MONITORING OF THE AEROSOLS RADIOACTIVITY AT BEO MOUSSALA



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1.Method of sampling of aerosols

Parameters of the system:

capacity ~ 1800m³/h, volume per sample ~ 15000m³ filter – fiber type, $\Phi\Pi\Pi$ -15-1,5, 50x50cm effectiveness ~ 95% for aerosol size 0.2-2.5 µkm sample for measurement of gamma-spectrum – pressed pill with size Φ 56x15mm



2.Method of measurement of gamma-spectra H.P.Ge – spectrometer, 1.9-2.2Kev on 1.3Mev, 33% relative effectiveness, standard for calibration, INRNE, < 3%





3.Background of the spectrometer lead shielding – some impurities the filter material – no contribution



4.Max. sensibility on the next
conditions:
15000m³, vol.
100000sec. time
of measurement

NOTE:

Factor of the sensibility is the ratio of the mean activity per year for the public places for Republic of Bulgaria to the minimal detectable concentration gained with our system.

The same concentrations proposed by ITU are several times higher. On reality this one means how many times the measured activity for any isotope is lower, then maximum permissible on the public places. For workers in special areas this is 20 times more.

isotopeenergy of gamma- rays, KeVmin. det. concent -ration, microB q/m3DAC/20 ITU-EU Bq/m3NRA R.B. Bq/m3factor of sensibility R.B./minCs - 134 $604,6$ \sim 7 20.8 6.0 $0.85x10^6$ Cs - 137 $661,6$ \sim 4 10.7 3.2 $0.80 x10^6$ I - 131 364.5 \sim 4 56.5 3.3 $0.82 x10^6$ I - 133 529.9 \sim 5 760 29 $5.8 x10^6$ Nb - 95 765.8 \sim 4 231 62 $15 x10^6$ Zr - 95 756.7 \sim 6 70 19 $3.1 x10^6$ Na - 22 $1274,5$ \sim 3 320 72 $24 x10^6$						
Cs - 134604,6 \sim 720.86.0 $0.85x10^6$ Cs - 137661,6 \sim 410.73.2 $0.80 x10^6$ I -131364.5 \sim 456.53.3 $0.82 x10^6$ I - 133529.9 \sim 576029 $5.8 x10^6$ Nb - 95765.8 \sim 423162 $15 x10^6$ Zr - 95756.7 \sim 67019 $3.1 x10^6$ Na - 221274,5 \sim 332072 $24 x10^6$	isotope	energy of gamma- rays, KeV	min. det. concent -ration, microB q/m ³	DAC/20 ITU-EU Bq/m ³	NRA R.B. Bq/m ³	factor of sensibility R.B./min
Cs - 137661,6 ~ 4 10.73.20.80 x10^6I - 131364.5 ~ 4 56.53.30.82 x10^6I - 133529.9 ~ 5 760295.8 x10^6Nb - 95765.8 ~ 4 2316215 x10^6Zr - 95756.7 ~ 6 70193.1 x10^6Co - 601173,2 ~ 3 13.54.01.3 x10^6Na - 221274,5 ~ 3 3207224 x10^6	Cs - 134	604,6	~ 7	20.8	6.0	0.85x10 ⁶
I -131 364.5 ~ 4 56.5 3.3 0.82×10^6 I - 133 529.9 ~ 5 760 29 5.8×10^6 Nb - 95 765.8 ~ 4 231 62 15×10^6 Zr - 95 756.7 ~ 6 70 19 3.1×10^6 Co - 60 1173.2 ~ 3 13.5 4.0 1.3×10^6 Na - 22 1274.5 ~ 3 320 72 24×10^6	Cs - 137	661,6	~ 4	10.7	3.2	0.80 x10 ⁶
I - 133529.9 ~ 5 76029 5.8×10^6 Nb - 95765.8 ~ 4 23162 15×10^6 Zr - 95756.7 ~ 6 7019 3.1×10^6 Co - 601173,2 ~ 3 13.54.0 1.3×10^6 Na - 221274,5 ~ 3 3207224 \times 10^6	I -131	364.5	~ 4	56.5	3.3	0.82 x10 ⁶
Nb - 95765.8 ~ 4 2316215 x10 ⁶ Zr - 95756.7 ~ 6 7019 3.1×10^6 Co - 601173,2 ~ 3 13.54.0 1.3×10^6 Na - 221274,5 ~ 3 3207224 x10 ⁶	I - 133	529.9	~ 5	760	29	5.8 x10 ⁶
Zr - 95756.7~ 67019 3.1×10^6 Co - 601173,2~ 313.54.0 1.3×10^6 Na - 221274,5~ 33207224 $\times 10^6$	Nb - 95	765.8	~ 4	231	62	15 x10 ⁶
Co - 601173,2 ~ 3 13.54.01.3 x10 ⁶ Na - 221274,5 ~ 3 3207224 x10 ⁶	Zr - 95	756.7	~ 6	70	19	3.1 x10 ⁶
Na - 22 1274,5 ~ 3 320 72 24 x10 ⁶	Co - 60	1173,2	~ 3	13.5	4.0	1.3 x10 ⁶
	Na - 22	1274,5	~ 3	320	72	24 x10 ⁶

5.Natural and human made radioactivity at BEO *MOUSSALA*

- human made was not identified
- natural : Be-7 and U Th products



6.Conclusions

- > high exchange of the air mass
- > air mass with different origin
- > air mass from far-away
- > connection with the intensity of the space particles
- very important role in the case of accidentmember of RO-5

7.Next advance of the system
> detector at BEO-Moussala
> analysis of the spectra at BEO-Moussala
> on-line results
> monitoring of Pb-210

