



Biomass pellets

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The issue...

- During a random control, a sample of biomass in the form of pellets was measured with gamma spectroscopy in a Greek laboratory.
- The results indicated that the pellets contained ^{137}Cs with an activity concentration of 126Bq/kg.
- The measured biomass pellets have been distributed in the local market, mostly for use in the household burners.
- Information regarding similar situations and relative actions in other European countries was asked to the ERPAN members.



Bibliographic information...

- ^{137}Cs accumulates in the ash residue after the burning of the pellets.
- An enrichment factor (activity concentration in ash/activity concentration in pellets) ranging from 8 to 200 has been reported.
- Therefore, even though the original material has a specific activity below the exemption levels, the ash (final product) may have an activity well above these levels (10,000 Bq/kg for ^{137}Cs).



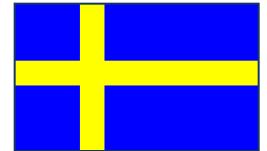
Relative actions - France

- Situations of wood pellets for use in household heating have not been encountered in France.
- ASN have reported some cases in industrial facilities using biomass. The alarm of the entry level radiation monitoring system was triggered.
- These reports happened more generally during the discharges of ashes rather on raw materials.
- ^{137}Cs is not currently regulated in the French of Public Health.
- An IRSN study is underway to assess the impact of boilers using wood slightly contaminated by ^{137}Cs and the impact of ashes resulting from this activity for workers and the public.



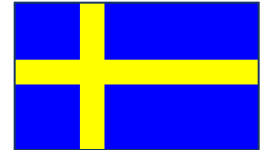
Relative actions - Sweden

- The radiation protection problem of ^{137}Cs in wood fuel ashes was addressed due to Chernobyl accident in 1986.
- Recommendations on how to handle the ashes from heating in small private houses.
- **Since 2005**, legislation for handling of wood-fuel ashes from in combustion plants producing more than 30tons of ashes dry matter (DM) per year.
- The handling of ashes from burning wood-fuel in private small houses does not fall under the Swedish Radiation Protection Ordinance (1998:293). The municipality has the authority to regulate the handling of ashes.
- **A recommendation was issued in 2001** addressed to the municipalities in the areas with a fall-out higher than approx. **30kBq/m² ^{137}Cs** .



Relative actions - Sweden

- A fall-out of 30kBq/m² ¹³⁷Cs was considered to give approx. 30-40Bq/kg in tree-fuel, consisting of stem wood and bark.
- With an ash content of 1%, the ashes would contain 4kBq/kg dry matter ¹³⁷Cs (basis for recommendations).
- A heating need of 24,000kWh/y in a standard house and 5kW/kg in the fuel, gives 4800kg fuel/year and 48kg ashes/y. The dose restriction was set 0.1mSv/y for the humans in house.
- For combustion plants producing more than 30tons/y of ashes the dose restriction was set to 0.01mSv/y for the general public.



Relative actions - Switzerland

- Several radionuclides tend to accumulate in combustion processes and therefore exceed threshold values for clearance.
- Most of the time, the phenomenon is limited to naturally occurring radionuclides which allow disposal as NORM or TENORM.
- ^{137}Cs even though quite common represent a bit of a problem (cannot be considered as naturally occurring).
- Most of countries reacted on a case by case basis and did not restricted the use of biomass pellets.
- With an ingestion factor of $1.3 \cdot 10^{-8}\text{Sv/Bq}$ for ^{137}Cs and for an activity of $10,000\text{Bq/kg}$, one has to eat around 7.7kg of ashes to accumulate a dose of 1mSv over 50y
- Ashes end most of the time at more or less controlled disposal sites where a re-dilution of the concentrated activity occurs.



Relative actions

Ireland

- No such situation has been registered in Ireland.



Belgium

- Not any experience with Cs contaminated pellets
- Requests from the public to measure wood, purchased in Ukraine, on traces of radioactive contamination, but those were all negative.



Luxemburg

- Never detected any such value in comparable material.



Scotland

- Recently interest in the topic in relation to the burning of wooden derived biomass pellets and other wood products in small biomass power stations.
- To date, no samples taken of either biomass pellets or the resultant ash.





Thank you for your attention!