



<http://www.cigre.org>

Study Committee B3
PS2: Existing Substations, new challenges

RETROFIT OF CONTROL AND PROTECTION IN OLD SUBSTATION

Roberto Suárez Silva
TRANSELEC
CHILE
rsuarez@transelec.cl

Due to the necessity of having quality information and provide this information to deliver to the authority in CHILE, it is necessary to adapt and upgrade the substations that were made at many years ago by other different criteria than those currently governing the electric utilities today.

This paper presents a methodology that help to do the retrofit works in old substations, this substations are very important because supply energy to large cities or important customer but the problems is that substations need to be upgraded but cannot be disconnected in long time period.

The fact that the substation cannot be disconnected from service creates a major difficulty in to do the project should be coordinated with the operation area and must be carefully planned to avoid unwanted falls in electric supplies.

These papers present two examples of retrofit made in TRANSELEC, which proved successful in the security aspect of service and final goal is to obtain relevant information of the substation equipment.

The first example, consist in four changes of distance protection, electromechanical relays by new digital relays, this experience allowed reusing existing space in the closets to make changes one at a time enabling this changes in minimal disconnections for each bay involved in this works. These works were made reusing and adapting the core of potential transformers and current transformers in addition to new functionality that doesn't exist there on the bay and substation in question. The protections change also allowed obtain real-time information in the SCADA through the integration of such equipments to the remote control system of the substation, at a very low cost since it only requires communication ports and no special wiring between equipment. The negative aspects of this work is a constant concern for the safety of the service throughout the work that leads people to be subjected to a constant pressure that causes the work is high emotional component.

The second example to be developed, is the change of philosophy of control in a substation that had old switch to do the local control, for a new digital controller capable to do of local communications and control in the bay, allowing to integrate this bay to modern substation control center with the benefit of real-time information alarm and event besides reducing wiring and virtually all the logic that was previously performed using a lot of switches and relays, now this same solution was implemented without major problems within the controller by use the boolean logic. Work like the first example was development with installation in

service and only short breaks were necessary for the replacement of the old system and connect the new controller. Interruptions basically aimed to involve the new equipment and test the commands and signals from the breaker and disconnector and check the information in the remote control systems.

Importantly, the work was carried out with staff from the company that knows the facilities and politics the operation of the company, as well as in this type of work there may be periods in which no progress can be made for operational reasons, in this case the people can move to other activities during idle time, which is very complex to do with an outside contractor.

An important fact which has been obtained from the changes and modernization of old substations, is that although current technologies offer many benefits but the duration is much lower than the old substation solutions, requiring a team that always evaluates changes by technological obsolescence.

Finally, this work not only left a methodology to retrofit in old substations, also obtain the experience will in future replace not only the substations today there are old and the substations today are modern in 10 or 20 years will need to be updated.