MoLaRi

Telemetric and Remote Control System for Disaster Management

The economic and political stability of the industrially developed countries is highly depending on the continuous growth of the economy. The two main factors of economic growth are technological development and the productivity enhancement of existing technologies. Both factors bring new environmental risks in both the nuclear, chemical, energy and oil&gas industry.

One of the most effective mitigation techniques is to implement an electronic environment control integrated with an early warning system in the affected settlements.

The essence of the **electronic control** is round the clock gas emission measurement installed between the hazardous factory and the endangered settlements. Meteorological information is also continuously collected in the surroundings of the factories to be able to forecast the gas dispersion in the case of an incidental emission. Knowing the gas concentration evolved by an emission and the meteorological environment, the professional supervising personnel of the system is able to influence the behavior of the population by alarm signals and speech instructions.

by the system, then compared to the set warning and alarm thresholds. The incidental warnings and alarms are transported to control room application.

Measurement frequency:	Customizable, by default: normal status: 10 min. alarmed status: 1 min.

Measured meteorological parameters:	Temperature (0.5m & 2m) Humidity Wind direction Wind speed Calculated vertical stability

Measurable gases	NH_3 H_2S Cl_2 $COCl_2$ CH_3CH_2 CH_3 NO_2	C_3H_3N C_2H_7N HF CO AsH_3 H_2	HCN HCl SO_2 $CNCl$ NO O_3

Configurations	Gas only – Gas&Meteo Normal with battery – Without battery – Explosion proof with battery Redundant – Non redundant

Communication options	Fiber – Ethernet – Microwave – GSM – TETRA

Monitoring System

The most important component of the system – the monitoring device measuring the background radiation – is installed with BNS-98 and a BNS-98S dose rate transmitters, one of them measuring the air kerma dose rate in Gy/h, while the other is measuring the ambient dose equivalent rate H*(10) in Sv/h. The analogous measurements of the sensor are digitized

Control Room Application

The meteorological and background radiation measurement data is transported to a computing center – formed by highly reliable servers and network devices – serving the control room clients. The computer center has professional physical protection formed by access control system, video surveillance, flooding protection, electromagnetic shielding, highly reliable air conditioning, redundant power with multiple inline and manned security.

The control room client application provides an integrated interface to the supervisor personnel to control the whole system or several instances of the system deployed in different locations:

Displays the measurement data and the alarms	
Supports the personnel with	action plans dispersion modeling
Provides a possibility to operate the publice alarm system	

Alarm system

The remote control of the public alarm system enables issuing alarms and providing information by speech instructions.

Sound sources	Pre-defined signal-alarms Pre-defined speech stored in the siren Speech pre-defined by the suprevisor personnel Live speech
Variations	Standalone pole Flat roof Individual desing (e.g. tent roof)
Communication options	Microwave – TETRA

Reliability

All parts of the system are designed to allow a full-extent in-depth system monitoring via standard system management tools from application memory usage through server fans to even the membrane of the sirens pressure chamber.

This high extent of monitoring allows defect repairs before actual outage would happen, resulting a very high system availability.

The system design allows all system components to be implemented redundantly increasing the reliability even more.

Potentials

The system – thanks to its flexible design – optionally equipped with other sensors (gas detectors, water or soil contamination, water level etc.) or other controlled devices (e.g. energetic or traffic control) is ready to be adopted to several other telemetric and remote control applications.