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Technical Report

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Executive Summary

As dual-energy X-ray (DXA) systems are adopted by the red meat processing sector, the full benefits of objective carcase measurement rely on all stakeholders having confidence and trust in the integrity of information. This can only be achieved through transparency of data recording, management, and reporting. This report provides a framework to support red meat processors to successfully integrate DXA-generated and other objective measurement technologies data into business processes, and to use information derived from DXA data for commercial purposes within and external to their business.

It is the objective that all business decisions based on DXA-related and other objective data:

i. Are made on good quality data;
ii. Utilise business rules that are applied consistently and automatically;
iii. Identify carcases where the completeness, accuracy and integrity of DXA results are compromised; and
iv. Where DXA-related data is missing (or of poor/unknown quality) and is used for supplier feedback and carcase payment purposes, then consistent and transparent processes are applied, and a clear audit trail is provided.

The development and implementation of business rules governing the use of data is driven by the needs of information users. The two primary types of DXA information uses include:

a) Internal (within business) use (carcase sortation and optimisation)

   A consistent hierarchy of criteria has been developed for application to DXA yield data produced for each lamb carcase and integrated data from other sources/devices. Its purpose is to enable the automated identification of data quality and application of unique status codes enabling an audit trail for each carcase outcome.

b) External Data Use (DXA Yield Feedback/Payment and Publishing)

   The methodology for utilising DXA yield outputs in carcase payment systems is entirely the commercial decision of the processing company. However, to provide consistency to external consumers of objective carcase yield data, the basis by which the yield is derived must be clearly identified. As per internal data use, a consistent hierarchy of criteria has been developed for application to DXA yield and related data produced for each lamb carcase. This enables the quality of data to be automatically identified and unique status codes applied to support an audit trail for each carcase outcome.

Validation of the impact of degrees of carcase trimming on yield and cut presentation will require further research and development and may be site specific. This may potentially include more specific descriptions recorded on the Retain Rail where feasible. Businesses may also wish to identify the primary causes of carcase defects impacting DXA data for monitoring and feedback purposes. Causes may be categorised as either product (farmer) or process (butcher) caused or related faults.

If a yield outcome is reported for feedback and/or carcase payment, the basis by which the yield was derived (Yield Type Code) must be clearly identified for each carcase.

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A communication strategy for suppliers should be implemented to support the understanding and transparency of the process for calculation and application of Yield Type Codes and provide background and supporting details/justifications for their reporting.

Other processes and systems to support the successful commercial adoption and ongoing success of objective carcase measurement technologies are outlined below.

a) DXA System Health Monitoring

   To enable the timely identification and response to issues impacting DXA data integrity and quality, it is important that near real-time feedback be provided to the operational and support personnel at processing plants responsible for DXA systems. Due to DXA systems requiring significant integration (sometimes with several systems), a comprehensive dashboard solution needs to accommodate the DXA device as well as the integrated systems.

b) DXA Calibration and Auditing

   For all DXA outputs to be accurate and reliable for making business decisions, all systems must be operated within the calibration and tolerances set by the equipment supplier. This includes approved hardware, software and algorithm versions. AUS-MEAT is required to approve each establishment's DXA device prior to its commercial use as per the Australian Meat Industry Language and Standards Committee (AMILSC) approval. This framework outlines examples of information to be recorded for calibration and auditing purposes and the capture of all information should be automated.

c) DXA Yield Export to Industry Platform

   Where Meat & Livestock Australia (MLA) has supported the installation of a DXA system, a requirement of funding is that DXA data be uploaded to the MLA group data platform for use in an anonymised manner for industry and research purposes. In addition, it is a funding requirement that producers can receive DXA data on their consigned animals. Such feedback may be made available through the processor's own feedback system and will also be made available through MLA's Integrity System Company producer feedback portal (currently known as Livestock Data Link - LDL).

To maintain the confidence and trust of livestock suppliers in objective measurement systems for payment/feedback purposes when comparing yield data from different processors, only quality data should be released. This is achieved through the application of consistent definitions and business rules to all data. This is also critical when objective data is used to inform industry-based decisions.

ALMTech is facilitating the development of agreed and consistent data rules (including qualifying data quality) prior to uploading to an industry platform to underpin the industry's confidence in the use of objective yield data. This framework aims to assist in the alignment of the application of Business Rules for DXA-based yields at plant level with the standardised rules for upload to the industry data platform.

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Contents

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1 Introduction

As dual-energy X-ray (DXA) systems are adopted by the red meat processing sector, the full benefits of objective carcase measurement rely on all stakeholders having confidence and trust in the integrity of information. This can only be achieved through transparency of data recording, management, and reporting.

This report provides a framework to support red meat processors to successfully integrate DXA-generated data into business processes, and to use information derived from DXA data for commercial purposes within and external to the business. This framework can similarly be applied to other objective measurement technologies as they enter the commercialisation and adoption phase in the Australian lamb and beef industries. An overview of issues to address is summarised below.

1.1. Site-Specific Integration

i. Establishing business rules governing the use of data, documented procedures and training of personnel (roles and responsibilities), and responses to system failures to maximise data quality, including DXA system calibration regimes.

ii. Establishing protocols to ensure completeness, accuracy and integrity of data.

   a. DXA systems failures/downtime.

   b. Erroneous DXA analyses.

   c. Synchronisation of carcase data between different sources (e.g. Production data; DXA; Animal Health; and Eating Quality) caused by queuing and/or RFID issues.

   d. Identification and management of exceptions or issues that impact accuracy, integrity or consistency of results. For example:

      - Heavily trimmed or incomplete carcases.
      - Multiple carcasses analysed together by DXA.

iii. Integration of DXA data with other plant information systems to enable value to be gained e.g. DXA generated data interfaced to plant IT systems to enable sortation (either automated or manual).

1.2. Data Use at Business and Industry Levels

i. Internal use – sorting and optimisation purposes.

   The definitions and use of data within businesses are entirely at the control of each business and dependant on their individual needs and capacity. These business rules and procedures need to be well planned, documented, and communicated with all stakeholders within the business. Planning should also make provision for flexibility in meeting future or changing business needs where possible, with consideration of backwards compatibility to enable benchmarking and future modelling i.e. recording/storing raw component information to accommodate changes in algorithms as well as images and calibration information. This information need not be stored within businesses' production information systems.

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ii. External use – publishing of data for supplier feedback and/or industry R&D.

To maintain confidence by livestock suppliers in objective measurement systems and trust in the data or feedback supplied when comparing data/feedback from different processors, it is important to consider that consistent definitions and business rules be applied by processors when reporting data or feedback to producers. This applies to:

a. Individual producer feedback.

b. Anonymised producer feedback within a processor.

c. Aggregated data across processors for either producer feedback and benchmarking; and Industry research and development. The application of consistent definitions and business rules is critical for aggregated data to ensure that accurate and valid analyses can be undertaken, and subsequent decisions made.

e. Version control of algorithms and business rules to enable legitimate benchmarking and interpretation of data between and within systems over time. This includes evaluating the impact of any changes to system versions or configurations prior to implementation into production systems.

f. Compliance with requirements for site approval from AUS-MEAT before commercial use for payment of feedback at each establishment.

2 Objective

It is the objective that all business decisions based on DXA-related data:

i. Are made on good quality data.

ii. Utilise business rules that are applied consistently and automatically.

iii. Identify carcases where the completeness, accuracy and integrity of DXA results are compromised.

Where DXA related data is missing or of poor/unknown quality and is used for supplier feedback and carcase payment purposes, then consistent and transparent processes are applied, and a clear audit trail is provided.

3 Use of Data

The development and implementation of business rules governing the use of data is driven by the needs of information users. The two primary types of DXA information uses include:

i. Within the business.

ii. External to the business (e.g. yield feedback/payment, and publishing of DXA-generated data and information).

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3.1. Internal Data Use

Fig. 1 below outlines a high-level approach to applying data logic for the internal use of DXA yield (calculated on an individual carcase basis) for carcase sorting and utilisation e.g. boning optimisation.

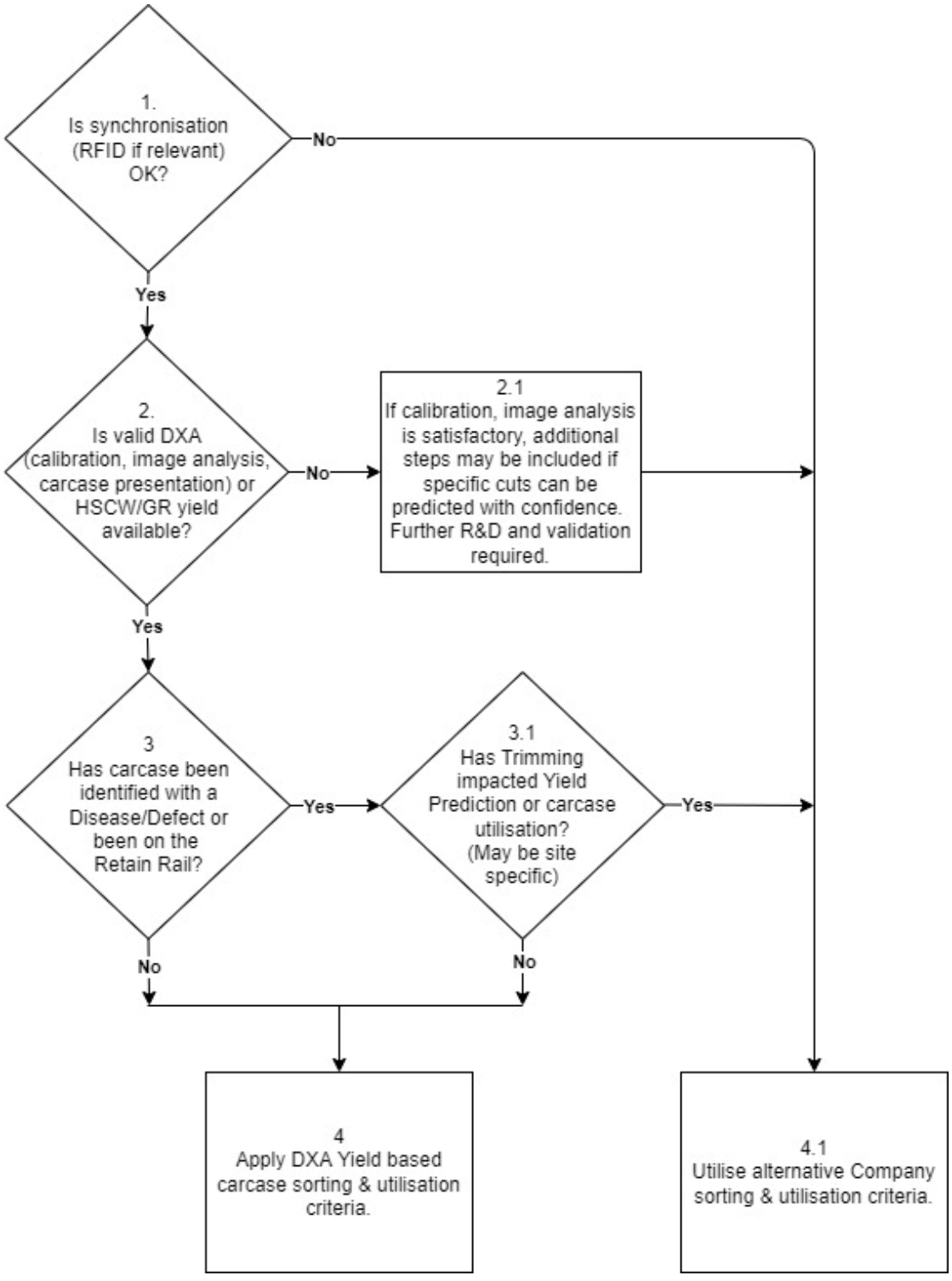

Figure 1. Use of DXA Yield for Internal Purposes.

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Notes (Fig. 1):

a) *Decision 2: May be broken down further to sub levels if information is available from DXA and further segregation is beneficial.*

b) *Decision 2.1: Requires further research and development to support reporting or use of specific primal cuts or DXA related information.*

c) *Decision 3.1: May require further research and validation to quantify impact of degrees of trimming on yield and cut presentation and may be site specific.*

    - *Potentially need more specific details to be recorded on the Retain Rail and will be dependent on: the site's operational constraints; infrastructure; and capacity. Training and responsibilities require clarification e.g. Meat Inspectors are trained to identify food safety or animal health issues and are not generally expected to identify how each carcase may be utilised within a processing plant.*
    - *Integration with Animal Health capture and reporting is essential to successfully identify potential impacts of damaged or trimmed carcases.*

3.1.1. Business Rules and Status Codes Overview

An example of the hierarchy of checks performed on DXA yield data produced for each lamb carcase (from various sources/devices), the criteria applied to identify data quality and unique status codes to enable an audit trail for each check are outlined in Table 1.

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Table 1. Example Business Rules and Status Codes Overview for Lamb.

	Type of Check	Data Source	Status Code[&]	Description
A.1	Carcase Weight Range	Grading Station	CL	Carcase Weight Low: <10kg
A.2			CH	Carcase Weight High: >45kg
B.1	Carcase Defect/Fault	Grading Station[^]	CD	Carcase Defects potentially impacting DXA yield predictions[^^] (e.g. Heavily trimmed / part condemn)
B.2			BF	Butcher Fault
B.3			FF	Farmer Fault
B.4			CI	Fault – Carcase use impacted
B.5			CN	Fault – Carcase use NOT impacted
C.1	DXA Data	Grading Station	NO	No DXA Information available. (This code can be recorded in combination with other status codes.)
C.2		DXA	NI	DXA status – ID Not Found
D.1	DXA/Grading Scales Carcase Weight Comparison	Grading Station / DXA	WH	Carcase Weight difference between DXA and Grading Scales >10kg (identify double carcases at DXA)
E.1	DXA Yield Prediction Range	DXA	LH	Lean % High (>68%)
E.2			LL	Lean % Low (<45%)
E.3			BH	Bone % High (>22%)
E.4			BL	Bone % Low (<8%)
E.5			FH	Fat % High (>40%)
E.6			FL	Fat % Low (<12%)

[&] All Status Codes applicable to a carcase are to be recorded.

^ Carcase Defect/Fault data may be provided via the Grading Station or an alternative source depending on the specific site data architecture and require integration with Animal Health capture and reporting. Refer Appendix I – Example Carcase Defect/Fault List and Mapping.

^^ Validation (impact of degrees of trimming on yield and cut presentation) will require further research and development and may be site specific. Potential requirement for more specific descriptions for what is recorded on Retain Rail and will be dependent on: the site's operational constraints; infrastructure; and capacity. Training and responsibilities require clarification e.g. Meat Inspectors are trained to identify food safety or animal health issues and are not expected to identify how a carcase might be utilised.

Note: AUS-MEAT approved carcase weight and parameter ranges are a subset of the example ranges above.

3.1.2. Integrated Business Rules Hierarchy

The diagram below (Fig. 2) outlines an approach to the integrated application of data logic on an individual carcase basis for the internal use (e.g. carcase sorting and boning optimisation) and external use (e.g. supplier payment and feedback) of DXA yield-related information.

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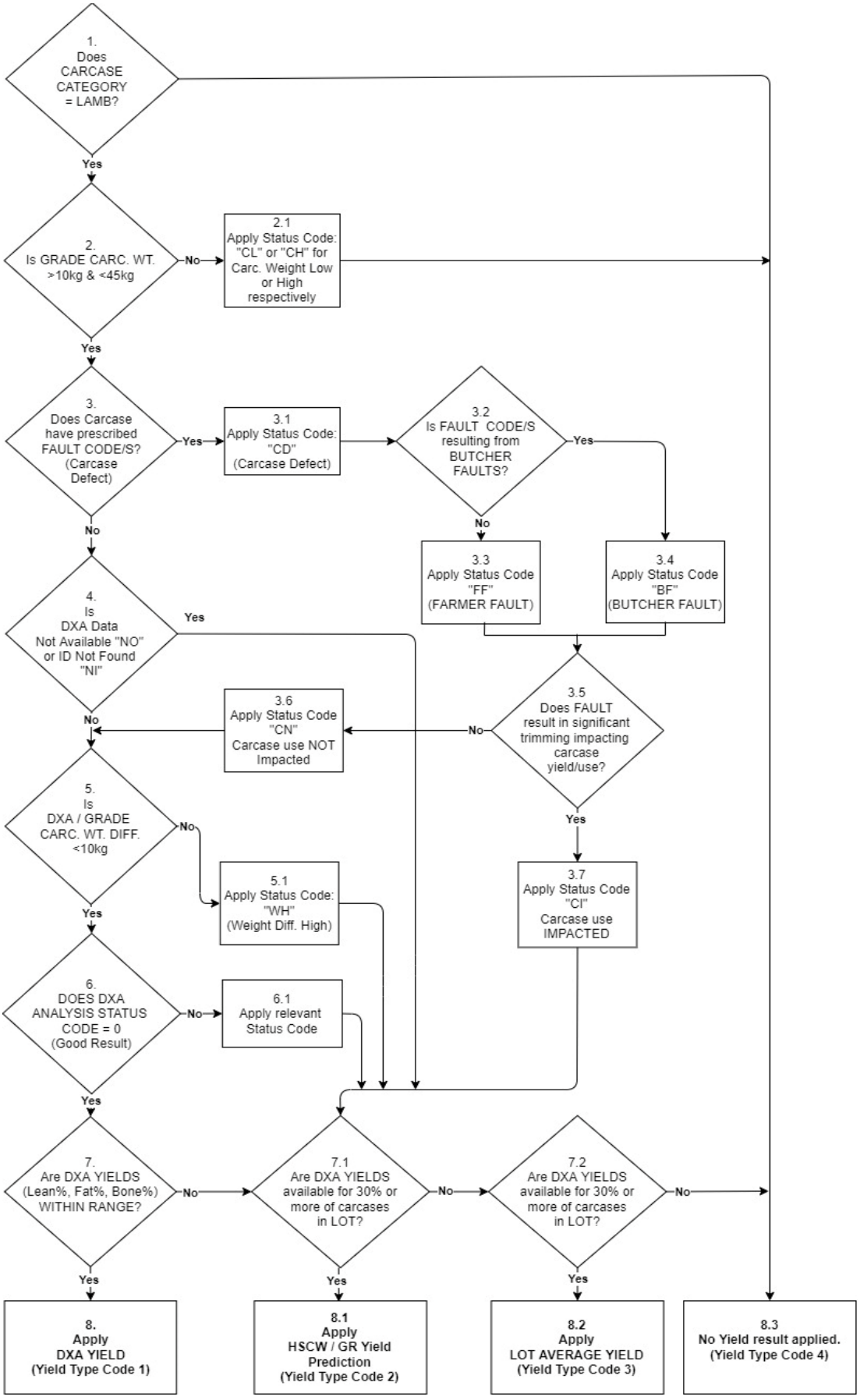

Figure 2. Business rules hierarchy and application flowchart.

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Notes (Fig. 2):

a) Decision 3.2:- Business may wish to identify the primary causes of carcase defects that compromise the quality of DXA data for monitoring and feedback purposes;

- *Product (Farmer) Faults: Refers to defects resulting from issues with the animal prior to delivery e.g. arthritis, broken ribs etc.*
- *Process (Butcher) Faults: Refers to defects resulting from processing the animal e.g. contamination as a result of a burst paunch.*

3.2. External Data Use (DXA Yield Feedback/Payment and Publishing)

3.2.1. Yield Calculation, Identification and Reporting Hierarchy

The methodology for utilising DXA yield outputs in carcase payment systems is entirely the commercial decision of the processing company. However, to provide consistency to external consumers of objective carcase yield data, the basis by which the yield is derived must be clearly identified (as suggested in examples in Fig.3. and Table 2).

The methods of utilising DXA yield outputs for carcase yield payment may include one or a combination of the following:

i. Paying directly on the predicted yield of an individual carcase (either kilograms or percentage of the whole or part carcase).

ii. Utilising yield as a criterion for broader carcase payment calculations e.g. a parameter in association with thresholds or grid type systems along with other contributors to carcase payment calculation e.g. eating quality.

If a yield outcome is reported for feedback and/or carcase payment, the basis by which the yield was derived must be clearly identified for each carcase (as suggested in section *3.2.2.Yield Type Code*).

The flowchart below (Fig. 3) outlines a high-level approach to applying a hierarchy and methodology for identifying and reporting how DXA-related yield outputs are derived in relation to potential carcase feedback and payment.

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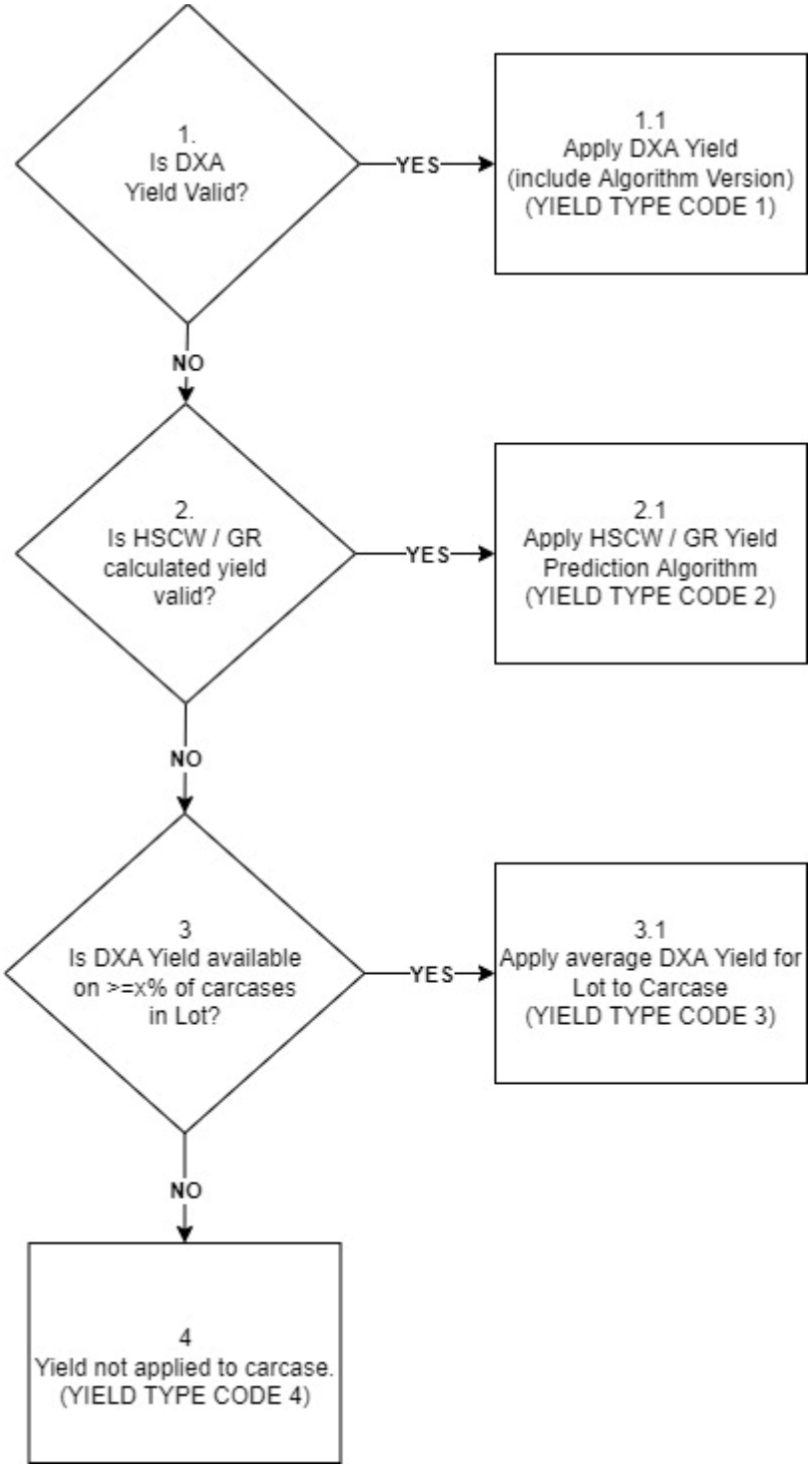

Figure 3. Yield Calculation Identification / Reporting Hierarchy

Notes (Fig. 3):

a) *Thresholds for minimum number within lot (#3) to be determined in consultation with the processor.*

b) *Consideration required for providing support for communicating HSCW/GR yield calculation methods and implications (Yield Type Code 2).*

c) *The method (Yield Types Code) of yield calculation must be identified for each carcase.*

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3.2.2. Yield Type Code

Table 2 outlines the standardised Yield Type Codes recommended for describing how the yield for every carcase was calculated.

Table 2. Recommended Yield Type Codes.

Yield Type Code	Reference*	Description
1	1.1	Individual carcase yield calculation based on DXA algorithm.
2	2.1	Individual carcase yield calculation based on HSCW / GR algorithm. (Algorithm and version to be advised).
3	3.1	Average Lot yield based on DXA algorithms applied to the carcase yield calculation. Minimum numbers of animals in a lot are required in order for a lot average to be calculated.
4		Yield not applied to carcase.

* Refer: *Figure 2. Yield Calculation Identification / Reporting Hierarchy*.

3.2.3. Average Lot Yield and Batch/Progressive Calculation

Average yield for the Lot may be applied to a carcase where there a valid DXA or HSCW/GR yield prediction cannot be calculated. For an average Lot yield to be applied, a minimum proportion (e.g. 30%) of carcases from the same lot must have valid DXA yield outputs recorded. Threshold/s for minimum numbers of carcases per lot for calculation of a lot average to be confirmed.

Business Rules and Lot Averages may need to be calculated progressively for some sites as carcases may be analysed and yield results applied at the grading station (e.g. in scenarios where the DXA is located prior to the grading station) and a full batch reanalysis of the lot is not available. Where possible, it is preferable that average lot yields be calculated retrospectively when data for all carcases within a lot is available and not calculated progressively as carcases are processed.

3.2.4. Yield Type Code Communications

It is recommended that a communication strategy be implemented to support the understanding and transparency of the process for calculation and application of Yield Type Codes and provide background and supporting details/justifications for their reporting.

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4 DXA Data Integration and Outcomes for Commercial Decisions

A high-level example of DXA data integration and outcomes is displayed below (Fig. 4) indicating data sources, systems and tools to support business decisions and resulting actions.

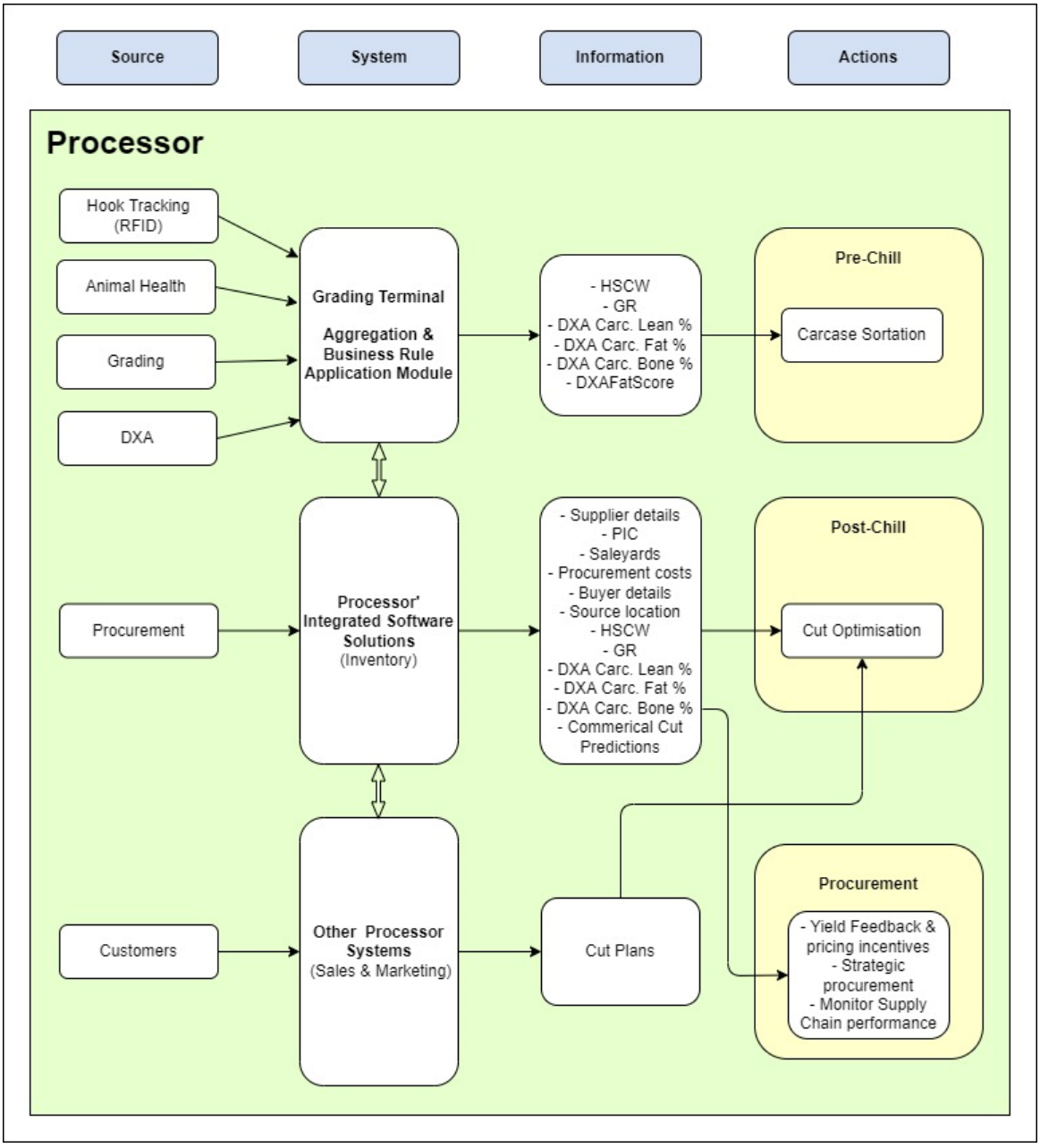

Figure 4. High level example of DXA data integration.

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5 System Monitoring and Auditing

5.1. DXA System Health Monitoring

To enable the timely identification and response to issues impacting DXA data integrity and quality, it is important that near real-time feedback be provided to the operational and support personnel at processing plants responsible for DXA systems. It is recommended that a DXA Dashboard be implemented to provide timely operator/site feedback on the operational status of the DXA and interfaced systems. Due to DXA systems at sites requiring significant integration (sometimes with several systems), a comprehensive dashboard solution needs to accommodate not just the DXA device, but also the systems with which it is integrated. An example of the extent of integration required is displayed in Fig. 4 and includes: livestock procurement; hook tracking; animal health; scales/grading terminal; sortation; and inventory. This is due to the potential impact of all integrated systems on data quality and completeness.

5.1. DXA Calibration and Auditing

DXA system calibration requirements are provided by the equipment supplier. For all DXA outputs to be accurate and reliable for making business decisions, all systems must be operated within the calibration and tolerances set by the equipment supplier. This includes approved hardware, software and algorithm versions.

AUS-MEAT is required to approve each establishment's DXA device prior to its commercial use as per the Australian Meat Industry Language and Standards Committee (AMILSC) approval. An extract from AUS-MEAT's List of Approved Equipment Suppliers is provided in Table 3.

Table 3. Extract from AUS-MEAT List of Approved Equipment Suppliers (AUS-MEAT 2022[1]).

AUS-MEAT LIST OF APPROVED EQUIPMENT SUPPLIERS

Predict CT Lean%, Fat% and Bone% in sheep carcases in Sheepmeat

(Please note that site approval from AUS-MEAT is required before commercial use at each establishment)

Equipment Name	Equipment Supplier	Contact Details	Comments
Dual Energy Xray Absorptiometer (DXA) device	Scott Automation and Robotics	https://scottautomation.com/en/products/industrial-automation	

	APPROVED LEVEL OF ACCURACY		
Hot Standards Carcase Weight	Carcase Fat %	Carcase Lean %	Carcase Bone %
<22kg	10.9% - 30.3%	53.2% - 65%	14.9% - 25.0%
22-28kg	14.0% - 35.0%	50.9% - 66.2%	13.3 – 18.0%
>28kg	22.0% – 37.1%	*Not Approved*	11.6% - 17.5%

"Commercial Use" is defined as when payments are made to vendors on their carcases based on the scores, results or measurements from the device. Auditing requirements are provided by AUS-MEAT in order to satisfy the approval for commercial use.

[1] AUS-MEAT. AUS-MEAT List of Approved Equipment Suppliers. Equipment Approval Information, Murrarie: AUS-MEAT, 2022.

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Examples of the information to be recorded through automated systems for calibration and auditing purposes includes:

a) Primary/Commissioning.
    - Hardware versions.
    - Software versions.
    - Calibration details/outcomes.
    - Initial sign-off/approval details.
b) Daily/Start-up.
    - Date.
    - Time.
    - Responsibility.
    - Calibration details/outcomes.

The information to be reported includes:

a) Hardware.
    - Key DXA Hardware version.
    - Key DXA Hardware Serial Numbers.
b) Software.
    - DXA (Analysis) Software version.
    - Algorithm versions (all output types).
    - Business Rules version.

6 DXA Yield Export to Industry Platform

Where Meat & Livestock Australia (MLA) has supported the installation of a DXA system, it is a requirement of the funding that DXA data is uploaded to the MLA group data platform to be used in an anonymised manner for research purposes. In addition to this, it is also a funding requirement that producers can receive DXA data on their consigned animals. Such feedback may be made available through the processor's own feedback system and will also be made available through MLA's Integrity System Company (ISC) producer feedback portal (currently known as Livestock Data Link - LDL).

The type and format of data, and the process for upload by processors has been outlined by ISC in the factsheet "Processor Technical Requirements for DEXA Data – Ver 2.0, 26 April 2021, Appendix 2).

To maintain confidence of livestock suppliers in objective measurement systems and trust the data or feedback supplied when comparing data/feedback from different processors, only quality data should be released. This is achieved through the application of consistent definitions and business rules to all data. This is also critical when objective data is used to inform industry-based decisions.

ALMTech is facilitating the development of agreed and consistent data rules (including qualifying data quality) prior to uploading to an industry platform to underpin the industry's confidence in the use of objective yield data. This includes providing users with clear, consistent and transparent identification of methods of DXA yield calculation to support yield-based carcase payment, genetic selection and industry research and development direction and investment. This document aims to assist in the alignment of the application of Business Rules for DXA-based yields at plant level with the standardised rules for upload to the industry data platform.

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7 Appendix 1. Carcase Defect/Fault List and Mapping Example

Ref.	Plant Defect Code	Defect Description /Name	Code ID (DRAFT Disease & Defect Meat Industry Attributes) (applied by Processor)*	Butcher Faults		Farmer Faults	
				Butcher Fault (Yes/No)	Fatal (Yes/No)**	Farmer Fault (Yes/No)	Fatal (Sig. Carc. trimming impacting carcase yield/use) (Yes/No)**
1	ART	Arthritis	32213607	No		Yes	Yes
2	PLEURISY	Pleurisy	32211203	No	Yes	Yes	Yes
3	SEPTIC	Septic	32213601	No	No	Yes	Yes
4	ABCESS	Abcess	32213602	No	Yes	Yes	Yes
5	POLYARTH	Polyarthritis	32213607	No	Yes	Yes	Yes
6	CONTAMIN	Contamination	32212402	Yes	Yes	No	Yes
7	EMACIATE	Emaciated	32213502	No	Yes	Yes	Yes
8	BRUISED	Bruised	32213610	No	Yes	Yes	Yes
9	JAUNDICE	Jaundice	32213512	No	Yes	Yes	Yes
10	SEED	Seed	32213623	No	Yes	Yes	Yes
11	OVIS	Ovis	32212507	No	No	Yes	No
12	FEVER	Fever	32213601	No	No	Yes	No
13	MALIGNAN	Malignant	32211206	No	Yes	Yes	Yes
14	ANZAC	ANZAC	**	Yes	Yes	Yes	Yes
15	Sel	Sel		No	No	No	No
16	HIDE	Leg Dressing		Yes	No	No	No
17	6 BY 6	6 by 6		Yes	Yes	Yes	Yes
18	CLA	CLA		No	Yes	Yes	Yes
19	VACLESIO	Vaccination Lesions		No	Yes	Yes	Yes
20	HYDATIDS	Hydatids	32211810	No	No	Yes	Yes
21	ARTHRITI	Arthritis	32213607	No	Yes	Yes	Yes
22	DOGBITES	Dog Bites		No	Yes	Yes	Yes
23	CANCER	Cancer	32210603	No	Yes	Yes	Yes
24	MELANOSI	Melanosis	32213604	No	No	Yes	No
25	PNEUMONI	Pneumonia	32211204	No	No	Yes	No
26	SARCOCYS	Sarcosyst		No	Yes	Yes	Yes
27	CYSTENU	Cysterius tenuicollis		No	No	Yes	No
28	PERICARD	Pericarditis	32211120	No	No	Yes	No
29	ECCHYMOS	Ecchymosis	32213607	Yes	No	No	No
30	UNSPECIF	Unspecified		No	No	No	No
31	NEPHRITI	Nephritis	32211331	No	No	Yes	No
32	LIVERFLU	Liver Fluke	32211501	No	No	Yes	No
33	CIROSIS	Cirosis	32211508	No	No	Yes	No
34	BACTSPOT	Bacterial Spots		No	No	No	No
35	MULGALIV	Mulga Liver		No	No	Yes	No
36	HOVIS	Heart Ovis		No	No	Yes	No
37	HJAUNDIC	Heart Jaundice	32211112	No	No	Yes	No
38	HUNSPECI	Heart unspecified		No	No	Yes	No
39	KUNSPECI	Kidney unspecified		No	No	Yes	No

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Ref.	Plant Defect Code	Defect Description /Name	Code ID (DRAFT Disease & Defect Meat Industry Attributes) (applied by Processor)*	Butcher Faults		Farmer Faults	
				Butcher Fault (Yes/No)	Fatal (Yes/No)**	Farmer Fault (Yes/No)	Fatal (Sig. Carc. trimming impacting carcase yield/use) (Yes/No)**
40	LUNSPECI	Liver unspecified		No	No	Yes	No
41	LJAUNDIC	L jaundice	32211512	No	No	Yes	No
42	LCYSTERI	Cysterius tenuicollis		No	No	Yes	No
43	CCCYSTER	Cysterius tenuicollis		No	No	Yes	No
44	MACHFLT	Machinery fault		Yes	Yes	No	
45	NONHALAL	Non Halal		Yes	No	No	
46	P DRESS	Poor dress		No	No	No	
47	NOHSHANK	No H Shank		Yes	Yes	Yes	Yes
48	NOFSHANK	No F shank		Yes	Yes	Yes	Yes
49	LGHTHEAV	Light Heavy		No	No	No	
50	MYOSITIS	Myositis	32210506	No	No	Yes	Yes
51	OVIS C	Ovis C (Carcase)		No	Yes	Yes	Yes
52	LOWSEED	Low Seed	32213623	No	Yes	Yes	Yes
53	MED SEED	Medium Seed	32213623	No	Yes	Yes	Yes
54	HIGHSEED	High Seed	32213623	No	Yes	Yes	Yes

* A blank Code ID indicates a defect/description that is used on a company specific basis and does not directly correspond with coding in the Draft Disease and Defect Condition Recording and Reporting Data Set.

** A fatal carcase fault code will nullify all DXA outcomes and Business Rules will be applied (i.e. either an average DXA yield applied or no DXA Yield result recorded).

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8 Appendix 2. MLA Group Data Platform – Processor Technical Requirements for DEXA Data

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MLA Group Data Platform

Processor Technical Requirements for DEXA Data

Introduction to the MLA group data platform

The MLA Group Data Platform enhances industry data sets through linking individual data sets, applying analytical tools and allowing access by industry users, including producers and processors. Data is shared in line with the permissions of the data owners (generally either the producer or the processor) and identifiable data will not be visible to others. Aggregated deidentified data will be used to identify industry trends, guide research and adoption opportunities.

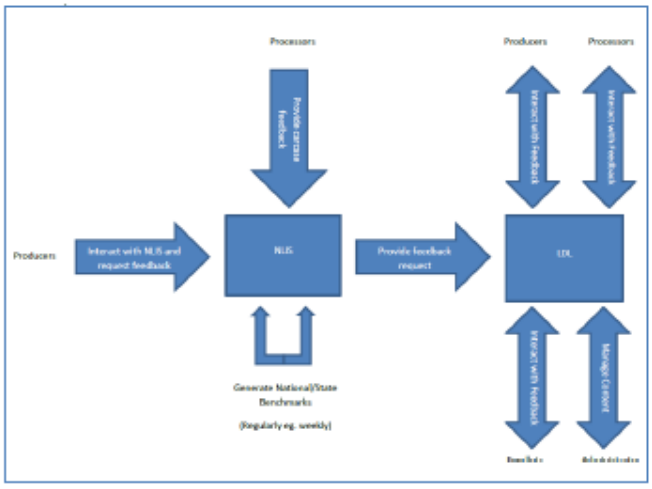
DEXA Lean Meat Yield (LMY)

MLA has significantly supported the use of Dual Energy X-ray Absorptiometry (DEXA) in the red meat industry to support the collection and exchange of more accurate yield information for the supply chain. DEXA data includes a predicted LMY% for the whole carcase as well as the forequarter, middle and hind quarter.

Where MLA has supported the installation of a DEXA unit, it is a requirement of the funding that the DEXA data is uploaded to the MLA group data platform to be used in an anonymised manner for research purposes. In addition to this, it is also a funding requirement that producers receive DEXA data on their consigned animals. This can happen through the processors own feedback system and it will also be made available through Livestock Data Link (LDL).

Livestock Data Link

Livestock Data Link (LDL) is an online feedback system that enables the timely sharing of carcase and animal disease information between processors and their producers with the aim of support the optimisation of supply chain performance. LDL links carcase data from the National Livestock Identification System (NLIS), Meat Standards Australia (MSA) and the central Animal Health databases with analytical tools, benchmarking reports and the Solutions to Feedback library. Producers can use LDL to understand why their consignment did or did not comply with market requirements, including carcase compliance and animal health issues.



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Uploading DEXA data to the MLA Group data platform

Data fields:

	Fields	Description	Data Type	Data Type Description	Example	ISC Data Source
1	PIC	Property Identification code	String	Alpha-Numeric, 8 characters in length as directed by State Jurisdictions	3HSET006	LDL (producerpic)
2	Body	Body Number	Int	Numeric, maximum 5 characters	43	LDL (bodynumber)
3	KillDateTimeStamp	Date and Time carcase entered the DEXA unit	ISO DateTime	Numeric , 8 characters (expected format is YYYY-MM-DDThh:mm:ss	2020-04-23T06:54:13	-
5	LotId	Lot Number allocated by Plant	Int	Alpha Numeric, maximum 6	21	LDL (lotid)
6	AnimalRfid	Unique RFID from eID (if available)	Int	Numeric, maximum 16 characters in length including spaces	983 000140436480	LDL (rfid)
7	NlisId	NLIS Assigned ID number	String	Alpha-Numeric, 15 or 16 characters in length	QABD0020XBE0011 1	LDL (nlisid)
8	AlgorithmVersion	Algorithm version	String	Alpha Numeric	1.12	-
9	HSCW	Hot Carcase weight	Float	Numeric, maximum 5 characters	24.2	LDL (hscw)
11	GRFatDepth	GR Fat Depth measured in millimetres	Int	Numeric, maximum 4 characters	6	
12	FatClass	Fat Class when Fat Depth measured in millimetres is not captured.	Int	Numeric, maximum 1 character (accepts 1-5)	2	
13	Species	Species of Stock	String	Alpha, maximum 3 (accepts either C (CATTLE), S (SHEEP), G (GOAT), or U (Unknown)).	S	Can be extracted from nlisid in LDL e.g B, C = cattle breeder device; S = sheep breeder device
14	ChainNumber	Plant chain identifier	Int	Alpha-Numeric, maximum 2.	1	LDL (chainnumber)
15	EstNUM	Abattoir identification– registered Establishment Number	String	Alpha-Numeric, maximum 7 chacters.	Z12345	LDL (estbno)
16	TotalCarcaseLean		Float	Numeric,	55.4089	

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				maximum 6 characters (4 decimal places)		
17	TotalCarcassFat		Float	Numeric, maximum 6 characters (4 decimal places)	27.7403	
18	TotalCarcassBone		Float	Numeric, maximum 6 characters (4 decimal places)	16.8508	
19	ForequarterWeight		Float	Numeric, maximum 6 characters (4 decimal places)	8.65	
20	ForequarterLean		Float	Numeric, maximum 6 characters (4 decimal places)	50.306	
22	ForequarterFat		Float	Numeric, maximum 6 characters (4 decimal places)	34.9182	
22	ForequarterBone		Float	Numeric, maximum 6 characters (4 decimal places)	14.7757	
23	MiddleWeight		Float	Numeric, maximum 6 characters (4 decimal places)	5.23	
24	MiddleLean		Float	Numeric, maximum 6 characters (4 decimal places)	53.0924	
25	MiddleFat		Float	Numeric, maximum 6 characters (4 decimal places)	30.9988	
26	MiddleBone		Float	Numeric, maximum 6 characters (4 decimal places)	15.9088	
27	HindquarterWeight		Float	Numeric, maximum 6 characters (4 decimal places)	7.46	
28	HindquarterLean		Float	Numeric, maximum 6 characters (4 decimal places)	49.3797	
29	HindquarterFat		Float	Numeric, maximum 6 characters (4	36.2213	

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				decimal places)		
30	HindquarterBone		Float	Numeric, maximum 6 characters (4 decimal places)	14.399	
31		Cold or Hot DEXA				
32	DEXARValueForequarter					
33	DEXARValueMiddle					
34	DEXARValueHindquarter					

DEXA file requirements

- Data files are CSV with the file name being the file type identfier, plant est number (AUS-MEAT if possible), killdate and then the sequence number with underscore between the elements. (eg dexa_123_20210101_1.csv) The sequence number is based on the number of files (or emails sent) for a specific plant est number and kill date combination. If 3 files are created for the one plant est number and kill date the third file would for example be named dexa_123_20210101_3.csv.
- Contains header row.
- Must be encoded as UTF-8.
- Data elements must not contain comma's, carriage returns, and line feeds
- If there is no data for the data element the data element should be empty.
- Data elements must not be double quoted.
- All rows must end in CRLF (carriage return and line feed).

Data upload methods

To ensure ISC delivers a solution that is aligned with the ways that our stakeholders operate we would like feedback on which single method of exchanging DEXA data with ISC is preferred.

1. Email

The plant emails a specific ISC email account including the DEXA CSV file as an attachment.

The email is required to have a subject line of the form [FILE:file_type][EST:your_ausmeat_number][KillDate:yyyymmdd][SequenceNumber:SN][Reply:sender_email_address].

The values for FILE, EST, KillDate, SequenceNumber in the email subject should match the attached CSV filename and each email must contain exactly 1 attached CSV file. For example, if the filename is "dexa_123_20210101_3.csv", then the email with this file attached must have the subject "[FILE:ids_002][EST:9999][KillDate:20200101][SequenceNumber:3][Reply:test@integritysystems.com.au]"

After processing each file, the ISC email service will send an email back to the plant including a summary of the upload and reasons for record rejection where required.

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2. SFTP

ISC will issue each plant with SFTP credentials and SFTP location details (e.g. www.sftp.integritysystems.com.au).

The plant uploads their DEXA CSV file to their SFTP folder.

After processing each file, the ISC email service will send an email back to the plant including a summary of the upload and reasons for record rejection where required.

3. AWS upload

ISC will issue each plant with AWS credentials and AWS bucket details (e.g. https://s3.console.aws.amazon.com/s3/buckets/mla-dataplatform-dexa-SampleURL).

The plant uploads their DEXA CSV file to their AWS bucket.

After processing each file, the ISC email service will send an email back to the plant including a summary of the upload and reasons for record rejection where required.

More information?

For more information about the LDL program, or to access technical information please contact ldlsupport@mla.com.au.

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