Q. Please provide a brief functional description of the electrode line protection system. Include in the response whether the protection will be capable of detecting faults whether or not the electrode line is energised.

A. Two independent conductors are provided for each electrode line, and the HVdc converter supplier is required to provide fault detection schemes to detect the following conditions during monopolar and bipolar operations:

- An open circuit in one or both electrode conductors;
- A permanent fault to earth; and
- A conductor-to-conductor contact.

To accomplish this, each electrode conductor will be equipped with an independent dc measuring device. The electrode line fault monitoring system will consist of an electrode line unbalance protection that will compare the current flowing on each of the two electrode conductors while the dc system is in operation. During balanced bipolar operation, a “spill” current will be injected periodically to allow sufficient pickup for the unbalance protection. The electrode line unbalance protection will be implemented as part of the HVdc Control and Protection System, which is a fully redundant system.

In addition, each electrode line will be equipped with a fault locator that will be used to provide operators and maintenance crews with information relating to the location of a fault and the ability to detect a fault if the converters are offline.

Ultimately, the HVdc system will be designed such that it can operate with a single electrode line in service, and also be designed to withstand the loss of a single

electrode conductor while operating in monopole operating mode. In each of these cases, power transfer capability of the HVdc link will be limited by the current carrying capability of the working electrode conductor.