

**Q.     SUBSTATIONS**

**PUB 6.0 (RE: p. 23 & 24 of 73) Protection and Monitoring Improvements (\$78,000)**

**PUB 6.2**

**How, specifically, are these replacements and/or additions expected to maintain and/or improve system protection and operating reliability?**

- A. Replacement of the existing tap changer controllers at Bay Roberts Substation is required to reduce the possibility of a premature failure of one or both of the power transformers at the substation. Both transformers are equipped with tap changing mechanisms that ensure the transformer output voltages are equal and within acceptable limits. If the mechanism controllers fail, the transformers will adjust their output voltages independently, giving rise to current flows that can overheat the transformers. In severe cases, this can lead to failure of one or both transformers. Both of the existing controllers are old and require ongoing adjustment to keep them working properly.

The installation of current transformers on the bus tie breaker at Memorial Substation is a protection modification that will allow a reliable power supply to be maintained to the university campus and the hospitals while maintenance is being performed on the power transformers. When Memorial Substation was built, the protective relaying was not designed to accommodate the present load levels. Consequently, the last time one of the two power transformers at the substation was taken out of service for maintenance, the relaying interpreted the increased power flow through the remaining transformer to be a fault, resulting in the loss of power to the entire Elizabeth Avenue campus and the Health Sciences/ Janeway Hospital complex. The installation of current transformers on the bus tie breaker will enable the protective relaying to respond appropriately in such circumstances.

At present, the protective relaying circuits for three transmission lines at Gander Substation do not incorporate test block devices. Test block devices allow portions of the relaying circuits to be isolated for maintenance work by means of a switch, which is safer than having to install wiring to bypass the relays. The installation of test block devices at Gander Substation will reduce the risk of injury to personnel working on the relaying circuits, and also reduce the possibility of damage to equipment and service interruptions to customers.