

24 April 2017

ASX Market Update

Redflow Limited (Redflow) provides an update regarding the performance of our products in the field and also regarding the recent Strategic Review.

Executive Summary

- The Strategic Review commenced late last year is now complete and the Board is considering its response. Redflow will release details of its planned operating path within the next few weeks.
- Redflow has about \$1 million worth of product backorders, with 96 batteries in stock and another 120 batteries in transit from the factory.
- Redflow has recorded some unexpected product failure modes from remote monitoring of batteries deployed at customer sites. Most of these problems were resolved on an ongoing basis via 'over the air' remote deployment of updates to battery software. Thus, lessons learned from 'real world' customer deployments are being fed back into product improvement.
- Laboratory testing of electrolyte samples from one specifically identified batch of ten batteries indicate that they may be at risk of failure due to the presence of impurities in battery electrolyte.
- Based on manufacturing test data and ongoing operational product testing, Redflow's expectation is that this issue is likely to be confined to a small subset of our stocks.
- Samples from a further 20 batteries out of our Australian stock have just been sent for laboratory testing. The laboratory testing cycle typically takes about 10 working days.
- Delivery of new batteries has been paused pending the outcome of this further testing. If the tests being conducted return satisfactory results, Redflow expects to resume customer shipments at that point.
- Redflow also believes the issue can be remedied economically in any affected batteries by the application of a simple chemical remediation (cleaning) process. Redflow is now undertaking a trial to confirm this. If required, remedial action will be taken on any affected batteries before delivery.

Battery problems resolved by production changes and 'over the air' software updates

Since Redflow partners began installing batteries at a range of customer sites, Redflow has gained a greater understanding of the performance of our product under real world conditions.

Redflow has replaced or is in the process of replacing a total of 23 batteries in customer sites since January 2017 under warranty for a variety of reasons.

Three batteries were replaced due to routine and minor mechanical issues. These problems were resolved by changes to manufacturing processes.

Thirteen batteries were replaced due to operating cycle issues observed in the field that were the result of sustained operation of batteries in a manner not anticipated during in-house product testing. These issues were resolved via software updates to optimise the battery operating cycle.

The updates were distributed to our installed base via our Internet-connected Redflow Battery Management System (BMS) units. No further failures of this type have occurred in the field since the remote software update was performed.

Seven batteries were replaced recently due to a different observed failure mode. This has recently been identified as arising from a separate aspect of the battery operating cycle, where unexpected stress on the product is created in specific circumstances. Redflow has produced a new software update to resolve this further issue which will roll out to customer sites this week.

Redflow's capacity to use the Internet to remotely monitor battery performance, diagnose problems and implement their resolution is a key success factor for our unique product.

Redflow expects to continue iterating and improving its battery software as we learn from real world experience that provides insights additional to those gained from internal laboratory testing.

Temporary delivery delay to investigate potential supply chain quality issue

Redflow engineering staff have identified that presence of impurities in battery electrolyte beyond acceptable levels may also contribute to this most recently observed failure mode.

A small batch of batteries identified as being at specific risk in this regard have had electrolyte samples sent out for laboratory testing and these results have just been returned to Redflow.

The results show impurities in the tested battery electrolyte exceed operating limits set by Redflow. These impurities were not present when the battery electrolyte was loaded into the batteries in the factory. The impurities may have arisen from a supply chain quality issue with a specific batch of source material used in the manufacture of the products tested.

Redflow has temporarily suspended delivery of new battery stock to customers until further test results are obtained from additional battery stocks to verify the extent of the issue.

New laboratory tests of samples from a further 20 batteries have just been submitted to an Australian test laboratory. Test results are expected to take about 10 business days to be returned to Redflow. Additional stock will then be tested until the issue is fully characterised.

If test results are acceptable, Redflow expects to resume battery deliveries from the tested stock.

Redflow is also trialling a simple chemical remediation process to remove impurities from affected batteries. Should this remediation approach be subsequently required, Redflow estimates the net cost of this process to be about AU\$500 per battery.

Redflow is also undertaking a range of improvements in respect of its material supply chain management to mitigate against the potential for continuing issues of this nature in the future.

Redflow remains confident in the effectiveness of its technology and underscores that this recent issue is not a fundamental technology deficiency, but rather it appears to be an unfortunate supply chain quality issue that can be resolved by improved supply chain controls.

Redflow will provide a further update after further progress is made on the activities outlined above.

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