2012 Prevention First Symposium:

Smart Pipe Project

October 24th, 2012

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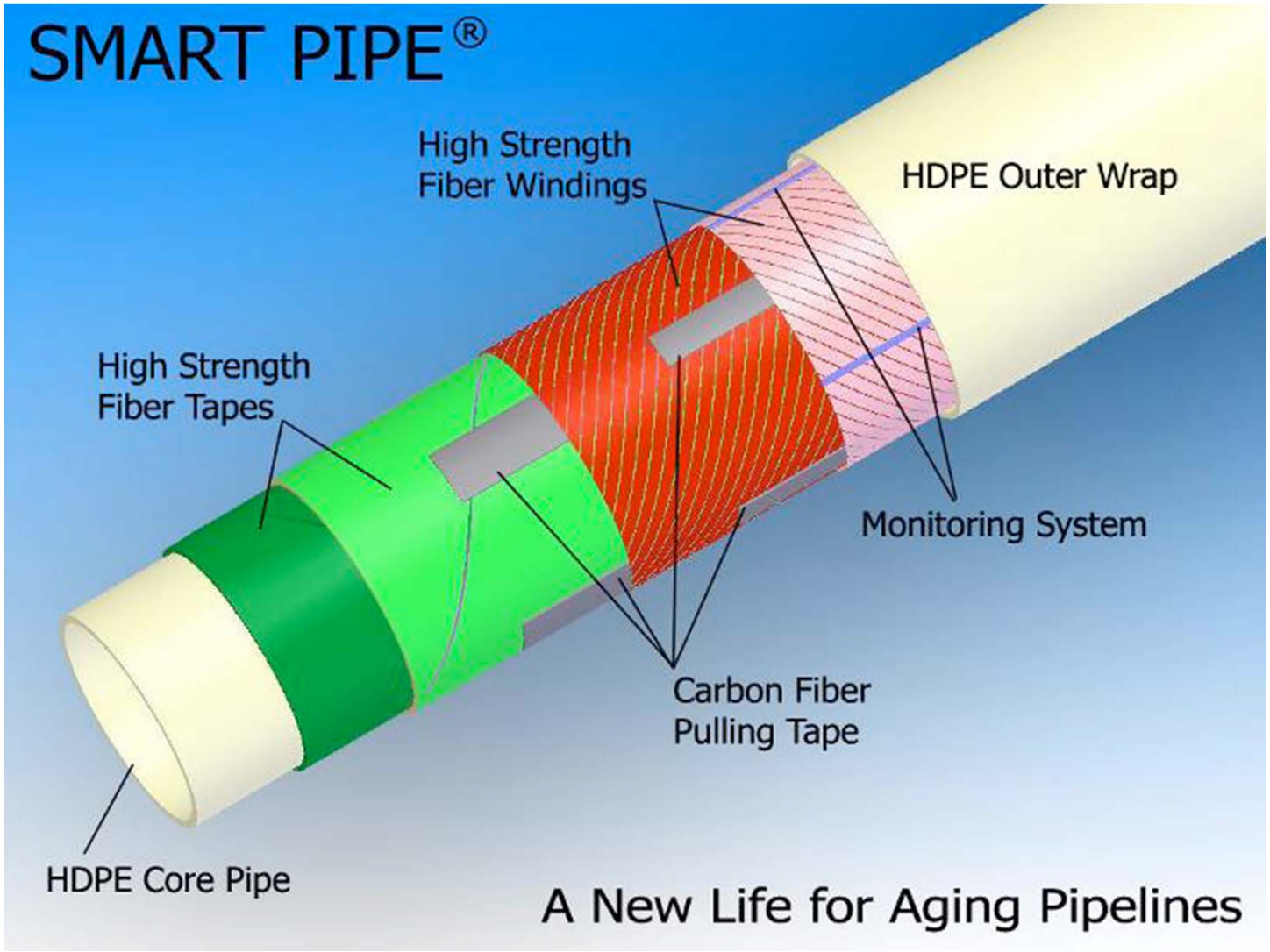
Agenda

- Technology
- Project Overview
- Installation Challenges
- Operational Experience
- Take Aways

What is Smart Pipe?



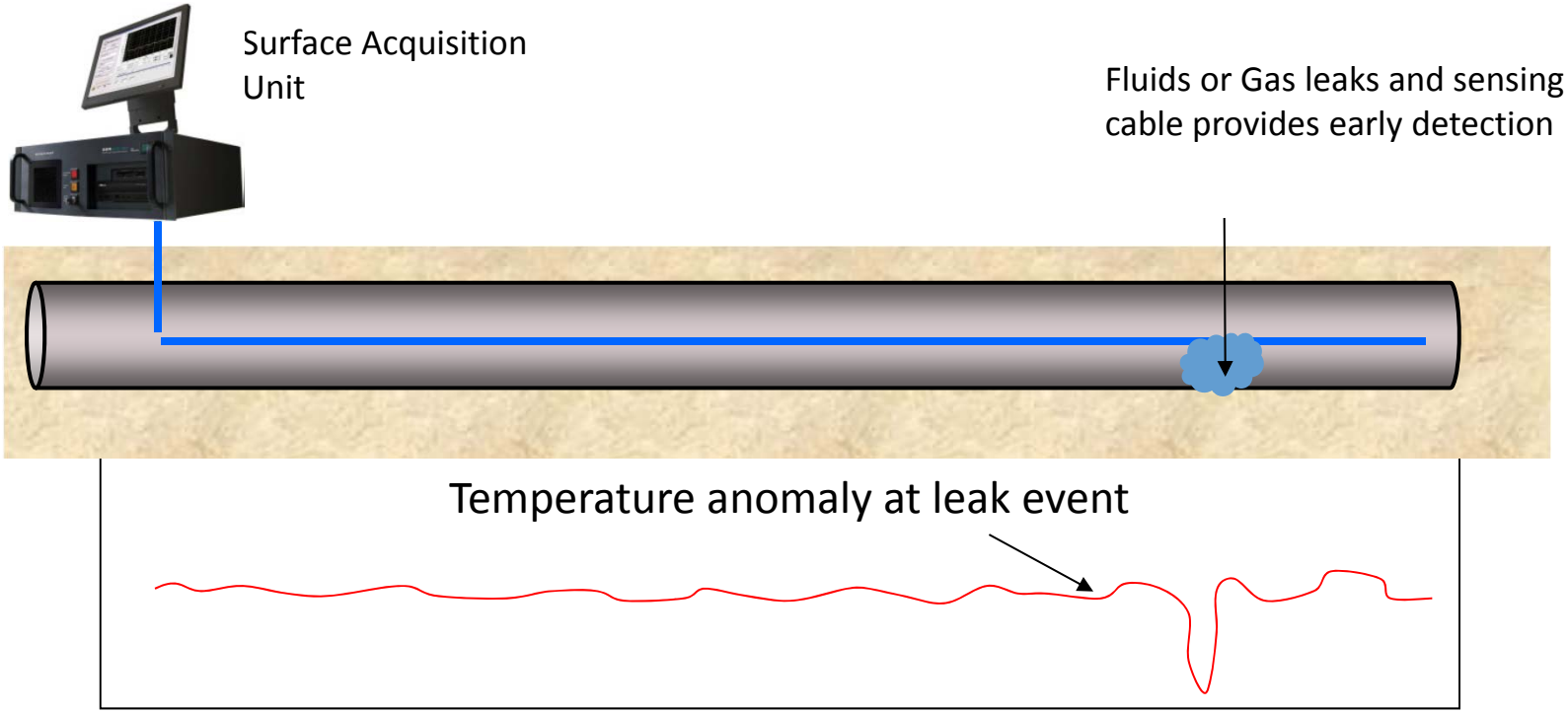
Product Design

1. HDPE Core
   - Reduced erosion
   - Corrosion resistant to oilfield fluids
   - Temperature rating of 140°F

2. High strength fiber tape and windings
   - Higher pressure ratings (up to 1000psi)

3. Fiber Optics
   - Continuous health monitoring
     1. Temperature – leak detection
     2. Vibration – warning of potential mechanical damage
     3. Strain – indicator for material creep

Fiber Optic Measurement

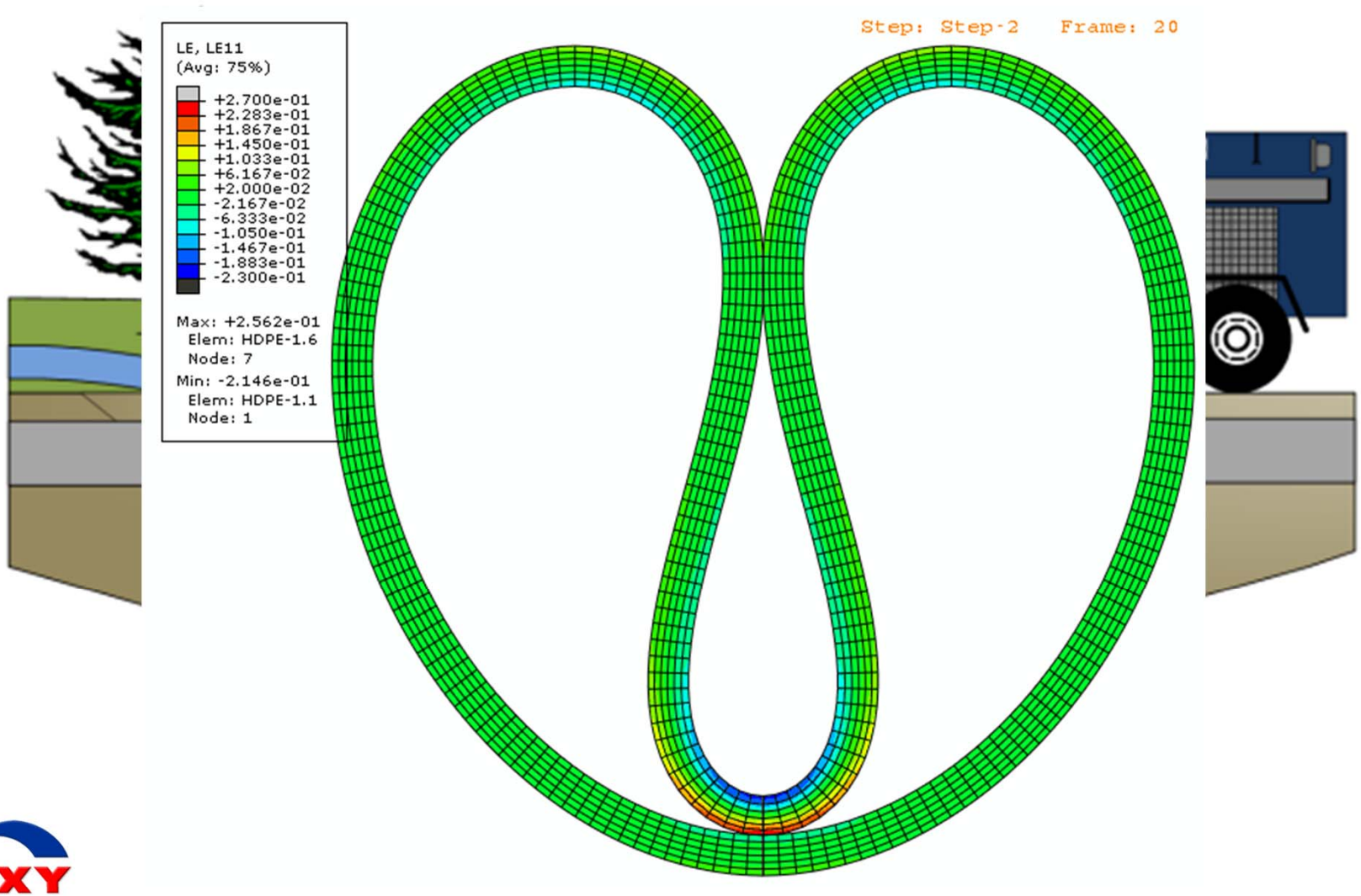


Manufacturing Process

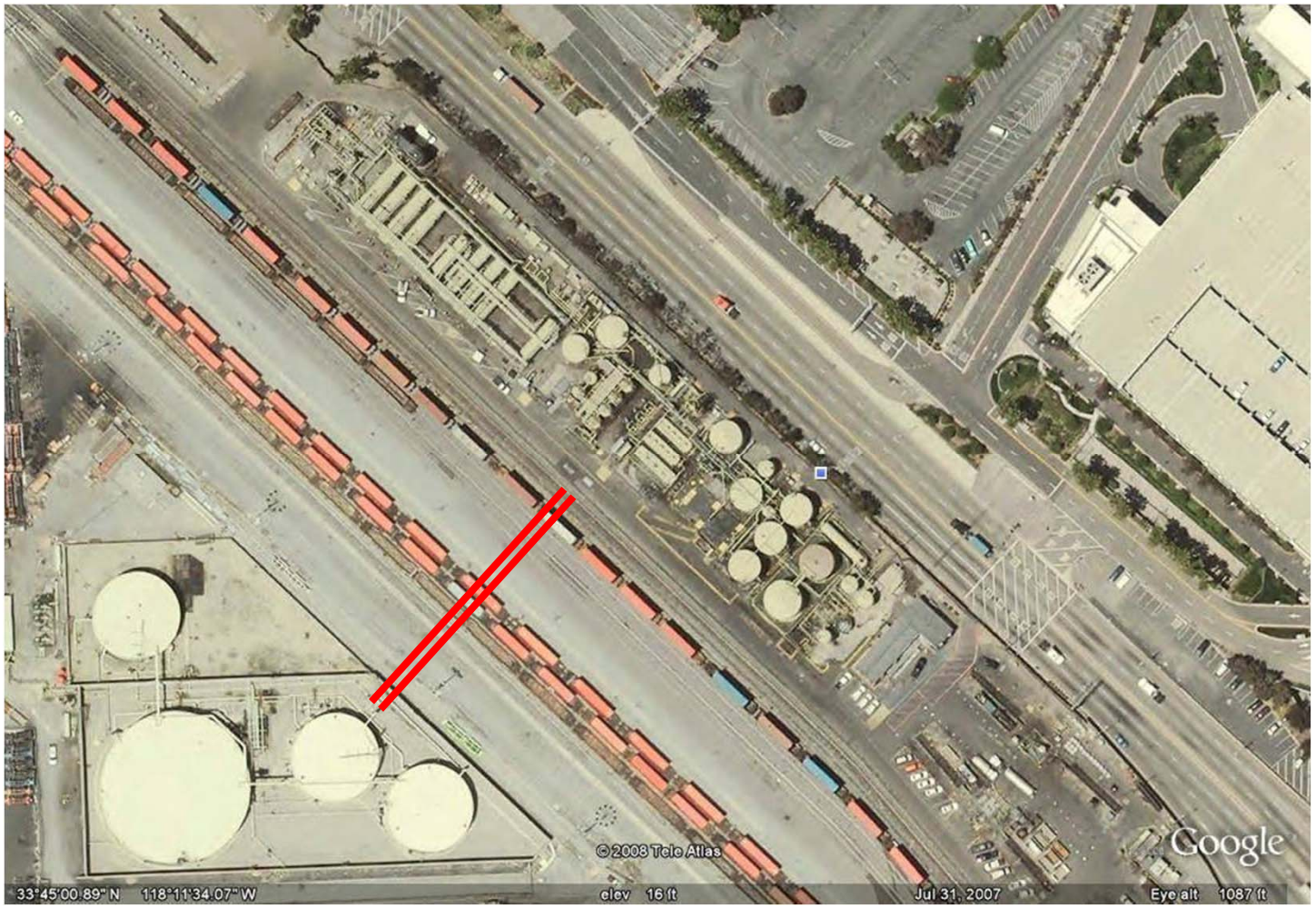
- In shop or In field
  - Smaller sizes can be spooled
  - Can fabricate continuous sections up to a few miles long
  - Fabricate and install up to 1 mile/day
- Can handle larger pipe sizes
  - 32” for shorter sections
  - 16” for longer runs

Manufacturing Process Video

Designed for Slip Line Applications



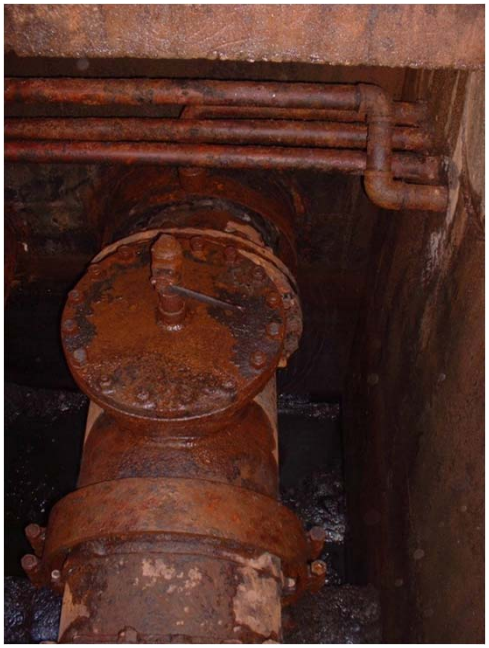
SmartPipe Project at Oxy Long Beach



Scope of Work

Replace a Clean Oil and Water Reject line (~300ft each)

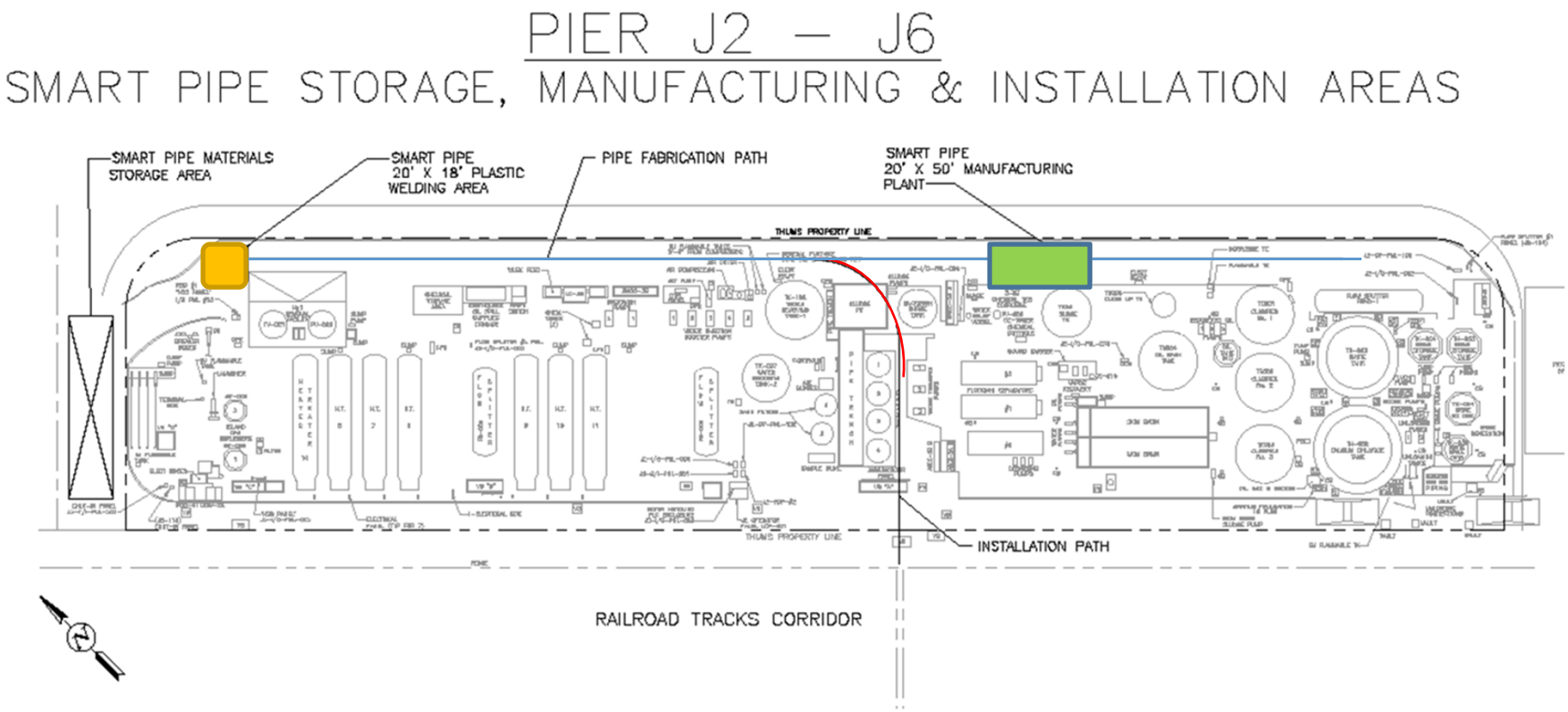
- Install 20” SmartPipe inside existing 24” Clean Oil pipeline
- Install 14” SmartPipe inside existing 20” Reject pipeline
- Connect and integrate fiber optic monitoring system



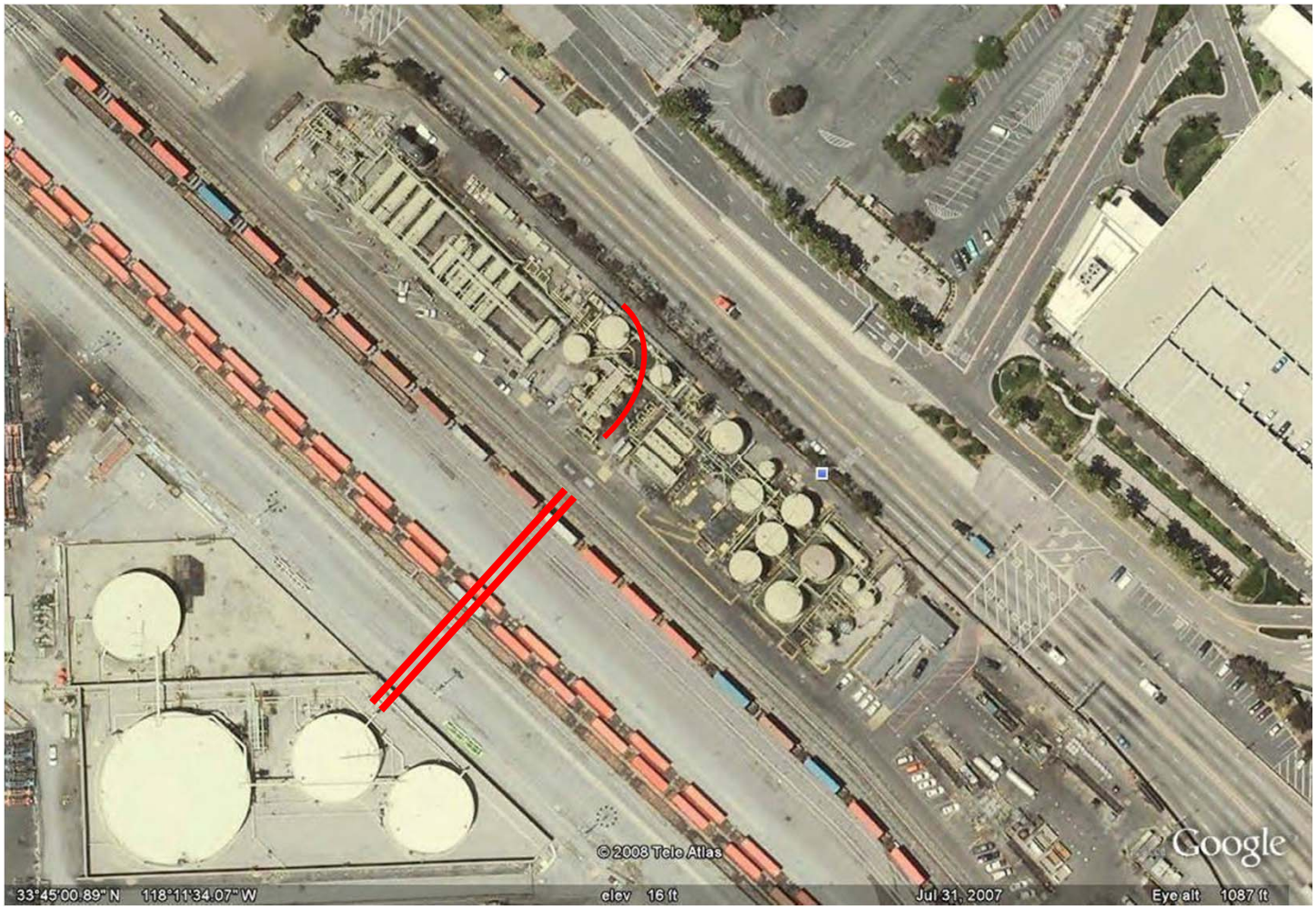
Installation Challenges

1. 1st industrial application
2. Site logistics
3. State and Federal waivers

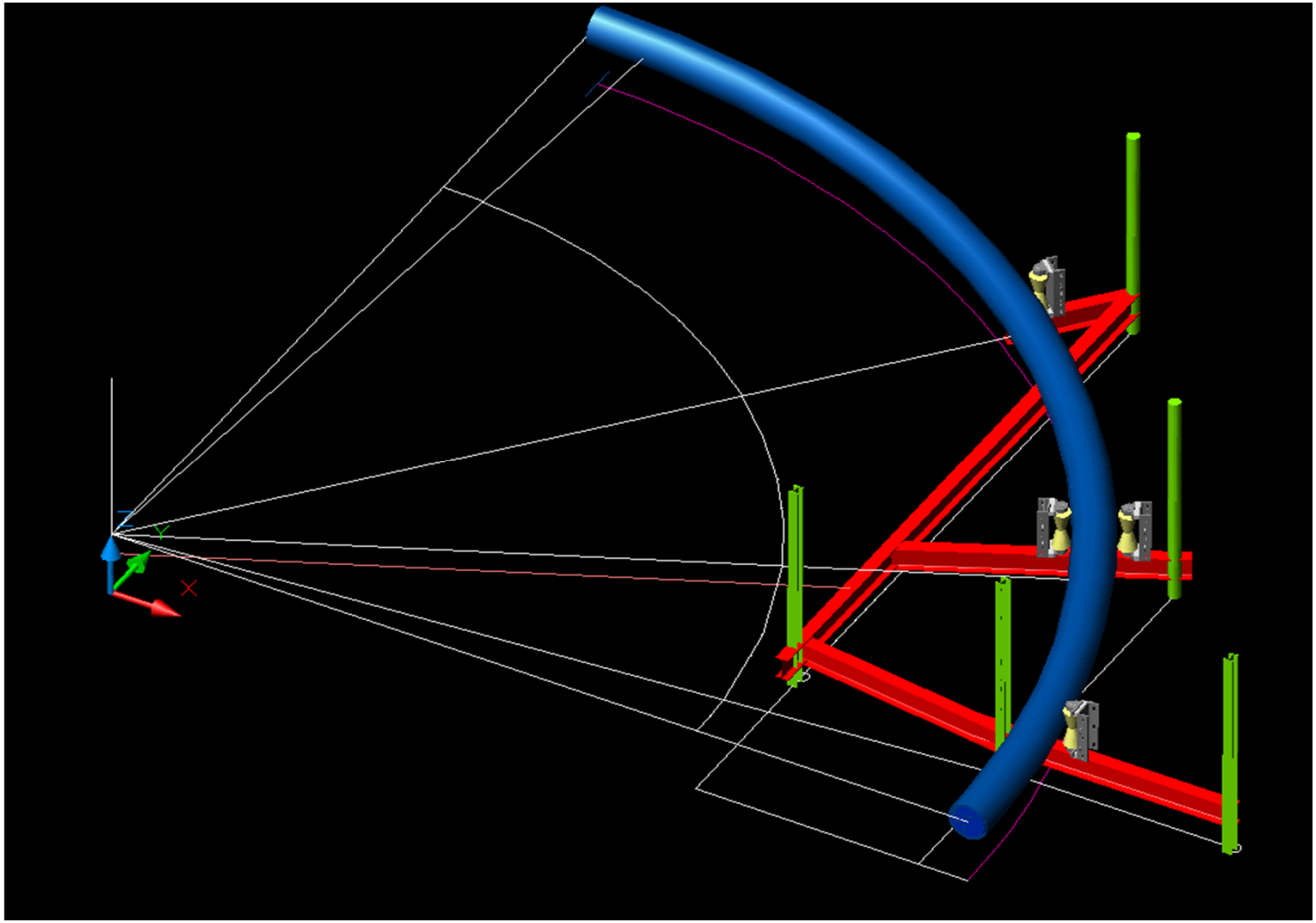
Site Logistics – Onsite Fabrication



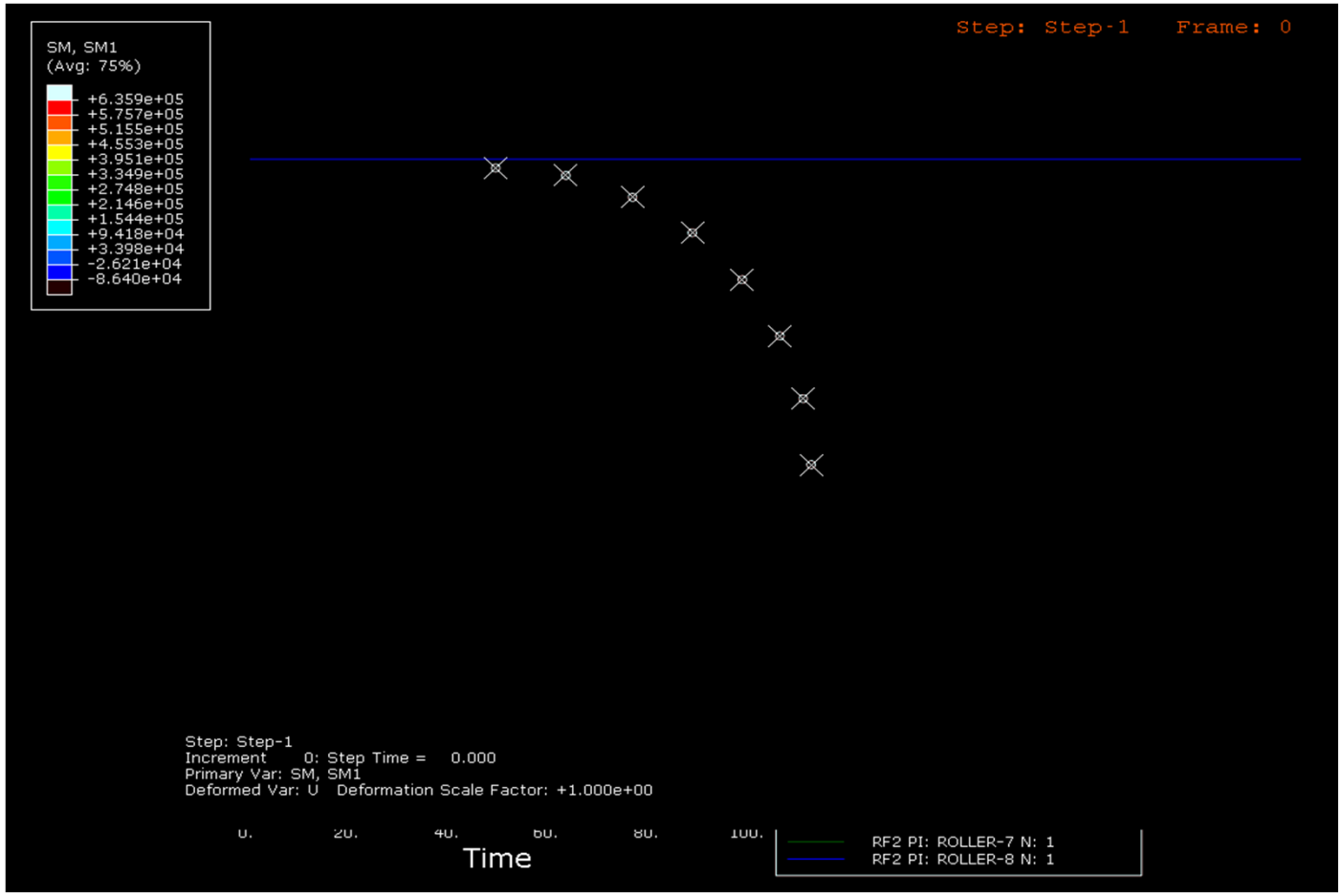
Site Logistics – Installation Path



Modeling the Bends



Modeling the Bends - FEA



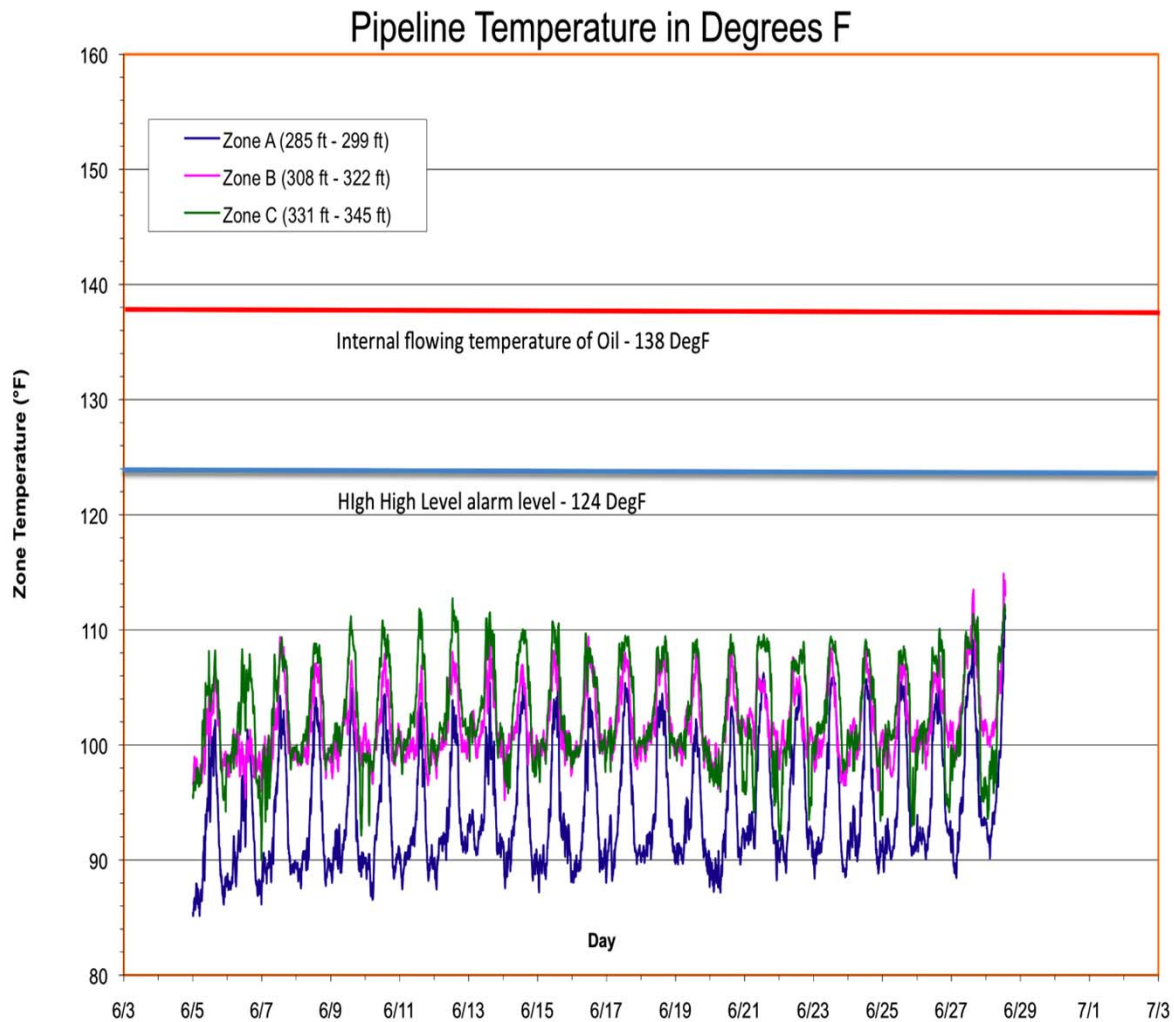
The Bends In Practice

A Congested Entrance

The Waterfall

In Operation

- Alarm
  - Tes
- Data
- Have
  years



Take Aways

- A challenging installation
- Lines are performing as designed
- Worth considering for future applications

Q&A