visplore PETROBRAS

Success Story

From Labeling Restart Patterns in Oil Well Data to Scalable Tolerance Corridor Generation for Brazil's National Oil & Gas Company

Restarting a production process—whether an oil well, furnace, power plant, or any other complex asset—is a highly dynamic and risk-prone operation. In oil and gas, hydrate blockages during well restarts lead to significant delays for dissociation, and can cause significant costs and weeks of unplanned effort. Early detection of deviations is vital to prevent escalation and minimize losses.

Petrobras, Brazil's national oil and gas company sought a way **to define dynamic tolerance corridors** for monitoring pressure and temperature measurements **during restarts of more than 400 oil wells.**

Challenges

- Extensive sensor data history, but with **sparsely labeled restart events.**
- Limited labeled data, resulting in **statistically weak monitoring corridors.**
- **Multiple restart patterns** to distinguish (e.g., diesel- vs. gas-filled restarts).
- **High variability between individual assets**—no "one-size-fits-all" corridor.
- **No automation to update corridors** as new data becomes available.

> ***"With Visplore's capabilities to label well restarts and build tolerance corridors in a scalable way, we can improve the monitoring of our wells nationwide with truly accurate information ."***
>
> - **Rogerio Leite**,
> Senior Advisor at Petrobras

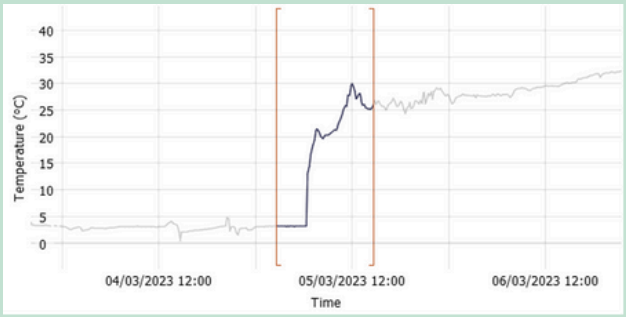
The Solution

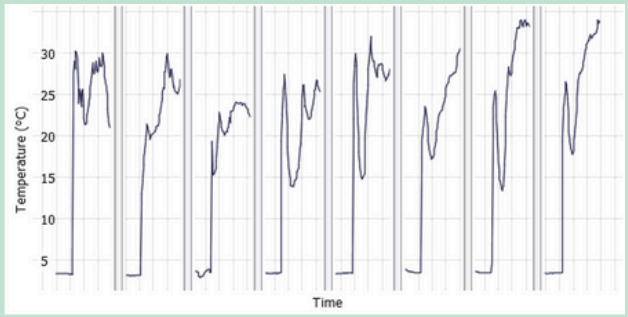
From a **small dataset** to a **complex data-powered monitoring solution** that enables:

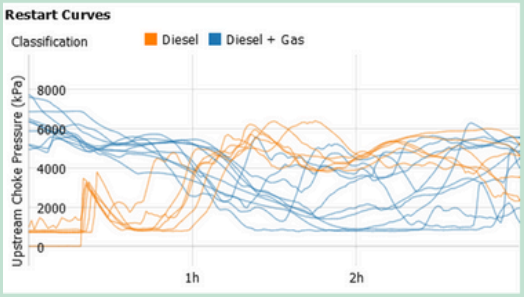
- **Pattern search:** identify similar restarts using pressure and temperature history.
- **Graphical labeling:** interactively define rules to classify restart patterns types.
- **Pattern expansion:** automatically classify all historic restarts using labeled examples.
- **Tolerance corridor generation:** create statistically based corridors for each asset.
- **Adaptive corridors:** workflow for dynamic corridor adjustment as new restarts occur.

How It Works

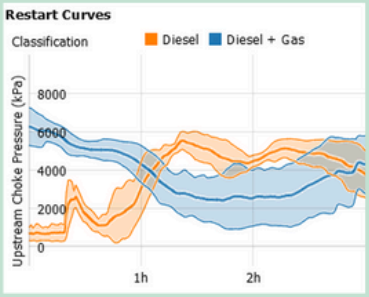
1. **Extract restart events of oil wells from historical data using pattern search**



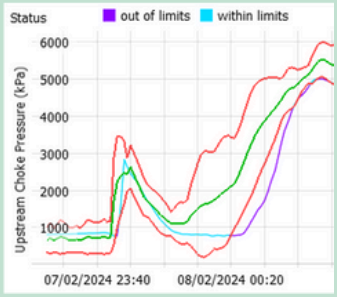




2. Define rules on the pattern shape to classify distinct pattern types



3. Generate corridors



4. Use for monitoring

The Results

- **Hundreds to thousands of hours saved** for manual labeling and corridor generation.
- **Statistically backed corridors for monitoring** based on 100% more events labeled.
- **Up to 70% fewer potential hydrate plug incidents** on restart that *can* be foreseen on time.
- **Avoiding 1 blockage event** per year across **100+ wells** saves from **30 to 300 days** of downtime.

Why It Matters for Any Industry

Data Scientists can:

- Turn pattern mining and labeling from days of scripting into minutes of graphical interaction.
- Build statistically strong, adaptive models from just a few labeled samples.
- Scale monitoring logic across hundreds of similar, yet non-identical, assets.
- Enable the potential for fully automated corridor retraining and self-improving models.

Whether you're managing oil wells, power plants, or process-intensive assets, **accurate pattern monitoring** can mean the difference between smooth production and unexpected downtime.

Master your data with Visplore. Start your free trial today!

www.visplore.com sales@visplore.com +43 660 10 57 155