

Contractor Cases for Using Temperature Monitoring All Along the Pipeline in CIPP Mid-Sized Pipe Installations

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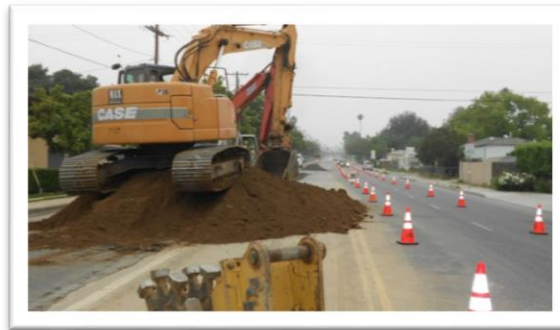
Zia Systems LLC Overview

Zia Systems, LLC is an international high-tech business, based in central Ohio, specializing in integrating wired and wireless sensor technologies that allows customers to remotely monitor and control assets.

Zia's sensor technology provides onsite and remote real-time monitoring of temperature readings, all along the pipeline, during the CIPP (Cured In Place Pipe) rehabilitation process. Zia's innovative technologies benefits contractors, engineers and municipalities by ensuring the quality of the pipeline curing process and can drastically reduce rehab costs.

CURED IN PLACE PIPE (CIPP)

- A trenchless process to repair damaged pipelines, developed in 1971.
- An economical alternative to traditional open cut replacement techniques.
- Involves the insertion of a resin lining tube inside the existing sewer line.
- Over 17 million ft. of liner installed annually.

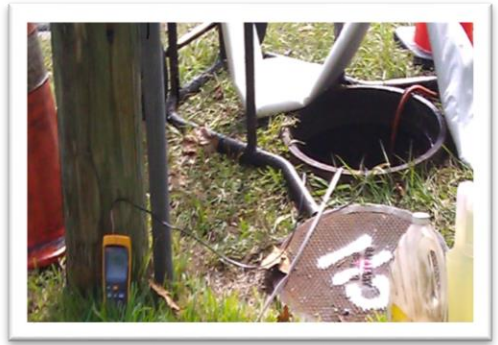


Cured in Place Pipe (CIPP)

- Resin-based liner sleeve inverted or pulled in host pipe.
- Typically from manhole-to-manhole.
- Hot water, steam or UV light used to cure the resin to form a tight fitting pipe within a pipe.
- Can take from 2 hours to 2 days.



CIPP THE PROBLEM



- Often times, temperature readings are taken manually with thermocouples, at the manholes which are typically over 50 feet apart.
- Readings are typically manually logged.
- Readings along the pipeline are unknown.
- Difficult to verify that the cure was properly done.
- Heat sinks can occur on a very small scale, so granularity of measurement is important
- Unknown thermal barriers and water infiltration can lead to faulty results.

THE RESULT

- Improper curing can cause imperfections.
 - Lifts and Surrounding Environmental Contamination
- Unknown cure temperatures and time can cause:
 - Overcooking
 - Increased Fuel
 - Increased Labor Costs
 - Undercooking
 - Shorter Liner Life
 - Expensive repairs
- Manual data entry can lead to errors in record keeping.
- Difficult to warranty the work.



WHAT IS CMS?

- CMS TM - Optical Fiber Curing Monitoring System
- A patented system made up of fiber optic sensor cable and sophisticated software that becomes an integral part of the CIPP lining process.
- A tool to help automate data collection.
- A technology that delivers accurate and timely data to pipeline infrastructure stakeholders to help ensure quality of performed work.
- Technology that improves on the “old way of doing things.”

THE SOLUTION: HARDWARE

- A fiber optic cable, used to monitor the temperature within a pipeline, is first connected easily to a controller, which is then plugged into an onsite laptop.

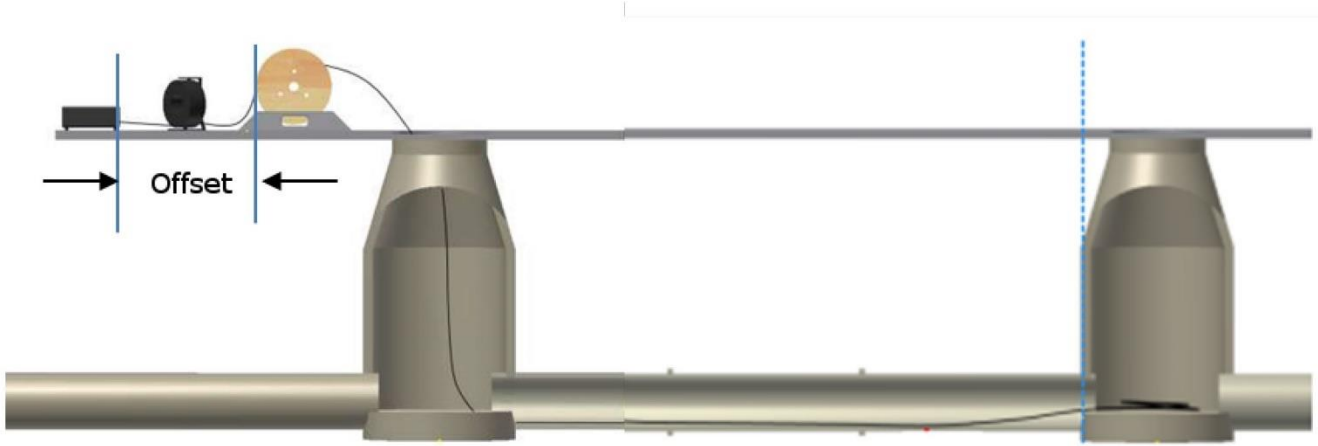


Fiber Optic Cable

DTS Controller

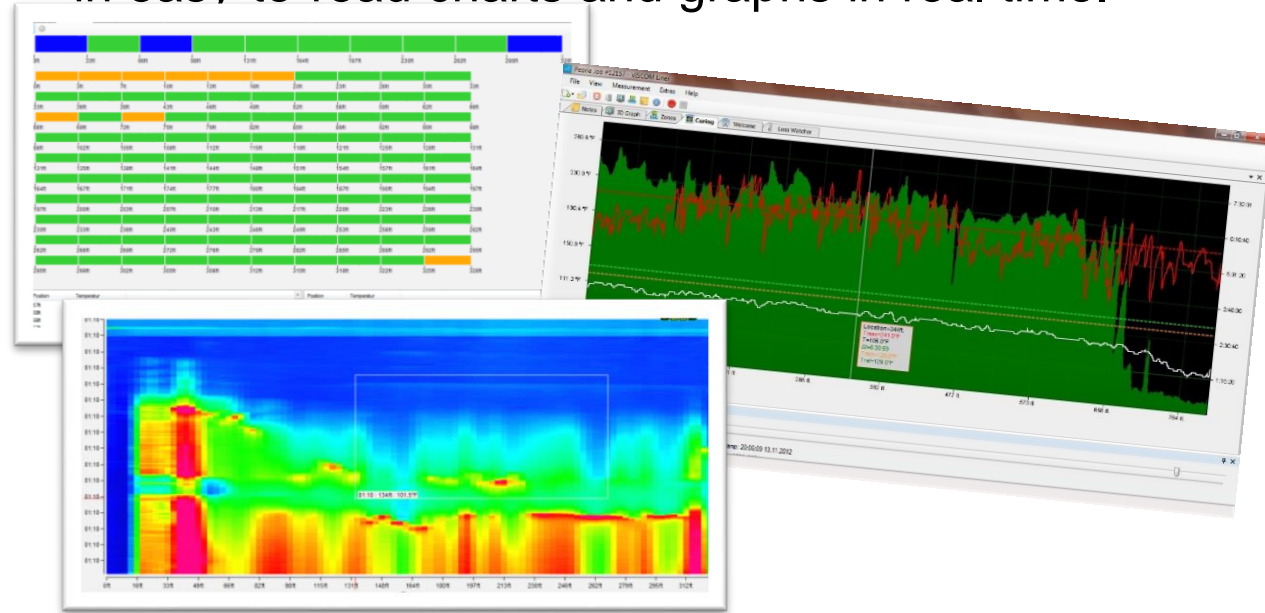


Contractor Stories

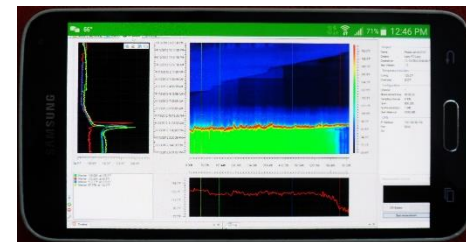


THE SOLUTION: SOFTWARE

- The onsite computer displays temperature readings in easy-to-read charts and graphs in real time.



- We also have a Smartphone app for remote monitoring.



Contractor Stories

Contractor Story

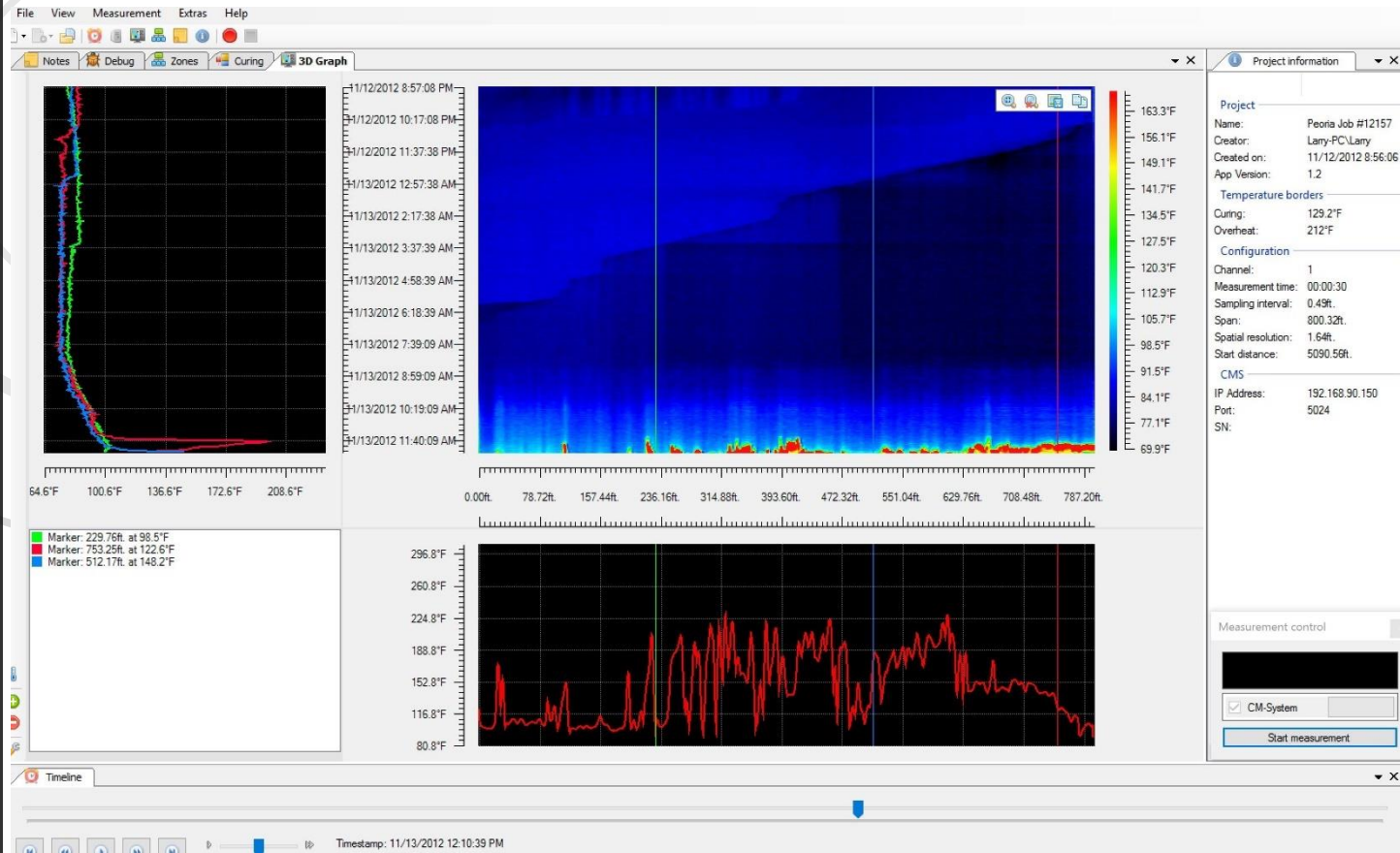
#1

Arizona

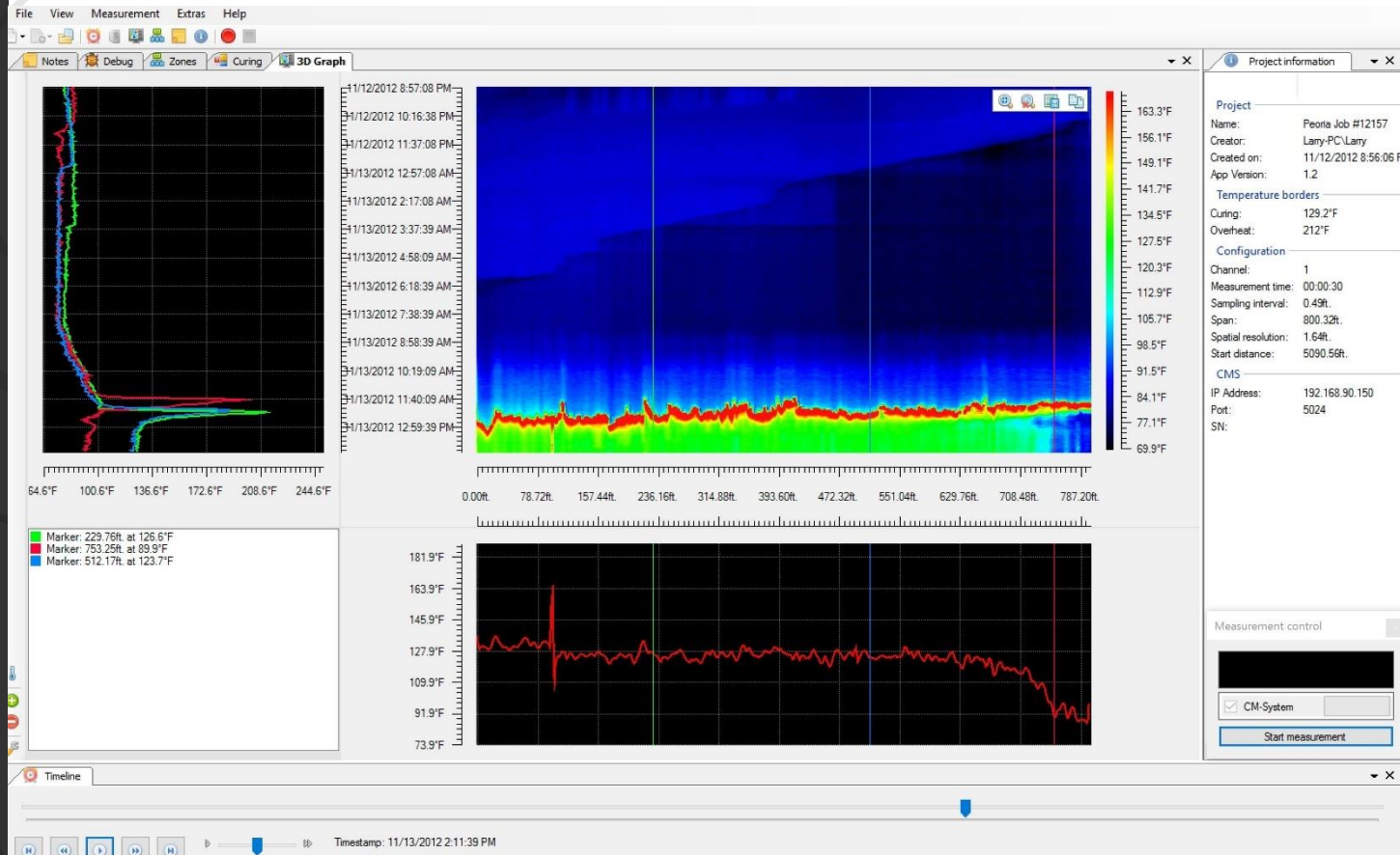
Shot Details:

- Pipe Size – 800 LF x 30” (log in the Notes section)
- Water Cure
- Outside Temperature was very hot

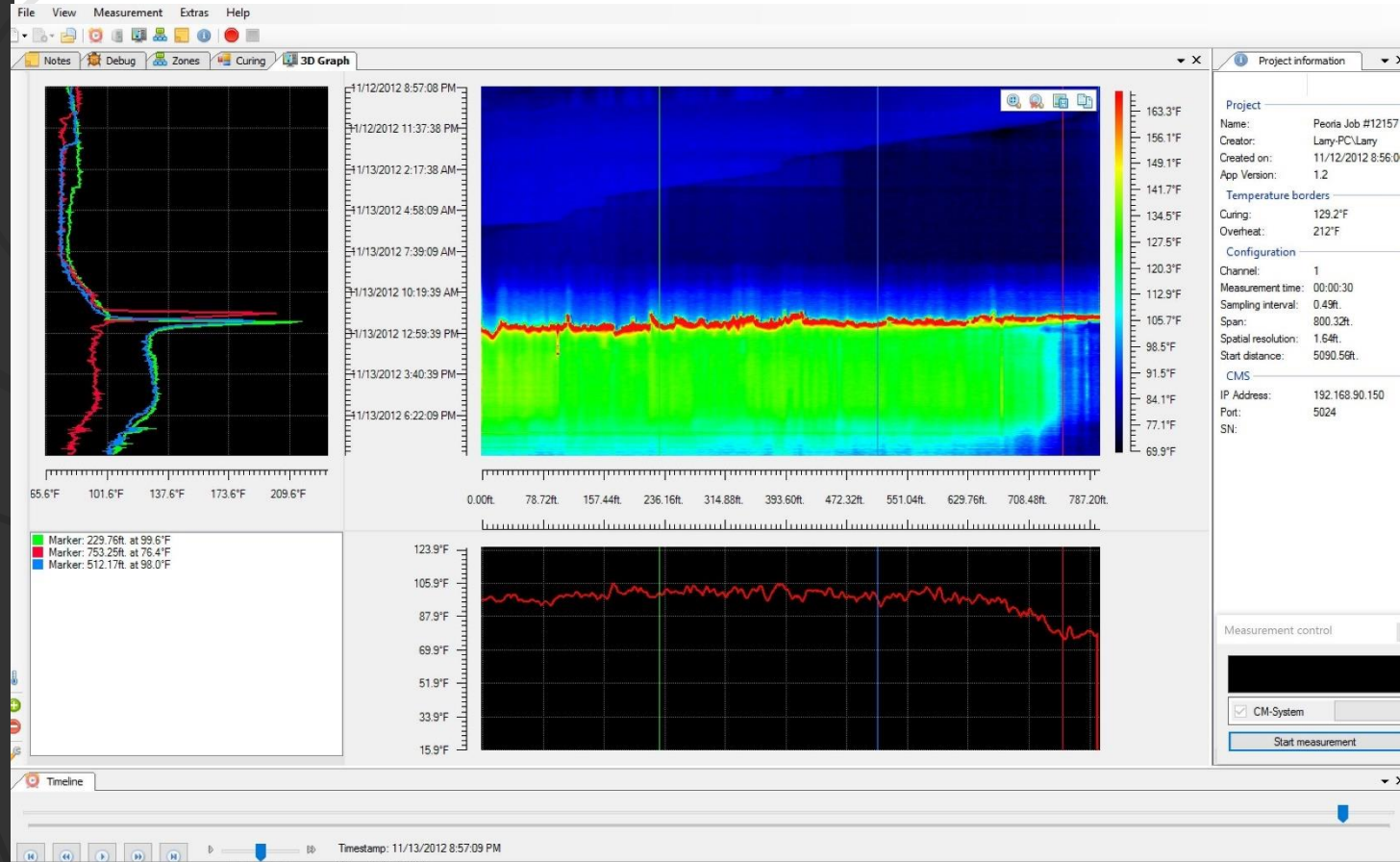
Contractor Story #1



Contractor Story #1



Contractor Story #1



Contractor Story #1



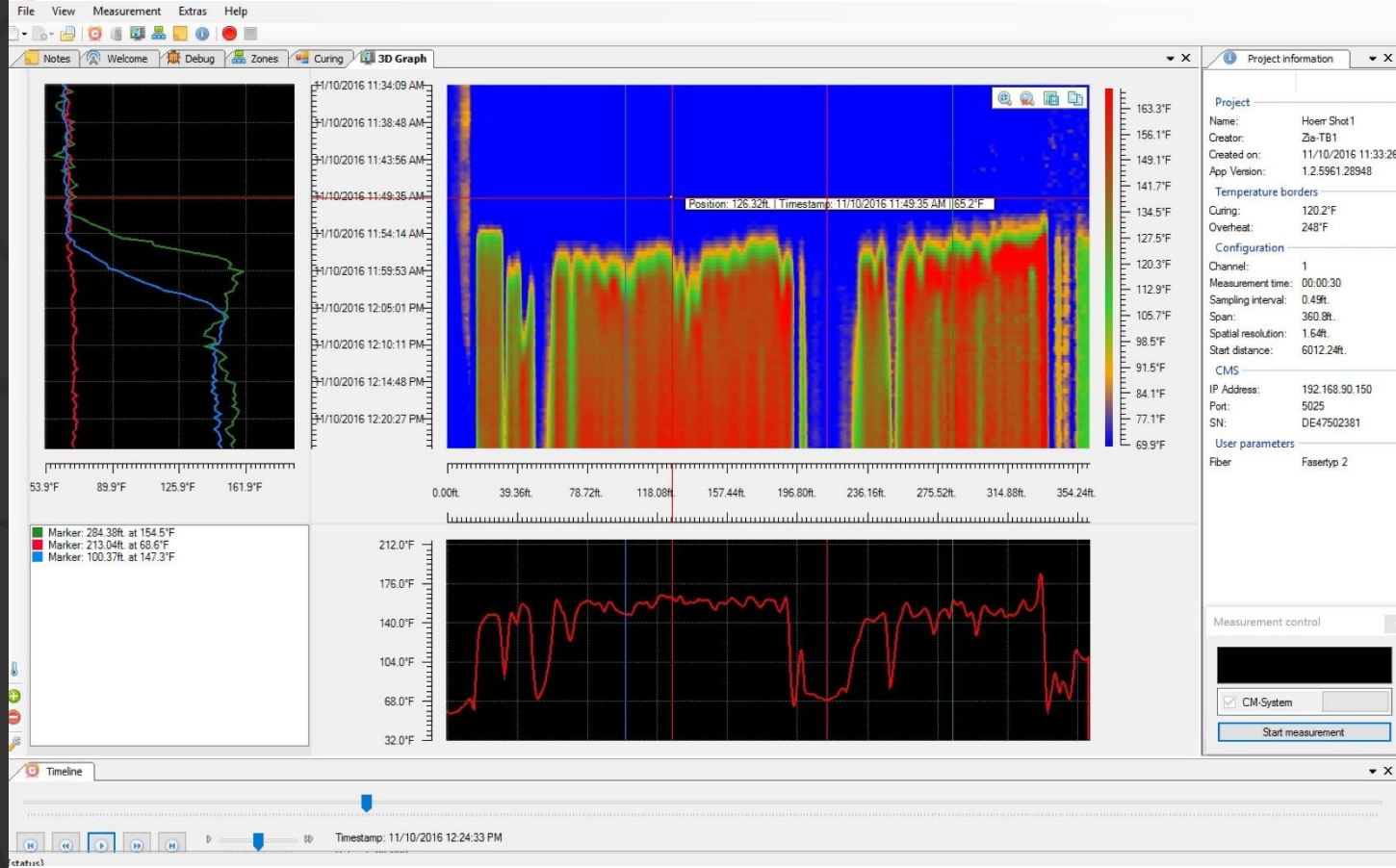
Contractor Story #2

Illinois

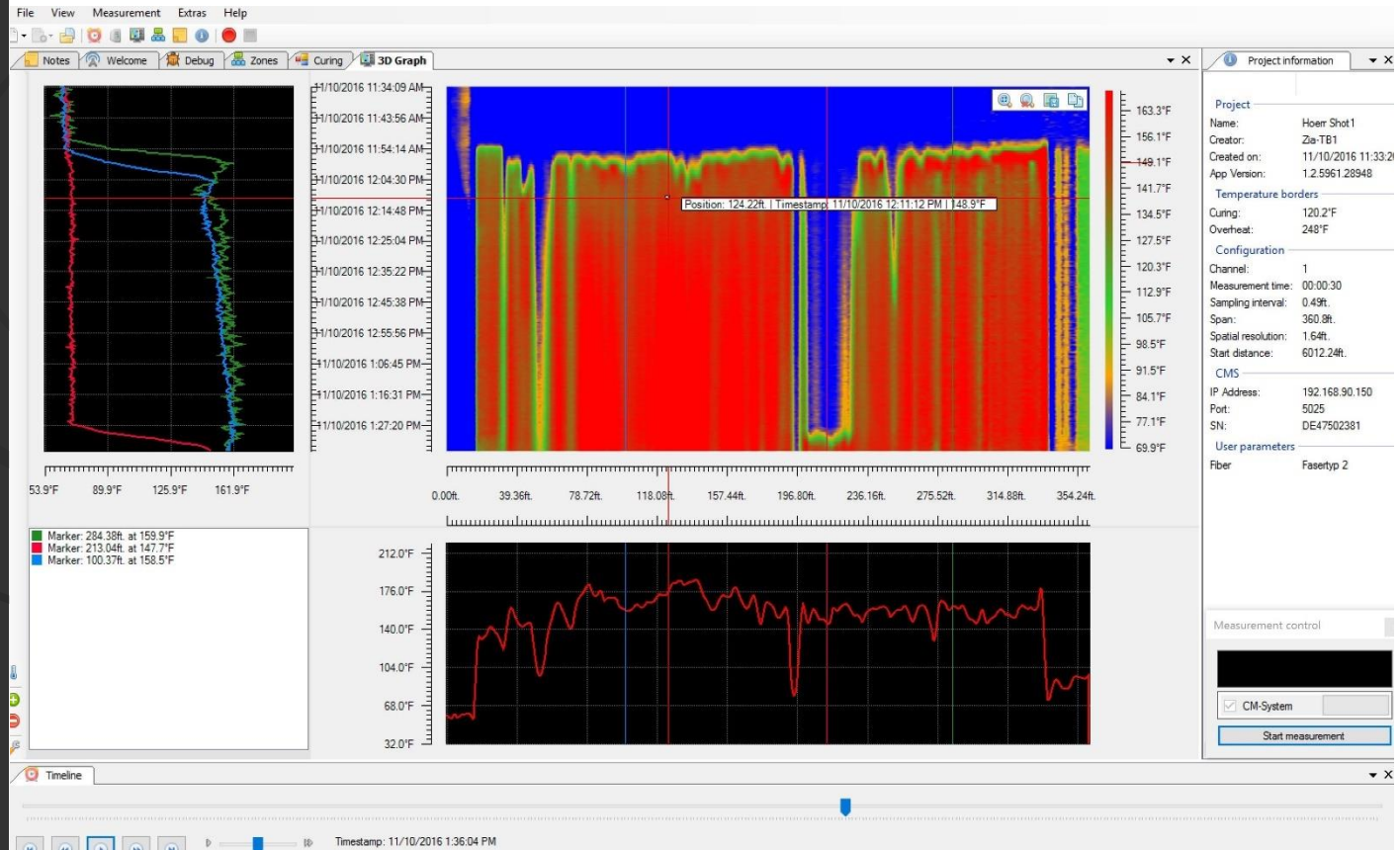
Shot Details:

- Pipe Size – 307 LF x 15", 10.5 mm thick
- Steam Cure
- Over 50 ft. deep under RR tracks
- Along side a marsh

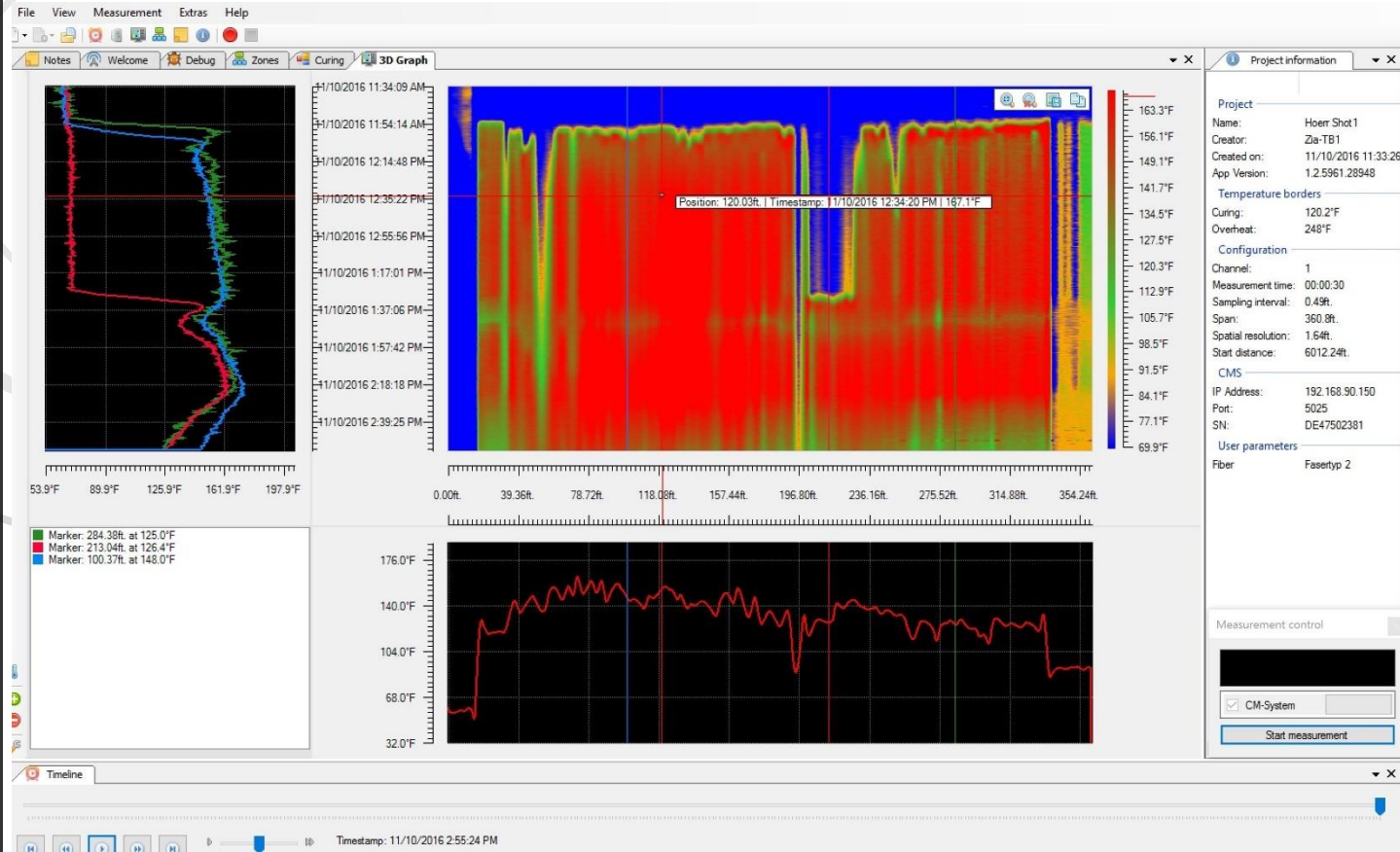
Contractor Story #2



Contractor Story #2



Contractor Story #2

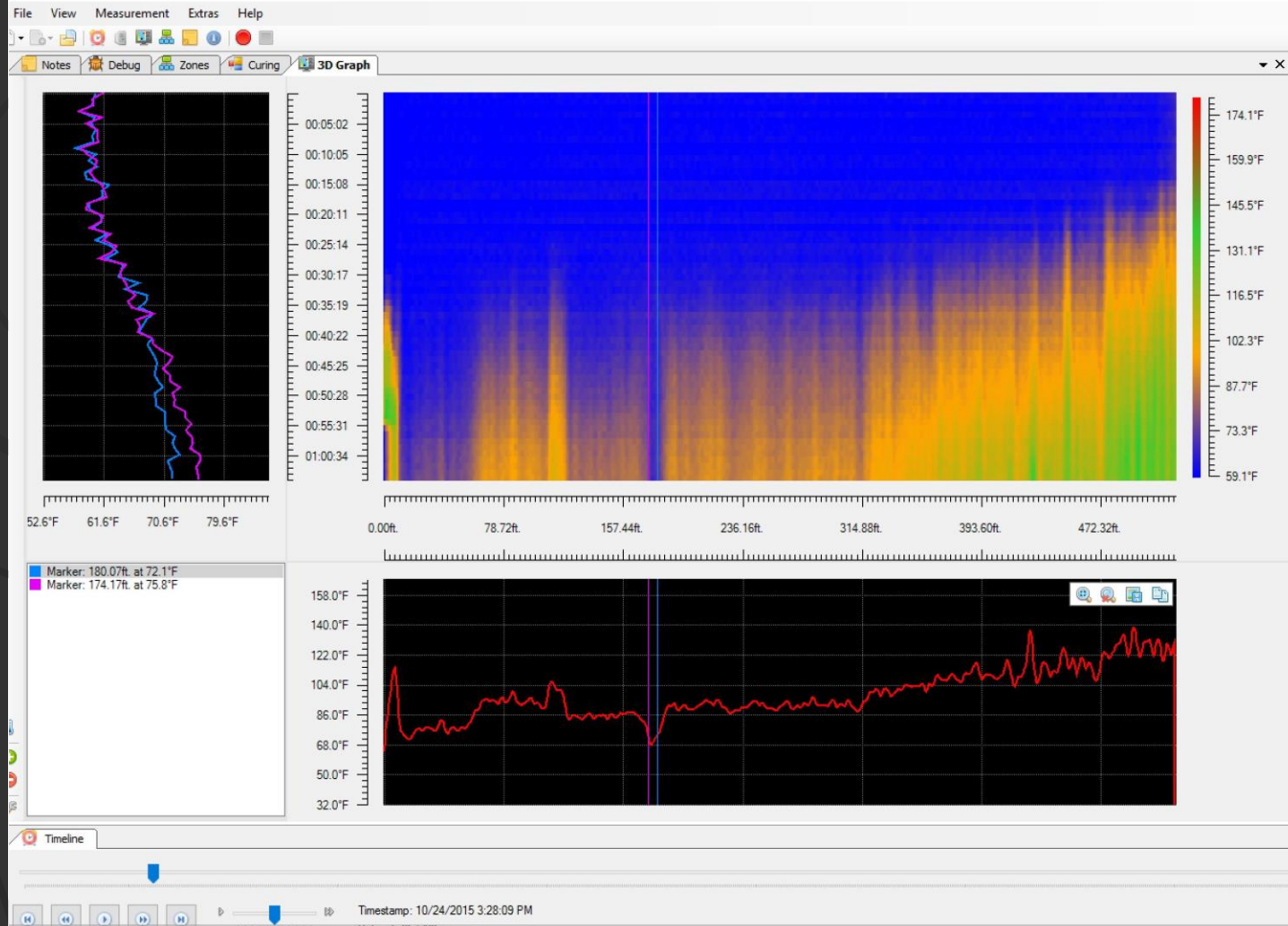


Contractor Story #3 Pennsylvania

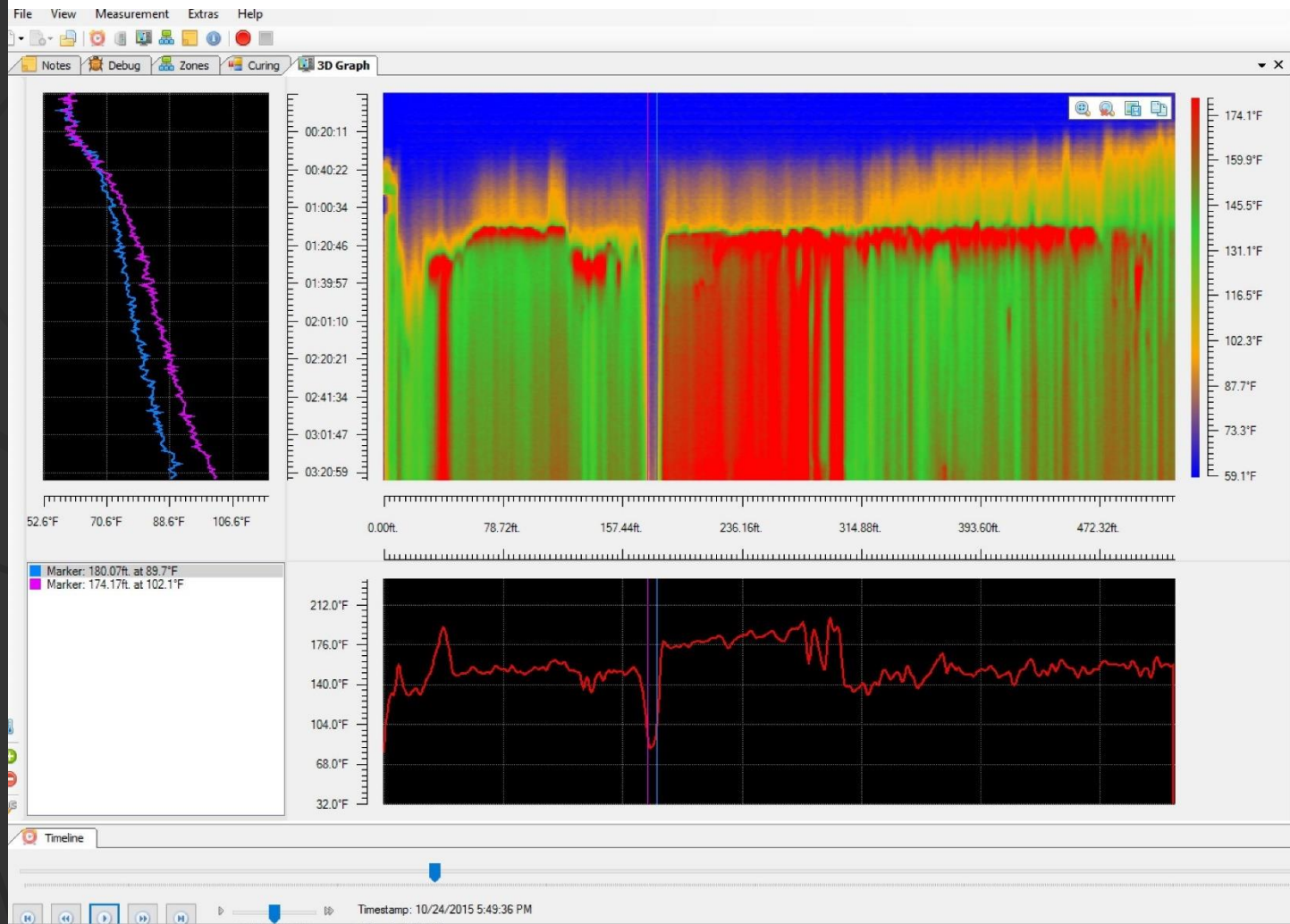
Shot Details:

- 500 ft. x 27" pipe
- Steam Cure
- Difficult terrain
- Pipe had steep slopes and low spots

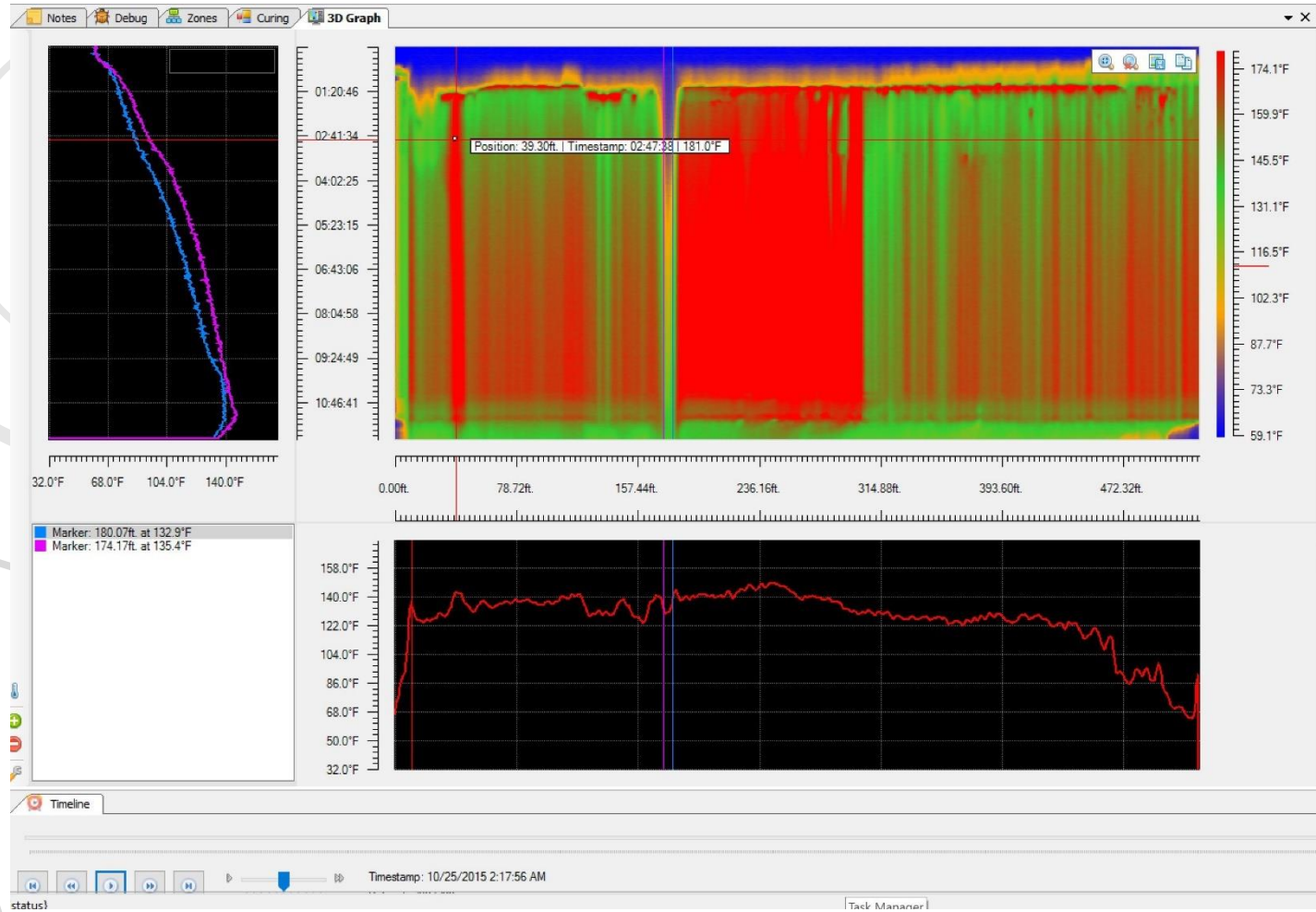
Contractor Story #3



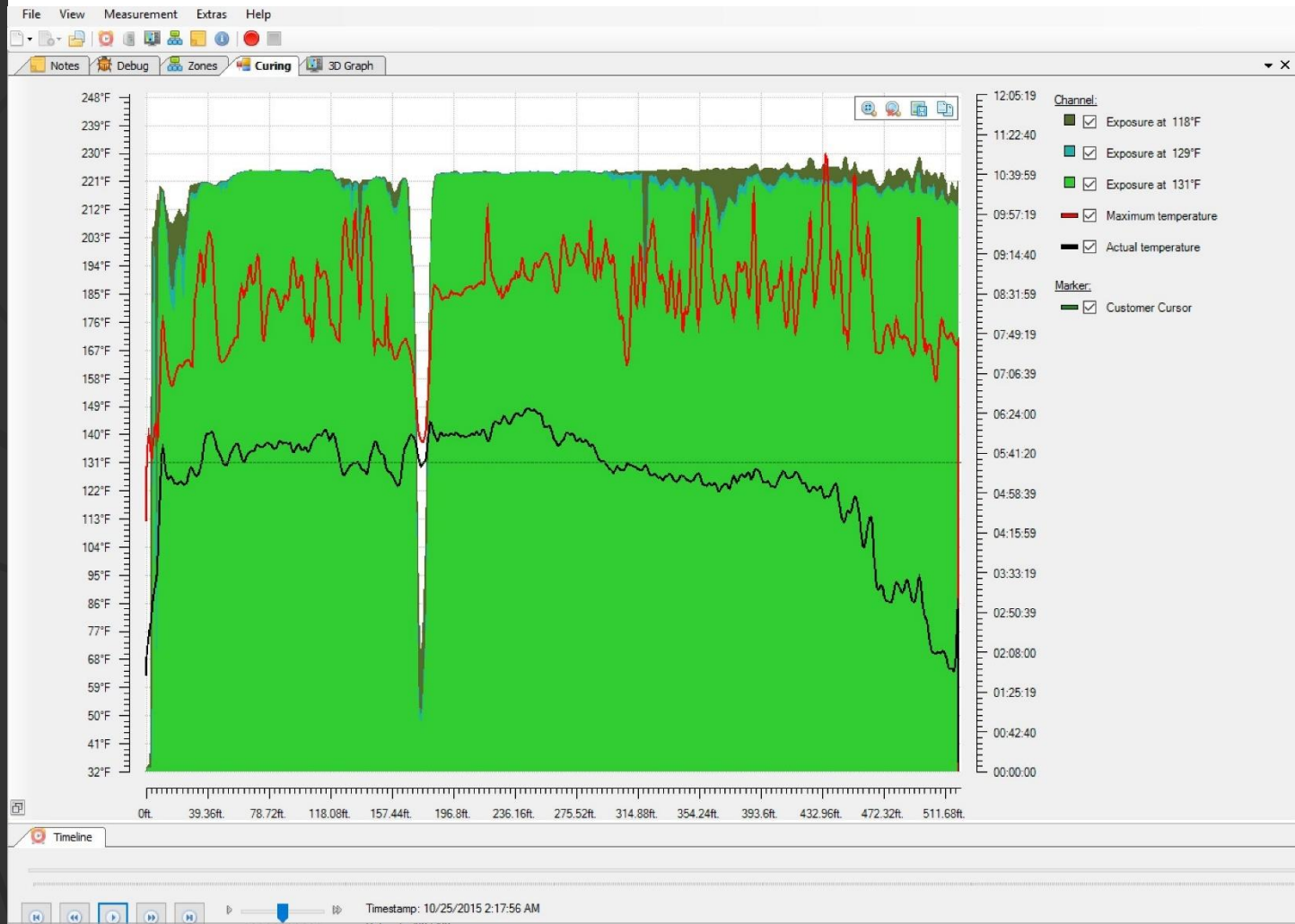
Contractor Story #3



Contractor Story #3



Contractor Story #3



VALUE PROPOSITION #1

- Accurate and timely sensor readings.
 - Takes away manual recording errors.
- Pinpoints actual time of cure and cool-down process.
- Easy to install.
- No blind spots.
- Installed to design specs.
- Provides liner supplier protection.

VALUE PROPOSITION #2

- Continuous readings along the pipeline helps ensure against problem areas within the pipe.
- Problem areas within the pipe can be readily identified for focused solution.
- Reduction in fuel, equipment and labor costs.
- Quality Assurance to meet customer satisfaction.
- Data collected and stored for history reporting and monitoring.

Questions?

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