

EARLY WARNING NETWORK OF THE CZECH REPUBLIC

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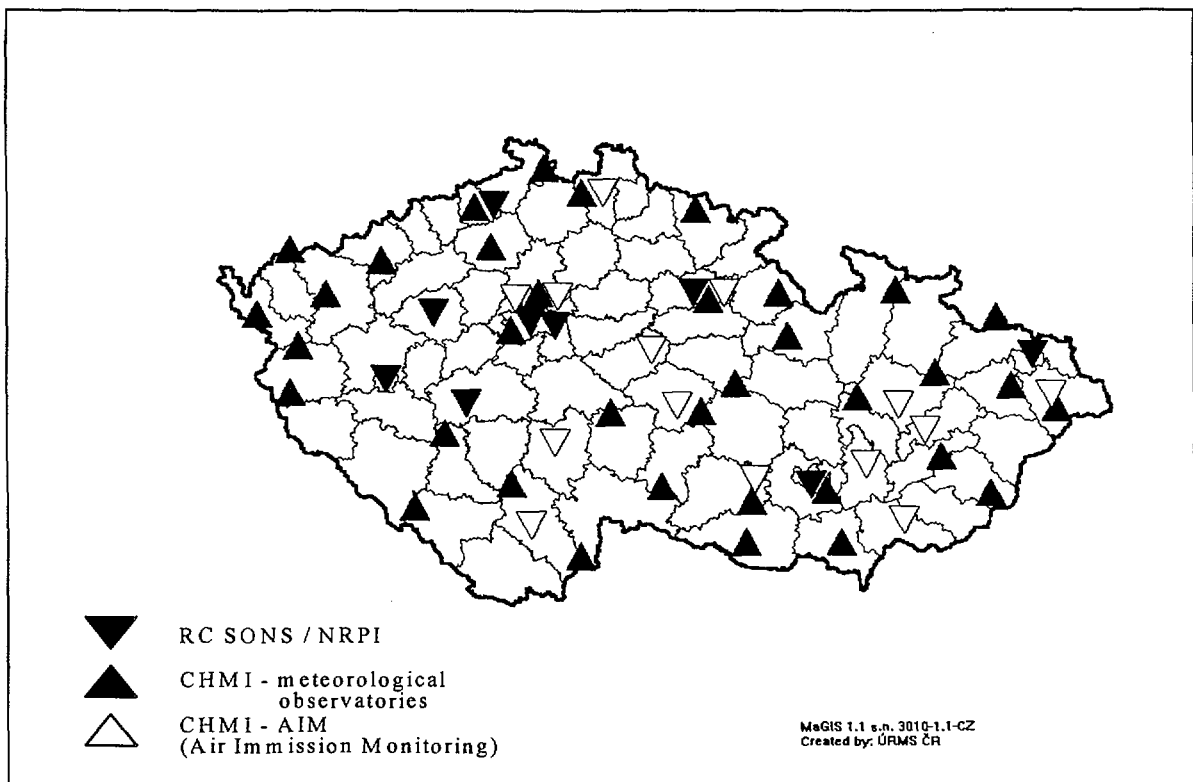
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The Early Warning Network (EWN), part of the Radiation Monitoring Network of The Czech Republic, has been established after 1990 to provide overview information on radiation situation across the territory of CR and to raise an alarm in case of unreported accident outside the territory of CR.

The EWN measuring sites are equipped with two-probe system LB-111 / LB 6360 / LB 6500-manufactured by EG&G Berthold, BRD. As a result of combination of a low-range probe (proportional counter LB 6360, dose-rate range 10^{-8} to 10^{-3} Sv/h) and a high-range probe (Geiger-Müller counter LB 6500-3, dose-rate range 10^{-5} to 1 Sv/h) the system is able to cover the dose-rate range from natural background to values in real emergency situation. The energy range covered is 20 keV to 2 MeV and 55 keV to 2 MeV, respectively.

The EWN consists of 48 measuring sites covering the whole territory of CR (Fig.1), 38 of them located at observatories of Czech Hydro-meteorological Institute (CHMI) – 28 at round-the-clock manned observatories, 10 at unmanned (automated) observatories (AIM) – and 10 located at Measuring Points of Air Contamination (MPAC) operated by National Radiation Protection Institute (NRPI) and Regional Centres of the State Office for Nuclear Safety (RC SONS).

Fig. 1. Early Warning Network - part of the Radiation Monitoring Network of the Czech Republic



Each EWN measuring site provides values of integrals of dose-equivalent over 10 minutes, starting at 00, 10, 20, 30, 40, 50 minute of each hour; measuring sites operated by CHMI provide in addition basic meteorological data (temperature, atmospheric pressure, wind speed and direction, precipitation, dew-point – all, cloudiness, category and trend of weather – only manned).

All data (both radiation and meteorological) are transferred to the Centre of Radiation Monitoring Network (CRMN) located in NRPI; data from part of EWN operated by CHMI using dedicated com-

munication lines from observatories to CMHI and through leased line from CHMI to NRPI/CRMN; data from part of EWN operated by NRPI/ RC SONS at MPAC using dial-up lines and modems.

Fig. 2. Data-Flow Chart of the Early Warning Network of the Czech Republic

Mode of Operation	CHMI Observatories (manned)	CHMI AIM (automated)	SONS / NRPI Regional Centres (manned during working hours or on request)
<i>Standard</i>	1x per hour averaged value calculated from six 10-minutes measurements + meteorological data	1x per hour averaged value calculated from six 10-minutes measurements + meteorological data	1x per day set of 144 values of 10-minutes measurements
<i>Alert</i>	1x per hour six values of 10-minutes measurements + meteorological data	1x per hour six values of 10-minutes measurements + meteorological data	1x per hour six values of 10-minutes measurements
<i>Emergency</i>	1x per 30 minutes three values of 10-minutes measurements + meteorological data	1x per 30 minutes three values of 10-minutes measurements + meteorological data	1x per 30 minutes three values of 10-minutes measurements

In NRPI / CRMN data are processed by Central Information System of CRMN, stored into a database and displayed over the map of CR (Fig.4). Furthermore, processed data and resulting maps, graphs and tables are communicated to Crisis Co-ordination Centre (CCC) of SONS and to EURDEP (via E-mail).

The EWN can operate in one of three modes, the standard mode, the alert mode and the emergency mode. The modes of operation differ in frequency of data transmission as follows (Fig.2):

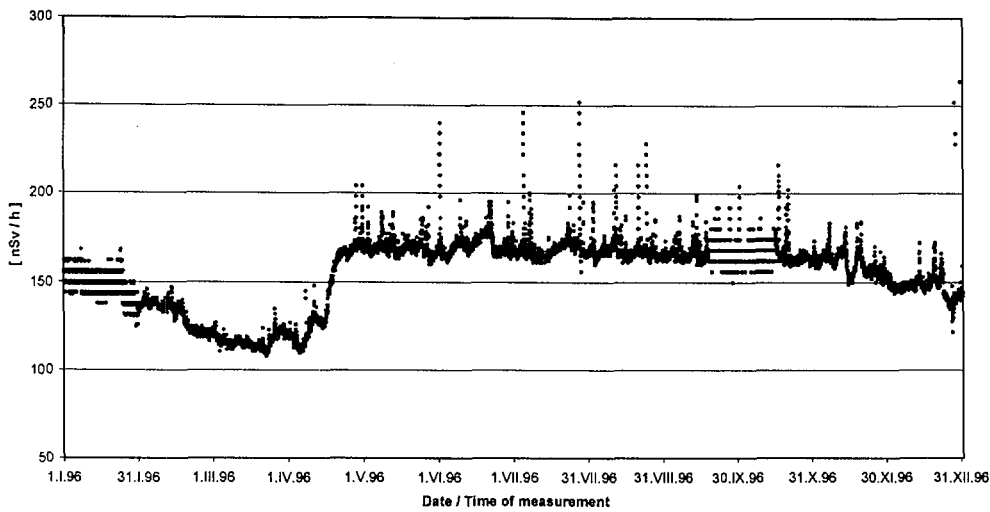
- *in standard mode*, data from part of EWN operated by CHMI are preprocessed directly at the measuring point, at the beginning of each hour the hourly average value for the last hour is calculated and only this value accompanied with meteorological information is transferred (the transfer occurs about at fifth minute of each hour); data from part of EWN operated by NRPI/RC SONS at MPAC are transferred once per day (sets of 144 values of 10-minutes integrals of dose-equivalent)
- *in alert mode*, data from all measuring points of EWN are transferred to NRPI/CRMN every hour (sets of 6 values of 10-minutes integrals of dose-equivalent accompanied with sets of meteorological data for CHMI sites)
- *in emergency mode*, data from all measuring points of EWN are transferred to NRPI/CRMN every 30 minutes (sets of 3 values of 10-minutes integrals of dose-equivalent accompanied with sets of meteorological data for CHMI sites)

As a result, processed data and resulting maps, graphs and tables are available about the tenth minute of every hour (plus about the fortieth minute of each hour in emergency mode).

Basically the EWN operates in standard mode, to the alert mode or to the emergency mode it switches either automatically using a decision scheme based on reaching preset dose-rate levels or manually on request of CRMN.

When preset level for both alert and emergency mode on manned sites are reached, the operators are due to perform a check-out of the equipment using calibration source (Cs-137). The levels for alert mode are set specifically for each site so that they are expected to be reached approximately once per month to keep the operator ready to use the equipment (and not to be reached too often to disturb normal work of the operators); the level for emergency situation is set to the value of 500 nSv/h for all sites (this value we consider as not reachable due to fluctuation of natural background).

Fig. 3. EWN-Measuring site Churáňov-1996 (dose equivalent rate calculated from 10-minutes integrals)



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emergency situation is set to the value of 500 nSv/h for all sites (this value we consider as not reachable due to fluctuation of natural background).

The alarm function of EWN is assured by paging and GSM-messaging system; each time when information that preset levels are reached on any site the server of Central Information System of CRMN contacts the server of a paging service and transmits a warning message to pagers on members of CRMN (in close future, it will also transmit a message using GSM-messaging system). Members of CRMN have a possibility to remote log-in to the server of Central Information System of CRMN via notebook and GSM data services, check the situation (i.e. whether the increase of dose-rate was caused by fluctuation of natural background) and adopt proper measures.

In future, we assume on-line connection of EWN RMN CR with other existing or projected networks both on national (network of the Czech Army and network of the Czech Civil Defense) and international (EURDEP, RODOS) levels.

Typical time-course of 10-minute integrals of dose equivalent for a mountain and lowlands sites are shown in Fig.3 and Fig.4.

Fig. 4. EWN-Measuring site Dukovany-1996 (dose equivalent rate calculated from 10-minutes integrals)

