

USE OF INFORMATIC FOR RADIATION CONTROL PANELS

R.COCHINAL, B.GRIMONT - Commissariat à l'Energie Atomique (FRANCE)
V.MAI - Merlin Gerin Provence (FRANCE)

Radiation control panels (R.C.P.) are systems which enable irradiation and contamination risks to be quantitatively determined and monitored.

Such systems automatically control the immediate activation of warning devices (audible and visible in the zones concerned so as to alert personnel at their working stations).

For a few years now, the CEA has been developing a programmed system generation of radiation control panels.

R.C.P. can be divided in to three main elements :

1°) a series of monitoring stations

Each station monitoring a zone consists of :

- . a detector adapted to the characteristics of the radiation to be detected together with part of all of the associated electronics (power supply, amplifier...)
- . an audible and visible alarm unit alerting personnel of the risks to which they are exposed.

Measured exposure levels fall into four scales as seen in the table of figure 1, which also indicates the corresponding visible and audible signals.

2° a central station

All the radioprotection data recorded converge into this station. In general, an operator is posted here, whose responsibility is to monitor, and when necessary, record, the risks encountered at each individual station.

3° more or less sophisticated information processing facilities (between 1° and 2°)

A recent orientation in the design of the R.C.P. programmed system generation is to locate totally autonomous units in the various different zones. These units provide signals when given thresholds expressed in LMA or CMA are exceeded. In this way safety and availability are improved.

This unit, which together with its detector constitutes an autonomously operating monitoring station, can be connected to a centralizing unit (e.g. minicomputer).

DESCRIPTION OF THE MICROPROCESSOR PROCESSING AND SIGNALLING UNIT (PSU)

The monitoring station of a zone figure 2 consists of :

- a detector and its associated electronics which delivers a standard pulse for all types of detector.
- a processing and signalling unit assuring the following functions :
 - . acquisition of information detected by the detector
 - . processing of this information to determine LMA dose rates, while taking into account parameters such as the radiotoxicity of the radioelement, which can be memorized in the unit

- . generation of different output signals to be transmitted to the central station (100 to 200 meters)
 - . warning outputs for synoptic
 - . analogic dose rate output for recordings
 - . asynchronous line output for centralizer
 - upon cyclic interrogation by minicomputer, the unit transmits :
 - . dose rates
 - . the threshold exceeded by the unit
 - . the state of the unit
 - . the memorized values of the thresholds and coefficients
- The correct operation of each station is verified :
- the complete system, by measurements with a permanent low activity control source, which triggers correct functioning threshold
 - the quasi-totality of the system with periodic tests (generator simulating levels)
- An MC 6800 microprocessor is used.
 A maximum of 8K REPRM and 2K RAM memories is available.

DESCRIPTION OF CENTRALIZE

At the central station, all or part of the following facilities are available :

- minicomputer which acquires (via asynchronous lines) informations from units for determining cumulative doses and different logs
- a detailed visual synoptic providing, for each station, the number of the threshold exceeded
- recorders

The last two devices are independent from the computer and can constitute :

- . either, by themselves, the centralizer
- . or, a back up system for the computer in the case of failure.

A first realisation of this system is being used to control an effluent treatment plant. 30 units are connected to a MULTI 6 minicomputer.

RADIATION LEVEL DISPLAY

4 Measurement scales (according to regulations)

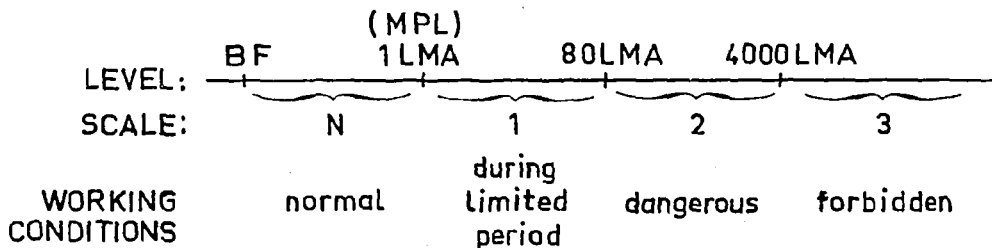


Fig. 1

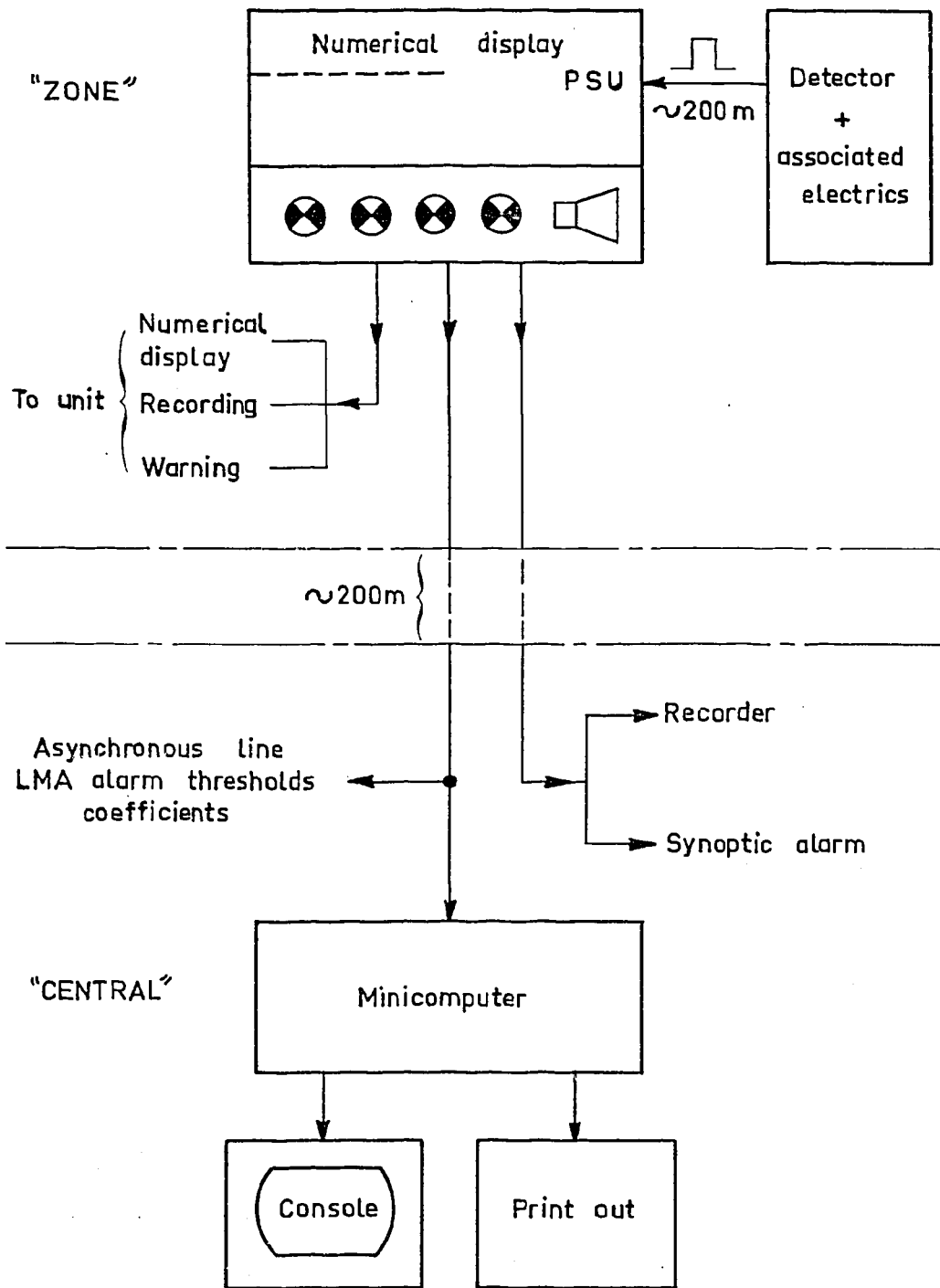


Fig. 2