

Platts Agriculture Limited and Natural Resources Wales (NRW)

Report of Dr O Atkinson MRCVS

Dated:	3rd July 2023
Specialist Field:	Cattle health and production
On the instructions of:	Saunders Law
Acting on behalf of the appellant:	Platts Agriculture Limited
Subject matter:	Appeal against deemed refusal by NRW for an environmental permit for production of cattle animal bedding, recycled from waste wood feedstock.

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Report

1 Introduction

1.01 My suitability as an expert in this case

I am Owen Atkinson, a veterinary surgeon of over 25 years' experience in dairy production and herd health. I am owner/director of Dairy Veterinary Consultancy Ltd, and I provide independent health, production, nutrition and welfare advice and training for dairy farmers, vets, and other professionals in the dairy industry.

I am a Specialist in Cattle Health and Production and a Diplomate in Cattle Health and Production, both awarded by the Royal College of Veterinary Surgeons. Specialist is a protected title for vets.

Full details of my qualifications and experience entitling me to give expert opinion evidence in this case are in Appendix A1.

1.02 Summary background of the case

The case concerns the refusal by Natural Resources Wales (NRW) to permit Platts Agriculture Limited to recycle specified waste wood (sawdust and shavings), collected from joinery and manufacturing sites, to produce animal bedding, namely cubicle conditioner/ topping material for rubber mats and mattresses, used by cattle (predominantly adult dairy cows).

An application for an environmental permit under the Environmental Permitting (England and Wales) Regulations 2016 was prepared by Environmental Compliance Limited (ECL) in January 2022. On 19th July 2022, Natural Resources Wales requested further information before reaching a decision. ECL prepared a response for End of Waste Justification, dated September 2022. To date, a permit has not been granted.

My instructions are to provide an independent expert opinion on the aspects of using recycled wood product for animal bedding for use on cattle farms. In particular, my expertise is being sought over the real and potential direct animal welfare concerns, and indirect animal welfare concerns when the material finds its way through onto land via farmyard manure or slurry.

1.03 Methodology

My methodology for preparing this report includes:

- (i) I have considered the instructions from Saunders Law, and enclosures attached with those instructions. The enclosures were:
 - (1) ECL application for permit, non technical summary, January 2022.
 - (2) An 8 page document from NRW, not dated, with 58 paragraphs summarising NRW's interpretation of the situation and their concerns which have hitherto led to refusal to grant a permit.
 - (3) NRW document: Notice of request for more information, 19/7/22.
 - (4) ECL response to above, September 2022.
 - (5) Spreadsheet: laboratory results of hazardous substances assays; samples of feedstock product arriving at Platts for manufacture/ recycling.
 - (6) Emails from Dr Vince, expert in chemical analysis and risk assessment retained by Platts.
 - (7) PAS 111 (2012): specification and test methods for processing waste wood, published by the Waste and Resources Action Programme (WRAP) in conjunction with the British Standards Institution (BSI).
 - (8) ECL application for permit, environmental permitting technical requirements, January 2022.
 - (9) Letter from Saunders Law to Huw Davies, NRW, dated 13/1/23, which included a Schedule of 5 paragraphs of questions or points of clarification to NRW.
 - (10) Letter from Saunders Law to Justin Amos, NRW Legal Services, dated 3/2/23, requesting a response further to letter (9) above.
 - (11) Letter from Justin Amos, Barrister for NRW, dated 10/2/23, in response to Saunders Law letters, as per (9) and (10) above).
 - (12) Instructions to Dr Vince, ASK Consultants, from Saunders Law, dated 2/3/23.
 - (13) NRW End of Waste Operational Guidance Note (OGN 051), v 2.0, April 2022.
- (ii) On 17th January 2023, I visited the Platts production facility in Wrexham, N Wales, in order to further understand their process and their product range.
- (iii) I have consulted with the following additional documents and sources:

Cattle bedding and housing resources, guides and legislation:

- (1) The Welfare of Farmed Animals (England) Regulations, 2007, available at <https://localgovernmentanimalwelfare.org/wp-content/uploads/2020/03/England-The-Welfare-of-Farmed-Animals-Regulations-2007.pdf>
- (2) The Welfare of Farmed Animals (Wales) Regulations, 2007, available at <https://www.legislation.gov.uk/wsi/2007/3070/contents/made>

- (3) Code of Practice for the Welfare of Livestock: Cattle, 2010, published by the National Assembly of Wales, available at <https://www.gov.wales/sites/default/files/publications/2018-01/welfare-of-cattle-code-of-practice.pdf>
- (4) Code of Recommendations for the Welfare of Livestock: Cattle. DEFRA publication, 2003. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69368/pb7949-cattle-code-030407.pdf
- (5) Red Tractor Certified Standards, Standards Manual, Dairy, current edition (February 2023), downloaded 17/1/23
- (6) Red Tractor Explanatory Document: Cattle and Sheep Bedding Materials (updated Dec 2020), available at <https://redtractorassurance.org.uk/wp-content/uploads/2021/08/Cattle-and-Sheep-Bedding-Materials.pdf>
- (7) RSPCA Welfare Standards for Dairy Cattle, 2021, available at https://science.rspca.org.uk/documents/1494935/9042554/1306_DairyCattle_Standards_2022_v2.pdf/ad895c3e-6bb8-fe7a-87a4-b16f10778e1c?t=1672833219745
- (8) Animal & Plant Health Agency (APHA) guide: Conditions of use in Relation to the Use of Recycled Manure Solids as Bedding for Dairy Cattle, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/585281/guid-ab143.pdf
- (9) Report for Agriculture and Horticulture development Board (AHDB): Risks, benefits and optimal management of recycled manure solids for use as bedding for dairy cattle (2015), available at https://projectblue.blob.core.windows.net/media/Default/Research%20Papers/Dairy/411137_branded_executive_summary.pdf
- (10) The Bedding Materials Directory, AHDB, available online at <https://ahdb.org.uk/knowledge-library/the-bedding-materials-directory>
- (11) Kingshay Report: Effective Bedding Management, 2011, incorporating dairy farmer survey results, available on line at <https://www.kingshay.com/wp-content/uploads/BeddingReport-020911-785.pdf>
- (12) Kingshay Dairy Insight Report: Bedding Conditioners (2020), purchased 9/2/23
- (13) Animal & Plant Health Agency (APHA) Information Note - Straw bedding shortage this winter, January 2018 and rev September 2020, available online at <http://apha.defra.gov.uk/documents/surveillance/diseases/bedding-shortage-info-jan18.pdf>
- (14) AHDB Dairy - bedding materials, online resource "Planning ahead for winter bedding", updated 4th August 2022, and available online at <https://ahdb.org.uk/news/planning-ahead-for-winter-bedding>

Additional resources and guidance notes on waste classification and management:

- (15) [gov.uk](https://www.gov.uk/how-to-classify-different-types-of-waste) pages on waste classification, at <https://www.gov.uk/how-to-classify-different-types-of-waste>

- (16) Technical Guidance WM3: Waste Classification - Guidance on the classification and assessment of waste (Oct 2021 version), published by NRW, Environment Agency and Scottish Environment Protection Agency. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1021051/Waste_classification_technical_guidance_WM3.pdf
- (17) Waste Wood Assessment Guidance for the UK Waste Wood Industry, Nov 2021, published by the Wood Recyclers Association, available at <https://woodrecyclers.org/wp-content/uploads/WRA-Waste-Wood-Assessment-Guidance-V2-November-2021.pdf>
- (18) Environment Agency Guidance Note: U8 waste exemption, using waste for a specified purpose, at <https://www.gov.uk/guidance/waste-exemption-u8-using-waste-for-a-specified-purpose>
- (19) Environment Agency Guidance on the use of waste wood, 14/6/2013, available online at <http://www.organics-recycling.org.uk/uploads/article2618/Guidance%20on%20the%20use%20of%20waste%20wood.pdf>

Human health and safety guidance:

- (20) Health and Safety Executive (HSE) information sheet: Wood dust: controlling the Risks (05/22), available at <https://www.hse.gov.uk/pubns/wis23.pdf>

Miscellaneous:

- (21) World Buiatrics Congress, September 2022, Madrid, Scientific Program, available online at <https://www.wbc-madrid2022.com/images/site/PROG-COMPLETO-WBC-A4-05-09.pdf> Page 46, Short papers 09, herd health management, smart farming and economics; HH-02, Richard Sibley: An outbreak of acute respiratory disease in an adult dairy herd due to dust inhalation.

Note - all online resources were available and accessed on 03/7/2023

- (iv) I have consulted with the DEFRA Animal & Plant Health Agency (APHA) Cattle Expert Group veterinary lead, enquiring of any surveillance reports of actual or suspected cattle health or welfare incidents due to bedding on any sawdust or other recycled wood product (9/2/23).
- (v) I have consulted with Red Tractor Farm Assurance to enquire about the wording on their guidance note for the use of sawdust bedding (10/2/23).
- (vi) Finally, I detailed my findings in this report, and I have provided my opinion based on those findings.

2 The issues to be addressed and a statement of instructions

2.01 I received an initial formal letter of instruction on 8/2/23 from Steve Garratt, Saunders Law. I received additional instructions on 2/3/23, 9/3/23 and a final instruction on 3/7/23 from Steve Garratt, Saunders Law.

The documents included the enclosures listed in 1.03 (i).

2.02 I have been asked to provide an expert opinion with respect to end-of-waste criteria for Platts products, namely Fine Bed and Powder Bed, recycled waste wood products for cubicle bedding or conditioners:

According to Article 6 (1) and (2) of the Waste Framework Directive, certain specified waste ceases to be waste when it has undergone a recovery operation (including recycling) and complies with specific criteria, in particular when

1. *the substance or object is commonly used for specific purposes*
2. *there is an existing market or demand for the substance or object*
3. *the use is lawful (substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products)*
4. *the use will not lead to overall adverse environmental or human health impacts.*

2.03 In the first instance, I have been asked to consider bullet point four (adverse impacts) in the broadest sense, with my knowledge of dairy farming systems, cattle health & welfare, and milk quality factors to cover:

- (a) harm to cows,
- (b) harm to humans who look after cows,
- (c) harm to the food chain, and
- (d) environmental harm from disposal of soiled bedding (e.g. in slurry).

2.04 With respect to bullet points 1 to 3 of Article 6(1) of the Waste Framework Directive, using my knowledge of usual practices on UK dairy farms and the bedding of dairy cows, I have been asked to provide answers to specific questions:

- (1) To what extent are MDF, fibreboard, chipboard and plywood products used in UK dairy farms as bedding or cubicle conditioner? How are they normally used? What are their pros and cons from the farmers' and cows' perspectives? What happens to the bedding material and cubicle conditioner after use?
- (2) What are the potential or actual reported harms to cattle of such products? How does this compare to other bedding or cubicle conditioner alternatives, including virgin (kiln dried) wood sawdust or shavings, or alternative recycled waste products?

- (3) Are there any bedding or cubicle conditioner materials which you know to be harmful or which are reported as such in scientific literature?
- (4) Am I aware of any adverse health effects on cattle of MDF (or similar) by-products or powder, whether through my own experience, or knowledge of disease surveillance in cattle?

The supplementary instructions (2/3/23 and 9/2/23) asked me to consider the additional questions:

- (5) Is there any legal requirement on the part of manufacturers of animal bedding to obtain prior approval for the use of their products from APHA or any other organisation concerned with the welfare of farm animals?
- (6) Does Platts bedding conditioner meet any technical requirements for its specific purposes or other existing legislation and standards applicable to bedding conditioner?

Whilst answering these questions, I have been asked to consider the checklist in Appendix 2 of the End of Waste guidance note, OGN 051, which is enclosure (13) with my instructions.

2.05 After my initial instructions of February and March 2023 I was asked to assist ECL in the preparation of an "End-of-Waste Justification", which I am aware is to be submitted to NRW. I have held discussions with Dr Ivan Vince, Dr George Fisher and Mr Oliver Matthews in order to do so.

Prior to signing this Report, I have seen what I understand to be the final version of the End of Waste Justification (Addendum), which is ECL Ref: PLAT.01.02/EoW (Addendum). My contributions to this document have been limited to my area of expertise and I have made them consistently with the Statements and Declarations at section 5 of this Report. I am satisfied that the contents of the Addendum are consistent with the answers I have reached in this Report, and that the bedding/conditioner material sold by Platts which meet the Standard of Conformity at Appendix I will meet the conclusions summarised in the final sentence of para.4.7 of the Addendum:

"4.7 It is therefore considered, when taking into consideration the small quantities of material being used and the extremely low substance concentrations present, that the material can be deemed as 'end of waste' at the point at which it has been packaged after processing. The material has an established use, is

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considered to contribute to improving animal welfare, is a suitable alternative to traditional materials and has no greater risk or impact than those materials.

I am aware that ECL may serve this Report as a source of evidence for Platts' revised end-of-waste submissions.

3 My investigation of the facts

3.01 Assumed facts and areas of uncertainty around facts.

- 1) I have been informed by Saunders Law, and again during my visit to Platts production facility, that the source waste wood is from around 50 different suppliers, none of which are civic amenity waste sites. I have assumed this to be true.
- 2) The suppliers, I am informed, are joinery firms and manufacturers of wood products, for example furniture manufacturers. The waste wood is from softwood, hardwood, panel board and particle board sources. I have assumed this to be true.
- 3) My understanding is that **panel board** includes chipboard, fibre boards, hard board, particle board, soft board and plywoods, and includes MDF (medium density fibreboard). I have taken this definition from the PAS 111:2012 WRAP/ BSI document: Specification for the requirements and test methods for processing waste wood.
- 4) I am not a chemist or expert in toxicology. I rely on other expert opinion regarding the potential harmful chemicals in panel board. I rely on the chemical analyses undertaken by Platts to demonstrate that the waste wood sources are non-hazardous, category 03 01 05, as opposed to hazardous, 03 01 04, as set out below (section 3.03).
- 5) I have relied upon the documents listed in 1.03 (iv) 14-18 to inform myself about the classification of wood waste. Some uncertainty remains with me about the definition of "treated" wood, and this seems an unsatisfactory classification, due to the ambiguity in the various documents and guidance notes, including AHDB and Red Tractor guidance notes for farmers.
- 6) The PAS 111:2012 WRAP/ BSI document: Specification for the requirements and test methods for processing waste wood defines treated wood as that which has been chemically treated to enhance the performance of the original wood. These may include coatings, preservatives and flame retardants. I have interpreted the guidance notes that panel boards should not automatically all be regarded as treated wood.
- 7) The PAS 111:2012 document states that the classification of waste wood as non-hazardous or hazardous is in most cases a complex matter requiring information on the specific chemicals in the wood and their concentration. This is outside my area of expertise. I therefore rely on the preliminary findings of the expert chemist, Dr Vince, which have been made available to me. I have cross-checked these preliminary findings against the reference tables, 1) and 2), referred to in sections 6.3.3 and 6.3.4, of the PAS 111:2012 document, which set out the upper levels of risk of potentially toxic elements (PTEs). The tested levels of PTEs do appear to be

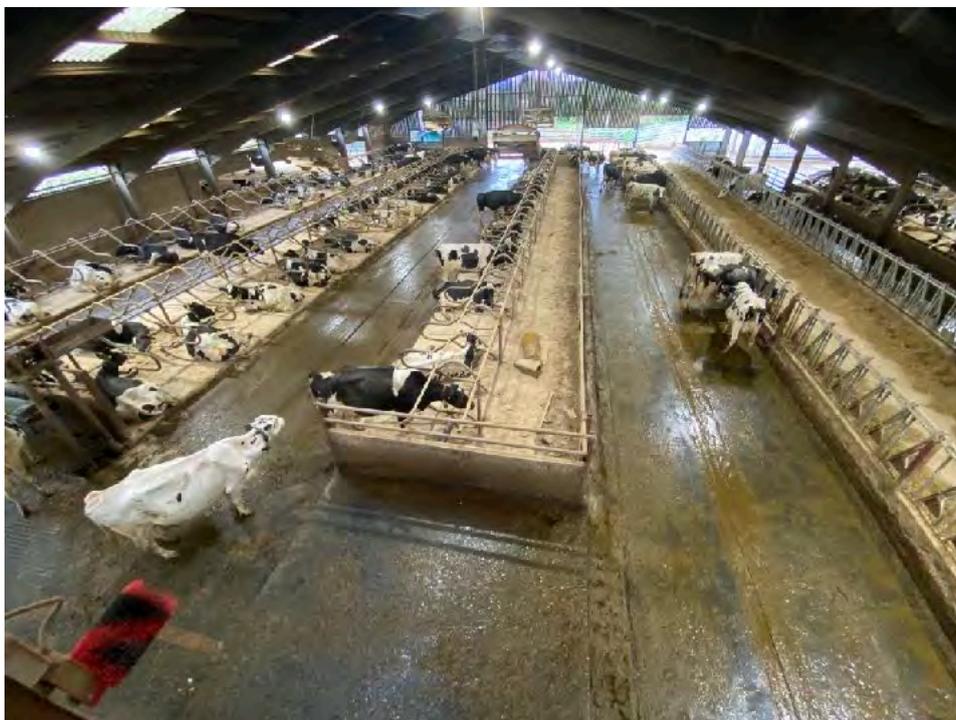
below the threshold for the three stated end uses. However, I would defer to a recognised expert in this area to confirm the samples are indeed non-hazardous. I note that the samples do not appear to have been tested for pentachlorophenol, which is a PTE listed in Table 1), section 6.3.3. I cannot be certain about the selection of samples which have been tested - for example that these include a true representation of source waste wood - and I rely on the evidence of others to assure that the appropriate samples have been tested, using the appropriate methodology to assure non-hazardous status.

- 8) On providing my final opinion, I am assuming that Platts will undertake the necessary conformity measures as outlined in ECL document Sept 2022, whereby they will assure that the source waste is 03 01 05, and the source does not contain hazardous substances, based either on direct knowledge of source, or a schedule of chemical testing, or both.
- 9) I have used the HSE information sheet (Wood dust: Controlling the Risks) to inform myself about the potential harm of wood dust on human health, including asthma, dermatitis and irritation to the eyes, nose and throat. I am not expert in this area (human health) and therefore I cannot be certain that this HSE document includes all of the likely or possible risks to human health of contact with wood dust, including the wood dust which comprises the Platts bedding products, even assuming the source waste wood material meets the non-hazardous status, 03 01 05.

3.02 Enquiries and investigations into the facts: normal dairy farm practices (bedding)

- 1) There are around 8000 dairy farms in GB, comprising around 1.5 million adult dairy cows. Most cows are housed for at least part of the year (winter months). A minority - perhaps up to 25% - of dairy cows are housed all year round. These tend to be in higher-yielding herds where grazed grass can be insufficient to meet their dietary needs.
- 2) The vast majority of housed cows are kept in what is known as “cubicle houses”. See Figure 1. The cubicles are the lying areas for the cows. Housed cows will lie down for approximately 12 hours per day, in several bouts (around 8 lying bouts per day). They will eat for approximately 5 hours per day, and the rest of the time they will be socialising, loafing and being milked. It is important that cows’ beds are comfortable so that they can get up and down easily and that they do not suffer pressure sores when lying. The bedding surface is very important in both of these respects.

Figure 1: typical cubicle house/ shed:



- 3) Alternatively, cows are housed on “loose housing”, which are usually “straw yards”. Many herds will house cows on this bedding when they are about to calve, so that they can more easily stretch out to give birth. See Figure 2. Whilst lying comfort is usually easier to ensure with straw yards, or loose housing, the main disadvantage is

hygiene. Cubicles are generally easier to clean and keep clean, as compared to loose housing. The main importance of hygiene in the lying area is for udder health - i.e. to have low infections of the mammary tissue (udder), known as mastitis.

Figure 2: straw yard housing



- 4) Cubicles are either "deep bedded" or have rubber "mats"/ "mattresses". Whilst there are some technical differences between mats and mattresses, and different types of both are in use, further details of these are not relevant to this case, and mats or mattresses can be considered as the same thing in this report.
- 5) The most typical bedding substrate for a **deep bedded** cubicle system is sand (Figure 3). This provides good comfort and because clean, dry sand is an inert substance, it can be good from a hygiene perspective too. Hygiene, in this context, is important for udder health (mastitis and somatic cell counts). Deep sand beds are considered by many, including myself, to be the "gold standard", but are not suitable for all farms due to special consideration of handling sand in slurry, and the effects of sand on correct functioning of drainage channels and slurry spreading equipment.

Figure 3: deep bedded sand cubicles



- 6) Cattle are commonly bedded on waste wood products, which have been recycled as by-products from other sources. These can be broadly split between two different types of material: **sawdust** and **woodchip**. Woodchip is coarser than sawdust, consisting of larger wood fragments, and would be used in deep bedding, either in deep-bedded cubicles, or indoor or outdoor deep bedded pads (yards). Sawdust is generally used as a top-dressing on, for example, rubber mats or mattresses in cubicle housing.
- 7) Woodchip is rarely used for dairy cows. It is more frequently used for beef cattle. Anecdotally, the provenance of woodchip is more likely to be of concern than the provenance of sawdust, due to the possibility that it is sourced very cheaply from shredded waste, which might include civic amenity waste, construction or demolition waste. Figure 4 shows a deep woodchip pad used for accommodating out-wintered youngstock.

Figure 4: A deep bedded outdoor woodchip pad for youngstock winter accommodation



- 8) Occasionally, recycled woodchip is used for deep bedded cubicles which may be used for adult dairy cows (Figure 5). This is not common and the substrate is very different from the Platts products, which would not be suitable for this type of deep bedding.

Figure 5: deep bedded cubicles with recycled woodchip waste (not a Platts product)



- 9) Occasionally, cubicle bases are solid concrete with a bedding substrate on top, approximately 2.5 cm deep. These rarely provide adequate comfort and so in this regard would not meet Red Tractor Standards (see section 3.04). The general exception may be a deep straw layer on concrete. This type of cubicle is now rarely found on GB farms.
- 10) The most common cubicle system in GB is rubber mats/ mattresses plus a bedding substrate on top. The most common bedding substrate used is sawdust (Figures 6 and 7). **This is the type of system where the Platts products will be used.**
- 11) My own estimate is that around 30-50% of dairy cows in GB, when housed, are kept on rubber mats/ mattress cubicles with additional sawdust bedding substrate on top. This estimate concurs with a 2011 Kingshay report on dairy cow bedding materials which found that the most prevalent bedding substrate amongst the surveyed farmers was sawdust, when considering all dairy cow bedding systems.



Figure 6: cubicles with rubber mattresses topped with sawdust. This shed has solid floors and automatic scrapers in the passageways to remove slurry.

Figure 7: cubicles with rubber mattresses topped with sawdust. This shed has slatted floors in the passageways to remove slurry.



- 12) Alternative bedding substrates (other than sawdust) used on top of cubicle mats/ mattresses include: chopped straw; recycled paper waste; wood shavings; oat husks; chopped rape straw/ pea husks; recycled manure solids; ash; gypsum; peat and sand.
- 13) Each farm makes its own decision over bedding substrates based on their own particular circumstances. In my opinion, the reasons why sawdust is most prevalent include that farmers are likely to perceive an advantage over the alternatives in several areas, including: cost; absorbency properties; availability; compatibility with slurry systems and ease of use.

- 14) My experience of dairy farms throughout GB is that the majority of sawdust bedding used on cubicles, as described above, is not from pure softwood or virgin wood sources. The sawdust products can be sourced through a plethora of suppliers; an online search for sawdust bedding suppliers for cubicle beds gives a ready indication of the number of suppliers. Sometimes, supply is arranged directly from a manufacturing source, or alternatively through a wood recycling company which sells a product specifically as cubicle bedding. Apart from those products sold by Platts, common examples would include "Agrisorb" or "Easicattle" sawdust. My experience is that sawdust bedding products which contain fibres or dust from panel board sources are commonplace.
- 15) Cubicle conditioners. There is no official definition of a cubicle conditioner, but in general terms, this describes a product marketed to be used in smaller quantities to bedding, and specifically used to provide anti-microbial or hygiene properties. Most have a specific drying effect on cubicle beds, in order to provide a hostile environment for bacterial growth. The reasons for such being to reduce the risk of mastitis-causing pathogens. Examples include alkali or acid products. Ground limestone or hydrated lime are probably the most common cubicle conditioners. There are many other examples, many of which are marketed under various trade names. Most farms will use bedding substrates (as described in para 12, above) for additional comfort, and may or may not use cubicle conditioners in addition to these bedding substrates in order to reduce bacterial load.

Arguably, rubber mats or mattresses which provide a high degree of lying comfort do not need additional bedding substrate for comfort. Here, cubicle conditioners alone may be used to aid keeping the beds clean and dry. Examples of cubicles where cubicle conditioners are used, as opposed to a deeper bedding substrate are shown in Figures 8 and 9.



Figure 8: cubicles with rubber mats with no significant additional bedding substrate. A cubicle conditioner is likely to be used to help keep the mats dry (e.g. ground limestone)



Figure 9: rubber cubicle mattresses with no significant depth of additional bedding substrate. A lesser amount of cubicle conditioner is being used to help keep the mattresses clean and dry. In this instance the product appears to be similar to Platts Powder Bed.

The advantages of using limited bedding substrate, as shown in Figure 9, would be predominantly ease of slurry management. It is reasonable to suggest that Platts Powder Bed is included within the meaning of bedding conditioner, as it would presumably have desiccant properties, and the marketing materials suggest that its intended use is as a sparingly-applied product on a little-and-often basis.

I note that NRW does not distinguish between cubicle conditioner and bedding substrate. In fact, for the purposes of this report, I do not believe there is a need to make any such distinction.

- 16) An alternative approach to the sparingly-applied bedding substrate or cubicle conditioner is for farmers to use greater quantities of bedding substrate on their mats/ mattresses (Figures 10a and 10b). There is some evidence that this can improve lying times (Tucker et al, 2020, Journal of Dairy Science. Invited review: lying time and the welfare of dairy cows). Presumably this is due to increased nesting behaviour and/or better lying comfort. In my experience, more generous application of bedding is often adopted where the mats or mattresses are not such good quality, or are damaged (which would reduce lying comfort) - see Figure 11.

Figure 10a: deep bedding layer of coarse recycled wood waste sawdust, on mattresses.





Figure 10b: close-up of recycled wood waste material, used as shown in Figure 10a. This appears to contain sawdust from a mixture of wood and panel board sources of different size gradings, and would typically be delivered onto farm in bulk, directly from a recycling operator (N.B. this is not a Platts Agricultural product).

Figure 11: damaged mattress surface, requiring sufficient (generous) use of recycled wood waste sawdust in order to provide sufficient lying comfort.



17) Normal bedding frequencies and practices. Most dairy cows are milked twice a day, which is normal practice. Cows will be herded from the cubicle sheds to be milked. This provides the opportunity for cleaning the backs of the cubicle beds and re-applying fresh bedding. Cows will inevitably soil the rear of the cubicle beds (Figure 12), and this faecal matter is scraped or brushed off into the passageway. From the passageway, it will be scraped into the slurry store. This is done either by automatic scrapers (Figure 6) or tractor scraping once or twice per day, as would be done for the shed in Figure 12. Alternatively, the floor is slatted (Figures 7 and 9), with a slurry store directly beneath the slats, or via channels.

To a large extent, the presence of bedding substrate such as sawdust governs the ease by which the beds can be brushed clean. Best practice is to do this twice a day. Fresh bedding may then either be brushed back from further up the bed, or re-applied at each occasion ("little-and-often").

Figure 12: rubber mattress cubicles, topped with sawdust bedding, and showing faecal soiling of the rear of the beds. This shed has solid concrete passageways which would be tractor-scraped twice a day, during milking when the cows were not in the shed.



There is no definitively right or wrong way to maintain the cleanliness of the cubicle beds, and some farmers will adopt a little-and-often approach of sparingly applying bedding substrate or cubicle conditioner twice a day, and others will apply fresh bedding only two or three times per week, but in larger quantities each time. Others will apply bedding once per day.

18) Fresh bedding can be applied manually, by barrow and shovel or by hand scoop, or by an automatic bedding dispenser attached to the front of a tractor, or self-drive machines. An example of a tractor-mounted automatic dispenser is in Figure 13. On this case farm, the bedding would be applied three times per week, in relatively large quantities, whilst the beds would be hand-cleaned twice per day at each milking time. It would be usual practice to maintain the cubicles whilst the cows were outside of the shed, during milking times for example.

Figure 13: Tractor mounted sawdust bedding dispenser, beside a bulk load of recycled wood waste sawdust.



3.03 Enquiries and investigations into the facts: legislative guidance on using sawdust or other waste wood products for animal bedding

- 1) The legislative definition of wood waste provided by the environment agencies (03, and its subsets) differs to the industry classification (Grades A, B, C and D). I have referred to the List of Waste (LoW) codes used in the UK government guidelines on the classification of different types of waste.
- 2) Waste wood from processing and furniture manufacture is the source material used to manufacture Platts products, Powder Bed and Fine Bed. It is a subset of LoW classification, 0301 (waste from wood processing and the production of panels and furniture). The subsets are copied below, in Table 1, taken from Guidance on the Classification and Assessment of Waste (Oct 2021 version). This is published by NRW, Environment Agency and Scottish Environment Protection Agency.

Table 1: LoW codes for waste wood:

03	WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD		
03 01	wastes from wood processing and the production of panels and furniture		
03 01 01	waste bark and cork	AN	
03 01 04*	sawdust, shavings, cuttings, wood, particle board and veneer containing hazardous substances	MH	
03 01 05	sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04	MN	
03 01 99	wastes not otherwise specified	AN	

By way of clarification, the code AN = Absolute non-hazardous; MH = Mirror hazardous; MN = Mirror non-hazardous. MH and MN are used where two similar wastes are in existence ("mirror" of each other), one which is hazardous and one which is non-hazardous.

I have noted that the product manufactured by Platts is from 03 01 05 source (non-hazardous) as set out in the various Applications for Environmental Permit (ECL documents, Jan 2022 and Sept 2022), and not from hazardous sources, 03 01 04.

I have noted (circled red) that this legislative classification allows for non-hazardous waste wood to include particle board.

- 3) Non-legislative guidance for farmers on dairy cow bedding (see section 3.04) sometimes refers to the Wood Recyclers Association classification of waste wood, Grades A-D, rather than the legislative waste classification, set out above.

- 4) The relevant section of the Wood Recyclers' Association publication of the A, B, C, D grading classification (2021) is copied below:

GRADE	Typical Markets	Typical Sources of raw material for recycling and/or recovery	Typical Materials	Typical non-wood content prior to processing	Notes
GRADE A Pre-Consumer Waste Wood (*1) and untreated wooden packaging = Clean untreated	A feedstock for the manufacture of professional and consumer products such as animal bedding, equine and landscaping surfacing. May also be used as a fuel in domestic and non-IED Chapter IV biomass installations and for the manufacture of pellets and briquettes.	Wood Product Manufacturing, Distribution, Retailing, Packaging and Secondary manufacture, e.g. joinery and pallet reclamation.	Solid softwood and hardwood. Packaging waste, scrap pallets, packing cases and cable drums. Process off-cuts from the manufacture of virgin/sawn timber and untreated board products.	Nails and metal fixings. Small amounts of non-hazardous surface coatings such as water-soluble paint.	This is a waste as defined by the waste regulations. Does not require an IED Chapter IV installation and should not contain any treated or low-grade material.

Here, Grade A waste can include board products, as long as they are untreated. "Untreated" is not defined.

- 5) The WRA Grade A classification is consistent with the WRAP/ BSI guidance document, PAS111:2012, copied below, although the wording is slightly different and does not specifically include "board products":

Annex A (informative) Grades of recycled wood

Grade	Typical markets	Typical sources of raw material for recycling	Typical materials	Typical non-wood content prior to processing	Notes
Grade A "Clean" recycled wood	A feedstock for the manufacture of professional and consumer products such as animal bedding and horticultural mulches. May also be used as fuel for renewable energy generation in non-WID installations, and for the manufacture of pellets and briquettes.	Distribution, Retailing, Packaging, Secondary manufacture, e.g. joinery, Pallet reclamation.	Solid softwood and hardwood. Packaging waste, scrap pallets, packing cases, and cable drums. Process off-cuts from the manufacture of untreated products.	Nails and metal fixings. Minor amounts of paint, and surface coatings.	Some visible particles of coatings and light plastics will remain. Is a waste for the requirements of Waste Management Regulations. Does not require a WID installation. Should not contain lower grade material.

- 6) The different interpretations of "treated" wood appear to lead to some uncertainty over the suitability of using sawdust for animal bedding from any particle board or panel board source. My interpretation of the legislative guidance above is that sawdust from particle board or panel board can be used for animal bedding, as long as it is non-hazardous (03 01 05).
- 7) This does not appear to be consistent with the interpretation of NRW.

Enclosure (2), which I have seen, an 8 page document from NRW, not dated, with 58 paragraphs summarising NRW's interpretation of the situation and their concerns which have hitherto led to refusal to grant a permit to Platts Agriculture, includes the following (in paragraph 11):

"Wood types considered treated include, MDF, chipboard, panel board, plywood, and particle board. This is as a result of the glues/resins and other

substances (including a percentage of treated waste wood) contained during manufacturing."

- 8) My opinion (Section 4) is dependent on the legislative guidance, as set out in paragraphs 3.03 (1) & (2) above, and that my interpretation of such is correct. This is in contrast to the view of NRW which might appear to be that all sawdust bedding derived from panel board (which includes MDF and other types of particle board), using their definition of "treated wood", is necessarily not suitable to be used as animal bedding.

My reasonings are based on the following logic: when considering treated wood products, the treatments might be considered hazardous (in particular, preservatives such as creosote (containing phenols), chromated copper arsenate, non-arsenical copper based preservatives, or heavy metals), or non-hazardous (e.g. water-based surface paints, organic resins, water or pressure) for example as used in the manufacture of particle board and panel board.

If the term "treated" is being used to imply that a preservative, coating or retardant of some sort has been applied to the wood, then this would not automatically encompass all particle board and panel board materials, e.g. plywood, chipboard, MDF and other fibreboards.

In addition, the term "treated", by itself, is unsatisfactory to describe whether the wood source is likely to be hazardous or non-hazardous.

3.04 Enquiries and investigations into the facts: legislative and non-legislative guidance on cubicle bedding (general terms - not necessarily confined to waste wood products)

- 1) The legislative guidance for dairy farmers on bedding materials in cubicles is, in the main, non-specific. The Welfare of Farmed Animals (England) Regulations, 2007, and for Wales, the Welfare of Farmed Animals (Wales) Regulations, 2007, set out the broad terms. These are further elaborated upon in various codes of practice, or recommendations, for example: Code of Recommendations for the Welfare of Livestock: Cattle. DEFRA publication, 2003, and Code of Practice for the Welfare of Livestock: Cattle, 2010, published by the National Assembly of Wales. The requirements are in the broadest terms, for example, as taken from Welsh Code of Practice for the Welfare of Livestock; Cattle:

“There should be enough bedding to:

- *keep the cows comfortable;*
- *prevent them from getting contact or pressure sores (from always lying in the same or cramped positions); and*
- *keep the cows’ teats, udders and flanks clean.”*

- 2) The vast majority of British dairy farmers will comply with additional, and more detailed, farm assurance standards. The national baseline standards are the Red Tractor Farm Assurance Standards. The relevant elements of these standards, under the section, Housing, Shelter and Handling Facilities, are DR.HF.4, copied below:



DR.HF.4 Key

Standards

Conditions in housing must be maintained in a manner that ensures livestock are able to keep clean.
(Revised & Upgraded)

How you will be measured

DR.HF.4.a

Lying areas are well-drained and regularly cleaned out to avoid a build-up of dirty bedding.

DR.HF.4.b

All livestock sent to slaughter meet abattoir cleanliness specifications.

DR.HF.4.c

Slurry and manure from loafing areas/areas at rear of cubicles is scraped/removed at least twice daily.

DR.HF.4.d

No accumulation of excess water, urine, dung or slurry.

DR.HF.4.e

No unmanaged welfare outcome issues in relation to cleanliness.

Public register of waste carriers, brokers and dealers (Wales): <https://naturalresources.wales/permits-and-permissions/waste-carriers-brokers-and-dealers-public-register-the-amazingtruthanouttesting/?lang=en> Protecting our water, soil and air – GOV.UK: (www.gov.uk)



DR.HF.4.1

Standards

Safe, suitable, and legal bedding is provided in lying areas.

*please see additional audit points if Recycled Manure solids are being used as bedding material.

How you will be measured

DR.HF.4.1.a

Bedding (used in lying areas including cubicles, loose housing, non-slatted lying areas, and corrals) is non-injurious, non-toxic and is absorptive.

DR.HF.4.1.b

Where slatted flooring is used for new-born and young lambs, bedding is provided.

DR.HF.4.1.c

Delivery records of waste materials used for bedding are kept e.g. recycled woodchip, paper.

DR.HF.4.1.d

Waste exemptions to use such materials are registered with the Environment Agency and kept.

Public register of waste carriers, brokers and dealers (Wales): <https://naturalresources.wales/permits-and-permissions/waste-carriers-brokers-and-dealers-public-register-the-amazingtruthanouttesting/?lang=en> Protecting our water, soil and air – GOV.UK: (www.gov.uk)



- Delivery Records
- Waste transfer notes
- Waste exemption records



DR.HF.4.2

Standards

Lying areas provide comfort. (Revised)

How you will be measured

DR.HF.4.2.a

Comfort provided through provision of bedding, mattresses, matting.

DR.HF.4.2.b

No unmanaged welfare outcomes in relation to lesions caused by lying comfort.

Public register of waste carriers, brokers and dealers (Wales): <https://naturalresources.wales/permits-and-permissions/waste-carriers-brokers-and-dealers-public-register-the-amazingtruthanouttesting/?lang=en> Protecting our water, soil and air – GOV.UK: (www.gov.uk)

In summary, the considerations are that dairy cows' bedding should be **non-injurious, non-toxic and is absorptive**. It should provide for **good comfort** (to ensure adequate lying times) and **cleanliness** of the animals.

There are provisions regarding use of recycled waste materials (the examples given are recycled woodchip and recycled paper) and specific provisions when recycled manure solids are used.

- 3) The use of Recycled Manure Solids (RMS) as a bedding material, whether as deep bedding, or on top of cubicle mats or mattresses, has been addressed by the industry through review. Specific guidance notes for the use of RMS have been provided by DEFRA.

- 4) Some dairy farms are additionally assured through standards which are above and beyond the Red Tractor Standards. These include farms supplying milk on “aligned retailer contracts”, for example for premium supermarkets, such as Marks and Spencer, Waitrose, Tescos and Sainsburys. One example of an additional dairy farm assurance standards scheme is the RSPCA Welfare Standards for Dairy Cattle, 2021. I refer to this, as it contains the most specific or detailed guidance on cubicle bedding that I am aware of. The relevant RSPCA standards on cubicle bedding are copied below:

- E 5.1** For cubicle housing systems, animals must be provided with a minimum total social/loafing area (exclusive of cubicles) of 6m² per head.
- E 5.2** Unbedded areas must be:
 - a) slatted or of solid concrete
 - b) scraped at least twice daily.
- E 5.3** Slats must not result in injury to feet.
- E 5.4** Cubicle housing must provide a clean, dry and comfortable bed, free from contamination.
- E 5.4.1** Recycled Manure Solids (RMS) are not permitted as bedding substrates.
- E 5.5** Adequate bedding must be provided on the cubicle base.
- E 5.6** Bedding must be managed in a way that maximises cow comfort.
- E 5.7** Fouled bedding must be removed at least twice daily.
- E 5.8** Animals using cubicles must be able to stand with all 4 feet in the dry cubicle.
- E 5.9** **REVISED** In each cubicle, animals must be able to change position from standing to lying and vice versa in a normal manner without difficulty, hindrance or injury.
- E 5.9.1** **REVISED** To help achieve standard E 5.9, for each cubicle:
 - a) there must be a minimum of 0.7m provided for forward lunging and bobbing of the head,
 - b) where the 0.7m forward lunge space cannot be met, it must be clearly demonstrated that the largest animals in the herd have sufficient, unobstructed space to rise and lie down without hindrance.

In this standard, which is more restrictive than basic Red Tractor, the use of Recycled Manure Solids are not allowed as a bedding substrate.

There are no additional restrictions that I am aware of in any dairy farm assurance codes of practice on the use of recycled waste products from wood sources, as long as the relevant legislative requirements are met (for example, a U8 waste exemption for use of recycled waste products may be required, which would in itself prohibit wastes deemed hazardous).

- 5) An explanatory guidance note, to accompany Red Tractor Standards, regarding the use of Cattle and Sheep Bedding Materials, is available online for farmers to refer to. The relevant section is copied below:



Material	Suitable?	Additional Information
Straw	Yes	Commonly used as a bedding material. It has good thermal properties and moderate absorption.
Sand	Yes	Fine washed sand is recommended as coarser material can be too abrasive. Not recommended for calving/lambing areas.
Untreated wood shavings and sawdust	Can be	Okay from untreated wood only, with a U8 waste exemption to use it as a bedding material. Fine sawdust may contaminate fleeces and is less suitable as sheep bedding.
Paper	Can be	Waste shredded paper and cardboard, dried paper sludges and plasterboard backing paper can all be used but a U8 waste exemption is required. Lime ash requires mixing with another material before use as a bedding material.
Untreated Woodchip – clean recycled wood originating from pallets etc.	Can be	Suitable if classified as Grade A and a U8 Waste exemption is held to use it as a bedding material. Ensure it is screened for metal and nails. Doesn't contain MDF or chipboard.
Treated woodchip	No	Grade B, C or D. Wood normally includes contaminants such as paint, varnish, chemicals and plastics that may pose a threat to the environment. Includes MDF and chipboard.
Waste gypsum	No	Can be applied to land as a soil conditioner with a waste exemption, but not suitable for livestock bedding.
Virgin gypsum	Yes	Pure, virgin gypsum is suitable. There are safety risks when using it in some housing systems.
Recycled Manure Solids – produced on-farm from own, dairy cows – ENGLAND, WALES and SCOTLAND	Can be	Article 36 of the 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 (ABPs) and derived products not intended for human consumption and repealing Regulation (EC) No. 1774/2002 (the ABP Regulations) enables the use of Recycled Manure Solids (RMS) as animal bedding to the extent that you (as the operator) ensure the control of risks to public and animal health. Defra, the Welsh Government (WG) and the Scottish Government (SG) are of the view that if RMS is used for cattle bedding in accordance with the conditions set out below, there will be no unacceptable risks to public and animal health. If you are using RMS as a bedding material you must: <ul style="list-style-type: none"> • Comply with the RMS Conditions of Use at all times* • Complete an annual self-assessment (using the Red Tractor template available from www.redtractorassurance.org.uk)

This advises that MDF or chipboard cannot be used as animal bedding (circled red). However, this advice is limited to **woodchip**, rather than sawdust.

- 6) This wording is important because it does not appear to be consistent with legislative guidance (see 3.03 (2)). The current Red Tractor beef, lamb and dairy technical manager (Jenny Holden) informed me by email (14/2/23) that the Red Tractor guidance note was probably based on previous AHDB guidance (see later, 3.04 (8) to (12)), but that she was not sure why the terms MDF and chipboard had been specifically used. During a follow-up phone call with Jenny Holden, I was advised that Red Tractor would look to revise this guidance note to correct any inaccuracies. The latest email response to me (17/3/23) from Ms Holden is copied below:

Hi Owen,

I have had a look at this and am confused!!

[Waste classification technical guidance WM3.pdf \(publishing.service.gov.uk\)](#) This document mentions non hazardous waste whereas [U3 waste exemption: using waste for a specific purpose - GOV.UK \(www.gov.uk\)](#) mentions un-treated but the classification remains the same 03 01 05.

So I am thinking, that perhaps the guidance RT produces needs to be a bit more detailed and specific and laid out separately.

I am still waiting for AHDB to get back to me!

Kind Regards,

Jemma Holden
Dairy, Beef and Lamb and Post Farm Gate Technical Manager

M: 07717 241183



- 7) The Red Tractor guidance note uses the non-legislative industry classification of waste wood, Grade A, B, C or D, as opposed to the legislative classification of waste wood (hazardous or non-hazardous). The premise of this advisory note seems to be that it interprets MDF or chipboard to be classed as "treated", without subclassifying this as hazardous or non-hazardous, and perhaps assumes therefore that it cannot be used as animal bedding. It is also inconsistent with the Wood Recycling industry's own definitions of Grade A - D, which, as previously shown in 3.03 (4), does not automatically exclude board products in the Grade A classification.
- 8) In addition to Farm Assurance Standards, and Welfare Codes, a farmer might gain guidance on bedding through the levy body, AHDB (the Agriculture and Horticulture Development Board). This organisation produces various technical documents for farmers, on a wealth of herd health management subjects, and which includes the Bedding Materials Directory. This includes advice on waste materials, and those which must not be used for animal bedding, copied over page:

Products that must not be used for livestock bedding

These include:

- Poultry litter. Animal by-product regulations prevent the use of this because of the risk of diseases such as Salmonella
- Recycled rubber. It is illegal to spread this on the land as a fertiliser
- Woodchip produced from treated timber. This poses risks to animals, may impact on food chain safety and cause disposal problems
- Waste Gypsum and waste plasterboard are illegal to use as a bedding material. These materials can be applied to the land as a soil conditioner with a waste exemption

This guidance booklet again uses the unsatisfactory loose term “treated timber”, as an example of a substrate which must not be used for animal bedding. “Treated” is not defined, but MDF or other panel boards are not mentioned. Of note again, the guidance refers to **woodchip** here, as opposed to sawdust.

- 9) Elsewhere in the same booklet, advice regarding sawdust bedding includes the following precautions:

“Sawdust from treated wood must not be used to bed livestock. Damp sawdust can harbour moulds, and high coliform counts have been linked to an increased risk of mastitis in dairy herds.”

Again, “treated” is not defined, but it does not specify MDF or other panel boards.

- 10) More recent AHDB guidance on bedding options for dairy farmers is available online (4th August 2022), as a news item “planning ahead for winter bedding”. Here the guidance is that:

“A good bedding material should be comfortable, non-abrasive, highly absorbent of water and urine, non-slippery and low in environmental bacteria. It is important to ensure that any bedding material has been screened to remove contaminants, such as nails, metals, glass and plastic, that could cause injury. It’s also worth re-examining materials even if they have passed through a magnetic process.”

Additionally, it lists products which should not be used for animal bedding:

“Products that must not be used for livestock bedding include poultry litter, gypsum, recycled rubber and woodchip produced from treated timber.”

“Treated timber” is again not defined, but MDF or other panel boards are again not mentioned. There appears to be a further discrepancy in the guidance to farmers here because to suggest that a bedding material should be screened prior to use to “remove contaminants, such as nails, metals, glass and plastic” by itself

suggests that the material, whether wood waste or other, is derived from an unsuitable source, such as waste timber from demolition or civic amenity waste.

11) This same guidance note summarises advantages and disadvantages of various bedding substrates available to dairy farmers, as copied below:

	Benefits	Disadvantages	Absorbency	Animal health and welfare considerations	Disposal
Sawdust	If managed correctly, it offers a comfortable, clean bed	Needs to be changed regularly to maintain drainage	Moderate	Damp sawdust can harbour mould spores	Easily spread to land. Can 'lock up' nitrogen
Sand	Produces a clean, dust-free and well-drained bed	Accelerates wear on slurry/muck-handling equipment	Low	Coarse sand may be too abrasive and can potentially cause mobility problems	Can be spread on the land, but be aware of long-term effect on soil pH
Paper	Easy to store and reasonably easy to dispose of	Must be removed once wet	Low-high <i>Depending on product</i>	Can heat up when wet to provide good conditions for pathogens to flourish. Cattle can appear dirty	Can clump together, making spreading or composting difficult
Woodchip	Can be reused for many winters	Requires dry storage	Low <i>Must be below 30% moisture content</i>	May contain sharp objects which may cause injury	Can be reused or spread on the land
Crushed Husk	Can be mixed with other products, e.g. lime	Requires dry storage. Advisable to use an antibacterial bedding in conjunction	Moderate <i>6-8% moisture content</i>	Doesn't set hard on beds and remains free-flowing for cow comfort	Biodegradable so can be spread on land
Calcium carbonate	Doesn't support bacterial growth	Highly alkaline and used on its own may cause damage to teat and udder skin	High	Doesn't introduce bacteria to the bed	Can be spread on fields, but advisable to analyse soils first because of its alkaline nature

12) Here, there is no advice repeated that products derived from MDF or other panel boards should necessarily be excluded for use as bedding. It can also be appreciated that each bedding substrate has potential advantages and disadvantages.

3.05 Enquiries and investigations into the facts: potential harm from sawdust bedding

- 1) The application of bedding can be a dusty process, whether the substrate be wood-based, paper-based, or consists of chopped straw or other organic material.
- 2) The AHDB Bedding Materials Directory includes the following precaution with regards sawdust bedding:

“Some very fine products, especially those coming from hardwood, can be dusty and may pose a risk to health.”

- 3) My experience from observing farmers bedding cubicles is that there is some variation in how they defend themselves from the risk of dust inhalation. The HSE document, Wood dust: controlling the risks, advises that precautions such as wearing a disposable half-mask respirator should be taken to reduce exposure to potentially harmful respiratory dust particles. My observational experience is that some farmers take such precautions whilst others don't.

I do not have evidence that dust from bedding with recycled wood waste sawdust is any more or less harmful than dust from other farm procedures, including bedding with other dusty substrates, including lime dust or chopped straw.

The exposure period for human operators on most farms would be relatively short lived, being a quick task performed between 14 and two times per week. As well as the actual bedding substrate in use, the risk of dust inhalation would also presumably depend on the general ventilation of the shed, the method by which the bedding substrate was applied, the size of the farm (i.e. time taken in bedding), the frequency of bedding, and the amount dispensed at each application. I am not aware of any greater risk associated specifically with wood waste derived from MDF or other particle boards/ panel boards.

The Platts product, Powder Bed, is particularly fine and logically this may therefore pose a greater potential for inhalation as compared to a more coarse sawdust or wood shavings.

The HSE document does not differentiate fibre board dust as being any greater risk than other wood dust. It does, however, state that hardwood dust can cause additional risk as it can cause a rare type of nasal cancer.

I do not have expertise in risk to humans from inhaled dust, from whatever source.

- 4) With regards respiratory disease in cattle, the predominant risk is due to infection: i.e., the presence of respiratory pathogens which include certain viruses, bacteria and mycoplasma. Dust inhalation is considered to be one of the potential exacerbating risk factors, in some circumstances. For example, in my experience

Bovine Respiratory Disease in youngstock, which is a very common disorder within GB cattle farms, whether beef or dairy, can be exacerbated by dust inhalation when bedding deep straw pens with chopped straw or mechanical straw blowers which can create a very dusty environment whilst the young cattle are present.

I am not aware of specific additional risk associated with bedding with waste wood substrates, or differences between MDF wood dust, as opposed to other types of wood dust. Logically, the finer the sawdust, the greater is the potential for dust inhalation. Platts Agriculture products, Powder Bed and Fine Bed are fine sawdust products and inherently have the potential to be dusty when applied to the beds.

In general, the cattle are usually outside the sheds when bedding is done (typically during milking times). It is not possible to apply the bedding effectively whilst the cubicles are occupied by cattle. Once the fresh bedding has been applied, the environmental challenge from dust would be negligible under normal circumstances.

- 5) Anecdotally, "farmers' lung" is a relatively common condition - one that I have encountered in farmers throughout my career. In this condition, I understand it to be a type of allergic pneumonitis which is caused by **mould spores**, for example from mouldy hay or straw. Potentially, any mouldy substrate may produce allergenic spores and this might include mouldy sawdust if it has been allowed to get damp.

Infrequently, cattle can be affected by an allergic pneumonitis, which is characterised by interstitial emphysema. It has been reported in the literature whereby the cause can be from inhaled mould spores, similar to farmers' lung, and it can also be as a result of pulmonary toxins derived from products of rumen fermentation. In this latter case, it is called Acute Bovine Pulmonary Oedema and Emphysema, or colloquially, "fog fever". It has not been associated, as far as I know, with inhalation of sawdust or wood dust *per se*.

I do not have expertise in human pneumonitis caused by mould allergens.

- 6) I have consulted with DEFRA Animal and Plant Health Agency (APHA) Cattle Expert Group veterinary lead, Dr Vanessa Swinson, enquiring about any surveillance reports of actual or suspected cattle health or welfare incidents due to bedding on any sawdust product (9/2/23).

Dr Swinson initially responded that she was unaware of any problems related to sawdust bedding (email 10/2/23), although she was aware of problems with other bedding substrates (rice husks, specifically) due to concretion when becoming wet and subsequent damage to the skin above the hooves.

I received a further response from Dr Swinson after the APHA Cattle Expert Group's monthly meeting, by email dated 21/2/23. This response included the following comments from the group:

- *In experience of the group, poorer quality sawdust or waste wood chip materials are more likely to be used for beef cattle rather than dairy.*
- *In experience of the group, in such cases, the product would not usually be marketed for use as bedding, and is often sourced locally by word of mouth. Local sourcing makes it difficult to regulate.*
- *Members of the group reported two relevant case reports seen in recent years at Veterinary Investigation Centres:*
 - i. *A case of beef cattle bedded on sawdust sourced directly from a kitchen unit manufacturer. The waste was being used for fertiliser and bedding and it contained glass in some batches. It was found to be highly contaminated with bacteria and several bull calves had severe post-castration infections. The bedding was tested for bacterial culture prior to use (as supplied) and the bacterial load was similar to that expected for used bedding/manure (i.e. very high bacterial contamination).*
 - ii. *Penrith VIC had encountered a case of lead poisoning after cows had licked bedding sawdust off their legs which was contaminated with heavy metals. (Explanatory note - cattle are particularly sensitive to lead poisoning and will ingest lead by licking contaminated substances, such as lead-paint, lead plumbing or discarded car batteries, as it appears to have an attractive taste to them).*

7) The passive surveillance which the APHA Cattle Expert Group have access to includes post mortem and clinical incident investigations which are performed through the GB-wide network of APHA Veterinary Investigation Centres, as well as reports from private veterinary surgeons in practice of novel disease syndromes or adverse health events which they might encounter on their clients' farms.

Dr Swinson informed me of one case report described by a veterinary practitioner, Richard Sibley, in Devon, of a respiratory problem in a herd of 850 housed dairy cows, possibly associated with inhaled sawdust. This case was presented at the World Buiatrics Congress, in Madrid in September 2022: "An outbreak of acute respiratory disease in an adult dairy herd due to dust inhalation". The author described that 28 cows were affected with respiratory disease over a 6 month period, leading some to be euthanised. Post mortem examinations suggested an allergic or hypersensitivity reaction to exposure to an irritable substance. It was suspected that inhalation of fine sawdust which was used as bedding, spread by a mechanical spreader each day whilst the cows were present in the shed, was a possible cause of the hypersensitivity reaction.

8) Bedding substrate ingestion. Apart from straw, I do not believe that cattle would voluntarily ingest bedding substrate, including substrate from recycled wood waste or sawdust, even if they had limited access to normal food. I have not encountered any problems associated with this during my career, and I would not anticipate

disease or disorders in cattle due to ingestion of sawdust bedding, including the type produced by Platts Agriculture.

I note the case report of lead ingestion, described in point (6) above, in which case the bedding was hazardous (toxic) and clearly not suitable for purpose as it was contaminated with lead (by definition, therefore, waste category 03 01 04). Lead, of itself, appears to taste attractive to cattle, and this could account for ingestion of the bedding in this particular case.

- 9) Disposal in slurry. The typical end route for bedding substrates on cubicles is into slurry storage, and subsequently spreading on farm land (arable and pasture). This includes the end route of bedding derived from recycled wood waste or sawdust. I am not an environmental expert, but I am not aware of any additional problems associated with spreading of slurry which contains sawdust, whether the sawdust be from virgin sources, hardwood, softwood or panel board.

I defer to the expert chemist's report on the potential for contamination of farm land with hazardous substances derived from the non-hazardous 03 01 05 wood sources intended to be used in the manufacture of Platts products.

In general terms, dairy cow slurry is considered to have beneficial nutrient value for land, due to its nitrogen content. There are of course environmental regulations on the use and spreading of slurry, in particular due to the risk of surface water run-off, and potential for contamination of waterways with a high nitrogenous product which can lead to algal blooms. These environmental regulations are outside the scope of my expertise or of this report.

- 10) Further considerations to spreading on land. The AHDB bedding guide (see 3.04 (11)) includes that sawdust may "lock up" nitrogen. I believe that the rationale for this is that sawdust contains very little nitrogen. The wood fibres of sawdust consist of the complex carbohydrates, cellulose and lignin (carbohydrates are combinations of carbon, hydrogen, and oxygen). In order for soil organisms to decompose sawdust, they require nitrogen, which they will take up from other sources in the soil. They will potentially compete with plants for this nitrogen supply, and therefore nitrogen is less available for plants during sawdust decomposition. However, as the sawdust breaks down, recycling of the micro-organisms (i.e. their death), releases nitrogen back to the soil.

In terms of soil fertility therefore, sawdust is a good source of organic carbon, but must be balanced with nitrogen sources for effective composting. When mixed with animal faeces in slurry, as described in point (9), there is a plentiful nitrogen source, and this is then quite different to spreading raw sawdust or other wood waste on the soil.

Sawdust, then, becomes a useful component of slurry, and is valuable for soil fertility in a similar fashion to how straw in farmyard manure is highly valued by farmers and growers as an organic fertiliser.

I am not an expert in soil biology, and I would defer to a soil scientist for specific detail here, and to whether the cellulose and lignin in panel board sawdust behaves in any way differently in slurry to other wood wastes.

4 My opinion

4.01 Answers to “issues to be addressed” listed in Section 2.02 and 2.03:

I have been asked to provide an expert opinion with respect to end-of-waste criteria for Platts products, namely Fine Bed and Powder Bed, recycled waste wood sawdust products for cubicle bedding or conditioners:

According to Article 6 (1) and (2) of the Waste Framework Directive, certain specified waste ceases to be waste when it has undergone a recovery operation (including recycling) and complies with specific criteria, in particular when

1. *the substance or object is commonly used for specific purposes*
2. *there is an existing market or demand for the substance or object*
3. *the use is lawful (substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products)*
4. *the use will not lead to overall adverse environmental or human health impacts.*

In the first instance, I have been asked to consider bullet point four (adverse impacts) in the broadest sense, with my knowledge of dairy farming systems, cattle health & welfare, and milk quality factors, to cover:

- (a) harm to cows,
- (b) harm to humans who look after cows,
- (c) harm to the food chain, and
- (d) environmental harm from disposal of soiled bedding (e.g. in slurry).

- (a) Despite their widespread use on GB dairy farms, I have not experienced harm to cow health or welfare from the use of these or similar products during my career. I have no reason to believe that the Platts Agricultural products pose a risk to cattle health or welfare when used as intended. Sawdust bedding derived from waste wood sources, including panel boards, is commonplace on GB dairy farms. Nationwide surveillance data and my own professional experience gives evidence to the fact that the products are not harmful to cows.

Surveillance reports from the APHA Cattle Expert Group indicate that bedding contaminated with lead, or sawdust which has been poorly stored (presumably damp and mouldy conditions) could lead to harm to cows, but this does not apply to the bedding products produced by Platts Agriculture as I have witnessed. This is on provision that the source material is non-hazardous panel board as described to me, and that farmers store the product so that it does not become wet. I note that the Platts Agriculture products are supplied (dried) in bulk, or in waterproof plastic-wrapped bales, which are then further protected on the pallet by an additional plastic cover to facilitate the correct dry storage.

Respiratory disease in cattle can be associated with dust inhalation. I am aware of this in particular with youngstock and the bedding-down with straw. With regards sawdust, I believe that there would be a similar possibility of dust inhalation by cattle and that this could lead to respiratory disease. I am aware of one reported case of a herd of adult cows which has suffered respiratory disease, possibly from the inhalation of fine sawdust, which might presumably have been similar to the product, Powder Bed. In this case, it appears that the sawdust was being spread inappropriately whilst the cows were present in the shed. I am not clear that this single case report definitively identified the allergen as the sawdust bedding, as opposed to mould spores, for example.

- (b) Fine dust particles, including from wood dust, can be harmful to humans, as set out in HSE document, Wood dust: controlling the risks. However, I do not know of any evidence that use of Platts Agricultural products, or similar, pose any greater risk than other dusty procedures on farms. In general terms, my opinion is that farmers should take precautions, as advised by the HSE guidance, when using sawdust bedding, and this should include sawdust derived from panel boards. I cannot find evidence that sawdust from panel boards is any more or less risky than wood dust from other sources, but this is outside my area of expertise.
- (c) I know of no logical reason why the use of Platts Agricultural bedding products should cause harm to the food chain. The bedding is highly unlikely to be ingested by cattle in any circumstance, and so the systemic contamination of meat or milk product is highly unlikely by this route.

The potential contamination of teat skin with the bedding, thus entering milk during the milking process, would be mitigated by usual farm practices, which include pre-milking teat preparation (cleaning of any teat soiling), and the use of milk filter socks in the farms' milking plants. In any case, I do not believe that particulate contamination of milk from the Platts bedding products would pose any greater risk or harm to the food chain than any other potential particulate contamination, including from the faecal soiling of teats.

- (d) I have no reason to suspect that the use of Platts bedding materials would cause environmental harm after being processed through the normal route of entering slurry stores and subsequent spreading on farm land as organic fertiliser.

Note: I defer to the evidence of the expert opinion of the retained chemist, Dr Vince, to assure that the source material is compliant with classification code 03 01 05, non-hazardous. Furthermore, I make the above opinion dependent on the basis that Platts will comply with the conditions in the ECL permit application (September 2022), whereby they conform to the collection of waste wood which is classification 03 01 05, and that this is assured either by first hand knowledge of the

manufacturing process of the feedstock material suppliers, and/or the use of a chemical testing schedule to routinely check for hazardous substances, on a risk-based approach.

If the source waste wood materials were in themselves deemed hazardous (classification 03 01 04), or that conformity to being non-hazardous (03 01 05) could not be assured, then my opinion on points a), b), c) and d) would not be as set out.

4.02 Answers to “issues to be addressed” listed in Section 2.04:

Turning now to the other aspects of the End of Waste criteria:

1. *Is the substance commonly used for specific purposes?*
2. *Is there an existing market or demand for the substance?*
3. *Does the substance fulfil the technical requirements for the specific purposes and meet the existing legislation and standards applicable to products?*

I provide my opinion by responding to the following six questions which I have been asked to address. Where relevant, I indicate directly how my answers apply to the End of Waste checklist criteria, in Appendix 2 of the End of Waste guidance note, OGN 051.

(1) To what extent are MDF, fibreboard, chipboard and plywood products used in UK dairy farms as bedding or cubicle conditioner? How are they normally used? What are their pros and cons from the farmers’ and cows’ perspectives? What happens to the bedding material and cubicle conditioner after use?

- MDF, fibreboard, chipboard and plywood products are very widely used on UK dairy farms as bedding material. On the whole, this is as sawdust bedding for top-dressing of cubicles mats and mattresses. In my opinion, this is the most prevalent bedding type on GB dairy farms.
- For dairy farmers, bedding costs are significant, and typically in the region of £50-£80 per cow per winter housing period. This is around 2-3% of their overall costs of production - similar to overall veterinary costs for the herd. Some winters there are bedding shortages, as evidenced by the [APHA Information Note: Straw bedding shortages this winter in the UK \(January 2018 and September 2020\)](#). Sawdust as a waste from manufacturing processes, including panel board sawdust from furniture manufacturers etc., as used by Platts Agriculture to make their bedding products, is a very valuable resource to GB dairy farmers. In the winter of 2020/21, I am aware that a reduction in manufacturing activity associated with the Covid-19 pandemic, created a shortage of sawdust and a supply problem for dairy farms.

- The sawdust is usually used as set out in paragraphs 3.02 (10) - (18). Broadly, this is as additional bedding substrate on top of cubicle mats or mattresses in order to improve cow comfort and bed hygiene. There is a wide range of different practices to its precise use, when it comes to application frequency and amounts.
- The advantages of sawdust bedding are usually that sawdust is easy to handle in slurry systems; that it is readily available, and, when dry, provides good hygiene, which is important for udder health, and hence milk quality (e.g. somatic cell counts). Furthermore, it does not create concretions when it gets wet, which can be a problem with other bedding materials, including recycled paper waste, which has a tendency to create hard lumps in the beds like papier-mâché once it has been exposed to urine or other moisture.
- The potential disadvantages are that it can be more expensive than other substrates; sometimes is associated with hock sores (especially coarse sawdust); and that it can pre-dispose to caking of slurry on the feet when mixed with lime. Occasionally, sawdust bedding is associated with Klebsiella infection - a mastitis pathogen - and this is more likely when the sawdust has been allowed to become damp when stored, or has been supplied damp.
- After use, the sawdust will inevitably find its way into the slurry, and thereafter will be spread onto the land. Its ability to distribute well in slurry, and to break down by normal microbial decomposition, as compared with non-organic bedding substrates such as sand, which settles at the bottom of slurry lagoons and does not decompose, is considered to be a distinct benefit of sawdust bedding.

How my answers apply to the End of Waste criteria 1-3:

My evidence supports that the Platts Agriculture bedding products are **used for specific purposes**. A clear description of that use is provided here. The products are supplied ready-to-use, requiring no further treatment before being put to use. The products replace various alternative bedding types, all of which have their pros and cons, as outlined in this report. Its use is genuine use and not recovery.

My evidence supports **there is an existing market and demand** for the Platts Agriculture bedding products. Farmers place a considerable economic value on the products. A shortage of these and similar products occurred during the Covid-19 pandemic which created distress and difficulty for farmers due to lack of bedding supply during the Winter of 2020/21.

(2) What are the potential or actual reported harms to cattle of such products? How does this compare to other bedding or cubicle conditioner alternatives, including virgin (kiln dried) wood sawdust or shavings, or alternative recycled waste products?

- There are no actual reported harms to cattle of sawdust products that do not contain hazardous substances that I know of, provided that the use and storage is appropriate. This includes storing the product so that it remains dry, and preferably applying the product when the cows are not in the shed to reduce dust inhalation.
- Some waste wood may contain hazardous materials such as preservatives - creosote, chromated copper arsenate preservatives, non-arsenide copper preservatives or heavy metals. These would not be suitable sources for bedding material as these chemicals are known to be hazardous to soil health, and potentially, if ingested or absorbed through skin wounds, to animal health.
- To this end, Environment Agency guidance on the use of waste wood for animal bedding (14/6/2013) states that “Waste wood from Material Recovery Facilities (MRF), Civic Amenity (CA) or construction and demolition sources are unlikely to be of sufficient quality (Grade A) to be used as animal bedding, horse ménages or for composting”. My understanding is that Platts Agriculture do not use any of these sources in the manufacture of their bedding products, and my opinion as to their safety is dependent on this being true.
- I note the preliminary findings of the chemist, Dr Vince, who has been retained by Platts Agriculture as their expert in the analysis for hazardous substances and assessment of risk, that the source materials from suppliers that have so far been tested do not contain hazardous substances above the threshold levels, as set out by in the PAS 111:2012 technical guide.
- I am not aware of additional or potential harms from non-hazardous panel board sawdust when it is used as intended over and above other sawdust bedding materials which might be derived from softwood or virgin wood sources.
- I am aware that paper waste is also used as a bedding substrate, and my understanding is that similar rules apply to paper waste waste as they do to sawdust waste, assuming it does not contain hazardous substances.

How my answers apply to the End of Waste criteria 1-3:

My evidence supports that the Platts Agriculture bedding products **fulfil the technical requirements for the specific purposes and meet the existing legislation and standards applicable to products**. My evidence supports that the products are similar to equivalent raw materials that would be put to the same

intended use.

(3) Are there any bedding or cubicle conditioner materials which you know to be harmful or which are reported as such in scientific literature?

- Recycled Manure Solids (RMS) may be used as an animal bedding substrate, but specific rules apply to its use, and it cannot be used under RSPCA Dairy Cow Assurance Standards. In general terms, the additional rules applied to the use of RMS are due to the potential of enteric pathogens, such as salmonella, which may spread between herds, or cause specific animal health problems. The investigation over the safety of RMS in GB herds is documented in Report for AHDB: Risks, benefits and optimal management of recycled manure solids for use as bedding for dairy cattle (2015).
- The rules over the use of RMS are specific to GB, and it is notable that RMS is commonly used in other countries, including USA. The presence of such a report and specific guidance is evidence that GB does undertake surveillance and risk assessments on bedding substrates where deemed necessary. I am not aware of similar concerns regarding the use of wood sawdust bedding, including where the sawdust is from panel board or particle board sources. I believe that if problems were suspected, then it is likely that a similar review would have been conducted within the GB dairy industry.
- I am aware of specific risks associated with the use of gypsum products, including plaster-board waste. This should not be used in animal bedding, despite its historical use, due to the risks of hydrogen sulphide (H₂S) toxicity in the resultant slurry, which has been associated with on-farm suffocation and death. This is an example where surveillance of animal or human health problems has led to a change in guidance on the use of a specific bedding substrate. There are various examples of press reports of death of both animals and personnel due to inhalation of hydrogen sulphide gas, where gypsum sourced bedding has been used. I know of no such risks or reports associated with use of sawdust bedding derived from panel board products.
- I am aware of the potential concerns of waste wood products which could contain hazardous treatments (e.g. creosote, chromated copper arsenate preservatives, non-arsenide copper preservatives or heavy metals) or sharp objects (e.g. glass, nails or screws). These would be unsuitable for animal bedding and would be waste classification 03 01 04 (containing hazardous substances). Such products might include waste wood from Material Recovery Facilities, Civic Amenity Sites or construction and demolition sources. My understanding is that this is more likely to be coarse woodchip, possibly supplied for deep bedding, as opposed to the sawdust supplied by Platts Agriculture and other companies for cubicle bedding. I believe that the AHDB and Red Tractor bedding guidance notes would have in mind this type of

woodchip material when they specify that "treated" waste wood products are unsuitable for use as bedding.

(4) Am I aware of any adverse health effects on cattle of MDF (or similar) by-products or powder, whether through my own experience, or knowledge of disease surveillance in cattle?

- I am not aware of additional or potential harms from non-hazardous panel board sawdust when it is used as intended over and above other sawdust bedding materials which might be derived from softwood or virgin wood sources.
- My report (paragraphs 3.04 (6) and (7)) details the surveillance reports that I am aware of, after investigation, where sawdust bedding has been associated with disease in cattle. Two reports are of bedding substrates which would not be similar to the Platts Agriculture products: one being wet and heavily contaminated with bacteria, and the other being contaminated with lead.
- I am aware of one report by a veterinary practitioner in Devon of suspected dust inhalation in adult dairy cows causing respiratory disease. In this case, a fine sawdust cubicle bedding, by its description similar to the Platts product Powder Bed, was applied daily whilst the cows were in the shed. It was suspected that inhalation of dust from the bedding may have contributed to or directly led to respiratory disease in some of the cows.
- Putting this single case report into some context, I believe that I would be aware if a substantial and widespread risk existed. I base this on the fact that the use of sawdust, including that derived from panel board, is the predominant bedding material on GB dairy farms. My estimate is that around 30-50% of adult dairy cows, that is around 450,000 - 750,000 animals, on around 2500-4000 dairy farm holdings, are housed on this substrate each year, and that it would appear to me highly improbable that if a significant risk of adverse health in cattle existed, including respiratory disease due to dust inhalation, it would not have come to light through passive surveillance by private farm vet practitioners and the APHA Veterinary Investigation Centres, or the active surveillance of cattle lungs in abattoirs by the Official Veterinarians and Meat Hygiene Inspectorate.

(5) Is there any legal requirement on the part of manufacturers of animal bedding to obtain prior approval for the use of their products from APHA or any other organisation concerned with the welfare of farm animals?

- I am not aware of a requirement by bedding manufacturers to obtain prior approval for the use of their products from APHA or any other organisation concerned with the welfare of farm animals.
- As set out in this report, there are several manufacturers of bedding sawdust very similar to that produced by Platts Agriculture, and I do not believe they will have obtained prior approval for the use of their products from APHA or any other organisation concerned with the welfare of farm animals.
- I believe that the legislation set out in paragraphs 3.03 (1) and (2) would govern the suitability (or not) of waste wood products for animal bedding. I believe that similar legislation would apply to other waste products such as paper waste.
- I am not aware of any list of approved manufacturer, or list of approved bedding products, held by APHA or any other body/ organisation concerned with the health or welfare of farmed animals.

How my answers apply to the End of Waste criteria 1-3:

My evidence supports that the Platts Agriculture bedding products **fulfil the technical requirements for the specific purposes and meet the existing legislation and standards applicable to products**. My evidence supports that the products are similar in this respect to equivalent raw materials that would be put to the same intended use. My evidence supports that the Platts Agriculture bedding products **are lawful** when used by farmers.

(6) Does Platts bedding conditioner meet any technical requirements for its specific purposes or other existing legislation and standards applicable to bedding conditioner?

- As set out in this report, paragraph 3.04 (1), the legislative guidance for animal bedding (and presumably including bedding conditioner) are very broad. The Welfare Codes for the different farmed animals would contain more specific requirements, for example, from the Welsh Code of Practice for the Welfare of Livestock; Cattle (2010):

“There should be enough bedding to:

- *keep the cows comfortable;*
- *prevent them from getting contact or pressure sores (from always lying in the same or cramped positions); and*
- *keep the cows’ teats, udders and flanks clean.”*

- My opinion is that the Platts cattle bedding products, including Powder Bed and Fine Bed, whether defined as bedding conditioners or simply as cubicle bedding, would meet those requirements.
- The Platts Agriculture product which I have witnessed in manufacture, and which I have seen used on farms, is dry and absorptive. This is conducive to keeping cows' teats, udders and flanks clean and assists farmers in keeping cubicle beds hygienic. This is important to control mastitis. Specifically, the bedding is able to absorb milk or urine leaked on to the beds, and aids in removing faecal soiling with a scraper or brush during normal cubicle bed maintenance that a dairy farmer would be expected to do twice daily.
- The Platts Agriculture product which I have witnessed in manufacture, and which I have seen used on farms, is non-abrasive and soft, and does not contain sharp objects or physical hazards which could reduce cow comfort.
- The Platts Agriculture product which I have witnessed in manufacture, and which I have seen used on farms is designed to be used in conjunction with rubber mats or mattresses on cubicle beds. The rubber surface is important to prevent pressure sores, and to allow cows to get up and down easily, with grip. By itself, unless used in very large amounts (deep bedding system), the Platts Agriculture sawdust bedding is not designed to provide all of the comfort which a cow should have, and I do not believe that it is marketed as such.
- Where mats or mattresses have become worn or old, applying additional sawdust bedding materials to a deeper level is very useful to improve comfort and overall lying times. I believe that the Platts Agriculture sawdust bedding materials are capable of this, as described in paragraph 3.02 (16) of this report, and depicted in Figure 11.

How my answers apply to the End of Waste criteria 1-3:

My evidence supports that the Platts Agriculture bedding products **fulfil the technical requirements for the specific purposes and meet the existing legislation and standards applicable to such products.**

5. Statements and Declarations

5.01 Statement of conflicts

I have no known conflict of interest in preparation of this report. Although being aware of the company through their industry presence and marketing, I have no relationship, social, professional or other, with Platts Agricultural Ltd. I have no current or previous relationship, professional, social or other, with NRW or their personnel.

I will advise the party by whom I am instructed if, between the date of this report and any possible trial, there is any change in circumstances which affects this statement.

5.02 Statement of compliance

I understand my duty as an expert witness is to the court. I have complied with that duty and will continue to comply with it. This report includes all matters relevant to the issues on which my expert evidence is given. I have given details in this report of any matters which might affect the validity of this report. I have addressed this report to Saunders Law Solicitors who instructed me but it may be addressed to the court if necessary in the future. I further understand that my duty to the court overrides any obligation to the party from whom I received instructions.

5.03 Declaration of Awareness and Statement of truth

I confirm that I have made clear which facts and matters referred to in this report are within my own knowledge and which are not. Those that are within my own knowledge I confirm to be true. The opinions I have expressed represent my true and complete professional opinions on the matters to which they refer. I understand that proceedings for contempt of court may be brought against anyone who makes, or causes to be made, a false statement in a document verified by a statement of truth without an honest belief in its truth.



Owen Atkinson BVSc DCHP MRCVS

3rd July 2023



Birth Date

28th August 1971

Education and Professional Qualifications

2015 RCVS Recognised Specialist in Cattle Health and Production
 2013 Diploma in Cattle Health and Production (DCHP), RCVS
 2000 Certificate in Cattle Health and Production (CertCHP), RCVS
 1989-1994 Bachelor of Veterinary Science (BVSc, Distinction), Liverpool University

Employment History

2013-present Owner, founder and director of Dairy Veterinary Consultancy Ltd., specialising in technical advice, research and training within the dairy industry
 2003-2013 Director and owner of UK Farm Vets Ltd (t/a Lambert, Leonard and May Farm Vets), a large busy dairy vet practice based in North Shropshire. As an owner, responsibilities included business development and management as well as clinical work
 1999-2003 Veterinary clinician at Daleside Vet Group, a specialist large animal practice in Wrexham, North Wales
 1999 Farm animal veterinary clinician at Kebir House Vet Group, North Yorkshire
 1998-1999 Sabbatical overseas travel, including working in India at Bangalore Veterinary Department
 1996-1997 Resident Clinician in Ruminant Medicine and Surgery at Liverpool University Veterinary School: tuition of final year vet students
 1994-1996 Veterinary clinician at Kebir House Vet Group, North Yorkshire

Additional Professional Memberships and Awards

2008-present Cow Signals® certified Master Trainer. Additional modules: youngstock; foot health
 2009 Awarded Trehane Trust Nuffield Scholarship (Nuffield Farming Scholarship Trust), culminating in a dissertation on "The Role of the Vet in Knowledge Transfer in the Dairy Industry"
 2009-present Lantra accredited trainer (completed 5 day course on instructional techniques)
 2003-present Member of National Association of Cattle Foot Trimmers. Veterinary adviser to the committee '04-'08
 2012-present Member of British Veterinary Forensic and Law Association
 2013-present Member of UK Dairy Cow Cattle Mobility Steering Group (Lameness Reduction)
 2014-2017 Director of BCVA (British Cattle Veterinary Association); education lead
 2016-present Member of Dairy UK antibiotic/ veterinary medicines working party
 2018 Facilitation for Organisation Leadership - postgraduate CQFW Level 7 module, Aberystwyth University, Wales
 2018-present Appointee to NOAH (National Office of Animal Health) Code of Practice Committee, independent member
 2019-present Appointee, UK Food Standards Agency Register of Specialists: special advisor on veterinary medicines and dairy food residues

Selection of Recent Peer Reviewed Publications and Academic Texts

- Atkinson, O. 2009. Guide to the Rumen Health Visit. In Practice. 2009; 31:314-325
- Atkinson, O. 2010. Communication in farm animal practice 1: Farmer-vet relationships. In Practice; 32 114-117
- Atkinson, O. 2010. Communication in farm animal practice 2: Effecting change. In Practice; 32 163-165
- Klœn, J.L., Atkinson, O., Noordhuizen, J.P.T.M. 2011. Communication in production animal medicine: modelling a complex interaction with the example of dairy herd health medicine. Irish Veterinary Journal, 64:8
- Atkinson, O. 2013. Practical and effective management of foot lameness in dairy herds. In Practice; 35 171-182.
- Atkinson, O. 2014. Prevalence of subacute ruminal acidosis (SARA) on UK dairy farms. Cattle Practice, 22 (1) 1-9
- Weaver, A.D., Atkinson, O., St. Jean, G., Steiner, A., 2018. Bovine Surgery and Lameness, 3rd Edition. John Wiley and Sons Ltd., Oxford, UK
- Atkinson, O. 2019. Medicine Residues in Milk and the MilkSure Initiative. UK-Vet Livestock 24:1 25-29
- Atkinson, O. 2019. Stewardship of Veterinary Medicines on Dairy Farms, Research Comment. Vet Record, 184:5 150-152

Selection of Recent Conference Presentations

7. Mastitis: the role of the milking machine. Dairy Conference, Tehran, Iran, 2006 (for MilkRite Ltd).
8. Developing an approach to herd lameness reduction. Cattle Lameness Conference, Nottingham University, 2011, and 2011 BCVA Autumn conference
9. British Society of Animal Science: Best practice knowledge transfer. March 2011, Worcester, UK
10. Facilitating change on dairy farms. Vet Trust Annual Conference, Stirling University. 2011
11. From wellies and stethoscope to flip chart and ears: the evolving role of the dairy vet. Royal Dutch Dairy Veterinary Association Conference, Arnheim, Netherlands. 2011
12. Herd health management and data management. BCVA housed herd seminar, Harper Adams University, Shropshire. March 2012
13. Prevalence of subacute ruminal acidosis in dairy cows. BCVA Congress, Harrogate, October 2013
14. A day in the life of a cow. BCVA Congress, Leicestershire, October 2014
15. The consultant dairy vet. Vital 90 days Conference, Barcelona. November 2014
16. Changing farmer and vet behaviours (medicine use). N8 AgriFood Conference, University of Manchester. June 2016
17. Improving dairy youngstock rearing. International Summit on Dairy Cattle Health and Innovation, Rome. April 2017
18. Meeting the challenge of reducing antibiotic use in food animals. Innovation for Agriculture Conference, Stoneleigh. July 2017
19. Vet:farmer communications for better herd health. Belgium cattle vets symposia, January 2019
20. Key note speaker at Australian Cattle Veterinarians conference, Gold Coast, Queensland, March 2019

Present activities within Dairy Veterinary Consultancy Ltd

- Regular tutor/speaker for small groups (farmers, vets, other dairy professionals)
- Dairy farm herd health audits and support for a supermarket dedicated dairy supply pool
- Design and delivery of research projects for agribusiness and the dairy supply chain e.g. Welsh Dairy Youngstock Project; Arla/Morrisons Herd Health Management project
- Collaboration with larger projects and organisations to provide specialist veterinary and scientific expertise e.g. AHDB Dairy for creation and development of national Healthy Feet Programme
- Knowledge exchange projects and copy writing specialising in making best science accessible to a farmer audience
- Second opinion (expert) clinical investigations in dairy practice
- Development and administration of MilkSure, a UK-wide dairy industry programme to reduce medicine residues in milk

Experience specifically relevant to dairy cow bedding materials

- 20 years' clinical experience in first opinion veterinary practice with heavy ruminant (predominantly dairy) caseload until 2013.
- Well known ruminant vet within UK veterinary profession, with broad dairy industry and veterinary connections throughout UK and enjoying a high level of respect as a RCVS Recognised Specialist; known for my impartiality, expertise in cattle health and production and balanced viewpoints.
- Member of UK Dairy Cow Mobility Steering Group (since 2013), with AHDB secretariat: remit includes dairy cow housing comfort/ cubicle bedding.
- Trainer and author in dairy cow facility design which includes all aspects of cow lying behaviour, cubicle design and comfort.
- Good written communication skills, e.g. trained in Excellence in Report Writing (Bond Solon, 2015).
- Bond Solon trained in witness familiarisation and courtroom skills (2017).