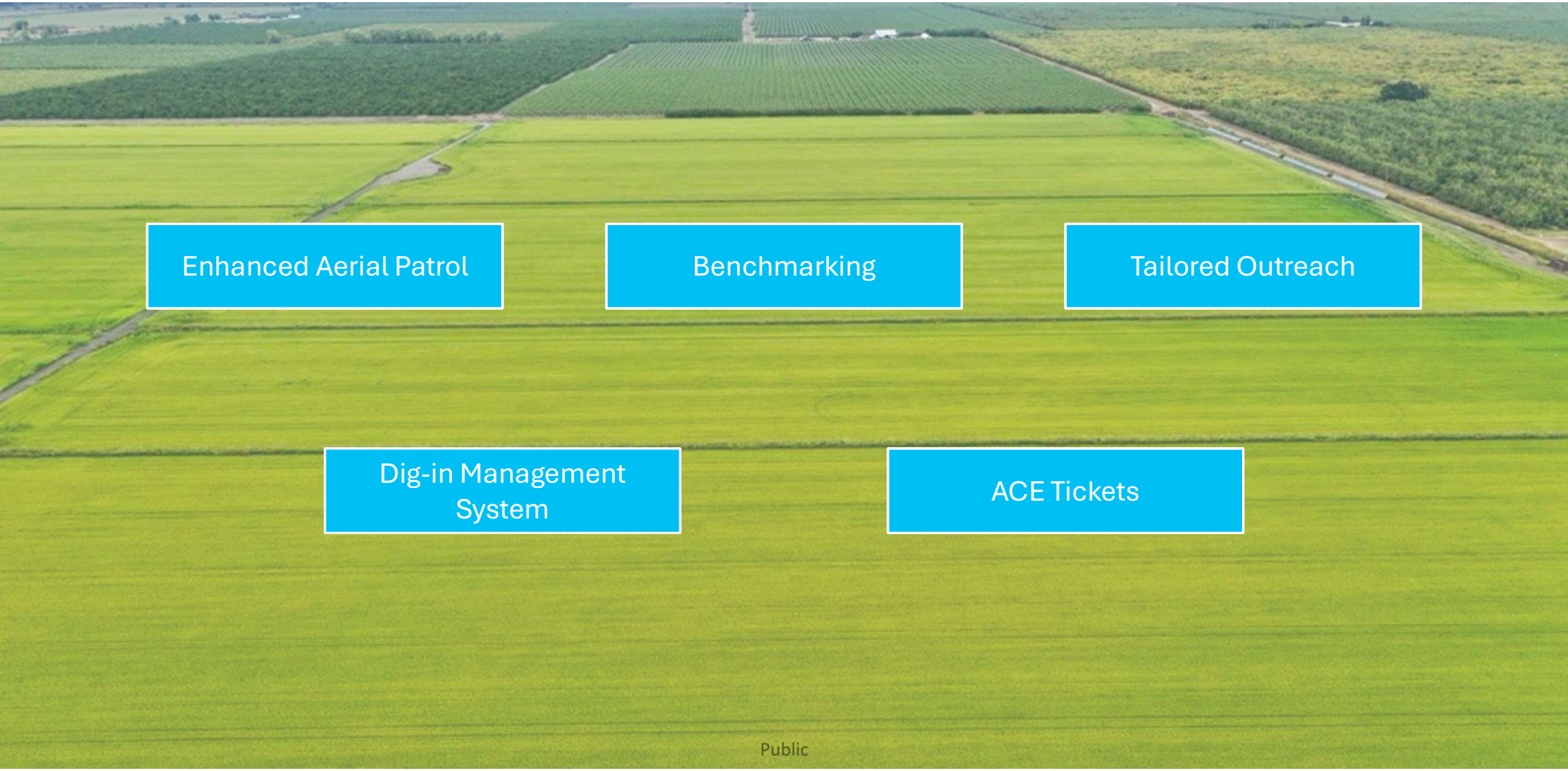
- PG&E Gas Emergency Response Plan (GERP)
- Mobilization of Gas Emergency Center
- Local emergency responders (evacuations)
- California Highway Patrol (road closure)
- Pipeline Association for Public Awareness (pipelineawareness.org)

Post-Incident Process Enhancements

Agriculture Damage Reduction Program (ADRP)

New Technology Exploration

ADRP Elements



ADRP Aerial Patrol

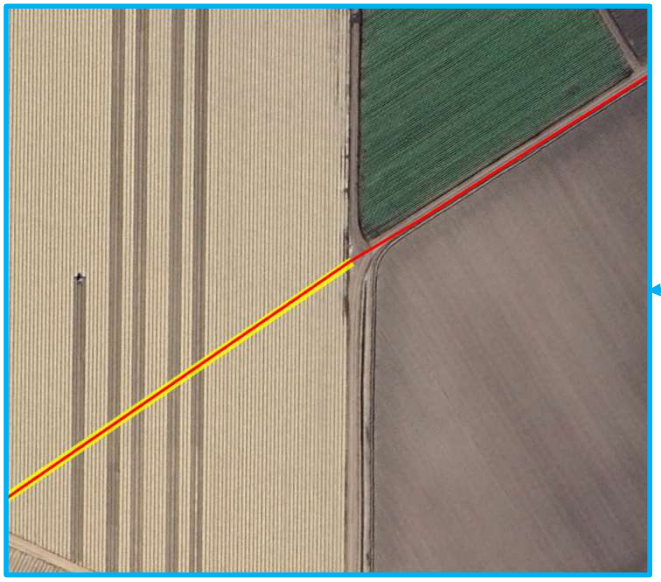
Tailored Agriculture Aerial Patrol

- PG&E's Aviation Services fixed wing owns and operates two Cessna Caravans
- Aircraft are equipped with high-resolution mission specific equipment
- Using GPS overlay on real-time video for precise navigation and location reporting to group responders for identified hazards

ADRP Aerial Patrol

Identify segments within agriculture areas

- Traversing active fields
- Access roads



ADRP Aerial Patrol

Identify land use and base patrol on soil turnover frequency



Low
Rangeland
Grazing Land
Permanent Pasture

Medium
Orchards
Vineyards
Permanent Crops

High
Cropland
Arable Land
Anything Cultivated

Benchmarking with Industry

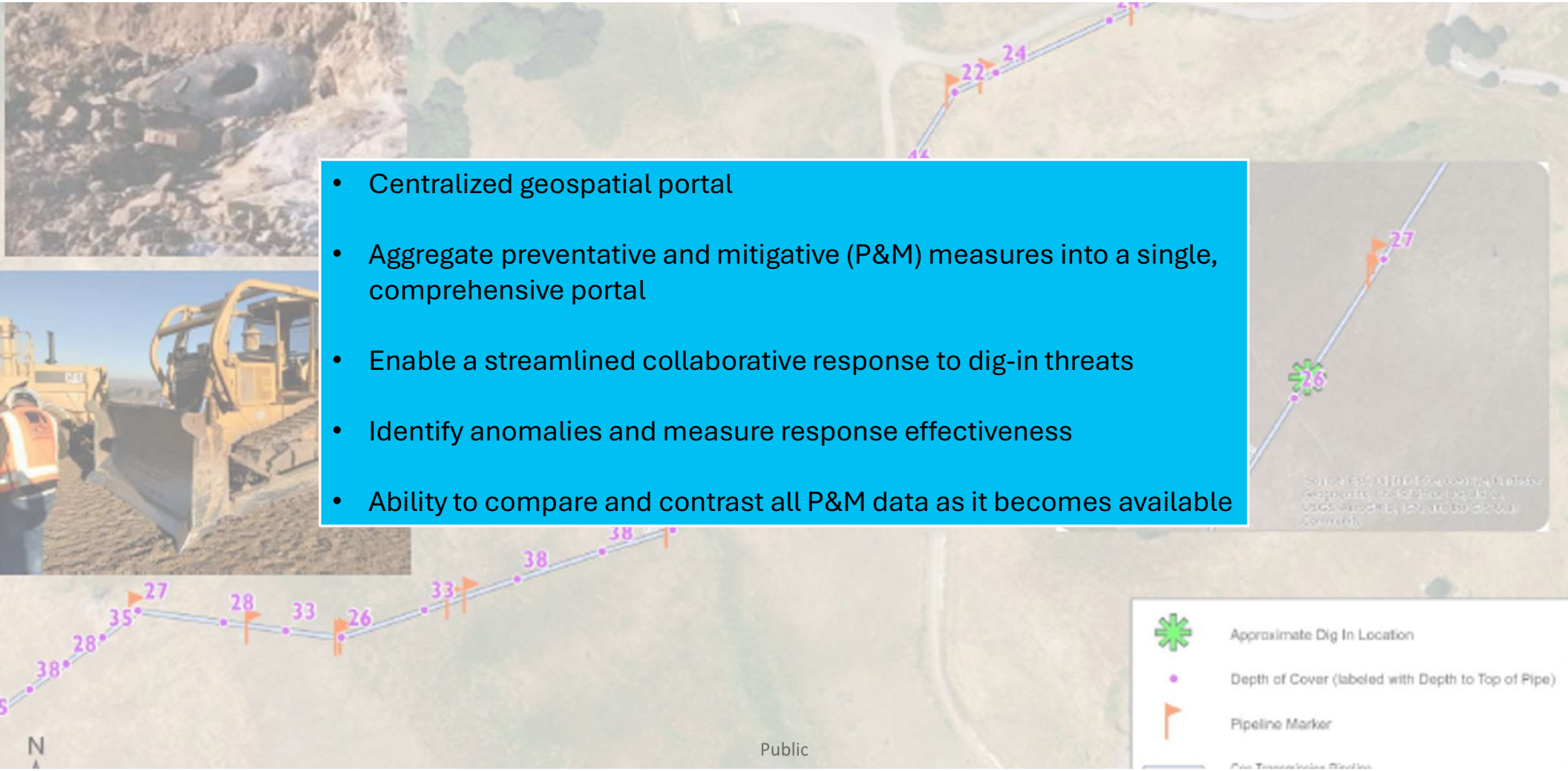
- Reviewing Damage Prevention programs and enforcement strategies
- Comparing incident data tied to farming activities
- Assessing outreach models
- Analyzing land use agreements
- Studying performance metrics
- Exploring cross-sector partnerships with ag organizations and regulatory bodies

Ag Tailored Outreach

- Landowner engagement
- Ag safety programs
- Seasonal outreach
- Feedback and collaboration
- Stronger community trust

Dig-in Management System

- Centralized geospatial portal
- Aggregate preventative and mitigative (P&M) measures into a single, comprehensive portal
- Enable a streamlined collaborative response to dig-in threats
- Identify anomalies and measure response effectiveness
- Ability to compare and contrast all P&M data as it becomes available



Area of Continual Excavation Tickets

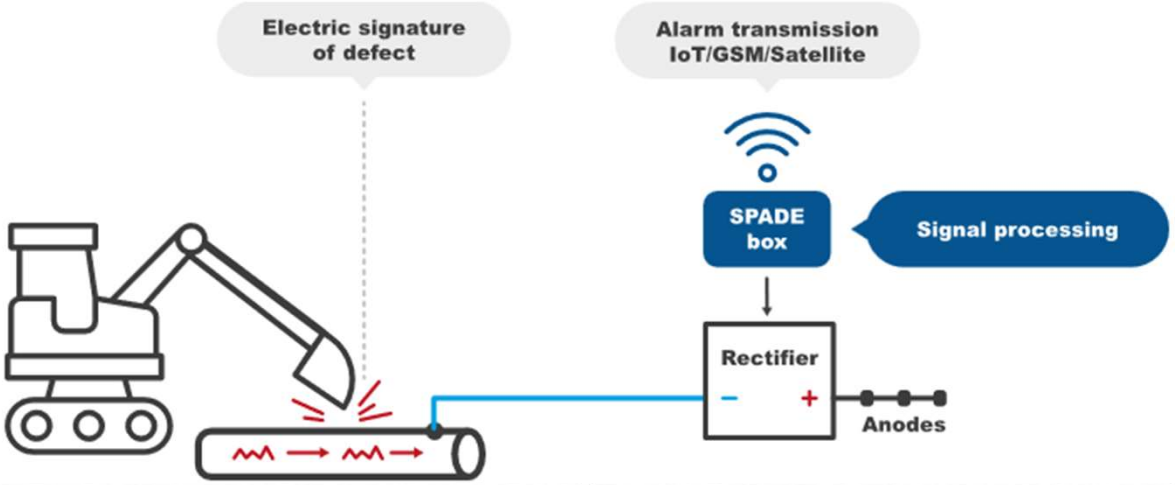
"Digging Safe is ACE"

- Became available July 2020 following a fatal gas explosion in 2015 caused by deep ripping
- Special dig ticket for farmers and certain flood control operators which complies with the "call before you dig" law
- Can be used for everyday ag practices like tilling, discing, cultivating, planting, harvesting, etc.
- Valid for one year from date of issuance
- Pursuant to Government Code 4216.10 and CCR Title 19 Division 4 Chapter 4

New Technologies for Dig-In Detection

SPADE

- Installed on cathodic protection rectifiers
- Real-time monitoring
- Instantaneous alert of mechanical impact



Satellite Change Detection

- Right-of-Way encroachments
- New construction
- Farming operations
- New structures
- Land movement

Takeaway

What can we learn from this to make our pipeline safer?

Thank you

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