LVA - Longwall Visual Analysis

Information Sheet

Hydraulic Health

for LVA versions 7.35 and later

Summary

LVA calculates a Hydraulic Health rating or score for each leg or shield across the face, and displays this in various ways to help understand where there may be areas for improvement in hydraulic performance.

The Hydraulic Health algorithm includes factors such as low set pressures, leaking issues, frequency of hi-sets, legs that are not yielding when they should be, legs that are not achieving good pressures or that have a significant difference from their neighbours, and slow LAS (lower-advance-set) times. Each of these factors is given a value of 0, 1 or 2 (good to bad), and then the values are added together for a final score. A low score is good, and higher scores indicate several significant issues that may be affecting the shield's performance.

Hydraulic Health results can be displayed…

- In LVA Gauges as a summary across the face.
- In Trending as a trend of Hydraulic Health gauge value against time.
- In the 3D images for every shield across the face and back in time.
- In Load Cycle Maps and Histograms as averages per shear for every leg across the face and back in time for a whole panel.
- Alert messages relating to poor Hydraulic Health gauge values can be generated and emailed along with other alert messages.

Hydraulic Health

Hydraulic Health is calculated initially as a rating for each leg at a specific time, based on seven parameters. Each parameter returns a result of 0, 1 or 2 (0 = good, 2 = poor). Then the seven results are added together for an overall score between 0 and 14. A low score means the leg is performing well at that time. Consistent higher scores indicate several significant issues that may be affecting the shield's performance.

The seven factors used to calculate Hydraulic Health are…

1. *Low set pressure* – could indicate either difficult roof conditions or a poorly performing leg.
2. *Leaking legs* – are unable to perform at optimum capacity.
3. *Hi-sets* – a high frequency of hi-sets indicates a leg may not be able to hold sufficient pressure.
4. *Not yielding* above yield pressure – indicates possible mechanical problems with yield valves, or incorrect pressure sensor calibration.
5. *Low pressure* relative to neighbouring shields – indicates a leg is under-performing.
6. *MG vs TG* – scores high when there is a significant difference between MG and TG leg pressures on the same shield, which may indicate a sensor calibration error.
7. *LAS* – scores high when then LAS (lower-advance-set) time is high, which may indicate pump capacity issues.

See the last section below for details on how to configure these Hydraulic Health settings.

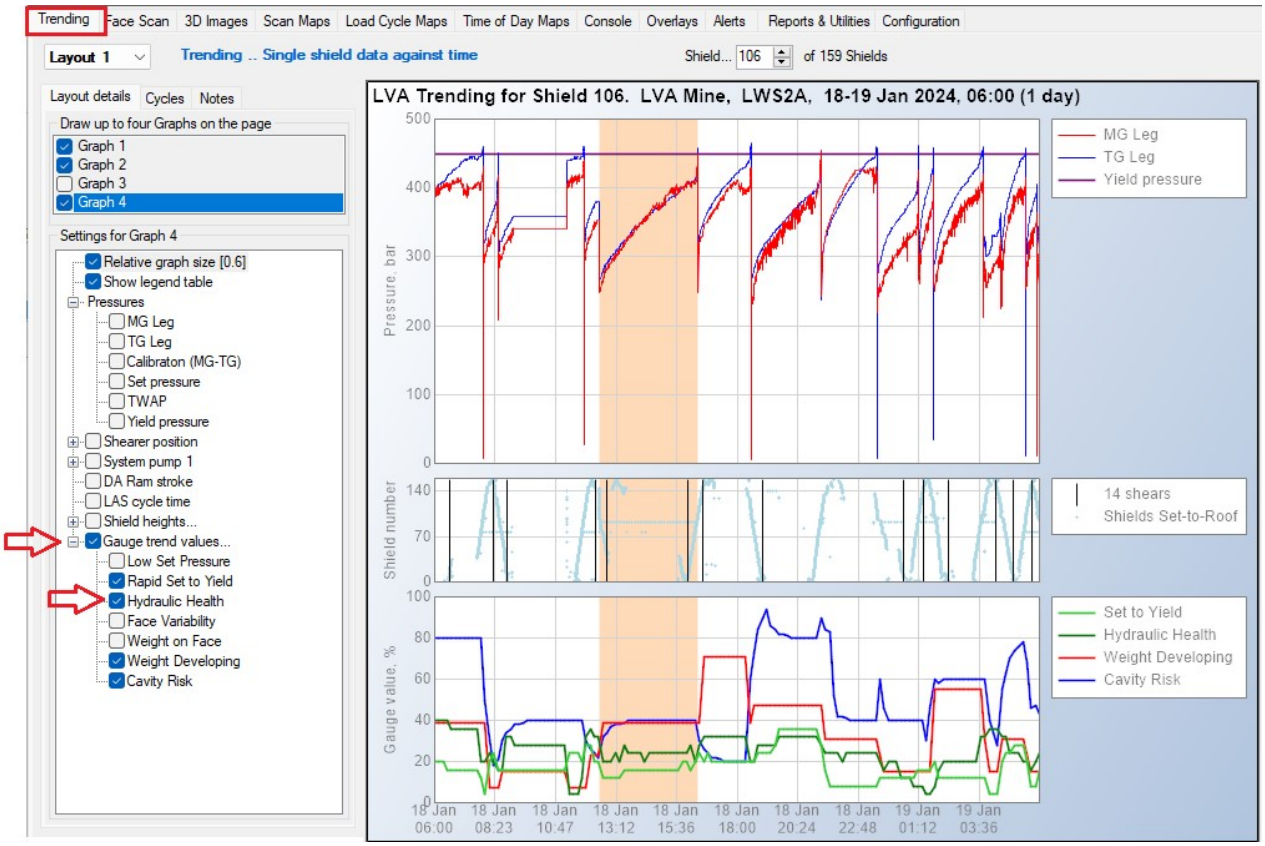
Gauges

The Hydraulic Health gauge is the third one along in the image below. Top left text shows the gauge value is currently 30% (needle in the green), and bottom left text shows "6 shields > 8". Hovering the mouse over the gauge shows the pop-up additional info at the mouse position, shown below the gauge in the image. In this case it shows "6 shields with Hydraulic Health > 8" and lists the relevant shield numbers.

See the last section below for details on how to configure the gauge settings.

Trending

The Hydraulic Health Gauge value can be plotted as a trend for each shield, as shown in the image below...

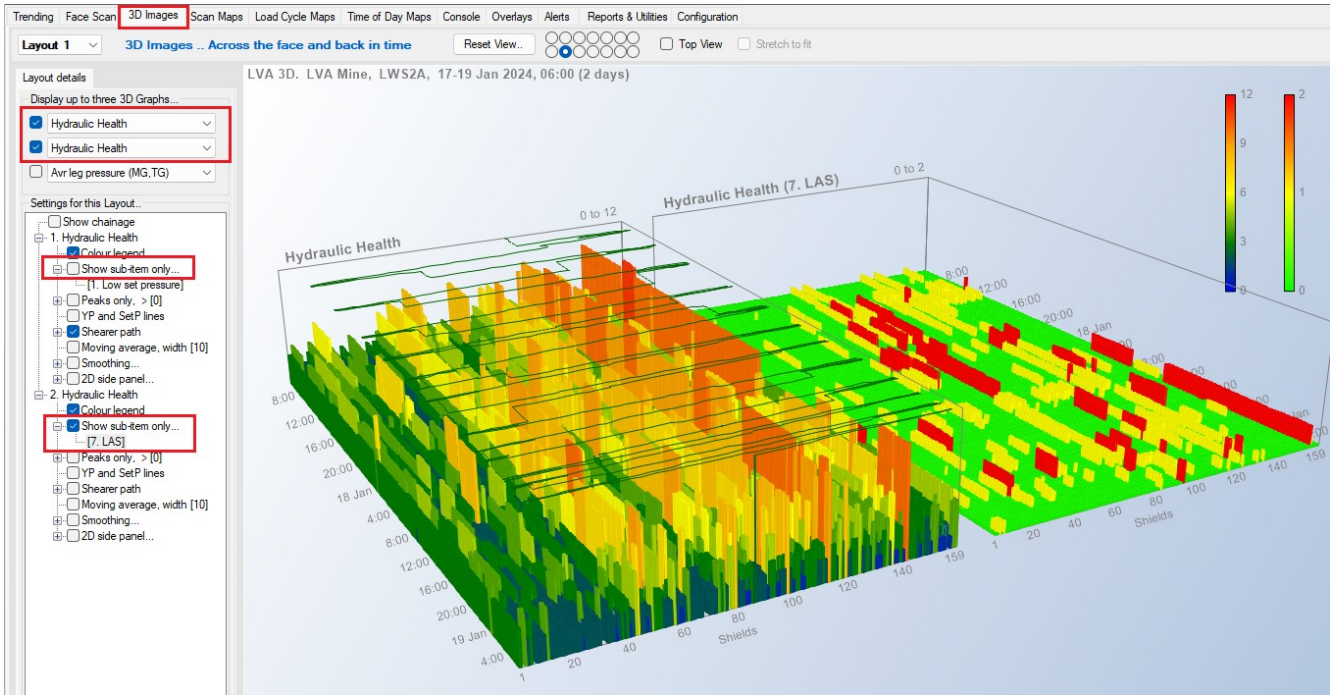


3D Images

Hydraulic Health images can be plotted for each shield, across the face and back in time in “3D Images”.

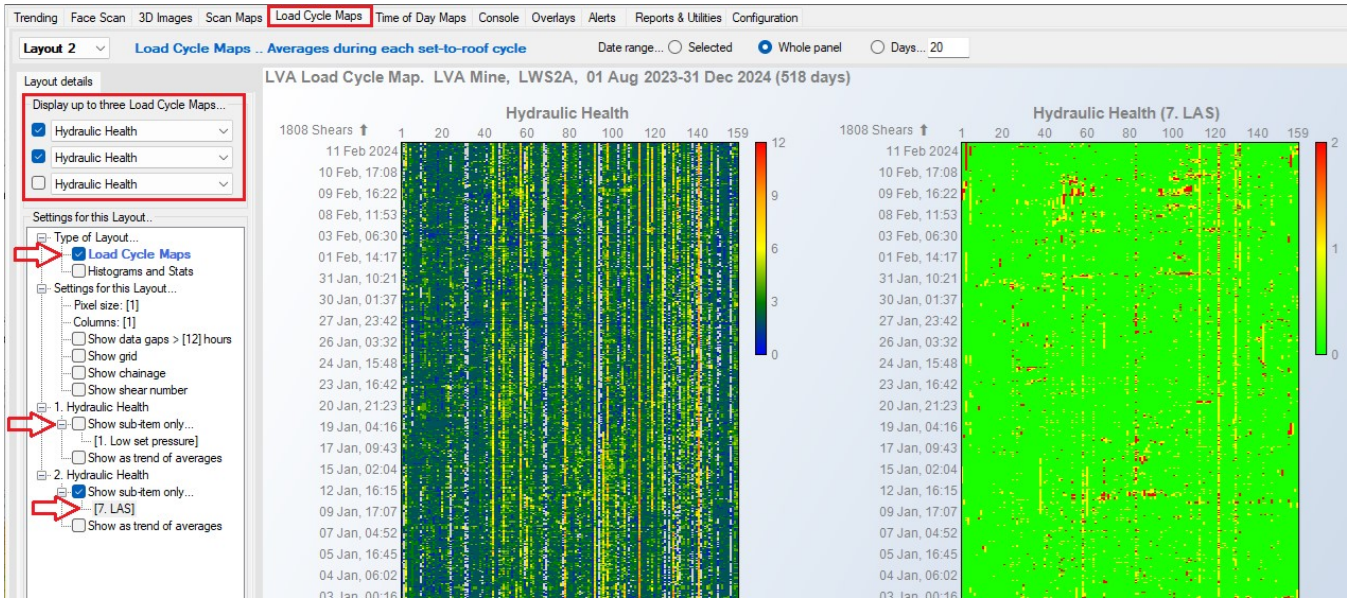
Graph 1 in the image below shows the overall Hydraulic Health index for each shield (the “sub-items” checkbox is unchecked).

Graph 2 below shows how to select and display one of the 7 sub-items that make up the overall Hydraulic Health score – double-click or roll the mouse wheel over the sub-item (shown below as “[7. LAS]”) to bring up a selection list of the 7 sub-items [Low Set pressure, Leaking, Hisets, Not yielding, Low pressure, MG vs TG pressure, LAS].



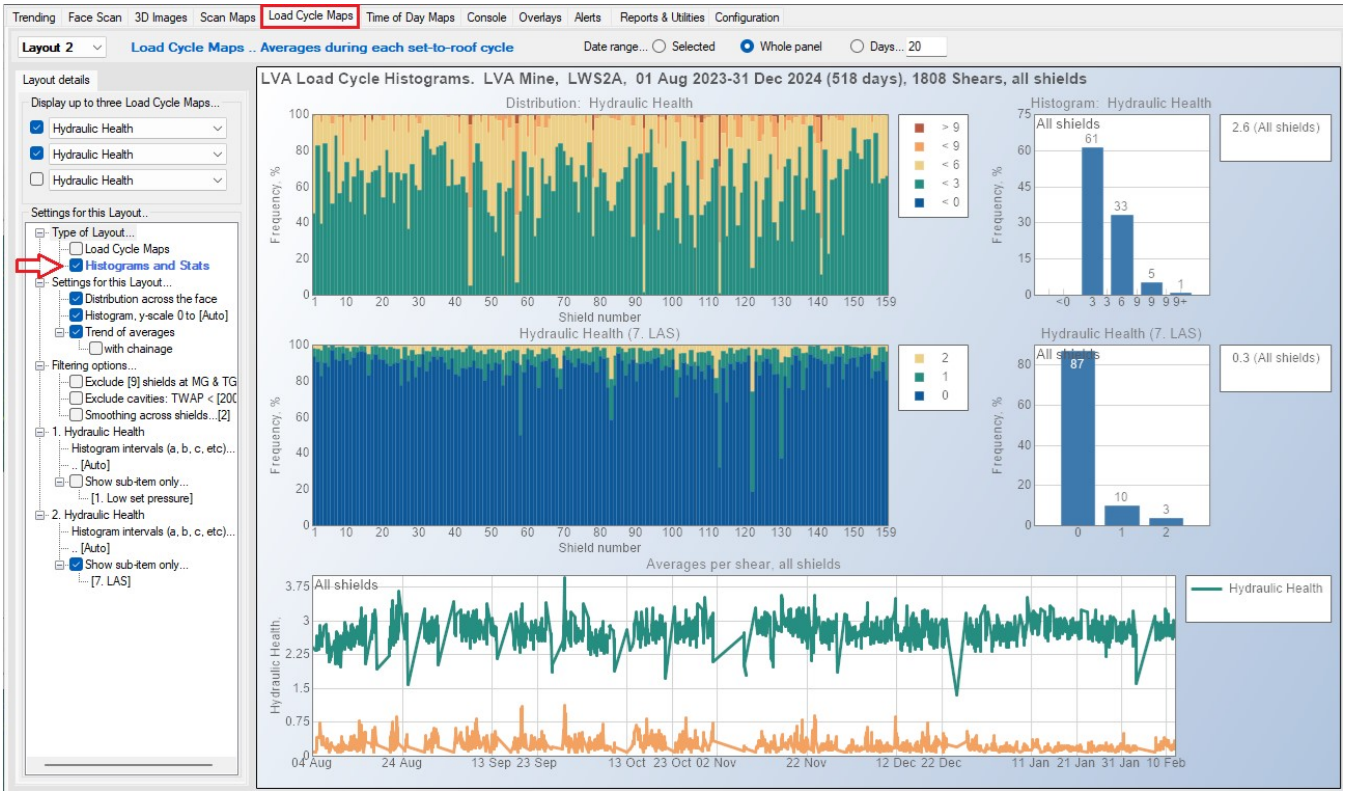
Load Cycle Maps

Displaying the Hydraulic Health Load Cycle Maps is very similar to the 3D images, as shown in the image below…



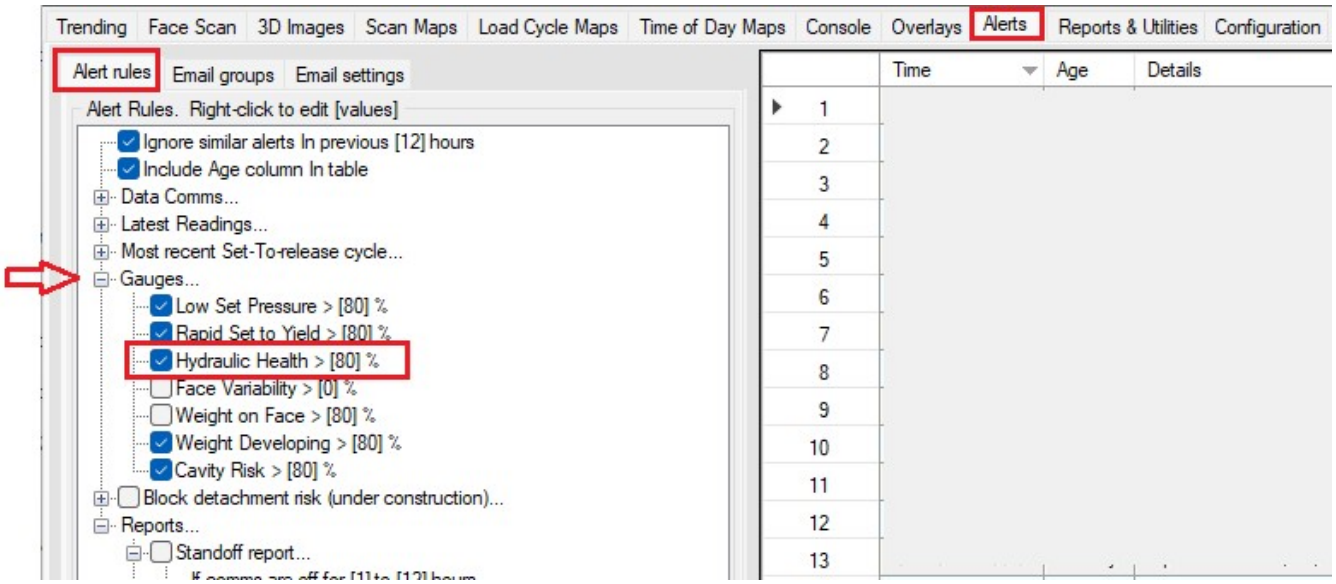
Histograms

And similarly for Histograms of the Load Cycle Maps…



Alert messages

The image below shows how to configure LVA to log Alert messages when the Hydraulic Health gauge value exceeds a set value, such as 80% as shown below. Edit any value in [square brackets] by double-clicking or right-clicking it.



Configuration of Hydraulic Health settings

The image below shows how to configure Hydraulic Health settings for calculating the individual and overall scores, and for how the gauge should be displayed.

- The Hydraulic Health Gauge response settings are defined in Configuration | General Settings | Global settings | Gauge settings | Hydraulic Health.
- Hydraulic Health TARP settings for calculating the individual and overall scores are defined in Configuration | General Settings | Global settings | Hydraulic health TARP settings, for the 7 categories.

Note that after changing any Global settings, you should copy them to the network so that other LVA users will have the same settings – see next section for details.
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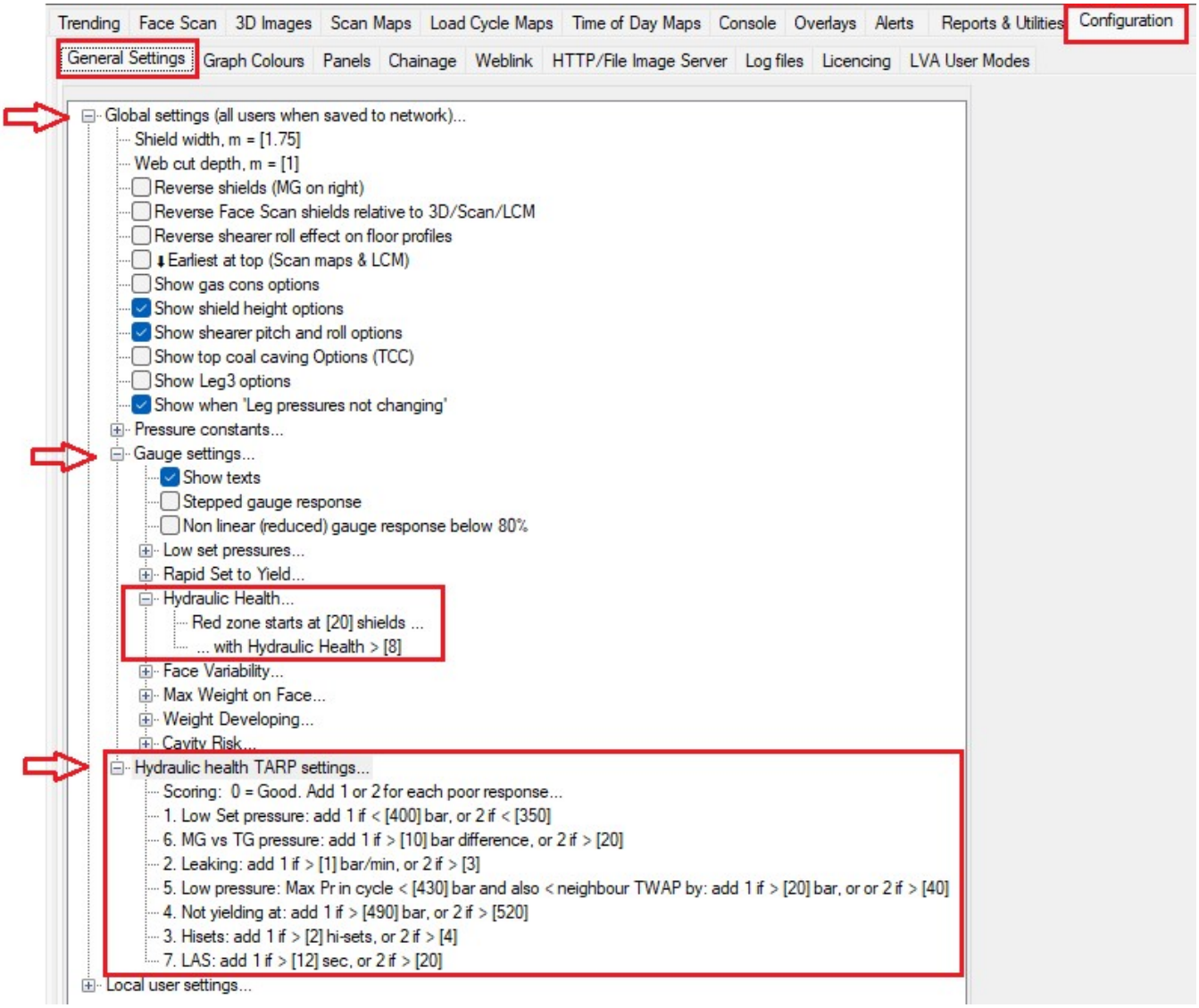

After changing Global settings

After changing any Global settings, if you would like to roll them out to other LVA users then you need to copy them to the network folder.

Go to Configuration | LVA User Modes and click “Save settings to network”. You need to be in either Server or Technical User Mode to do this.