



# **Post-Chernobyl Monitoring and Controls**

## **Report of Cumbrian Summer Survey 2008**

**Food Protection Division**

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### **Summary**

1. Following the Chernobyl accident in 1986, restrictions under the Food and Environment Protection Act 1985 were placed on the movement, sale and supply of sheep in areas of the United Kingdom where contamination levels in sheep meat could potentially cause a risk to public health.
2. Surveys of sheep on farms placed under restriction are conducted in order to assess the possibility of de-restricting the farms. In the summer of 2008, whole-flock monitoring, totalling 5600 sheep, was carried out on six of the nine farms in Cumbria still under restriction. The results are presented below.
3. Four out of the six surveyed farms held sheep which were found to exceed the Working Action level (WAL) for radiocaesium contamination.
4. Based on the survey results and pending a technical review of the monitoring process, no farms in Cumbria will be considered for de-restriction until after the 2009 summer surveys have taken place.

### **Background**

5. Following the Chernobyl accident in 1986, restrictions under the Food and Environment Protection Act 1985 were placed on the movement, sale and supply of sheep in areas of the United Kingdom where contamination levels in sheep meat could potentially cause a risk to public health. At the time, 1,670 sheep farms in Cumbria were placed under restriction. Over the last 23 years, the level of Chernobyl-related radiocaesium contamination in the United Kingdom has reduced, with only nine farms in Cumbria remaining under restriction. Eight of these are clustered in the south west of Cumbria and one is located towards central western Cumbria.
6. Since 1986, surveys of radiocaesium levels in sheep on affected farms have been carried out to investigate whether the restrictions are still required. These surveys are carried out during the summer months when the sheep graze the affected grassland, and accumulate the highest levels of radiocaesium in their bodies.
7. The limit for radiocaesium in sheep meat is 1,000 Becquerels per kilogram (Bq/kg). Live-monitoring of sheep is carried out using a radiation detector to estimate the level of radiocaesium in the sheep muscle. In practice, a working action level (WAL) set below the 1,000

Bq/kg limit is used. This value is calculated to allow for uncertainties in the monitoring technique, and ensures there is a minimal chance of a sheep exceeding the limit entering the food chain.

8. Radiocaesium levels in sheep muscle can vary depending on a number of factors. These include the soil and vegetation type on which the sheep are grazing and climatic conditions such as rainfall patterns, which affect the uptake of radiocaesium from soil to grass and then into sheep. For this reason, monitoring data from several years is used to decide whether a farm can be removed from restriction.
9. Surveys of radiocaesium levels in Cumbrian sheep were conducted between 1990 and 2000. In 2001, the Foot and Mouth outbreak prevented a survey being performed and the repercussions following Foot and Mouth meant that it was not practical for further surveys to be conducted until 2004. Surveys were also undertaken in 2005, 2006 and 2007.

### **Methods Used**

10. Sheep on the farms surveyed in Cumbria were live monitored during July 2008. Where possible, the monitoring was performed within 24 hours of the animals leaving the fells (hills), when the radiocaesium levels tend to be at their highest. Radiocaesium levels in the soil and vegetation in the lower (in-bye) areas tend to be lower. As a result sheep grazing these locations lose much of the radiocaesium in their bodies over time.
11. A PRM 85C radiation monitor is used to take three readings from each sheep in counts per second (cps) and also a measurement of the natural background radiation of the environment. The three readings are averaged, and the background measurement is subtracted, to give a measurement of counts above background (CAB) for each sheep, measured in counts per second. The CAB represents the contribution of radiocaesium in the sheep. If this value exceeds the WAL (calculated in counts per second), the sheep fails the monitoring and is considered unfit to enter the food chain.

### **Survey Results**

12. Of the nine farms still subject to restrictions in Cumbria, six took part in the Food Standards Agency's 2008 summer survey. A total of 5,600 sheep were monitored, with 131 found to exceed the Working Action Level for radiocaesium (see below).
13. Based on the results of the 2008 summer monitoring and pending the outcome of a technical review, it has been decided not to de-restrict any farms this year.

**Table 1.** Calculated activity concentrations of caesium-137 in sheep from 2008 whole flock summer survey

<b>Farm no.</b>	<b>Number of sheep monitored</b>	<b>Mean activity concentration (Bq/kg)</b>	<b>Standard deviation (Bq/kg)</b>	<b>Maximum activity concentration (Bq/kg)</b>	<b>Number of sheep above 1,000Bq/Kg</b>
1	419	321	167	917	0
2	1019	23	127	614	0
3	653	271	160	833	0
4	551	271	214	875	0
5	877	-28	234	488	0
6	2081	103	294	1220	3

#### **Further information**

14. Further information on the Agency's work in relation to post-Chernobyl monitoring and controls can be found at <http://www.food.gov.uk/science/surveillance/radiosurv/chernobyl/>.

## 15. Glossary of Terms

<b>Becquerel</b>	The scientific unit of radioactivity, defined as the activity of a quantity of radioactive material in which one nucleus decays per second. The short-hand for Becquerel is Bq.
<b>Activity Concentration</b>	Represents the amount of radiocaesium measured in Becquerels per kilogramme (Bq/kg).
<b>De-restriction</b>	The lifting of restrictions imposed on a farm as part of the Chernobyl controls.
<b>In-bye</b>	Low level (valley) pasture. Levels of radiocaesium are usually very much lower in the in-bye land compared to that found on the fells (hills). Sheep are brought to in-bye for clipping during the summer and for fattening prior to being sold at market.
<b>Limit</b>	The maximum concentration of radiocaesium allowed in UK sheep meat farmed in Chernobyl-affected areas. The limit is 1000 Bq/kg and was set in 1986, following advice from the European Commission's Article 31 Group of Experts.
<b>Restriction</b>	The limits put on sheep movements from farms affected by the Chernobyl disaster. These restrictions require sheep to be monitored before they are allowed to leave the farm, with only sheep with a radioactivity level lower than the working action level allowed to be consumed.
<b>Working Action Level (WAL)</b>	The practical limit for radiocaesium in UK sheep meat. The Working Action Level (WAL) takes into account any inherent variability in monitoring results to ensure that sheep with activity concentrations above the limit do not enter the food chain.