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Doc. Id 1JNL685003
Reference No
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Date 2018-10-09

Life Cycle Announcement HVDC Light, 5SNA070025D0002,3,4,

Dear Stuart Dodds,

This letter is to address APA's kind attention on the following components of APA's HVDC Light installation:

5SNA070025D0002

5SNA070025D0003

5SNA070025D0004

Background

Over the past 21 years since HVDC Light Voltage Source Converter technology was invented and commercialised by ABB, we have continued to pioneer and develop the technology to higher performance and greater functionality, resulting in today's greater than 3500MW - 500kV VSC systems.

This rapid development curve has resulted in significant changes to the IGBT semiconductor structures over the past 21 years, i.e. since the first development of the original project dated back in 1997.

As a result of these developments, some components are now at the end of their natural lifecycle, and thus are becoming unavailable for future procurement as their availability elapsed within the market.

Currently ABB is replacing the pioneering generation of Semiconductor IGBT's that had been developed to create the mature technical solutions that nowadays ABB delivers.

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Current Status and way forward

The IGBTs used in your installation (B1, B2, B3, M2 and M3) are out of production for several years. We had prepared a stock that we believed would cover the need for spares for the life time of the installation. This was based on the expected failure rates of the specific design.

The last years' failure rate of the installation has been far more than expected and much higher than in other HVDC Light installation, resulting in an urgent decrease of the ABB stock.

The newly Upgraded system (M1) has seen a much lower failure rate.

As the result of all the above background, the referenced components are obsolete and ABB's stock of such components are limited.

As of today the total available stock is 81 pcs (20 pcs of those have already been ordered by APA).

The total failure rate in systems B1, B2, B3, M2 and M3 approximately 40 pcs/a based on statistics from 2017 and 2018

Based on this situation we have started detailed investigations in a number of areas:

Improve the failure rates, on-going actions to replace fiber optics and valve electronics

Stock/inventory, ABB's global stock and possible stock available at other installations of HVDC and FACTS

Upgrade alternatives, Valve upgrade and full converter upgrade of one system creating spares for the other system are being evaluated. Most of the design of System M1 can be reused and we therefore believe that this is the best alternative.

We are now evaluating those different options to handle the shortage of spares. Even though the options are not yet detailed we decided to inform APA at the earliest possible opportunity, to make sure that the different options we see now can be coordinated with APA's needs.

While ABB regrets any short term inconvenience this may cause, we confirm our firm commitment to continue to work in an open and collaborative way to find alternate solutions that keep APA's stations and system operating in the best possible way for APA's successful business operations.

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Yours Sincerely

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