Intelligent Plant™

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Facit™ – Surveillance Monitoring on the Industrial App Store - User Guide

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Revision History:

Date	Version	Description	Created by (Initials)	Reviewed by
13/09/2023	0.1	Created User Guide	VV	BN

Table of Contents

Figures

1   What is Facit?

Facit amalgamates and groups alarms and alerts into an intuitive dashboard to allow easy tracking, workflow management, and automatic task auditing. Facit can automatically detect operating envelope excursions and failing instrumentation.

Facit is a cloud-based application available on the Industrial App Store. App Store Connect enables direct access to your process data historians meaning that Facit can provide real-time monitoring and alerting options on industrial processes as well as recording a fully audited investigation into your alerts.
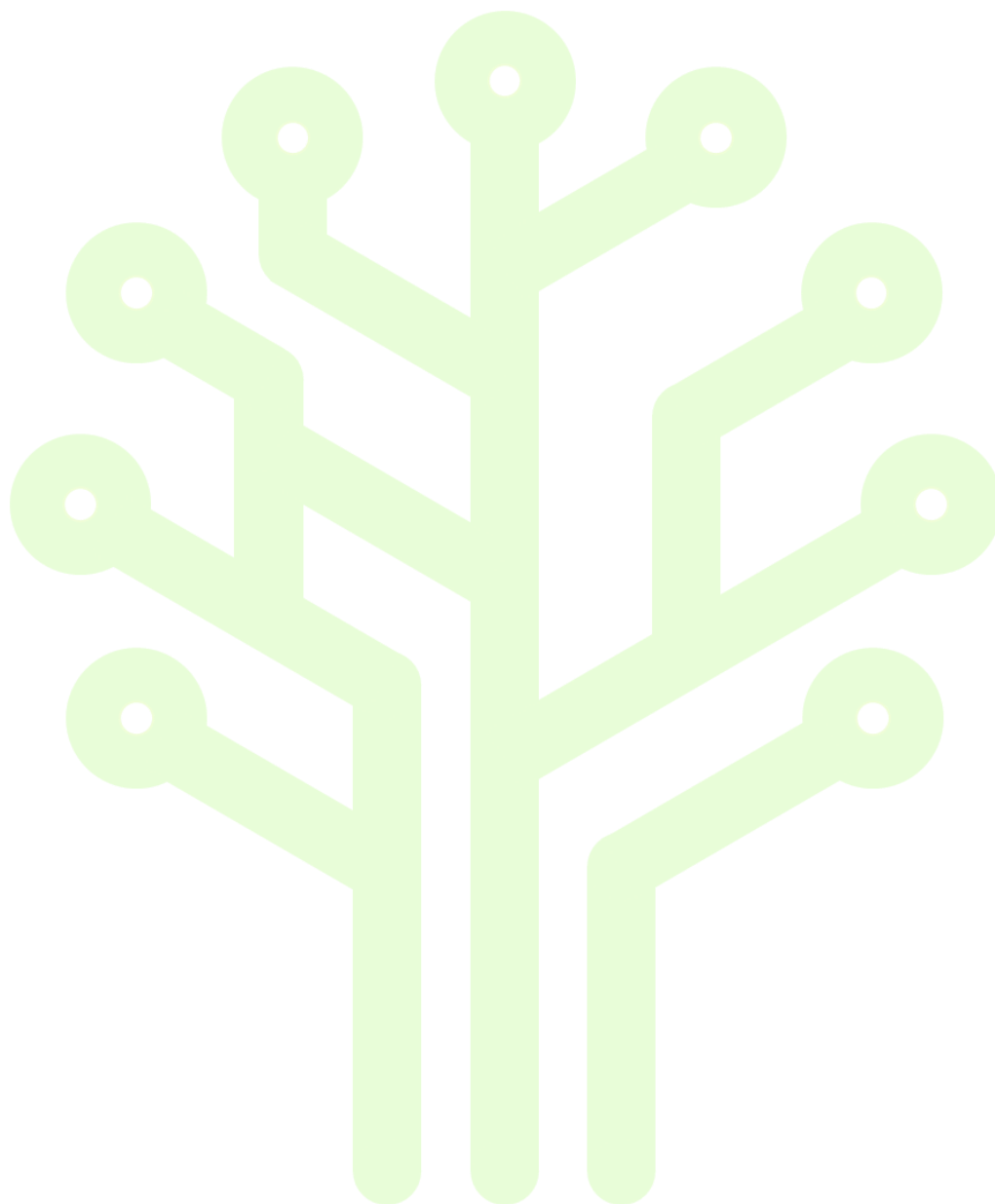
2 Access to Facit

Select this link **appstore.intelligentplant.com** to access the Industrial App Store. On the Industrial App Store home page, mouse over the Facit app card. You have the option to *Start* (where you will immediately be taken to the dashboard page in Facit) or view *More Info* about this app.

Figure 2-1 Industrial App Store Home Page

Use either your Google or Microsoft account or register your organisation with the Industrial App Store.
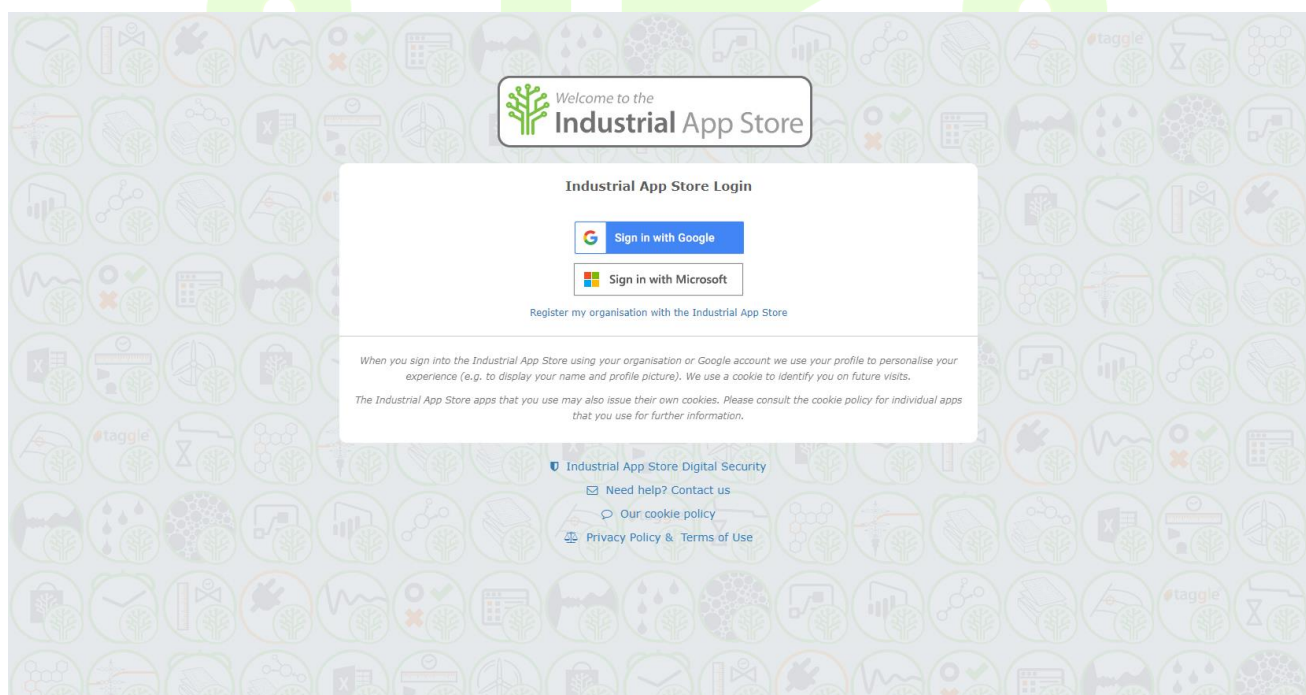

Figure 2-2 Industrial App Store Login Page

The *More Info* link allows you to browse the profile page to learn more information regarding this tool.

You can also find links to the user guide, YouTube videos, App Store Wiki, FAQs and browse screenshots of the app.

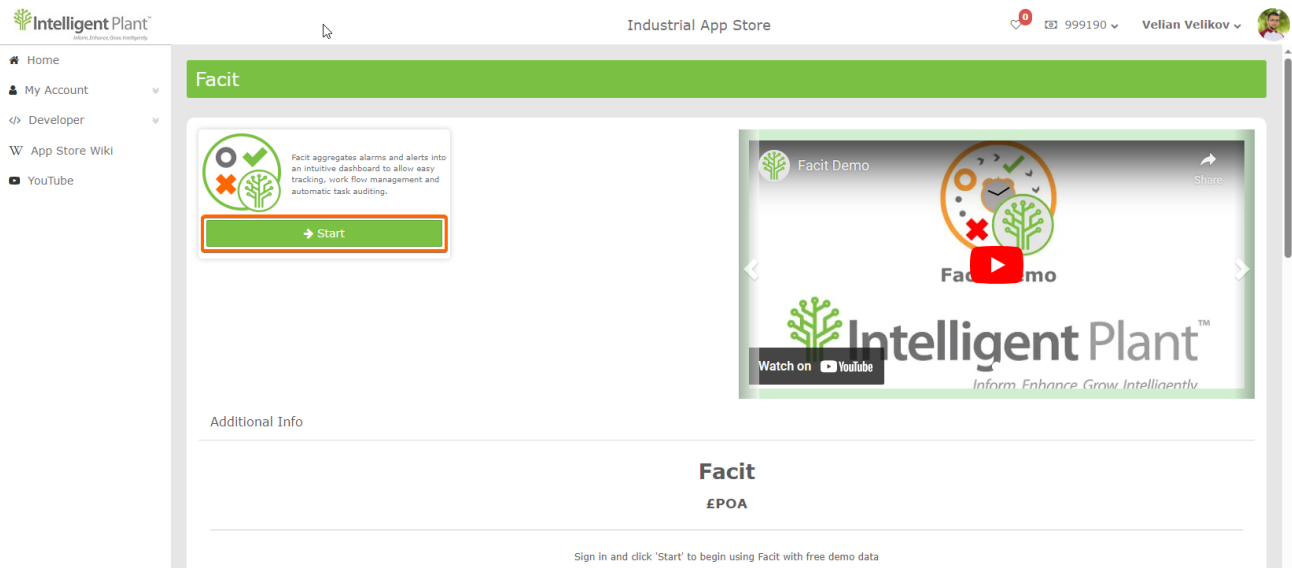Select Start from the profile area. This will take you to the home page in Facit.
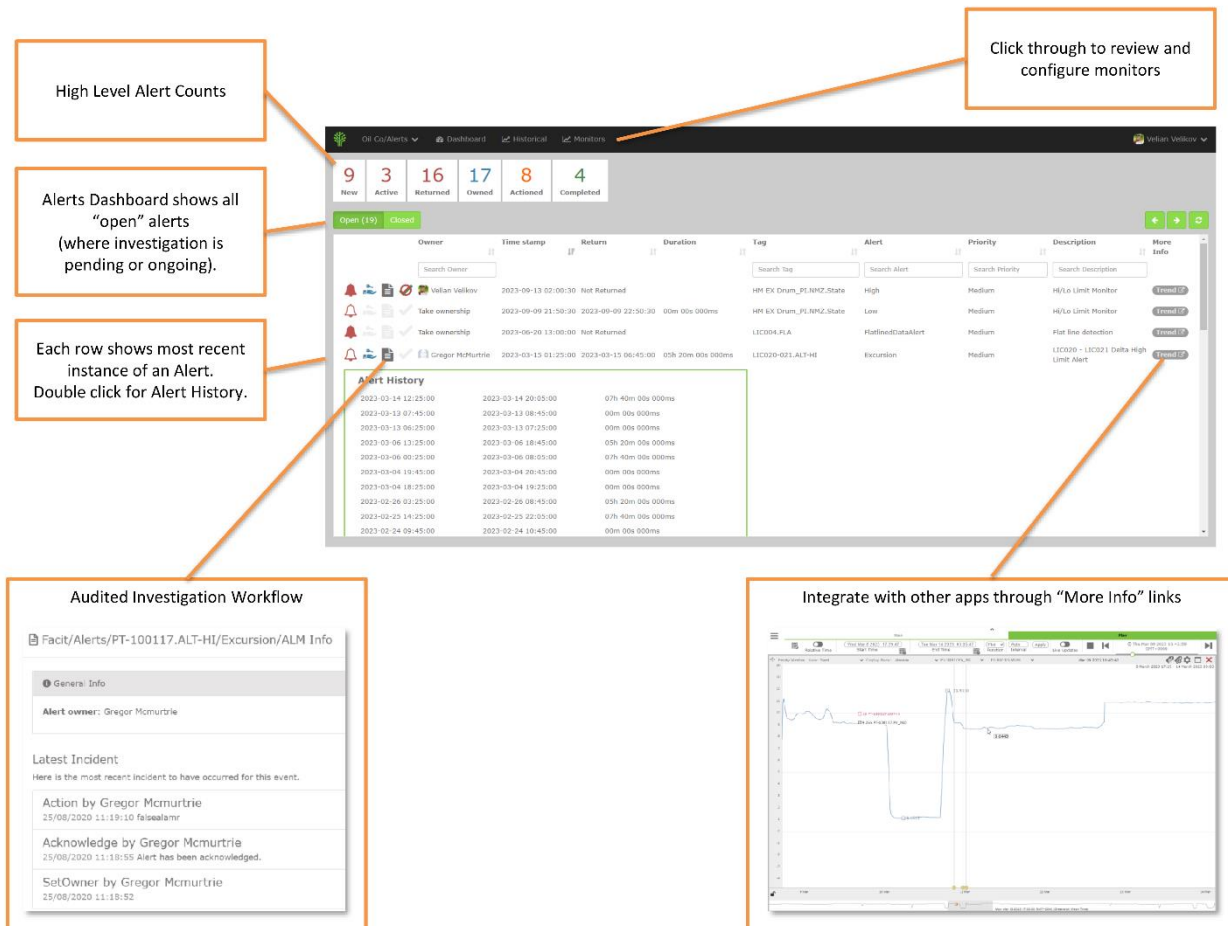

Figure 2-3 Facit Profile Page

Note:

Bookmark your links for quick access next time.

3 Dashboard page

The Dashboard page contains an aggregated view of alerts. Each row of this table is a case and displays the most recent instance of an alert. We can double click on a row to see the alerts history for the respective case.

The *Open Stack* shows all cases, which have not been quality assured yet. After right-clicking a case, a menu will appear that gives the user the ability to perform actions on the case, see more information about the case or select the "View Monitor" option to view the monitor that generated the alerts.

Figure 3-1 Facit Dashboard Page

The icons on the left of a case indicate where we are in the investigation. Facit encourages users to follow a straightforward workflow. The order of actions is advisable but not strict. If you need to revise the alarm cycle or workflow icons, know that this User Guide is easily accessible within the app from the drop-down menu on the top-right corner.
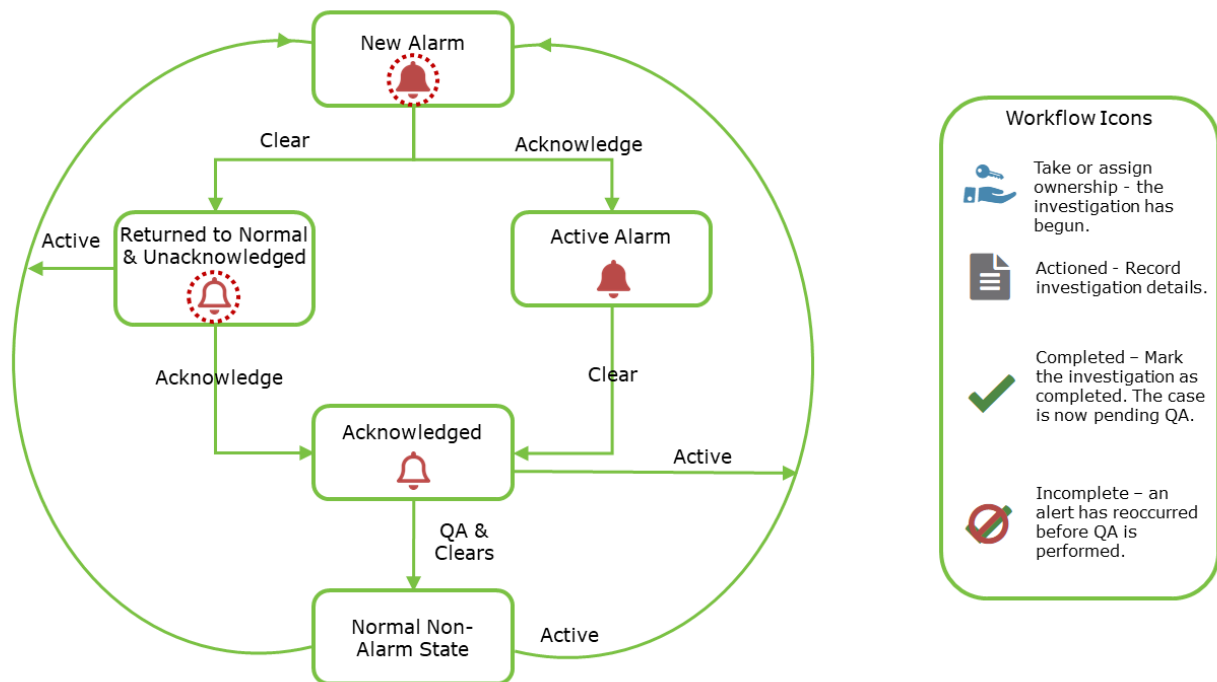

Figure 3-2 Alarm Cycle and Workflow Icons

3.1 Acknowledging a Case

New Case

A flashing alert bell indicates the arrival of a new case.

To suspend flashing, right click and acknowledge or assign ownership.

(An alert bell may resume flashing if the case annunciates again.)

3.2 Case State

The type of alert bell indicates the current case state.

Active Case

A solid alert bell indicates the case is currently active.

Expand the Case Summary - the most recent case instance is still ongoing.

Returned to Normal

A hollow alert bell indicates the case has returned to normal.

3.3 Investigation Workflow

A case investigation is a fully audited workflow - from *taking ownership* to *QA*.

1. Case

A case is displayed in the dashboard. The investigation is pending.

2. Take Ownership

Taking or assigning ownership starts the investigation.

(Taking ownership automatically acknowledges the case.)

3. Take Action

Record investigation details.

4. Complete

Mark the investigation as completed.

It is now pending QA.

5. Quality Assurance

The QA Manager reviews the investigation and either:
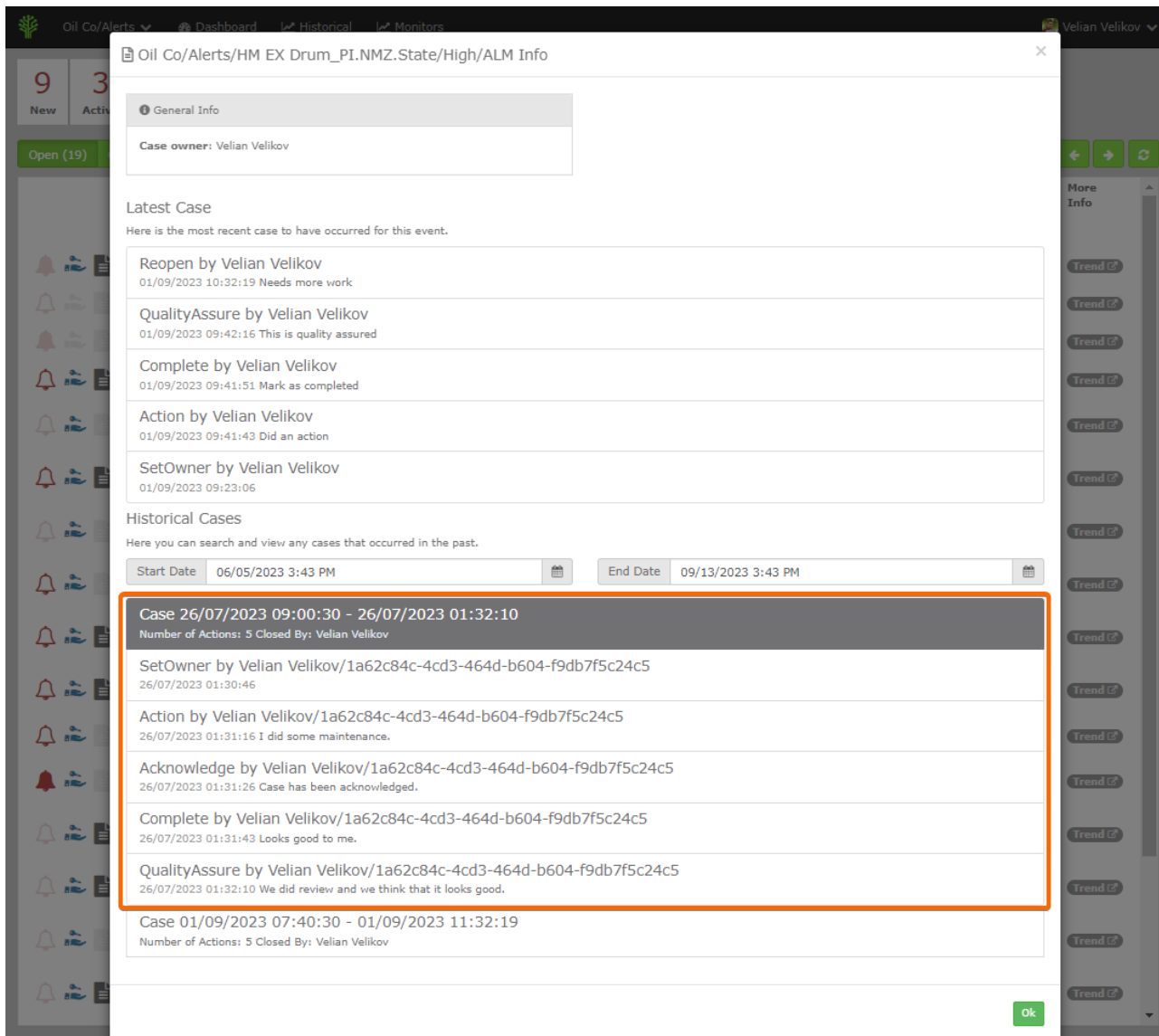
Approves Investigation

The investigation is now closed.
The case drops off the *Open Stack*.

Rejects Investigation

The investigation reverts to open.
The QA Manager may re-assign ownership at this stage.

3.4 Audit History

You can review the audited records at any point by right-clicking on a case and selecting "Info". This window contains general information about the case, the audit history of the latest case as well as the audit history of historical cases. Double-click the row to expand the audit history of a historical case.

The *Closed Stack* cases dashboard shows all cases, which have been quality assured. By right-clicking the case, users can reopen the respective case or see more information about the case.

3.5 Filtering

We can see high-level KPIs at the top of the Dashboard page.

41

New

KPI Filtering

The KPI panel at the top of the page is not only there to display the respective number of cases but can also be used to apply a filter to the data shown by clicking on the respective KPI.

When multiple KPIs are selected as filters, only cases that match either of these KPIs are shown (OR filtering). Clicking on the KPI again will remove the filter.

Search

Column Filtering

The column filters are not case sensitive, and they filter for all cases, which contain the typed filter value.

When filter values are entered in multiple columns, only cases which contain all the filter values will be shown (AND filters).

3.6 Integration with Trend™

Facit integrates with other tools available on the Industrial App Store such as Trend which we can use in the investigation. Following the Trend link should show our limit and the process data value being tracked.
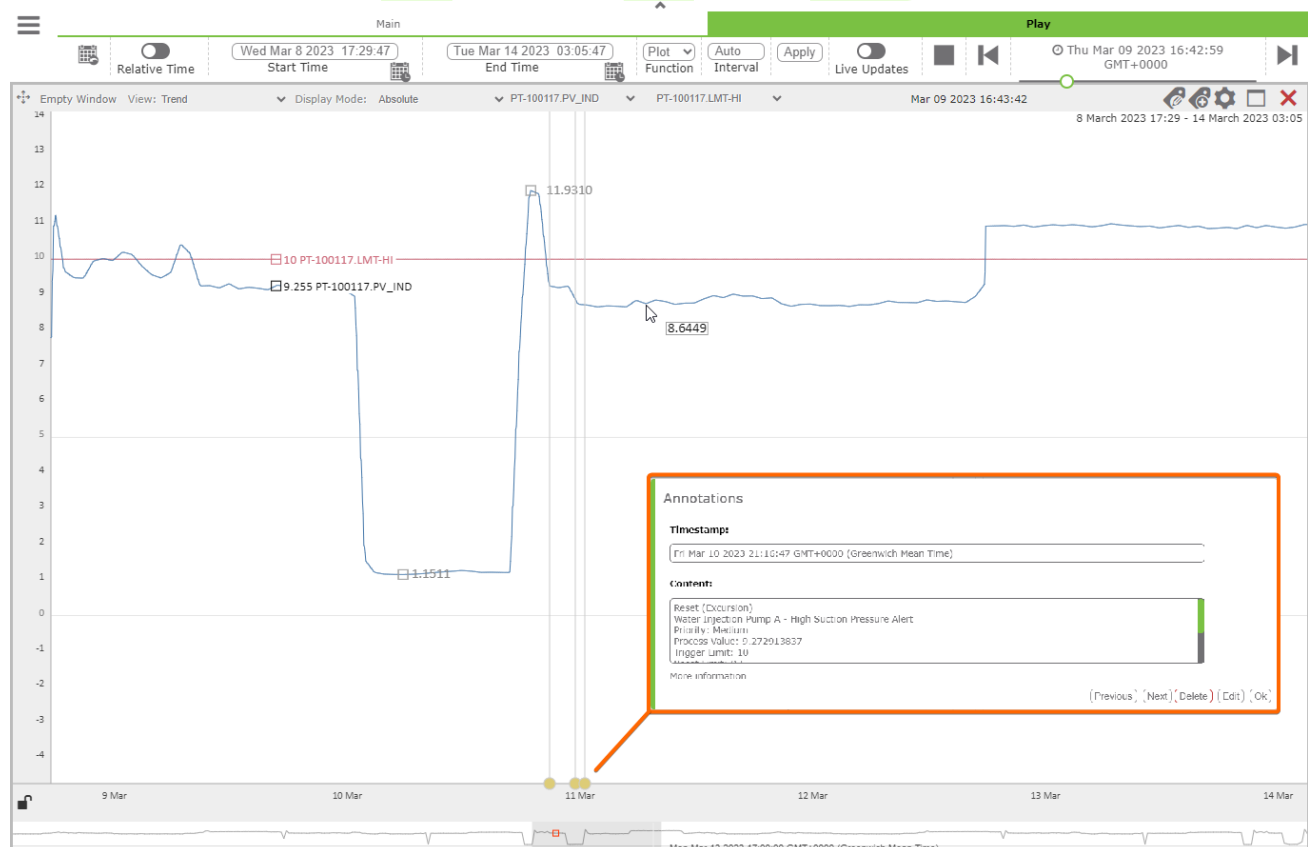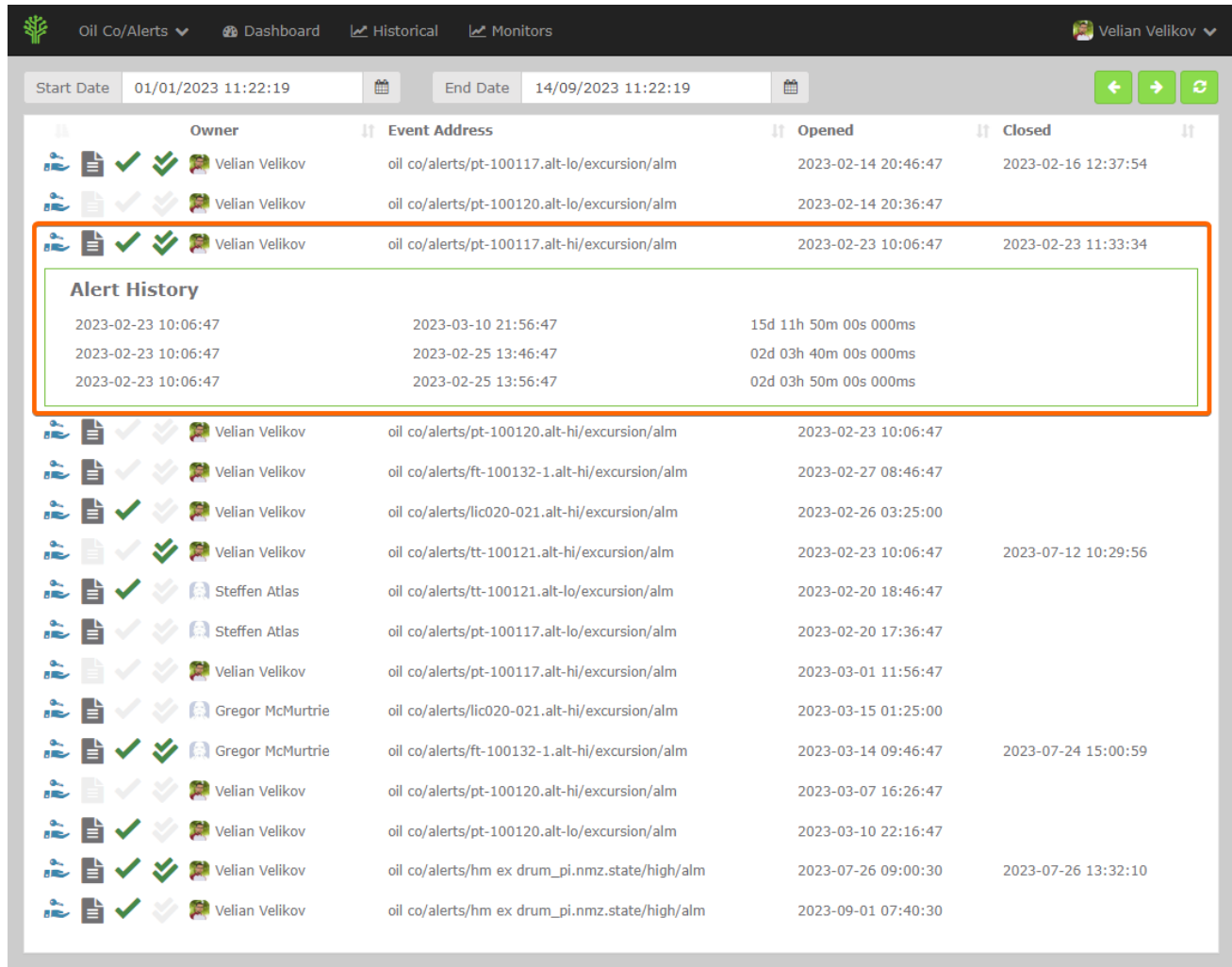

Figure 3-4 Preview of the integration with Trend™

Facit monitors can create annotation on tags when conditions are met. In this case the process value had first reset (returned to normal after an excursion of the HI limit) then another excursion occurred followed by another reset. We can click an annotation to view the information on the excursion in more detail. The *More information* link under the content of the annotation would direct us to the Info page of the respective case in Facit allowing us to see its audit history.

4 Historical page

The Historical tab shows all cases in the selected time range, which have been both completed and quality assured. When double-clicking on a row, it expands and reveals the alert history of the case, or you can right-click it and select the option to view more info about the case.
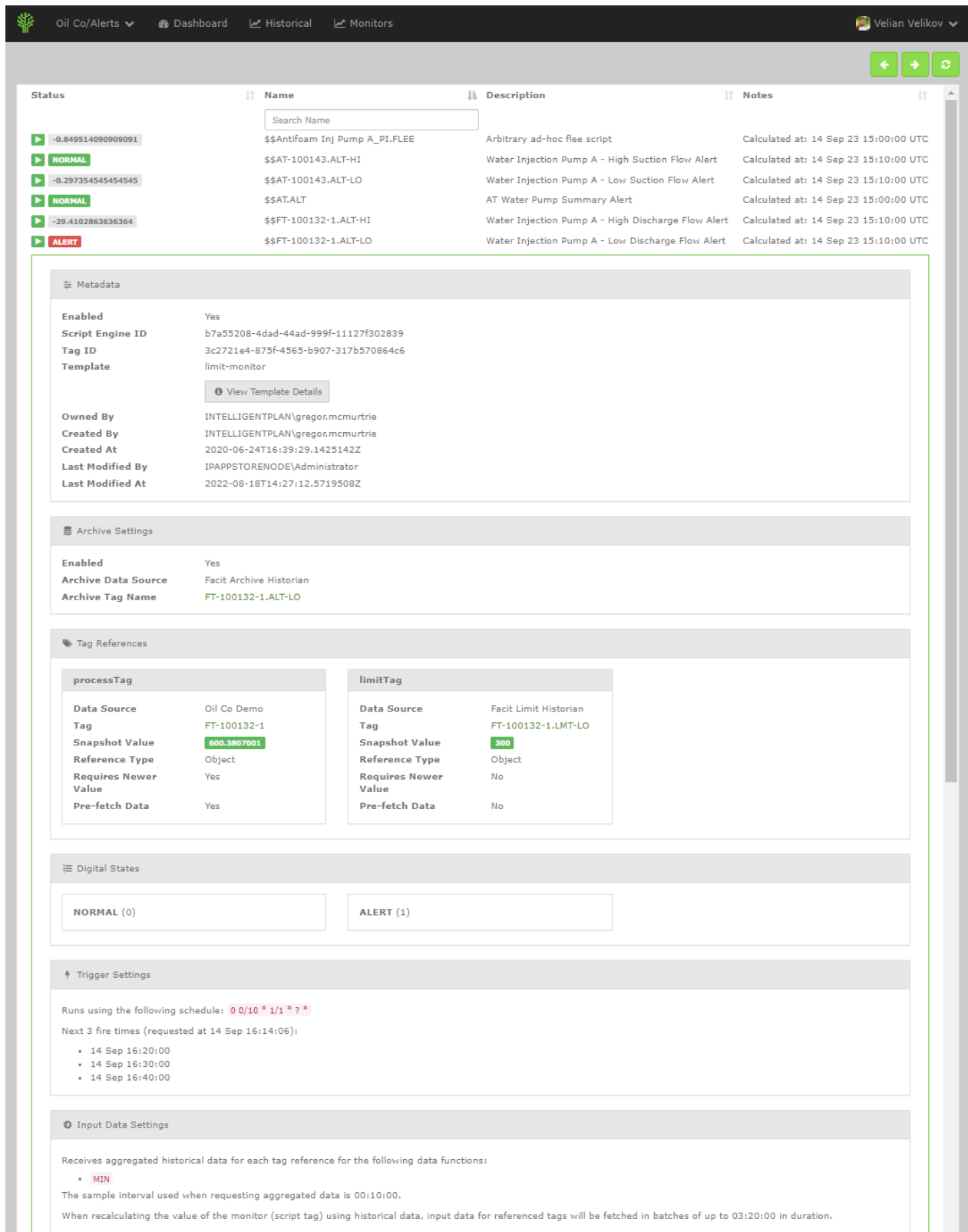
5   Monitors page

This page shows all the monitors associated with the selected asset. When double-clicking on a row, it expands and reveals all the monitor details. Administrators of App Store Connect will notice that Monitors in Facit display each configuration in a familiar and consistent design, akin to the configuration interface in Data Core. This allows users to understand the references in monitor calculations, view underlying template details, or access trigger times and settings, all without switching to the remote server.

Figure 5-1 Facit Monitors Page

5.1 What type of monitoring can Facit do?

Through Intelligent Plant's application – Facit, it is possible to create and configure monitors that perform calculations with your data.

There are two ways of creating these monitors.

5.1.1 Templated Monitors

Templated monitors in Facit provide a highly configurable way to define calculation and event-raising tags. Facit has a rich library of pre-made monitors available to users. These can perform a variety of calculations and it is just a matter of configuring the templates with your data. Key features of templated monitors in Facit:

- **Speed** – Templated monitors make it quick and easy for the user to create the monitors that they need. Creating multiple monitors is straightforward, with configuration being the only main time sink in this process.
- **No coding** – Templated monitors have been coded for the user already, thus no coding experience is required. This method allows anyone with knowledge of the calculations to configure the monitors through the user interface.
- **Cross-Referencing** – not all monitors can raise alerts. Some just perform calculations and can be referenced by other monitors. This feature makes Facit truly powerful!

A clear disadvantage of using templated monitors is that if the calculation you require is not performed by any of the templated monitors available, then an alternative method would need to be used, such as writing custom (ad-hoc) monitors.

5.1.2 Custom (Ad-hoc) Monitors

If you need or wish to create a custom monitor, this can also be done on Facit. Although the coding experience required to create custom monitors would likely be minimal, the time to make multiple monitors would be considerably longer than with templated monitors.

The key features of Custom Monitors in Facit are:

- **More freedom –** Being able to code your own monitors means that you are not restricted to the templated monitors available from Intelligent Plant. You have the ability to code any monitor that you require.
- **Easy to create –** As long as the developer has basic coding experience, then creating custom monitors should be straightforward.

The effort required to create many custom monitors will be significantly higher than by using templated monitors, and the efficiency of the code can significantly impact scaling.

Monitors can be written in:

- **C#**
- **FLEE – Fast Lightweight Evaluation Engine –** *More Information*

5.1.3 Library of Templated Monitors

Process Data Alerts

- **Average Monitor**
  Checks the rolling average against a limit. A useful method for dampening noisy signals.

- **Equipment Running Status Monitor**
  Monitors the running status of a piece of equipment. Triggers and resets events when the status changes.

- **Fleeting Excursion Monitor**
  Monitors sensors such as acoustic sand probes that can generate fleeting excursions. Usually used when we want to examine the data at an extremely fine level with a high degree of accuracy.

- ***Hi/Lo Limit Monitor***
  Performs a Hi/Lo limit monitor check.

- ***Limit Monitor***
  Periodically checks process tag value against configured upper and/or lower (MIN/MAX) limits to detect when the values exceed normal bounds.
  The granularity of the check is configurable and can be applied to aggregated data over a time period (e.g., 5 min sample check). Aggregation helps reduce noise.
  Use the Fleeting Excursion Monitor template if you require a high degree of accuracy.

- ***Limit Monitor 1 Precondition***
  Limit monitor that will only trigger or reset an excursion event if a precondition tag value check is met.

  Limit Monitor 2 Precondition
  Limit monitor that will only trigger or reset an excursion event if two precondition tag value checks are met.

- ***Limit Monitor 3 Precondition***
  Limit monitor that will only trigger or reset an excursion event if three precondition tag value checks are met.

- ***Logic Gate Alert***
  An alert that can be used to summarise the status of multiple alerts using an AND or OR operator.

- ***Time-Based Delta Monitor***
  Monitors changes in key processes over time by checking the delta of two process tag values against a limit.

- ***Value Change Monitor***
  Monitors a tag and emits an event every time the value of the tag changes.

Sensor Quality Checks

- ***Bad Data Detection***
  Data quality check that raises an alert if the monitored tag returns NaN or has a 'bad' status. Control the granularity and frequency of checks by varying schedules and sample-periods for average data points.

- ***Channel Deviation Detection***
  Checks for deviation in output from a sensor with two data channels. An alert indicates that one or both of the channels is unreliable. The method is to regularly compare Channel A and Channel B and check if the difference is within acceptable instrument error tolerance. The default configuration is to check the 24-hour average difference 4 times per day.

- ***Flatline Detection***
  Checks for flatlining data (i.e., process tags where the tag may be updated regularly, but the sensor value is not changing).

- ***Frozen Signal Detection***
  Periodically ensures that newer values are being received for a tag.

We can use those sensor quality checks as a precondition for our process data checks. For instance, only proceed to the actual limit check when we are confident that the signal, we are getting is true.

Calculations

- ***Accumulator Calculator***
  Calculates the accumulated result of a monitored process tag for a given period (e.g., a day).

- ***Aggregation Calculator***
  Periodically calculate an aggregation of a process tag.

- ***Average Calculator***
  Periodically calculates the average value of a process tag.

- ***Delta Calculator***
  Calculates the delta between the value of two input tags.

- ***Delta with Offset Calculator***
  Calculates the delta between the value of two input tags, then applies an offset.

- ***Energy Based Availability Calculator***
  Energy-Based Availability (EBA) is the ratio of actual to expected energy production.

- *Gas Velocity Calculator*
  Calculates gas velocity using flow rate and pressure.

- *Normalized Deviation Calculator*
  Calculates the normalized deviation of a process value.

- *Ratio Calculator*
  Calculates the ratio between two input tags.

- *Sensor Compare Calculator*
  Calculates the absolute delta of two tags and expresses the result as a percentage.

- *Time-Based Availability Calculator*
  Time-Based Availability (TBA) is an energy expression denoting the ratio of a time period (e.g., a day) when power is available. It does not discriminate the cause of downtime (e.g., a deliberate stop for maintenance, no/low wind conditions).

- *Time-Based Delta Calculator*
  Monitors the rate of change of a process tag over a time period.

- *Turbine Status*
  A turbine has three basic power-production states: 1. Power; 2. No Wind; 3. No Power.

- *Turbulence Intensity Calculator*
  Turbulence Intensity (TI) is a measurement of wind speed turbulence. It is the ratio of wind speed StdDev to Mean.

- *Turbulence Intensity Forecast Calculator*
  Turbulence Intensity Forecast (TI) is a measurement of wind speed turbulence derived from forecasted Wind and Gust Speed (rather than observed wind speed variance).

- *Unit Converter*
  Converts process value from one unit to another.

5.2 Notifications

What types of notifications are you interested in?

- Email

- Text Message

- Windows Notification

- WhatsApp/Teams Message

- Daily / Weekly / Monthly reports

To satisfy all the above use cases and more, we recommend using Facit in combination with our Microsoft **Power Automate Connector**.

Figure 5-2 Power Automate Connector

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