



## **DISPOSAL OF MANURE, CROPS & LIVESTOCK FROM A WARWICKSHIRE FARM USED FOR TSE EXPERIMENTS IN CATTLE & SHEEP**

### **ISSUE**

1. Defra and the FSA have asked SEAC to review the arrangements for the disposal of manure, crops and livestock from an experimental farm where BSE research projects in cattle have been ongoing since 1998 and TSE projects in sheep have been ongoing since 2002. The cattle BSE research projects are nearing completion.

### **BACKGROUND**

2. Defra Drayton (Drayton) is a farm situated near Stratford-upon-Avon in Warwickshire. **Annex 1** provides a location map and two site plans.
3. The farm was an Agricultural Development Advisory Service (ADAS) experimental husbandry farm and was one of the sites on which calves born to BSE-infected dams were kept between 1989 and 1996. During 1996/97, ADAS decided that it no longer needed Drayton as a research farm.
4. In 1996 the Veterinary Laboratories Agency (VLA) expanded its programme of experimental BSE challenges, such that it was no longer possible to accommodate experimental animals on the existing VLA estate. In March/April 1997 the Ministry of Agriculture, Fisheries and Food (MAFF) and VLA submitted a planning application for new cattle buildings to be built at Drayton for BSE research. A Method Statement, that formed part of the application, stated that all manure from animals exposed to BSE infection would be collected, composted and removed for incineration. It also stated that manure from non-infected animals might be spread on the land.

5. In 1997/98 the Advisory Committee on Dangerous Pathogens (ACDP) and the Spongiform Encephalopathy Advisory Committee (SEAC) provided advice on the disposal of excreta from BSE infected animals. In 1998 MAFF also sought specific advice from SEAC about the Drayton BSE projects.

### **Advice from Advisory Committee on Dangerous Pathogens (ACDP)**

6. The ACDP TSE Working Group advised that, in general, live animals infected with the BSE agent as part of a research project do not pose a significant source of exposure to the agent.
7. ACDP recommended that waste bedding and faeces from large (farm) animals which had been orally infected with BSE in research projects should be incinerated if the results of a risk assessment indicated that BSE infectivity may be shed, e.g. immediately after oral inoculation. Once this initial shedding phase was over, excreta could be disposed of by other means, subject to the general requirements of Control of Substances Hazardous to Health Regulations 1998 (COSHH), and any other requirements imposed by MAFF or the Environment Agency.
8. ACDP advised that the likely period of initial shedding after oral dosing was a period of three to four weeks. On veterinary advice, a precautionary 28-day risk period was agreed although the considered view was that a period of 14 days represented the period of real risk.

### **Advice from Spongiform Encephalopathy Advisory Committee (SEAC)**

9. In January 1998 SEAC considered the disposal of excreta from animals experimentally infected with BSE. SEAC noted that if infectivity were present in urine or faeces it would be of low titre. SEAC discussed Brown and Gajdusek's experiment, published in 1991, (see **Annex 2**) in which scrapie-infected hamster brain was buried for three years. Infectivity persisted although the titre was much reduced. SEAC commented that the experimental conditions were unlikely to be comparable to those in rotting manure where the level of bacterial activity was very high. SEAC also commented that horizontal transmission through environmental contamination was possible but unlikely and there was no evidence to support its occurrence. SEAC indicated that they were content with the ACDP guidance referred to above and noted that all waste would be incinerated for one month post oral challenge. SEAC agreed that

thereafter it would be acceptable to compost the material for one year and that the composted material could be used on agricultural land at the research premises involved, or disposed of in landfill sites. SEAC recommended that detailed disposal records should be kept and that any animals which subsequently grazed pasture land which had been used for such disposal, should be carefully monitored. In their published summary, *SEAC informed that they had considered options for disposal of animal excreta from cattle experimentally infected with BSE. They noted that for a period of one month all waste from animals which had been orally challenged would be incinerated. They agreed that other excreta could be composted and used as fertiliser on agricultural land at the experimental farms of the institutes concerned. They recommended that detailed records of disposal should be kept.*

10. In September 1998, MAFF presented SEAC with a detailed paper on the Drayton research projects and on the manure disposal issues. SEAC noted that the animals were held in new buildings and that there were arrangements for separation of solid and liquid waste. The housing arrangements and husbandry procedures would ensure rigorous separation of the different groups of animals. Although Drayton was used only for cattle at that time, a SEAC member informed the Committee that its advice would be applied to the disposal of excreta from sheep experimentally exposed to BSE at another research premises. SEAC confirmed their previous advice that the waste from challenged animals should be incinerated for the first 28 days (which represented an extended “safe” clearance time from cattle intestines) and that, thereafter, the excreta should be composted for one year. SEAC agreed that there was no scientific basis for a restriction on composted material being spread on land as fertiliser prior to planting crops. Such crops could then be used for human consumption or animal feed, although coppicing<sup>1</sup> might present the most desirable option from the point of view of public perception. However, SEAC felt it would be prudent not to spread the material on pasture which would be grazed by cattle. SEAC also advised that experimental animals which were part of the cattle bioassay experiment should not be given the food from the farm in case any future positive results were challenged on the basis that they resulted from contaminated feed rather than from the assayed tissue. In their published summary, *SEAC confirmed that after 28 days following oral inoculation, excreta could be composted for a year and then safely used to fertilise arable land and the crops*

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<sup>1</sup> A form of woodland management that can be used to provide wood for fuel or non-food related uses.

*subsequently grown could in principle be used for both human food and animal feed. Excreta from the first 28 days after challenge should be incinerated because if material from the oral inoculation were present in faeces it would be during this period that the risk would be apparent.*

### **Implementation of the Spongiform Encephalopathy Advisory Committee's Advice**

11. MAFF accepted SEAC's advice but decided that it would be prudent not to allow the growing of crops for animal or human consumption on the land to which composted manure from the BSE challenged animals was applied. MAFF indicated that this decision would be reviewed at a future time when the number of BSE challenged animals reduced to such a level that VLA did not need to use most of the available arable land at Drayton for the disposal of excreta from these animals.
12. When the BSE research projects started at Drayton all excreta from the orally dosed cattle were incinerated for the first 28 days after inoculation. A 12-month composting period was introduced and continues to be implemented for all manure produced from the BSE challenged animals, except for the manure from the group of control animals which is stored separately.
13. Although SEAC's advice related only to the orally inoculated cattle, MAFF decided to treat the manure from the intracerebrally inoculated cattle in the same way even though it was assumed that the manure from the latter group did not present a risk.

### **Current Situation at Drayton**

14. Livestock, crops and animal by-products (e.g. manure) from Drayton are currently disposed of according to agreed safety procedures. **Annex 3** provides a summary of the current situation and the proposals for future land management at Drayton.
15. In view of MAFF's decision not to permit the growing of crops for human or animal consumption on the land to which composted manure from the BSE challenged animals was applied, it was necessary to grow a crop on the Drayton land upon which the composted manure could be used. It was decided to plant **short rotation willow coppice**. Each planted crop is harvested every two years and the planting strategy results in an annual harvest. The harvested wood chip has only been allowed to go to an outlet (normally a power station) where it cannot come into contact with

animals or humans. Composted manure from BSE challenged animals was first applied to this land in 2001 and annually thereafter. This includes application of composted manure from the BSE projects ongoing at VLA Weybridge, and where VLA has neither the land nor the incineration capacity to dispose of the large quantities of manure produced.

16. The remainder of the Drayton farm that has not been put down to coppice is either planted with trees or is arable or pastureland maintained primarily for the Environmental Change Network (ECN) research project. This project, which is not TSE related, is one that Defra considers to be very important, and where Drayton is one of a number of key sites throughout Great Britain from which data is collected. This arable land can and does receive manure from the control animals at Drayton, this manure having been kept separate from all other manure. **Annex 4** provides details of the ECN research project which demands the regular collection of samples from the farm environment for analyses unrelated to TSEs.
17. On the **arable** part of this ECN land (which has received the manure from the control animals only) ADAS had in the past grown cereals and beans. Since the start of the BSE projects this arable land has been used only for cereals, with some of the harvested cereal crop used as feed in the research projects and with the straw used as bedding in VLA projects. However the BSE projects have only been able to utilise a small proportion of the cereals and there are now some 300 tonnes of grain in store at Drayton with no outlet. So far attempts to organise incineration at a power station, the cheapest method of disposal, have proved unsuccessful. Costs of incineration at a commercial incinerator would almost certainly be prohibitive and could not be justified.
18. The ECN **grassland** held a flock of breeding ewes but these were slaughtered as a precaution at the time of the 2001 Foot and Mouth Disease epidemic. These have been replaced with two separately kept groups of sheep: a group of healthy sheep from VLA and a group of sheep that are part of a Defra funded scrapie study by ADAS. This study is a long-standing project started at ADAS Redesdale for the selection of Swaledale sheep that are resistant to parenteral challenge with scrapie. There are currently approximately fifty sheep in this project, challenged with sheep scrapie, kept largely on pasture and separate from the BSE animals at Drayton. These two groups of sheep maintain the pastureland so that the ECN project is meaningful.

19. The current allocation of areas of the 199 hectares of the Drayton farm are shown in **Table 1**

**Table 1: Land Use at Drayton**

<b>Land Use</b>	<b>Hectares</b>
Short-Rotation Willow Coppice	98
Woodland/Tree Plantings, etc	13
ECN Arable	35
ECN Grassland	25
Discard Field for BSE Waste Water Effluent	5
Unused Areas, Rough land, etc	12
Buildings, Concrete yards, etc.	11
<b>Total</b>	<b>199</b>

**The Current Status of the BSE Projects at Drayton.**

20. There are currently five VLA managed BSE research projects ongoing at Drayton containing a total of **126 cattle** and approximately **500 sheep**. All animals are housed and held within secure perimeter fencing and subject to controls on disposal of waste. The studies are managed quite separately from ECN management on the remainder of the Drayton site. The current status of each project, the expected decline in animal numbers and the period over which this decline takes place are as follows:

**SE 1736 – Experimental production of bovine tissues for the validation of BSE diagnostic tests**

21. A Defra-funded study set up to provide a bank of tissues and body fluids for the TSE archive from cattle challenged orally with BSE and age-matched controls. Sixteen animals remain on the study (8 challenged and 8 controls) from an original 300 animals. The end point for this project is currently under review but it is unlikely to extend beyond March 2006.

**MO3007 – Bioassay of BSE infectivity in neural and non-neural tissues by intracerebral inoculations of cattle**

22. An FSA-funded study set up to investigate by intracerebral challenge of cattle, the presence of infectivity in a range of tissues collected from cattle at a range of time points in the incubation period following oral challenge with BSE brain homogenate. Some 109 cattle housed in 23 groups remain at Drayton out of an

original 200 animals. There is a staged withdrawal from Drayton in progress as the study reaches its endpoint early in 2007. There will be no animals on this project at Drayton after August 2006, as the remainder will have transferred to VLA Weybridge.

### **SE 1846 – Investigation of the effective minimum oral dose of BSE in PrP susceptible sheep of different breeds**

23. A Defra-funded study set up to investigate the smallest quantity of BSE brain homogenate that will cause disease in TSE susceptible sheep of different breeds following oral challenge. There are currently about 100 sheep in this study which has a proposed end date of November 2009.

### **SE 1945 – Investigation of sheep to sheep passage on the BSE strain phenotype**

24. A Defra-funded study to investigate the effect of oral challenge of sheep with sheep BSE on clinical presentation, histopathological profile and mouse strain typing. One hundred and fifty sheep are currently on this study which has a proposed end date of November 2009.

### **SE 1946 – BSE in sheep: investigation of natural transmission within a breeding flock and supply of tissues for further research.**

25. A Defra-funded study set up to investigate the potential for BSE to naturally transmit within a breeding flock and to provide a bank of tissues for the TSE archive. Approximately 240 sheep are currently on this study which has a proposed end date of March 2010.
26. These projects are VLA science projects for either Defra or FSA. ADAS act as VLA's sub-contractor and undertake the husbandry, etc of all the animals in the projects. ADAS also co-ordinates the harvesting and storage of the short-rotation willow coppice.

### **Proposed Strategy for Future Land Management at Drayton**

27. Some **livestock buildings** at Drayton, which previously housed cattle in BSE research projects, are now empty and have been thoroughly cleaned and disinfected. VLA is about to start a commercial contract with a large veterinary pharmaceutical company in these buildings where heifers from non-BSE farms in Denmark will be housed. The animals will have no contact with other BSE research animals at Drayton but their diet will include

wheat and straw grown at Drayton and they will be bedded on straw grown at Drayton. As the commercial research project (for a bovine respiratory virus vaccine) progresses some cattle will become surplus to requirements and VLA is seeking agreement from Defra and FSA to sell surplus cattle either for commercial slaughter or into the national herd. Under the current disposal 'rules' these surplus animals would have to be slaughtered and their carcasses incinerated. No restrictions apply to the slaughter of cattle from commercial farms where BSE has been previously diagnosed even though no formal cleansing and disinfection will have been carried out. Furthermore, there is legal provision for animals used in vaccine trials to be slaughtered for human consumption or sold, and the only specific issue arising here is whether housing such cattle in a building previously used to accommodate BSE exposed cattle represents a risk.

28. The ECN **arable land** at Drayton has received no manure from BSE exposed or experimentally inoculated animals. Only manure from healthy 'control' animals in the research projects has been used. VLA seeks agreement from Defra and FSA for unrestricted sale of the 300 tonnes of grain in store at Drayton and produced on this land. VLA also seeks agreement to spread 12 months-composted manure from BSE challenged animals onto the arable land. This would be within the guidelines set by SEAC in 1998 and VLA seeks agreement from Defra and FSA for unrestricted movement of any cereals, straw or other crops grown on the arable land.
29. If VLA receives agreement to this course of action on the ECN arable land it provides an extra 35 hectares for manure disposal, including manure produced from the BSE projects at both Drayton and VLA Weybridge, and where at Weybridge in particular there are many tonnes of manure in store for which disposal is currently difficult. This relaxation would ease the pressure on manure disposal on the coppiced area of the farm where tonnage applied is close to the recommendations in the Code of Good Agricultural Practice. Drayton is also in a Nitrate Vulnerable Zone and limits on quantities of nitrogen put into the soil should apply, however Drayton has an exemption from the Environment Agency because of the importance of the BSE projects.
30. The ECN **grassland** has not received manure from any animals in the BSE research projects. If it continues to be used for grazing the two separately kept groups of sheep (healthy and scrapie study), VLA seeks agreement from Defra and FSA to sell healthy

sheep which are not part of the scrapie study from Drayton for slaughter for human consumption or to other farm premises. This is on condition that the sheep sold have had no contact, directly or indirectly, with housed cattle or sheep in the BSE research projects. There are no proposals at this stage to spread composted BSE manure or BSE waste water effluent onto ECN grassland, although VLA seeks agreement to spread manure from non-BSE animals on the grassland as required.

31. VLA has taken care to ensure that the harvested woodchip from the **short rotation willow coppice** goes to an outlet, generally co-incineration<sup>2</sup>, where it has no contact with animals or humans. VLA seeks agreement from Defra and FSA for unrestricted sale of the harvested woodchip to any outlet.

## **SUMMARY OF SCIENTIFIC EVIDENCE**

32. **Annex 2** provides a summary of the scientific evidence regarding the possibility of TSE infectivity in excretory products from ruminants, and the potential persistence of such infectivity in the environment.

## **ADVICE SOUGHT FROM THE COMMITTEE**

33. The committee is requested to advise on the risks to human or animal health from BSE of:
  - permitting the unrestricted movement of surplus healthy cattle, which have been appropriately sourced and involved only in non-TSE commercial veterinary pharmaceutical trials, from the Drayton farm buildings previously used for cattle in BSE projects, either for commercial slaughter or to other farms.
  - permitting the unrestricted movement of the 300 tonnes grain stored at Drayton and grown on the ECN arable land that has only received manure from healthy “control” animals.
  - permitting the spreading of 12-month composted manure from BSE challenged animals on the ECN arable land at Drayton, growing any crop on this land, and moving these crops without restrictions to any outlet whether for human or animal consumption.

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<sup>2</sup> Incineration specifically intended to generate energy e.g. power station

- permitting the unrestricted movement of healthy sheep grazed on the ECN grassland to which manure from non-BSE cattle might be applied, from Drayton either for commercial slaughter or to other farms, but excluding sheep which are part of the scrapie study or have had direct or indirect contact with housed cattle or sheep used in the BSE research projects.
- permitting the unrestricted movement of the wood chip harvested from the willow coppice planted at Drayton and grown on land that receives 12-month composted manure from BSE challenged animals, to any outlet.

**Defra 2006**