TrendMiner
A SOFTWARE AG COMPANY

INDUSTRY
Petrochemicals

PROCESS TYPE
Continuous Processing

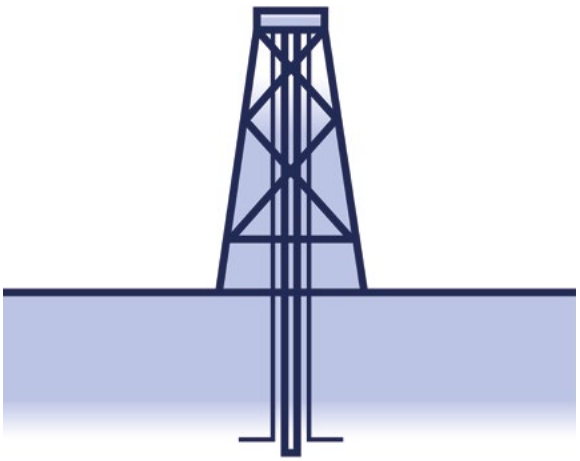
ANALYTICS TYPE
Root Cause Analysis and Process Control

KEY OBJECTIVE
Identifying Correct Bean Up Profile

# Identifying Correct Oil-Well Bean Up Profile

## BACKGROUND

At this plant, oil wells have a choke to control the flow from the well. This choke both decreases the chance of instabilities and helps to control the pressure. As a result, blow-outs can be prevented which is important to operate at maximum efficiency. When wanting to startup a well after a shutdown, the plant needs to get oil flowing from the reservoir, and the flow rate needs to be increased in a controlled manner. The profile that leads towards the operating flowrate is called the bean-up profile. If this profile is not satisfied, instabilities will cause a well to shutdown fast. Therefore, to avoid this issue, an optimal bean-up profile must be identified to more accurately monitor the well start-up behavior and prevent fast shutdowns.



## CHALLENGE

Process experts needed to determine the proper bean-up profile. To do this, they needed to search the historical data for good bean-up profiles in order to create a fingerprint to use as a comparison in the future. However, identifying the correct bean-up profiles is difficult. Traditionally, fingerprinting a golden bean-up profile required data science and coding expertise which is often time-consuming and expensive.

# SOLUTION

Process experts used TrendMiner to easily and quickly search historical data to identify good startup periods. They created a fingerprint that they could use as a basis and set a monitor to alert personnel for startup deviations.

## Approach

- The process experts searched into the historical data and overlay different timeframes which included loading the choke state and the flow tag.
- They next searched the historical data to find both bad and good start up profiles and defined a good bean-up rofile. They also searched for the startup periods to determine the time it took for these startups.
- The team discovered that a too fast bean-up led to a low time of operation, so used filters to get rid of the bad runs.

# RESULT

- Historical data was used to identify the relationship between a bad oil-well run and a too fast bean-up.
- Historical data was used to overlay good start up profiles to create a golden fingerprint of this startup profile and used it as a comparison for all start up profiles.
- A monitor was set up to send alerts to personnel in case of a too fast bean-up process, giving them sufficient time to proactively take corrective measures.

# TRENDMINER FEATURES USED

### VALUE BASED SEARCH

TrendMiner allows for an easy click and search for tags, just like using Google. While typing, our software auto fills best matching terms to speed up the analysis search. Value Based Search is used to quickly find anomalies in the time series data by analyzing criteria, numerical values, and limits.

### FINGERPRINTING

The search capabilities of TrendMiner can be used to find and overlay the optimal dynamic behavior, such as the best batches, transitions, and startups, etc. With a click of a button, multiple periods of the best performance can be combined into an envelope or fingerprint which can then be used for process monitoring purposes.

### FILTERING

TrendMiner's filtering capabilities enable isolation of relevant time periods for further data analysis. Filters can be easily set up manually or automatically using TrendMiner's dynamic search capabilties. This allows for quick isolation of data by startups, shutdowns, grade transitions, and specifc product campaigns and uses the relevant time periods for deeper statistical analysis.

### MONITORS

TrendMiner is like a watchdog; it continuously monitors processes and sends notifications when deviations from predefined fingerprints, process conditions, or operating zones occur. These early warnings improve plant output by allowing the plant to run at optimal energy consumption and waste reduction and at the same time, to comply with safety, health and environmental regulations.

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