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19th October 2011

Committee Secretary

Senate Standing Committee on Rural Affairs and Transport

PO Box 6100

Parliament House

CANBERRA. ACT 2600

Re: Senate Inquiry: Animal Welfare standards in Australia's live export markets

Senate Inquiry: Related Private Senators' Bills

I have been asked, based on my professional experiences as a veterinarian with expertise in beef cattle management and production to comment on the footage from the Four Corners Program *A Bloody Business* and to comment on a black Droughtmaster steer reportedly filmed at Jalan Stasiun abattoir near Medan in Sumatra. This steer is seen to be shaking, showing muscle tremor, head shaking and agitation in the Four Corners program.

I have asked been supplied with opinions from three (3) people with experience in the field of animal welfare: specifically Dr. Hugh J Wirth; Dr. Lloyd Reeve-Johnson; and Dr. Carol Petherick. I stress that in contrast to the detailed footage that had been viewed by these three experts providing an opinion, my knowledge is limited to that screened and available at the following URL:

http://www.abc.net.au/4corners/special_ed/20110530/cattle/ (accessed on 19th October 2011)

My relevant expertise is briefly outlined below.

Background: My opinion should be in no way taken to condone the completely unsatisfactory animal handling and management practices depicted in the footage associated with this matter. The objective is only to provide an independent and impartial assessment of the likely, and /or possible, causes of the clinical signs observed in this animal.

1. In the footage that I was able to obtain, the key point is that the steer, when first filmed, is clearly highly aroused and there is marked muscle twitching. The animal shows signs of a tremor, head twitch and excitation. The animal is, as stated by Dr. Petherick, 'aroused, looking around and reacts to the activities around him.'
2. I am unable to comment on the state of the animal as loaded in the facility or as previously handled as this footage was not available to me.
3. The most crucial tasks to undertake in providing a diagnosis on any animal presented for aberrant behaviour, or any other illness, is to obtain a history, and to consider a list of possible causes or differential diagnoses. The animal should then undergo a physical examination to evaluate which of the differential diagnoses are most likely. Subsequently, tests on blood, urine, faeces or other materials should be used to confirm a diagnosis.
4. The pertinent history to this case would include the distance that the cattle were trucked, and the conditions under which they were trucked (ie stock density, heat and humidity, rainfall, terrain, speed) to the abattoir. Additional history on diet and watering strategies would be especially valuable. Animal management that exposed cattle to involved prolonged withholding of food, extremes of heat, and overcrowding may predispose to a number of conditions that look and present very similarly to those of the animal in question.
5. In seeking a list of differential diagnoses for the condition, I sought firstly a standard and definitive text, Radostits et al (1994), and a table that would relate to the clinical signs observed in the steer. Specifically, and I quote from that text: For farm animals with signs that include 'mania, hysteria and hyper-excitability', the text book "Radostits in the 8th edition", Table 31. Page 469 describes examples of these conditions. These include 'peracute lead poisoning, rabies and encephalitis.' To this list I would add the possibilities of ketosis (and concomitant hypoglycaemia – also noted by Radostits et al 1994) and hypomagnesaemia (transit tetany) and ergotism and potentially exhaustion. One could also consider infectious nervous conditions such

as listeriosis and BSE. While remarkably, I could find no reference to this matter in the standard veterinary texts consulted (see references below), I also include the condition of 'distress and fear'.

6. In my experience, extreme signs of fear in cattle are rare. Frequently cattle will be apprehensive and on rare occasions I have observed animals, especially those on slippery concrete develop a similar shake, and excitation to that exhibited by the steer in question and, to a much less marked degree, by some of the other cattle depicted in the footage in the programme. I ascribe these responses to fear. The marked muscle twitching observed in the steer in question is not typical. I have also seen cattle react in an apprehensive, rather than a highly excited state, to noise and interventions, such as experienced in routine circumstances including anti-parasitic treatments (drenching) or during ear tagging. On occasions, I have even seen cattle uncomfortable, apprehensive, mildly shaking and vocalising under circumstances, where they are being held in race prior to being palpated for pregnancy. I do not consider any of those activities to be highly stressful for cattle. However, cattle vary in their responses to perceived threats. Therefore I would include 'fear' as being a possible differential diagnosis. The likely omission of this condition from the veterinary texts probably reflects the transient nature of the condition.
7. I note that in this case, neither I, nor other viewers, have the capacity to determine whether the animal was transiently in the state depicted, or whether signs were present prior to the scene depicted. Further, the progression of signs in the case, was not available to assess.
8. It is my opinion, that the following conditions are possible in this case:
 - i) Given the extreme and untoward circumstances under which this animal was held, it is very possible that part of the condition observed was a degree of apprehension and fear resulting from exposure to the extreme practices depicted.
 - ii) It is very possible that this animal was suffering from a transit tetany, I quote from Radostits et al (1994), a definitive, standard text on page 1332 'Transit recumbency (tetany) is a disease which occurs after prolonged transport, usually in cows and ewes in late pregnancy. It is also recorded in lambs transported to feedlots (1) and

in cows (2) and sheep (3) delivered to abattoirs. It is characterized by recumbency, alimentary stasis. Although cows of any age in late pregnancy are most commonly affected the disease has also been recorded in cows recently calved, in bullocks, steers, dry cows and lambs. Precipitating causes include heavy feeding before shipment, deprivation of food and water for more than 24 hours during transit and unrestricted access to water and exercise immediately after unloading. There is an increase incidence during hot weather. Clinical signs may occur while the cattle are still on the train or up to 48 hours after unloading. In early stages there may be excitement and restlessness, trismus and grinding of the teeth. A staggering gait with paddling of the hindlegs and recumbency occur.’ I also quote from a more recent text ‘Diseases of Cattle in Australia: a comprehensive text book’ Parkinson et al (2010) in which on page 548 they state that ‘Clinical signs in association with the history of recent transport are highly suggestive of transit tetany, primary hypocalcaemia and hypomagnesaemia.’ In regard to class of cattle, Parkinson et al (2010) state ‘While this condition is most commonly seen in heavily pregnant cows, it has also been reported in recently calved cows, dry cows and in steers. The specific cause of transit tetany is unknown, although stress is obviously a major factor involved in the development of the condition.’ In regards to differential diagnosis they state ‘The clinical signs, in association with a history of recent transport, are highly suggestive of transit tetany. Primary hypocalcaemia and hypomagnesaemia may also occur in similar situations, but the clinical signs are usually diagnostic, and their diagnosis can be supported by appropriate testing for serum Ca and Mg levels. Pregnancy toxemia may also produce similar clinical signs, but such animals have a marked ketonaemia and ketonuria and on post-mortem examination have a characteristic fatty infiltration of the liver.’ (note Pregnancy toxemia and ketosis are very similar conditions) Further from the same text Parkinson et al (2010), ‘Risk factors for the condition include heavy body condition, advanced pregnancy, heavy feeding prior to transport deprivation of feed and water of more than 24 hours during transport and unrestricted access to water and exercise immediately after arrival. Crowded, hot, poorly ventilated transport trucks seem to be predisposing factors. Similarly, hot environmental conditions may also be associated with an increased incidence of the condition. Other stress factors that occur during loading, transport and unloading may also be involved. Prolonged travel by foot is also a risk factor.’

- iii) The clinical signs of transit, and other forms of, tetany (hypomagnesaemia) are not consistent. In most cases, I have examined, the animals behave by extreme responses to external stimuli (being approached, handled or moved). In most cases these twitch and head shake, and tend to be exophthalmic (or 'wild eyed'). Later in the course of the condition these become recumbent and try to stand. I have not heard jaw champing or grinding of teeth, in any case, although this is reported.
- iv) In the case of the animal in question; the animal was well conditioned, had been transported, and would have been removed from feed for some time. Further, it is likely that conditions for transport, and subsequently, were hot and humid. All these are well recognised risk factors for transit tetany as referenced in standard veterinary texts and as cited above.
- v) The possibility that transit tetany was present cannot be dismissed without having a full physical examination of the animal. The physical examination would need supporting blood work to provide a diagnosis of hypomagnesaemic tetany, but the circumstances likely to have been involved in the transport of the animal and the heat and adverse conditions may well have precipitated a hypomagnesaemia tetany. Dr Reeve-Johnson notes that stressed cattle release 'adrenocorticoid hormones including adrenalin' (also called epinephrine). Radostits et al (2008) note that 'Epinephrine release will result in a precipitous fall in serum magnesium and this may explain the common observation that clinical cases are often precipitated by excitement or movement' (Radostits et al 2008; page 1655). It is quite possible that the stress of transport, the movement of a fat animal ex-feedlot, and hot humid conditions could have triggered a hypomagnesaemic response. Cattle that contain significant lipid deposits, such as this steer in body condition score 4.25/5, are more prone to hypomagnesaemia. The extent of muscle tremor in this animal, suggests the possibility of transit tetany.
- vi) Nervous Ketosis/ hypoglycaemia: Animals which have high body fat such as the animal depicted have the potential to mobilise body tissue subsequent to transport and stress. The conditions depicted in the footage in the program suggests the possibility of stress in the environment in moving these cattle and it is possible

withholding of feed and adiposity this animal could have been predisposed to a nervous ketosis / hypoglycaemia.

- vii) Other conditions could be possible, but very much less so. Indonesia is not rabies free, nor is the possibility of lead poisoning completely out of the question under the prevailing conditions. In other words, it is possible, although unlikely, that lead could get into the diet. Other infectious forms of encephalitis (generalised infection of the brain) are also possible, but rare. The possibility of ergotism could not be excluded based on the hot humid climate in Indonesia and very high concentrations of fungi capable of producing ergot alkaloids in tropical countries. The clinical signs of this condition are very similar to those observed for the animal in question.
- viii) The key point in regard to the latter comments is that, while some of these conditions are rare (nervous ketosis, rabies, encephalitis including BSE, and lead poisoning), these should not be excluded from a list of differential diagnosis, given that no physical examination of this animal is possible.
- ix) The clinical signs shown by the particular animal are extreme and beyond those that I have seen in regard to apprehension or fear alone (however, I note the very extreme and adverse conditions shown in the video). This certainly does not preclude fear or apprehension being a significant part of the pathogenesis of the condition evident or being the sole cause.
- x) I consider that the most likely causes of the condition observed in the animal are 'fear' and transit tetany. It is very possible that both were involved in the circumstances. Without a full physical examine, and ancillary pathology work, any diagnosis made must be speculative. Certainly no definitive diagnosis on the condition affecting the animal could be made based on the video evidence that was available to me.

Dr. Ian J Lean

BVSc, PhD, MACVSc

Specialist in Medicine and Production of Cattle (Dairy)

Ian John Lean

Qualifications

Bachelor of Veterinary Science, University of Sydney, 1979.

Member Australian College of Veterinary Scientists – awarded by examination in medicine of dairy cattle, 1985.

Doctor of Philosophy in Comparative Pathology. University of California, Davis, 1990. – Major studies in Nutrition and Epidemiology.

Current Positions: Managing Director

SBScibus is a series of companies which provide expertise in research, on-farm consultancy and corporate consultancy.

Adjunct Professor – University of Sydney

Honours

Australian College Prize – 1990 – Awarded by the Australian college of Veterinary Scientists for excellence in contributions to the veterinary profession since graduation.

Specialist in Medicine and Production of Cattle (Dairy) – Veterinary Surgeons Board of NSW, Tasmania, Queensland, Victoria and South Australia – Appointed 1990.

Examiner in Cattle Medicine – Australian College of Veterinary Scientists – Appointed 1993-8, 2001, 2011. Note 2011 I was a beef examiner and have done this and Dairy Medicine

Chief Examiner in Cattle Medicine – Australian College of Veterinary Scientists – Appointed 1995-8.

Chief Examiner Ruminant Nutrition – Australian College of Veterinary Scientists – Appointed 1997.

Honorary Associate – University of Queensland – Appointed 1997.

Adjunct Professor – University of Sydney – Appointed 2000.

The Gilruth Prize - The highest award given by the Australian Veterinary Association for Meritorious Service to the Veterinary Profession – 2009

The Australian Dairy Science Award - University of Sydney Dairy Research Foundation – 2010 – For services to the Australian Dairy Industry

Professional Appointments

President Elect – 1984 – **President** – 1985–1986 – Australian Association of Cattle Veterinarians.

Board Member – 1985–1986 – Australian Veterinary Association.

Member – 1984-1986 – Advisory Committee on Dairy Health to the New South Wales Department of Agriculture.

Committee Member – 1986-1988 – A Consortium for developing “A guide for care and use of Agricultural Animals in Agricultural Research and Teaching” for the USA.

President elect – 1994 – **President** 1995 – Australian Society of Animal Production – Cumberland Branch.

Member – from 1992 – 1994 AVA Adverse drug reaction subcommittee.

Chair from 1998 – 2000 Sydney Branch of Nutrition Society and committee member Nutrition Society of Australia

Consultancies (Major Relevant Only)

University of California, Davis – 1985 – The potential for provision of clinical services in cattle nutrition and medicine to clients in the San Joaquin Valley of California.

California State University Diagnostic Laboratory Services, 1986 – 1990. Consulting veterinarian for beef and dairy herds and sheep flocks which had problems of substantial economic import and which proved difficult to resolve.

Royal Society for Prevention of Cruelty to Animals – 1992 – Investigation of a feedlot dairy.

Elders-Pacrim Pty Ltd – 1995 – 1996 – Advice on feedlot profitability. Approximately 10000 head.

Japfa-Comstock Indonesia - 1999- Control of a *Brucella Abortus* outbreak in 700 dairy cattle

Meat and Livestock Australia – Developing Risk Based Post Mortem Methods Board 2009- Present.

Disclosure: I have undertaken research for Meat and Livestock Australia and am currently working with MLA projects. Income from this source has been <1% of *SBS* income for any given year.

Relevant Publications and Experience

I have over 200 scientific publications including two books, approximately 20 book chapters including Encyclopedia chapters on metabolic diseases (ketosis and pregnancy toxaemia; transit tetany is a metabolic disease), around 30 monographs and reports to governments and government agencies, and 80 publications in international scientific journals including a number on metabolic disease.

I worked in abattoirs as a young vacation worker, as a veterinary student and have visited these in Australia and elsewhere as a veterinarian. These jobs entailed spending regular contact with cattle about to be killed.

I have been on animal welfare committees at Universities. As an invited member of a National Committee on this in the USA, I contributed to the development codes of practice for animal welfare in research in the USA. I am the license holder for an Animal Ethics Committee and deeply committed to improving the well-being of animals, especially cattle.

I currently consult to primarily large rural enterprises in Australia with more than 20,000 head of dairy cattle and 2000 head of beef cattle. I have regularly consulted to the largest dairy producer in the US (at the time) and to large feedlot enterprises there. I have consulted to dairy enterprises in Indonesia.