The Automatic Radiation Monitoring Distributed System SRM-256C

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The Controlled and Supervised Areas (CSA) of UNK proton accelerator builded in Protvino (IHEP, Russia), borrows the significant area (more than 15 sq. km.) [1]. Submitted in work [2] results of accounts show, that by major factors, influencing to a radioecological conditions in region at the expense of work UNK are: 1) the output of pulsing radiation on day-time surface; 2) the radionuclides receipts with drinking water; 3) the pollution of radioactive air from system of ventilation. At normal mode of UNK operation the equivalent dose rates on day-time surface of pulsing radiation will changes in limits from 0.5 mcSv/hours near overmines buildings up to 0.1 mcSv / hour on the CSA border [2]. The average equivalent dose rates per year due to internal irradiation at use (intakes) of drinking water will not exceed 5 - 50 mcSv/years [2]. The Maximum equivalent dose rates on day-time surface, caused by pollution of radioactive air does not exceed 0.01 ... 0.03 mcSv/hour in limits of CSA, and the average equivalent dose per year caused by internal irradiation does not exceed 0.05 mcSv / years [2]. At emergency-free operation the maximum degree of the UNK influence in limits of CSA is estimated in terms of average equivalent dose per year at levels, not exceeding 0.05 ... 0.10 mSv/year [2]. For maintenance of integral environmental monitoring of total external radiation levels in limits of CSA network of passive monitor stations [3] will be developed.The UNK influence on radioecological condition of environment , according to resulted estimations, will insignificant and can be determined only by long measurements, as before UNK start , and during its operation. One of differential monitoring components [4] of environment in UNK region will be The Automatic Monitoring Distributed System (SRM-256C). Its based on network of Sensors, recording radiation parameters of the environment, connected through Input/Transmitting Stations (IOS) via the communication line (the switched telephone communications or the non-switchable cable communications of radial organization) with managing computer (IBM PC/AT compatible).The IOS executes reception, accumulation of the information from sensors and transmission of data in Communication Line (CL) on inquiry from managing computer. The data are received by managing computer through specialized modem. The program shell of SRI-256Å routes cyclic inquiry of IOS , reception and decoding of the information from them, executes the control of reliability of distributed sensors , archiving of the received information in specialized database, mathematical processing and graphic representation of data with binding on the controlled area , recall and notification under given telephone number list in case of dose rate limits exceed. The first developed variant of IOS (IOS1) consists of following main functional units: power supply unit (PSU); unit of the interface with communication line (ICLU); the timer unit (TU); the RAM unit (RAMU) (RAM with capacity 4 Kbytes); unit of address logic formation (ALFU); the unit of counters (CU); unit of the reliability control of detectors (RCDU); the unit of the universal shifting register (USRU). The IOS1 permits to accept, to store and to transfer data in line on inquiry from two detectors (are used modified industrial detector BDMG-08R for gamma - radiation

detecting (the measuring range of equivalent dose rate are 0.1 mcSv/hour ... 100 mcSvhour) and the DPN neutron detector (the measuring range of equivalent dose rate are 2.5 mcSv/hour ... 25 mSv/hour .) for registration of neutron radiation [3]. The signals from sensors are recounted with CU and through installed timing interval are recorded in higher word (with address W:2047) of RAMU. ALFU and TU controls the work of USRU and organize arithmetic shift of whole data file in RAMU to lower addresses. The changeable range of a timing cycle of record in unit the RAMU makes Tc = 1 minute ... 4 hours, thus minimum data storage time (without loss) makes (1 mines o 2048) 2048 minutes. With detecting of an asynchronous inquiry in CL by ICLU a cycle of sensors reliability testing (the testing radioactive Sr/Y sources deliverance are organized to a sensitive volume of detectors) is initiated, and then ALFU and RCDU give out in consec utive CL data file from RAMU and results of detectors diagnostics . The data are broadcasted to CL with installed rates of transfer: in telephone line - up to 2048 baud; to coaxial cables - up to 9600 baud. Taking into account experience of IOS1 operation the second variant (IOS2) was developed. Basis of IOS2 is the one-crystal microprocessor 80Å31AI of clone Intel MCS-51 (USA). The software of IOS2 is realized with TASM for MSDOS (Speech Technology Inc.) cross-tools.The IOS2 carries out all functions of IOS1, however the IOS2 use less of chips and is simple in set-up. The amount of served sensors may reached 8. The updating of functional opportunities for IOS2 is reduced to reprogramming of ROM (capacity of 4 Kbytes) The specialized modem is developed for ISA system bus (AT-bus) of IBM PC/AT - compatible computer. The modem cyclically recalls the IOS, accepts data, together with has an opportunity to give out the speech information on telephone lines. The software of system ÅDI-256Å is realized in environment of programming shell Borland C ++ and permits to serve up to 256 of IOS.

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