

The safe handling, transport and temporary storage of meat-and-bone meal which may be contaminated with a BSE agent or other pathogens - s adopted by the Scientific Steering Committee at its meeting of 26-27 October 2000

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Preliminary

The issue of handling, transport and storage of possibly BSE-contaminated meat-and-bone meal (MBM) as a hazard has been highlighted in various SSC opinions. The present document consists of a series of notes that may be helpful for decision makers when developing measures to contain this hazard. These measures may possibly need to be modulated according to the geographical BSE risk of a region or country.

The document is not meant to be comprehensive and is subject to amendments should relevant information become available.

It was first compiled for the Scientific Steering Committee at its meeting of 25-26 May 2000. This was made public via internet as a set of preliminary and incomplete notes, for comments and additional scientific inputs.

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The Scientific Steering Committee analysed, discussed and, if found appropriate, integrated these contributions in the present significantly revised report, which was submitted to the SSC at its meeting 26-27 October 2000.

Background

In its previous opinions, the SSC has addressed the problem of excluding specific risk materials from entering the food chain directly and the safe disposal of possibly contaminated material. The SSC has not previously addressed the question of the safe handling, storage and transport of possible BSE or other pathogen contaminated material that is destined for disposal. These s are centred on issues relating to BSE however it is relevant to the storage and handling of many other TSEs and other pathogen contaminated materials too.

Safe storage of pathogenic or potentially pathogenic material is an essential element in the protection of animal and human health, and of the environment. It can become of major importance if a large number of animals are required to be slaughtered over a short period of time in order to control an epidemic, and there is inadequate capacity for immediate safe processing and/or disposal. Storage may involve intact or dismembered carcasses and/or processed materials such as MBM derived from suspect carcasses.

Production of MBM by rendering in steam for 20 minutes at 133 °c at a pressure of 3 bars has been identified as a very important step in reducing the risk substantially from BSE contaminated material. However, because MBM produced in the UK is no longer fed to any species of farmed animal, the UK renderers have opted not to change to the steam-under-pressure system, and continue to use the more traditional but less inactivating rendering processes.

Depending on the capacity of a countries' rendering plants to manage the sudden increase in demand, an accumulation of animal tissues and/or of rendered material may occur prior to disposal by approved safe routes. In the case of BSE, the great majority of stored material for disposal comprises meat and bone meal and to a much lesser extent, tallow. It has been the case in some countries that the quantity of material requiring safe disposal, as a consequence of the BSE epidemic, has overwhelmed the storage capacity set aside to deal with potentially pathogenic/toxic material. This has identified the need for guidelines of what should be the minimum criteria for safe storage and safe disposal in an emergency situation in order to protect the workforce (ie: those involved in handling the potentially contaminated material), the general public and the environment. It also raises the important issue of the adequacy of the capacity for safe storage and disposal facilities in emergency situations in member states.

The more specific the criteria are for disposal the greater is likely to be the requirement for storage capacity. Some countries, such as Switzerland, have elected to combust all additional potentially suspect material in power stations and have consequently minimised the requirements for storage capacity. However, the SSC has not recommended this method of disposal to Member States to date because of the lack of evidence available to the Committee to demonstrate its suitability in terms of safety. Other countries, for example the UK, have been much more restrictive in the approval of disposal methods and as a consequence have had to find suitable storage capacity for large quantities of meat and bone meal and tallow.

The purpose of this opinion is to provide some advise on the safe storage and transport of meat and bone meal and of

carcasses prior to, and post rendering. It does not address, however, the risk to abattoir workers involved in stunning, killing, collecting blood and carcass preparation from food animals.

There have been several highly publicised incidents in which stored MBM material has either caught fire or has been shown to have not been contained effectively within the designated storage area. There is also evidence of poor storage conditions resulting in MBM setting like concrete, resulting in subsequent difficulties in disposal.

There are four important requisites to minimise the risk associated with storage of possible BSE-contaminated materials:

- A. well contained storage conditions;
- B. high standards of cleanliness
- C. good worker protection
- D. safe transport.

The SSC notes that these requirements are similar to those for minimising the risk for many other hazardous materials and that some Member States have already developed their own guidelines for dealing with possibly TSE-contaminated materials.

a. Well contained mbm storage conditions

For worker protection, the principal requirements are to minimise dermal contact with the MBM and keep dust levels very low to avoid contact with the eyes and respiratory system. When first produced MBM does not readily produce dust because of its relatively high fat content. However, after long-term storage it may set in large blocks which require to be broken up. This procedure has the potential to produce airborne particulate matter.

The requirement in terms of protection of the public and the environment should be considered in the light of the magnitude of the potential risks from poor control over access to or containment of potentially contaminated MBM. The following aspects need to be assessed:

- risk from access by animals, birds or insects which may result in transfer of MBM outside the store, and in the case of some animal species, a possible risk of BSE.

The actual risk of rodents (at least mice) acquiring BSE from consuming potentially BSE-infected MBM appears to be remote. Even in studies where two strains of mice were fed BSE-infected bovine brain material, only one of these developed a TSE after the consumption (on average) of 9g of infected bovine brain (Barlow and Middleton, 1990)

- risk through access by young children, vandals, etc. which could lead to escape of MBM and/or the risk of CJD. Based on epidemiological studies/information an estimate can be made for some countries of the number/ratio of probably BSE-infected carcasses that were unwittingly processed to provide food for humans. Using this data, the present risk would appear to be very low although there is insufficient information to confirm this.

- Contamination of watercourses due to poor containment of water used for cleaning storage areas, vehicles, etc.

- Microbial growth in the MBM, for example Salmonella (NB: odour problems may also arise This is unlikely to be a significant issue if exposure to water is avoided.

- Risks from dust generation to both reduce workers through MBM inhalation and potential for escape through doors, etc. (NB: This is also very important to minimise fire and explosion risk). Risk of fire through failure to control "core " temperature of stored MBM, which may result in widespread dispersal of contaminated material, formation of toxic products and an unpleasant odour.

Though these risks appear to be very small, it is appropriate nonetheless to ensure that they are minimised by having a

requirement for:

- good containment of the MBM in a fully enclosed store which excludes water ingress and egress of airborne MBM [NB: water contact with MBM enables microbial growth and enhances the fire risk];
- a well managed secure facility to ensure that:
 - i. access is limited to those who need to be there;
 - ii. all those entering the premises are well versed in the health and safety requirements;
 - iii. the MBM is turned regularly to reduce the likelihood of solidification and the build up of temperature;
 - iv. the premises are well maintained and animal, bird and insect entry is prevented.

The risk of fire in MBM stores is illustrated by the experience of auto-combustion with the release of smoke without flames at two major sites in Brittany during 1999. In the UK a fire occurred too, in Preston.

Fire risk is greatly increased if oxidation of the fat in the MBM occurs. This is not a new problem for stored material with a substantial fat content (eg: fish meal). It is recommended that appropriate anti-oxidants are added routinely and that contact with water is prevented to minimise the fire risk.

b. Standard of cleanliness

Special arrangements should be in force for handling and transporting specific risk materials (SRM) from cattle for disposal, to ensure both worker protection and appropriate storage and disposal to avoid the material from entering food and feed chains. The material should be stained to distinguish it from other products. High standards of cleanliness should be maintained by all those coming into contact with SRM including, for example, hauliers during loading and unloading the material at abattoirs and rendering plants.

The standard disinfecting process for many pathogenic materials is to use sodium hypochlorite solutions. The chemical disinfection of containers, vehicles, working surfaces, floors etc exposed to contamination by SRM is not practicable in the case of BSE due to the resistance of TSE agents to routine methods of disinfection. An alternative approach for TSEs is to use hot alkaline solutions of sodium hydroxide. (This is the subject of an ongoing EU Research Project by Oberth, Piva, Schreuder and Somerville). If significant contamination by TSEs is deemed to be possible, all washings should be subject to further appropriate treatment. Particles of solid material falling on to the floor or hosed out of storage bays or hoppers etc should be prevented from entering drainage systems.

During MBM production and subsequent transportation or storage as well as any grinding before disposal, particular emphasis must be given to minimising dust generation.

Engineering controls should be employed to enclose processes and minimise handling as much as possible. Local exhaust ventilation (LEV) equipment fitted with suitable dust filters may also be of use, for example at filling and tipping points. Where LEV is used, it is essential that the captor hood is placed as close as possible to the source of any potential dust exposure. Suitable equipment may be fixed or portable so that it can be removed for maintenance or, for example, clearing of blockages. It is also important that effective dust traps are in place to avoid the possibility of any contaminated material being released into the general environment.

Methods of loading MBM into and out of storage sites should be designed to minimise manual handling and dust generation. Ventilated cabs fitted with suitable dust filters should be used to provide protection if there is a risk of possible exposure to dusty material.

A clear work programme should be drawn up for the decontamination of individual stores which should be prepared by a suitably qualified person. A store will have its own physical characteristics, which should be taken into account when it is emptied and ready for cleansing. Potentially difficult areas to access should be noted and extra care taken here.

All storage areas should be completely emptied and thoroughly cleansed before further use. It is recommended that an industrial vacuum cleaner be used to ensure removal of all gross debris. This reduces the likelihood of the spread of

airborne particles and is therefore preferred to brushing. Material collected in the industrial vacuum cleaner must be disposed of with particular care because of its dusty nature either by transfer to a rendering plant, or incineration or other appropriate means of disposal.

Once the loose material has been removed the entire storage area must be subject to a de-greasing type operation to remove any melted animal fats. Any wooden or porous structures in the building must be thoroughly examined to check if any melted animal fats have penetrated them. If so, these must be subject to repeated de-greasing operations to ensure that the melted animal fats have been removed. The floor, ground, walls and ceilings must be examined carefully to determine if any rendered material has penetrated them. Likewise, any drains within the stores must be opened and inspected to check for the presence of any rendered material and resealed. If so, appropriate measures must be undertaken to remove and dispose of such material.

The storage areas should then be properly cleansed using strong alkaline solutions where practicable, disinfected and dried.

Care must be taken to ensure that no material, either in solid or liquid form, is released into the environment. Any solid material recovered during the cleansing and disinfection should be bagged in a leak-proof and sealable receptacle, the contents clearly identified, and stored in a safe place. It should be kept separated from any other material to prevent contamination and then disposed of in accordance with guidelines for handling specified risk materials (SRMs).

All equipment used for handling the rendered material (prior to and during the cleansing) must be properly cleaned using appropriate cleansing or sanitising agents, disinfected and dried, *before* it is used for any other purpose. Material removed from the equipment should be handled as indicated in the preceding paragraph.

Protective clothing used whilst handling rendered material should be bagged before removal from the site or if contamination is assessed to be minimal thoroughly washed with hot water and detergent before re-use.

c. Effective measures for the protection of workers

Although much of this opinion is centred on issues relating to the storage of MBM, it should be remembered that a number of other groups of workers are required to handle SRM derived materials and may require similar protection measures, eg:

- Incineration plants - which may destroy MBM by incineration;
- Rendering plants - which produce MBM and may use it as a fuel in the rendering process
- Hauliers - that load and transport MBM from the renderers to, for example, storage sites.
- Abattoir workers.

To date, there have been no confirmed cases of occupational transmission of BSE and none of the cases of vCJD have any obvious occupational links with exposure to BSE). Thus UK figures indicate that while several of the vCJD cases occurred among workers in animal farming or the meat industry, in percentage terms the incidence among these groups of workers did not differ from the percentage in a control population (UK Annual Report of Committee of Dangerous Pathogens, 1999.). Nonetheless it is necessary to ensure that all appropriate means of worker protection are in place. The following recommended controls are based on those introduced in the UK.

As part of their risk assessment, those managing storage facilities that are working with MBM should consider the potential routes of exposure. There is no evidence that the BSE agent can infect animals by the airborne route (although this cannot be ruled out entirely) but it has been shown to infect by the oral route. Nonetheless, minimising exposure to aerosols and dusts is prudent and in keeping with the principles of good occupational hygiene. The most likely other routes of entry are by dusty material contaminating wounds and open lesions on the skin, splashing of mucous membranes (eyes and mouth) or possibly by accidental ingestion. Basic precautions which should be taken to avoid contact between MBM and human mucous membranes are: [taken from BSE: Background and general occupational guidance HSE, UK].

Personal contamination by splashing should be avoided by using waterproof protective clothing including gloves and face-shield when, for example, hosing out a vehicle after delivery of SRM or at the site where it is received or when carrying out maintenance work on plant. Protective clothing should be removed before entering the cab of a vehicle or doing other work and before taking meal breaks etc. Protective clothing should be kept apart from other clothing and cleaned by washing thoroughly and regularly.

- If splashed in the eyes or face, wash with running water.
- Taking steps to avoid the generation of aerosols and dusts. If dust generation is possible, face-shields must be worn.
- Washing hands and exposed skin before eating/drinking/smoking, taking any medication, using the telephone or going to the toilet.
- Adherence to safe working practices and take extra care to avoid or minimise the use of tools or equipment likely to cause cuts, abrasions or puncture wounds.
- Covering existing cuts, abrasions and skin lesions on exposed skin with waterproof dressings.
- If cuts or puncture wounds occur, encourage the wound to bleed, then wash thoroughly with soap and water and cover with a waterproof dressing.

d. Safe transport

When loaded, all haulage vehicles need to be tightly secured and sealed with robust covers to prevent spillage during transportation. Once in place the covers should only be loosened and removed at the destination storage or disposal point.

Effective measures that follow the principles set out above need to be in place to deal with spillages, particularly during the loading and unloading of vehicles. This process should always be conducted in a controlled area.

Any vehicle used for the carriage of the rendered material must not be used for the carriage of other material until properly cleaned out using an industrial vacuum cleaner, cleansed using appropriate cleansing or sanitising agents, disinfected and dried.

The load sheet(s) for the vehicle must be included in any cleansing and disinfection routine. If there is a significant risk of the load sheets being contaminated with *BSE* material, the sheets must be disposed of by appropriate means. Particular care should be taken to cleanse and disinfect the blower unit on the blower vehicles, the delivery pipe and the wheels. No vehicle should be used for the transport of any other material unless it is inspected at the time of loading and found to be clean and dry. Collected material must be disposed of by appropriate means

Fully detailed documentary records of the procedures undertaken to cleanse sites following the removal of the rendered material should be kept.

For vehicles, written confirmation of when and where cleansing and disinfection took place, together with the identity of the vehicle/trailer, should be obtained and the records retained.

It is recommended that the local authority and/or government agency also confirms that it is content with the standard of cleansing, which will help to inspire confidence in future potential store users and demonstrate that the site will not cause pollution or harm to human health.

References.

Barlow, R.M., Middleton; D.J., 1990. Dietary transmission of Bovine Spongiform Encephalopathy. *Vet. Record*, **126**: 111-112.

UK. BSE (Bovine spongiform encephalopathy): Background and general occupational guidance.

Guidance for handling meat and bone meal material. UK Advisory Committee on Dangerous Pathogens, HSE, ISBN 0717612120.

