



ON THE POPULATION DOSE 2010 AND 2011 AT VOLINCY MUNICIPALITY IN BELARUS

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Large parts of Belarus suffered from Chernobyl fall-out. In several studies our division has been investigating the long-term development of population dose at the municipality Volincy in Korma County (Belarus) (e.g. [1]). We report on the most recent results, which were obtained during the 2010 and 2011. The external radiation exposure was derived in-situ measurements and measuring soil samples. The internal radiation exposure of the inhabitants in the municipality of Volincy was assessed by mobile in-vivo monitoring. Strongly elevated body burdens had been reported in the past [1]. Presently the internal dose is only slightly enhanced over background values and of no special relevance to health.



Map of Korma County, Belarus

Korma-County

- approx. 70 km north of Gomel/Belarus
- about 200 km from the Chernobyl NNP
- partly comparatively low contamination
- partly confiscated zones

Municipality of Volincy:

- i.e. Volincy, Kijapin, Klapinskaya-Buda
- situated in forest belt
- only some agriculture
- economy has more forestal character
- access through confiscated zone (Strumen)

Mobile Whole-Body Counter

- van-based
- two large NaI(Tl): 40cm x 10cm x 10 cm
- PC-based data acquisition and analysis
- weight dependent calibration

Environmental monitoring

- area dose rates
- portable monitor (MAB 500)
- soil samples
- German standard practice used to sample
- mineral and organic parts being separated

Results obtained at Volincy municipality

Body Burdens

Left: Age-dependant body burdens obtained for three settlements

Bottom: mobile in-vivo lab

Doses

Right top: time-dependence of mean annual internal dose

Right: time-dependence of mean annual population dose and its components

Right bottom: long-term evolution of dose (calc.)

Internal dose 2010 Volincy village 0.18 mSv/a Kijapin 0.08 mSv/a Kijapinskaya-Buda 0.28 mSv/a **Volincy mun. 0.18 mSv/a**

Internal dose 2011 Volincy village 0.15 mSv/a Kijapin 0.08 mSv/a Kijapinskaya-Buda 0.13 mSv/a **Volincy mun. 0.13 mSv/a**

Discussion and Conclusion

Mobile in-vivo measurements were performed for a total of **104 individuals** (2010) and **115 individuals** (2011). Over the time body burdens dropped significantly, as had been shown previously [2]. Besides the knowledge of the personal burden individual advice provided by the measuring team led to a changed attitude towards the consumption of contaminated food. Body burdens stabilized at more reasonable values.

A model of the transfer of Cs-137 in the environment has been applied to investigate the **long-term development of population dose**. The mean annual internal dose (Cs-137) had been predicted to drop below 0.3 mSv in 2010. This value is comparable to the dose typically received from the natural body content of K-40. Measured mean values were below this limit. In 2011 the mean annual dose dropped further.

In the years to come **internal dose will more and more become less important compared to external dose**, which already now governs population dose. It should be noted that the underlying estimation of external dose is rather conservative. Hence in the real world the mean population dose might drop below 1 mSv/a already before the year 2022 (forecast).

(1) Dederichs H, Pillath J, Heuel-Fabianek B, Hill P, Lennartz R. Langzeitbeobachtung der Bevölkerung in radioaktiv kontaminierten Gebieten Weißrusslands – Korma-Studie. Schriften des Forschungszentrums Jülich, Reihe Energie&Umwelt: Vol. 31. Jülich: Forschungszentrum Jülich GmbH; 2009. ISBN: 978-3893365623 (in German)

(2) Dederichs H., Heuel-Fabianek B., Hill P., Lennartz R., Pillath J.; Long-term development of incorporation dose at Korma County (Belarus) after the Chernobyl accident. Proc. Third European IRPA Congress, 14-18 June 2010, Helsinki, Finland, P10-26, pp. 1711-1720; Electronic publication, August 2011; STUK, Finland; ISBN 978-952-478-551-8 (pdf); <http://www.irpa2010europe.com>

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