6 Power system control centre: dispatcher's activities

6.1 Introduction

In a SCADA/EMS control centre the operator is as much an integral part of the control system as the hardware and the software. More than that, the operator represents the most essential part. The operating and the operational planning personnel are the pivot around which the whole control centre revolves. The operator remains the ultimate decision maker because his responsibility for the power system is not separable. Thus the problem of an energy control centre can be approached as a system with three components:

- Hardware
- Software
- Personnel.

The efficient functioning of a control centre requires more than matching or juxtaposing these three sub-systems; it represents a synergistic effect, based on an appropriate combination of these components, where the human sub-system - the operating personnel and the operational staff - including the operating knowledge, philosophy, rules, and procedures of the electric utility constitutes the key.

As more and more automation is incorporated into a network control centre, the essential question becomes: what is a control centre or a control room, and what is the role of the operator within a control room?

The control room in a dispatch centre forms the human-operator interface to the process of power generation, transmission and distribution. This interface contains up to several thousands gauges, meters, digital read-outs, buzzers, flashing lights, diagrams, displays, etc. The control centre and the control room constitute the operational focal point and the nerve centre of the electric power system.

6.2 Salient features of the operator activity

Analysing the activities of a power system operator, it can be pointed out that in a steady, quiescent and normal situation he is working at a low
stress level. This can change very rapidly when an emergency situation occurs.

The alternation between quiescent, boring, routine activities under low stress level and emergency, dynamic, non-predictable situations and actions under time pressure and high stress is characteristic of the activity of the power system operator. The decision-making process in a power system control room is realised through the human operators; as human problem solvers they are not alone. They are using and interact with a number of programs problem solvers or other intellectual tools.

One of these is the decision support system. The decision support system as part of the EMS is a collection of programs that constitute a sort of "crystal ball" for the dispatcher. It serves as a computer-aided consultant with advisory functions. The decision support system is divided into:

- Executive decision support system containing programs such as topology, dynamic network colouring, reactive power flow monitoring.
- Predictive/prophylactic decision support system containing programs for security assessment, economical dispatch.

6.3 A conceptual model of the dispatcher's activity

Fig. 6.3-1 describes a conceptual model of the dispatcher's activity. This model represents a cyclic process containing the following stages:

- Perception: obtain the current information
- Assessment: appraise the information by comparing expectations or patterns and identifying the significant features
- Planning: validate or revise current plans with respect to the most recent information
- Deciding: make decisions and select actions with regard to plans
- Execution: execute the selected actions.