Risk assessment feed and food safety bovine heads processing plant

Part 1: BSE risk assessment

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Motivation

X is a company that mainly processes meat from bovine heads. This includes the production of ground raw material which customers process into meat preparations and meat products for human consumption. The company also produces ground raw material for (raw) consumption by pet animals (pet food). One of the customers of company X's products is pet food company Y.

In the case of company X, the NVWA has detected infringements in several respects with possible microbial risks to human and pet health as a result. This section 1 focuses on the risks of prions. Section 2 focuses on other microbial risks.

For the risk of bovine spongiform encephalopathy (BSE), a transmissible spongiform encephalopathy (TSE) in ruminants, a relevant violation is the processing of bovine heads whose loopholes and occipital hole have not been properly sealed. In addition, these heads would have been boned on tables so that during processing brain material (brain fluid and brain tissue) can end up on the meat and tables on which the cattle heads are boned.

Brain material from cattle over 1 year of age shall be considered as specified risk material (SRM). According to the TSE Regulation (Regulation (EC) No 999/2001[1]), SRM must not enter the feed and food chains. SRM includes brain, spinal cord, eyes, tonsils and parts of the intestines. These are ruminant tissues and body fluids that are most likely to be infected with the prions that cause BSE. SRM and anything that has come into contact with SRM belongs to category-1 of animal by-products (ABP) that must be destroyed. Bovine heads with unsealed loopholes or occipital holes are considered as category-1 ABP. Meat on which brain fluid or brain material has ended up, or becomes contaminated by cross-contamination, should also be considered as category 1 and should therefore not be processed into products intended for consumption by humans and pet animals.

If the bovine heads boned on company X were derived from cattle with BSE, there is a chance of BSE prions from brain fluid and brain tissue of those cattle contaminating the meat and there may be a chance of transmission of BSE prions to humans and pet animals exposed orally to the products made from this meat.

In order to be able to interpret the consequence of the presence of legally prohibited brain fluid or brain tissue on meat from cattle that is processed in food and feed for pet animals respectively, the Enforcement Directorate asked BuRO to carry out an assessment of the health risks for humans and pet animals.

Question

What are the risks of BSE to human and pet health due to the presence of brain material from bovine heads on meat processed in food and feed respectively?

Approach

Methodology

This risk assessment follows - as described in the Microbiological Hazards Risk Assessment Methodology (BuRO, 2022) - the four steps of the risk assessment (hazard identification, hazard characterisation, exposure assessment and risk characterisation) to determine whether the leaked

[1] Regulation (EC) No 999/2001 of the European Parliament and of the Council of 22 May 2001 laying down rules for the prevention, control and eradication of certain transmissible spongiform encephalopathies.

brain fluid or brain tissue from bovine heads may be contaminated with BSE prions, BSE prions then end up on meat, which is processed into food or pet food, and thus subsequently poses a risk to human and pet health through consumption. This includes how TSE legislation controls the exposure of humans and animals to BSE prions.

Various sources of information have been used for this risk assessment. Some of the sources of information come from the so-called grey literature, such as research reports and websites of research institutes. A number of scientific articles consulted have been found using the snowball method (Wohlin, 2014) in the grey literature mentioned above. In addition, previous BuRO risk assessments on animal proteins in feed were used (BuRO, 2019; Kox & Sijm, 2026) and the scientific articles and reviews consulted for this purpose.

Non-public information from documents relating to the criminal investigation by the Intelligence and Investigation Service of the NVWA against company X for violations by this company on various points in relation to feed and food safety has also been used.

Scope

The risk assessment is limited to the risks of BSE prions to human and pet health (dog and cat) due to deviating practices at company X.

The risk assessment was prepared with the information available at the time of completion (28 May 2026). A draft version has been fact-checked by various experts from the NVWA and WBVR.

Background

About 40 years ago, the emergence of the previously unknown BSE prion disease in cattle in the United Kingdom (UK) led to a health and food crisis in the European Union (EU). In 1992, at the peak of the outbreak in the UK, 37,280 cases were reported in cattle in one year. Nearly 200,000 cases of BSE (i.e. in cattle) have been detected worldwide, almost all of them in the UK. The transmission of BSE prions to humans is possible through the food chain and at the time resulted in more than 200 people, most of them in the EU, dying from the variant form of Creutzfeldt-Jakob Disease (vCJD) (Ducrot et al., 2008; Requena et al., 2016; Badiola & Otero Garcia, 2024). Until October 2021, there were 232 cases of vCJD worldwide, of which 178 were from the UK (Watson et al., 2021; RIVM, 2024; EuroCJD network, 2026). The transmission of BSE prions to domestic cats is possible through the feed chain and has resulted in around 100 domestic cats, mainly in the UK (89), dying from feline spongiform encephalopathy (FSE) (Spickler, 2016). In the Netherlands, the following cases related to BSE prions have been identified: 89 bovines with BSE (EFSA, 2024; RIVM, 2024; Cuperus, 2025; GD, 2025; WBVR, 2025), 3 people with vCJD (Sánchez-Juan, 2007; RIVM, 2024; GD, 2025) and no domestic cats with FSE (FAVV, 2026).

Although the origin of BSE has never been established, the main cause of the epidemic was identified as prions in meat and bone meal from cattle fed to cattle (Requena et al., 2016). The history of BSE has most likely started with one or a very small number of cases in cattle, followed by amplification by intra-species recycling, or feeding of material derived from animals within their own species (ANSES, 2021). Intra-species recycling of bovine proteins (in processed bovine animal proteins), created a feedback loop. As a result, cattle were constantly exposed to BSE prions, causing accumulation of prions in bovine populations, which intensified the transmission of BSE and caused an epidemic.

The TSE legislation introduced in the EU in 2001 (Regulation (EC) No 999/2001) to protect the feed and food chain includes measures such as a ban on the use of proteins of animal origin in feed for farmed animals (feed ban) and the obligation to keep high-risk materials (tissues with the highest infectivity) of ruminants out of the feed and food chain. These measures have proven very effective in the control of BSE, and as a result also in the control of vCJD and FSE. Due to the introduction of TSE legislation the number of confirmed cases of BSE in the EU has dropped sharply from more than 2000 in 2001 to less than 10 per year from 2013 onwards.

There are three variants of BSE: the classical variant or C-type BSE transmissible to humans (vCJD) and cats (FSE); and (ii) two atypical variants L- and H-type BSE for which transmission to humans and animals has never been established. The last two cases of classical BSE in cattle in the EU-UK were detected in 2021 and 2024 in the UK (England and Scotland). The other cases of BSE in cattle in the EU-UK concerned atypical BSE. There are currently more atypical cases of BSE than classical cases in the EU-UK (Simmons et al., 2017; EFSA BIOHAZ Panel, 2018; APHA, 2021;2024; RIVM,

2024; EC, 2025; EFSA et al., 2025). The vCJD epidemic peaked in Europe between 1999 and 2004. The number of cases has since decreased due to reduced exposure of humans to BSE. vCJD has now become a rare disease in the EU (ECDC, 2024b;2024a). Most cases of FSE in domestic cats were reported in the period 1990-1999, but FSE has not occurred worldwide since 2003 (Spickler, 2016; FASFC, 2026).

Current management measures

BSE prions are heat-resistant, so a heating step is not an effective control measure. BSE in cattle, vCJD in humans and FSE in domestic cats are controlled by excluding BSE prions from the feed and food chains.

Control of (classical) BSE in cattle and vCJD in humans lies in the implementation of the applicable laws and regulations to control TSEs (TSE Regulation) that prevent BSE prions from entering the feed and food chain (feed ban and removal of the most infectious ruminant tissues (SRM) at slaughter). Together, these tissues determine 99.7% of the infectivity in a case of BSE (EC-SSC, 1999). (Lücker et al., 2011) estimate the reduction of TSE infectivity by the removal of SRM to a factor of 1000. As a result of these measures, the number of BSE, vCJD and FSE cases in the EU has dropped sharply and there is only a very small chance that BSE is present in the feed and food chain (EFSA BIOHAZ Panel, 2018).

The exclusion of SRM from the food chain is considered to be the most important measure to protect public health against BSE prions (EFSA BIOHAZ Panel, 2014).

The figure below shows current control measures targeting BSE in the beef chain schematically and chronologically (Figure 1, AI generated).

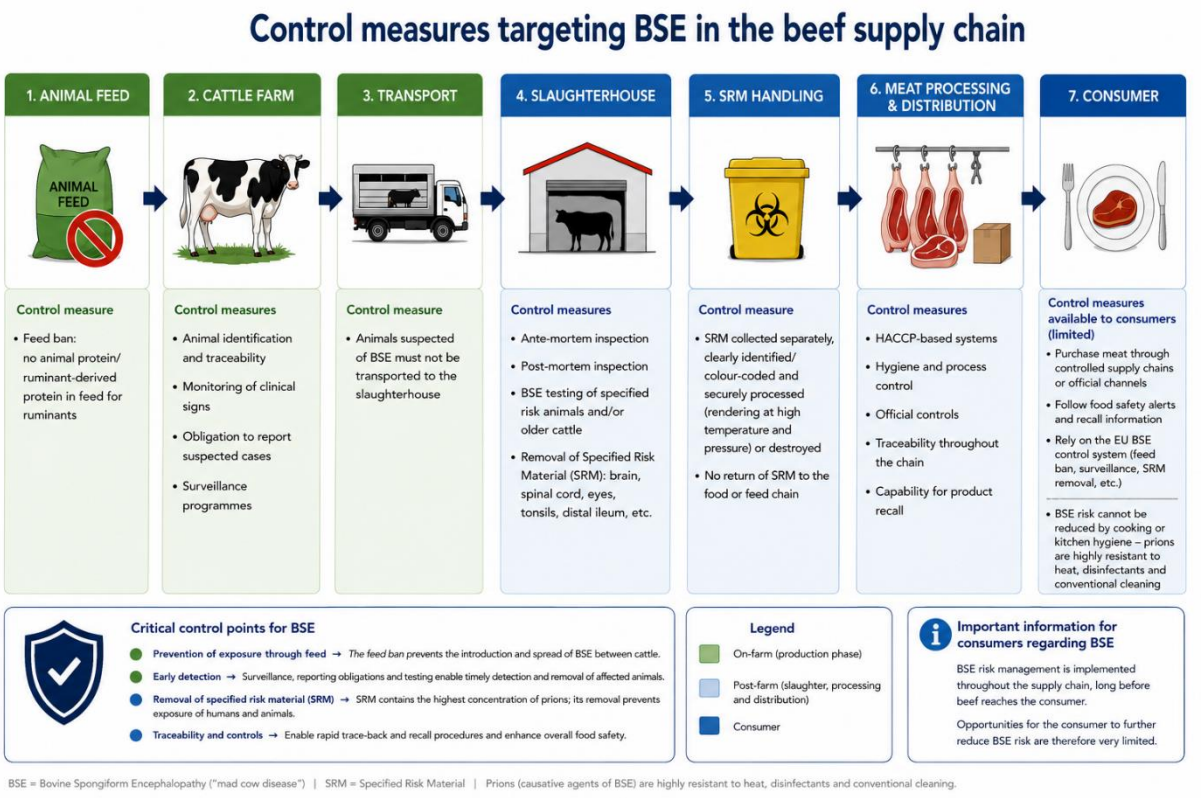

Figure 1: Control measures targeting BSE in the various links of the beef chain.

Countries that can demonstrate that BSE is well controlled according to the criteria of the Terrestrial Animal Health Code (WOAH, 2025a) can receive a negligible BSE risk status, the most favourable risk status according to the World Organisation for Animal Health (WOAH) and EU. In the EU, 26 out of 27 EU Member States have a negligible BSE risk status. Greece has a controlled BSE risk status. The Netherlands has had a negligible BSE risk status since 2013 (WOAH, 2025b). The UK also currently has a negligible BSE risk status for the zones Northern Ireland, Jersey, England and Wales, and Scotland (WOAH, 2024;2025b) (Figure 2).

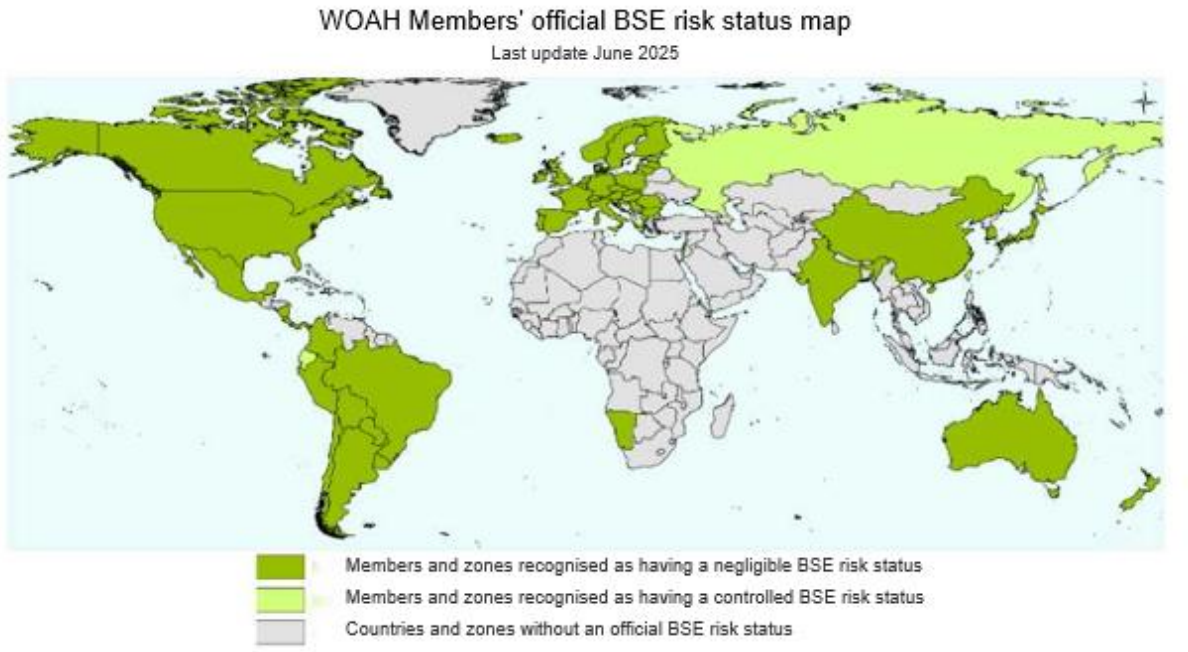

Figure 2 Map of official BSE risk status of WOAH members. Source: WOAH (2025b).

Findings

Hazard identification

The risk assessment addresses the risks to human and pet health posed by the possible presence of BSE prions in brain fluid or brain tissue from bovine heads leaked onto meat processed into ground raw materials for food and feed for pet animals. The BSE-prion is therefore the risk assessed in this study.

Hazard characterisation

Prions

Prions are proteins encoded by the prion protein (Prnp) gene. PrP^{C} (c of cellular) is the normal non-infectious prion protein that is transcribed from the prion protein gene. PrP^{Sc} (sc of scrapie) is the abnormal, protease resistant, pathological, infectious isoform (Prusiner, 1998). PrP^{Sc}, the pathological protein, arises from the normal cellular PrP^{C} that undergoes a conformational change (other folding) through contact with the $PrP^{SC.}$ The PrP^{Sc} proteins will then in turn convert surrounding normal, cellular proteins into the pathogenic, infectious form of the proteins.

Both the sequence of the PrP and the three-dimensional structure of the PrP^{C} are very conserved among mammalian species, but prions are not easily transferred from one species to another. Minimal differences in amino acid sequence can have a major impact on transmission efficiency (Béringue et al., 2008).

Prion diseases

Prion diseases, also known as transmissible spongiform encephalopathies (TSEs), are progressive, incurable and always lethal neurodegenerative brain diseases that can occur in animals and humans. After many years of incubation, the accumulation of pathogenic (misfolded) prion proteins causes cavities in the neurons and grey matter of the brain. The accumulation of pathogenic prion proteins causes abnormal behaviour and then dropouts and ultimately mortality in animals and humans (RIVM, 2024).

The emergence of TSEs in animals infected with prions requires exposure to a sufficient dose of prions to cause disease and the conversion of the cellular PrP^{C} to the pathogenic PrP^{Sc} must be at a rate that allows sufficient accumulation of PrP^{Sc} to cause disease within the lifetime of the host (EFSA BIOHAZ Panel, 2015).

BSE is the only TSE that can occur in cattle under natural (non-experimental) conditions. The atypical variants of BSE are caused by spontaneous mutations. The classical variant of BSE in cattle

is caused by feeding cattle with feed contaminated with proteins of ruminants infected with BSE, resulting in intra-species recycling of bovine proteins in the bovine population. The classical form of BSE is the only TSE that can be transmitted from cattle to humans. It causes the variant form of Creutzfeldt-Jakob Disease (vCJD) in humans through consumption of bovine products with BSE (RIVM, 2024). How this classic variant originated is not yet known (Requena et al., 2016). Classical BSE can also be transmitted to cats and causes FSE in these animals (Spickler, 2016). As far as is known, only vCJD and FSE are caused by BSE prions (FASFC, 2026). Dogs have never been diagnosed with BSE or any other prion disease, even though, like humans and cats, they had high exposure to BSE during the BSE epidemic in cattle.

BSE in cattle

The incubation period of classical BSE in cattle is on average 4-6 years, but can range from 2 to 15 years. Cattle with classical BSE are on average 4 years old at the onset of the symptoms and can show behavioural changes (fear, very alert, aggressive), neurological symptoms (muscle vibration, abnormal gait, spontaneous falling) and changes in response to stimuli (touching, noise and light) in a period of 2 weeks to several months and are becoming increasingly difficult to get up (50% of the animals in the Netherlands were only noticed at this stage). Most animals die within 3 months of the occurrence of symptoms (Badiola & Otero Garcia, 2024; RIVM, 2024; GD, 2025).

The skull, excluding the lower jaw, but including brain, eyes and spinal cord of cattle older than 12 months are legally classified as SRM. If a bovine animal is infected with BSE, the infectious agent concentrates in these tissues.

Based on experimental studies, the orally administered single dose at which 50% of cattle show clinical signs of BSE is estimated to be 0.15 g of the brain material used from a bovine animal with BSE, with a 95% confidence interval of 0.03-0.79 grams (Konold et al., 2012). There is no evidence for a threshold dose where the chance of infection becomes negligible; at the lowest experimental dose (1 mg), 1/15 (7%) of animals were affected (Wells et al., 2007).
Within the EU (excluding Romania and Bulgaria), cattle have been tested risk-based since 2013, i.e. only cattle from risk groups (dead animals, emergency slaughters and clinically suspect animals) are tested for BSE. The number of cattle with classical BSE reported to the EU in the period 2020-2024 was 2. With 5 million cattle tested during that period, this corresponds to 0.00004% of the bovine population tested (EC, 2025; EFSA et al., 2025).

BSE is almost non-existent in cattle in the Netherlands, with only occasional cases. Since 2011, only a few cases of the atypical variant caused by spontaneous mutation have been identified (1 in 2011 and 1 in 2023) (EFSA, 2024; RIVM, 2024; Cuperus, 2025; EFSA et al., 2025; GD, 2025; WBVR, 2025).

Transmission of BSE

With the exception of BSE, prion diseases are almost never naturally (non-experimentally) transmissible between animal species (Bruce et al., 1997; Prusiner, 1998; Scott et al., 1999). Transmission of BSE prions between different species is highly inefficient and has longer incubation times (Béringue et al., 2008; Requena et al., 2016). The transmission of BSE prions between different species is limited by the species barrier. This is a transmission barrier that limits the spread of prions between different animal species. This requires a much higher level of infectivity to cause a disease in a different species than in its own. The species barrier between cattle and humans is estimated to be 4,000 (1 = no species barrier) (EFSA BIOHAZ Panel, 2006). This means that transmission of BSE from cattle to humans is 4,000 times less efficient than transmission of BSE between cattle, between which there is no species barrier. There are no estimates of species barriers between cattle and cats and between cattle and dogs. The strength of the species barrier is mainly based on the degree of differences of PrP^C between host and donor species (Wopfner et al., 1999; Béringue et al., 2008). The amino acid sequence of the host PrP is the main factor for sensitivity to TSEs. Dogs have at position 163 of the PrP the amino acid aspartate or glutamate that ensures that the dog PrP proteins remain stable and almost cannot deform (Vidal et al., 2020).

vCJD in humans

Variant Creutzfeldt-Jakob (vCJD) is the form of Creutzfeldt-Jakob Disease transmitted from cattle to humans (Bruce et al., 1997; Prusiner, 1998; Scott et al., 1999). The incubation period of vCJD in humans is likely to be on average 12 years after exposure to BSE prions (6 to 18 years). The average age at the onset of symptoms is 29 years (16-48 years). At the onset of the disease,

psychiatric symptoms and (painful) sensory disturbances occur. At a later stage of the disease, other neurological symptoms (cognitive decline, muscle shocks, coordination disorders, paralysis, increased reflexes, spasticity, stiffness, vibrations) may occur. After 12 to 14 months, the patient dies (RIVM, 2024).

People's burden of disease can be quantified in disability adjusted life years (DALYs) or lost healthy life years due to illness or premature death. The burden of disease of vCJD is estimated at 36 DALYs per infection. This makes vCJD the most serious food-related disease (van Lier et al., 2016).

The infectious dose of BSE for humans is not known. It is unknown whether transmission is possible as a result of a single high exposure , or whether there must be long-term exposure (EC-SSC, 2000; RIVM, 2006;2024). It cannot logically be investigated experimentally because of ethical aspects. Based on epidemiological data, the infectious dose is only partially indirectly deducible by consumption behaviour. The first case of vCJD in the Netherlands concerned a person who consumed meat frequently (Sánchez-Juan, 2007).

In the EU, vCJD has become a rare disease (ECDC, 2024b;2024a). The last two cases of vCJD in the EU were reported by France in 2018 and 2021. This involved laboratory workers who had worked with tissues infected with prions. A previous case of vCJD associated with occupational exposure in a laboratory was in Italy in 2016. The mortality rate of vCJD, currently only associated with occupational exposure of laboratory workers, is less than 0.01 cases per million population (ECDC, 2024b).

There is currently no vCJD in the Netherlands. In the Netherlands, vCJD was previously diagnosed in three patients who died in 2005, 2006 and 2009 (RIVM, 2024; GD, 2025). Assuming that in the Netherlands all cases of vCJD are diagnosed, the incidence of vCJD has been zero since 2010.

FSE in domestic cats

The incubation period of FSE in domestic cats is not known. All domestic cats with FSE were at least 2 years old and most cases occurred in animals 4-9 years old. At the beginning of the disease, behavioural changes are observed. Movement and coordination disorders and changing reactions to touch or sound are also common. Excessive saliva production, unkemptness , insatiable hunger and thirst and dilated pupils have also been reported. In the later stages of the disease, drowsiness is common and convulsions may occur. Most cats die within a few weeks to 3 months of the onset of symptoms of FSE (Spickler, 2016; FASFC, 2026).

FSE is no longer found in domestic cats worldwide. The last reported case dates back to 2003 and occurred in Switzerland (Spickler, 2016; FASFC, 2026).

In the Netherlands, FSE has never been detected in cats (Spickler, 2016; FASFC, 2026).

Exposure assessment

Currently, the prevalence of classical BSE in cattle in the EU is very low. The number of cases of classical BSE reported to the EU was 2 in the period 2020-2024. With 1 million cattle tested annually, this corresponds to 0.00004% of the bovine population tested over that 5-year period (EC, 2025; EFSA et al., 2025). Reporting countries are all 27 countries of the EU, the United Kingdom and 8 non-EU countries (Bosnia and Herzegovina, Iceland, Montenegro, North Macedonia, Norway, Serbia, Switzerland and Turkey).

In the Netherlands, BSE is almost non-existent in cattle. Classical BSE has not occurred since 2011, but some cases of the atypical variant have been identified (1 in 2011, and 1 in 2023) (EFSA, 2024; RIVM, 2024; Cuperus, 2025; EFSA et al., 2025; GD, 2025; WBVR, 2025).

At company X infringements of the BSE measures that may have led to increased exposure to SRM have been detected. In the company X under investigation, it was found that bovine heads are processed whose loopholes and the back of the head are not properly sealed. From these openings in the skull, brain material can leak onto the meat. The impact of the shooting pin during the stunning of cattle with a mask pierces the skull, crushes the tissue and creates an open connection through which the accumulated pressure in the skull can squeeze out the brain fluid and brain tissue (Ramantanis, 2004; Ramantanis, 2006). The chance of release of brain tissue is smaller than the chance of release of brain fluid, because brain tissue is a solid mass and is more difficult to

squeeze out. However, additional information from the NVWA's Intelligence and Investigation Service (IOD) shows that the skulls were sawn and crushed, so that they were no longer intact and the release of brain tissue is very plausible. In the case of company X, an inspection by the NVWA found that a number of bovine skulls were damaged at the level of the loopholes and that brain tissue was hanging out that came into contact with the head meat. When working on tables, where heads are turned, brain material can end up on the tables on which the bovine heads are boned. There can be cross-contamination of meat on the tables. Contamination with brain material can be present without being visible.

The amount of brain material released is not known. However, an inspection showed that of 44 of the 696 bovine heads checked, the loopholes and/or back of the head holes were improperly sealed.

The bovine heads processed by company X are known to have been supplied by slaughterhouses from the Netherlands, Belgium, Germany and Denmark, countries with negligible BSE risk status. Slaughterhouses can slaughter cattle from different countries of origin in the EU. Which countries these are is not known (WOAH, 2025b).

Risk characterisation

The risks of classical BSE to human and pet health are characterised below on the basis of the magnitude of the impact (severity of the effect) of BSE prions on health and the magnitude of the chance of BSE prions due to the presence of brain material from bovine heads on meat processed in company X.

Impact

BSE, vCJD and FSE are incurable and always fatal brain diseases and therefore have a major impact on the health of cattle, people and domestic cats. With 36 lost life years (DALYs), vCJD is the most serious food-related disease in humans (van Lier et al., 2016).

Chance Despite high exposure of humans to BSE during the BSE epidemic among cattle with about 200,000 cattle infected with BSE, relatively few people (about 200) have been diagnosed with vCJD. The peak of vCJD in the UK in 2000 with 28 cases of disease (Watson et al., 2021; RIVM, 2024; EuroCJD network, 2026) was the result of exposure to BSE 8 years earlier in 1992, when there was a peak in BSE among cattle in the UK, with 37,280 cattle infected. Despite the high exposure of humans to BSE through consumption of products from BSE-infected cattle from which no SRM was removed during slaughter, the number of vCJD cases remained limited (most likely due to the large species barrier between cattle and humans).

ECDC indicates in their latest vCJD surveillance reports that the consistently low prevalence of clinical cases of vCJD over a number of years makes a large-scale epidemic of vCJD in the EU increasingly unlikely (ECDC, 2024b;2024a).

The chance of leakage of brain material on meat during boning of bovine heads whose loopholes and/or occipital holes are not properly sealed is real. In addition, cross-contamination can cause other heads to become contaminated with brain material.

The chance of meat containing brain material from bovine heads processed by Company X containing BSE prions is negligible. This is due to the current measures (feed ban, removal of SRM and prohibition of intra-species recycling) to control BSE which have resulted in a very low prevalence of classical BSE in cattle (0.00004% of the test population) giving most countries in the EU and also worldwide a negligible BSE risk status according to WOAH and EU.

The chance of vCJD in humans by eating products in which the meat contaminated with brain material from company X is processed is therefore negligible.

Despite high exposure of domestic cats to BSE during the BSE epidemic among cattle, relatively few domestic cats have been diagnosed with FSE. Approximately 100 cases of FSE were diagnosed in domestic cats between 1990 and 2003. Most cats were born before the TSE regulation came into force and SRM was still used in cat food.

The chance of FSE in domestic cats fed with animal feed (from company Y, among others) in which meat contaminated with brain material from company X is processed is also negligible.

Risk

Humans The risk of BSE to human health (vCJD) from the presence of brain material on meat intended for human consumption is characterised by a negligible low chance (nearly 0) with a very high impact (death) under the current BSE control measures. In a 2 x 2 risk matrix of probability on the X-axis and impact on the Y-axis (Figure 3), the risk falls far left in the upper left quadrant of low chance and high impact (black cross). The historical risk at the time of the peak of the BSE epidemic was in the upper right quadrant of high chance and high impact (blue cross). The impact of BSE now is unchanged from the impact during the BSE epidemic, but the chance has shifted from high to negligible (arrow). This decrease in chance can be attributed to the strict measures.

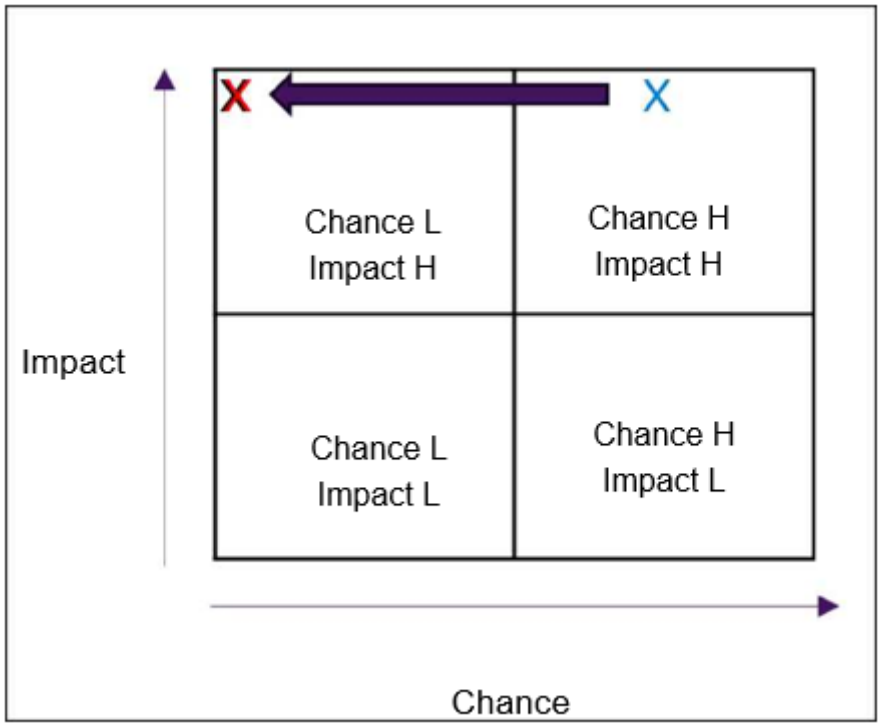

Figure 3 The risk (X) plotted in a 2x2 risk matrix of chance and impact, where L = low and H = high. The blue cross indicates the historical risk at the peak of the BSE epidemic. The black cross indicates the most recent risk and the red cross the additional risk (slightly higher than the recent risk but still negligible) the risk estimated in this assessment as a result of trading by company X. The arrow indicates the shift in risk due to the management measures taken.

In the current situation, it is assumed that the BSE control measures in the beef chain were not complied with in steps 5 and 6 of Figure 1, i.e. after slaughter and during meat preparation. In the chronology of those control measures, this is one of the last steps to avoid the chance of exposure to BSE. Assuming that the previous steps in the control measures have been safeguarded, it is estimated that the additional risk of BSE from the leakage of brain material from bovine heads to meat is negligible.

Because the additional risk from the observed BSE abnormalities at company X from brain material from bovine heads on meat is negligible compared to the current situation, the risk remains negligible after the incident at company X (red cross, which falls over the black cross in Figure 3).

Cats

The risk of BSE for domestic cats (FSE) due to the presence of brain material on meat intended for cat food is characterised by a negligible low chance (nearly 0) with a very high impact (death) under the current BSE control measures as well as the risk for humans. Compared to the current situation, the additional risk due to the observed deviations at company X is negligible.

Dogs
The risk of BSE to the health of dogs due to the presence of brain material on meat is characterised by a chance of 0 and an impact of 0 under the current BSE control measures.

Uncertainties

The risk assessment was requested following a criminal investigation by the IOD of the NVWA against company X into fraud by this company at various points in relation to feed and food safety where a lot of information has been deliberately withheld by the company and where new information can still be expected.

Therefore, there is no or insufficient information about how frequent and how much brain material from the bovine heads ended up on the meat during boning of bovine heads and processing meat into ground raw material at company X. It is also not known how high the chance of the release of brain material has been. It is certain that brain material has been released, so the chance is real. The cattle heads were delivered by the Netherlands, Belgium, Germany and Denmark. The countries of origin of the cattle are not known. Reliable data on production volumes and subsequent human and pet exposure are currently not available. However, it is very likely that humans and pets are exposed to products from customers of ground raw materials from company X.

Answer to the question

What are the risks of BSE to human and pet health due to the presence of brain material from bovine heads on meat processed in food and feed respectively?

Humans The risk of BSE to human health (vCJD) from the presence of brain material on meat intended for human consumption by humans is characterised by a negligible low chance (nearly 0) with a very high impact (death) under the current BSE control measures.

The additional risk of BSE to human health from the presence of brain material on meat intended for human consumption is characterised as negligible (almost 0). It is conditional that BSE management control are guaranteed up to and including the slaughterhouse.

Cats
The risk of BSE to the health of domestic cats (FSE) due to the presence of brain material on meat intended for cat food is characterised under the current BSE control measures by a negligible low chance (almost 0) with a very high impact (death).

The additional risk of BSE to the health of domestic cats due to the presence of brain material on meat intended for cat food is characterised as negligible (almost 0). It is conditional that BSE management control are guaranteed up to and including the slaughterhouse.

Dogs
The risk of BSE to the health of dogs due to the presence of brain material on meat intended for dog food is characterised by a chance of 0 and no impact under the current BSE control measures. So there is no risk.

Advices

As it is not allowed to introduce SRM into the feed and food chain, it is important to consider the impact on consumer confidence in the feed and food safety assurance system and consumer perception of the food safety risk.

It should be avoided that the exposure of humans and animals to BSE is increased by derogations in control measures against TSEs (feed ban and removal SRM). Ensuring these control measures throughout the beef chain remains of great importance.

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List of terms

Animal by-product (DBP): dead animals or parts of animals, products of animal origin or other products derived from animals not intended for human consumption, including oocytes, embryos and semen (Regulation (EC) No 1069/200 92).

- Category 1 material is the highest risk and consists mainly of material considered to be a TSE risk, i.e. specified risk material (SRM).
- Category 2 material includes fallen stock, manure and the contents of the gastrointestinal tract. Category 2 is also the default status of any animal by-product not defined as Category 1 or Category 3 material in the ABP Regulation, and includes material such as waste from slaughterhouse disposal.
- Category 3 material is considered low risk and includes parts of animals that have been found fit for human consumption in a slaughterhouse but are not intended for consumption either because they are not parts of animals normally consumed (skin, hair, feathers, bones) or for commercial reasons. Category 3 material also includes residues of animal origin from the food industry (by-products from food industry and former foodstuffs).

Specified risk material (SRM):

The TSE Regulation (Regulation (EC) No 999/2001) states:

The following tissues shall be considered as specified risk material if they come from animals originating in a Member State or third country, or region thereof, with a controlled or undetermined BSE risk:

The following tissues are classified as specified risk material if they come from animals originating in a Member State or third country, or region thereof, with a controlled or undetermined BSE risk (Annex V of the feed ban):

a) for cattle:

i) the skull, excluding the lower jaw, but including the brain and eyes, and the spinal cord of animals over 12 months of age;

ii) the vertebral column, excluding the vertebrae of the tail, the spinal and transverse protrusions of the cervical, thoracic and lumbar vertebrae, the *crista sacralis mediana* and the *alae sacrales,* but including the dorsal root ganglia, of animals over 30 months of age; and

iii) the tonsils, the last four metres of the small intestine, the appendix and the mesentery of animals of all ages;

b) for ovine and caprine animals: the skull, including the brain and eyes, and the spinal cord of animals over 12 months of age or with one of the permanent incisors broken through the gums.

For Member States with a negligible BSE risk status, only tissues referred to in points (a)(i) and (b) originating from animals originating from Member States with a negligible BSE risk shall be considered as specified risk material.

Isoform: version of a protein that originates from the same gene and is produced by a process such as alternative cleavage or other posttranscriptional modifications of the mRNA.

Cross-contamination: transfer of particles from one product to another.

Processed animal protein (VDE): animal protein wholly obtained from Category 3 material and treated in accordance with Section 1 of Chapter II of Annex X (including blood meal and fishmeal) to make it suitable for direct use as feed material or for other uses in feed (including petfood) or in organic fertilisers or soil improvers; however, it does not include blood products, milk, milk products, milk derivatives, colostrum, colostrum products, centrifuge and separator sludge, gelatine, hydrolysed proteins and dicalcium phosphate, eggs and egg products, including egg

[2] Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation)

shells, tricalcium phosphate and collagen (Regulation (EU) No 142/201 13).

Meat preparations: fresh meat, including meat minced into small pieces, to which foodstuffs, seasonings or additives have been added or which has undergone processing insufficient to alter the internal muscular tissue structure of the meat and thereby eliminate the characteristics of fresh meat (Regulation (EC) No 853/200 44).

[3] Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation)

[4] Regulation (EC) No 853/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules for food of animal origin