Section 2: KPI Results for the year ending 31/08/2017

Table 1(a)   Summary of Key Performance Indicators derived from analysis of 500 NMR milk recording herds for the year ending 31ˢᵗ August 2017 – Culling, fertility & milk parameters.

Parameter	Median (1)	1st – 3ʳᵈ quartile (25% - 75%) (2)	Target (3)	Inter-quartile range (4)
A. Culling rate	26%	21% - 32%	**21%**	11%
B. Percentage culled / died 100 days after calving	5%	3% - 7%	**3%**	4%
C. Age at exit (years)	6.0	5.5 - 6.7	**6.7**	1.2
D. Age at exit by lactations	3.6	3.1 - 4.0	**4.0**	0.9
E. Percentage Served by day 80	60%	47% - 70%	**70%**	23%
F. Percentage conceived 100 days after calving	35%	25% - 41%	**41%**	16%
G. Calving to 1ˢᵗ service interval (days)	81	69 - 95	**69**	26
H. Calving interval (days)	402	389 - 419	**389**	30
I. Age at 1ˢᵗ calving (years)	2.3	2.1 - 2.5	**2.1**	0.4
J. Conception rate	34%	28% - 41%	**41%**	13%
K. %Service intervals at 18-24 days (Heat detection)	36%	29% - 42%	**42%**	13%
L. Percentage service intervals >50 days	23%	15% - 32%	**15%**	17%
M. %Cows eligible for service served (Submission rate)	38%	27% - 49%	**49%**	22%
N. %Eligible for service that conceived (Pregnancy rate)	14%	9% - 18%	**18%**	9%
O. Lifetime milk / cow / day (kg)	12.3	10.3 - 14.4	**14.4**	4.1
P. Milk / cow / year (kg)	8,381	7,237 - 9,519	**9,519**	2,282
Q. Average protein%	3.26%	3.20% - 3.34%	**3.34%**	0.14%
R. Average fat%	4.00%	3.83% - 4.16%	**4.16%**	0.33%
S. 305-day milk yield (kg)	8,845	7,741 - 9,856	**9,856**	2,115
T. 305-day protein yield (kg)	283	252 - 315	**315**	63
U. 305-day fat yield (kg)	355	308- 388	**388**	80

(1) The median is the middle value (so 250 herds were better and 250 were worse than this value).

(2) The **first quartile (25% value) and third quartile (75% value)** describe the lower and upper limits of performance achieved by the middle 50% of herds. 25%, or one in four, herds achieve "better" and 25% "worse" than the limits for that parameter.

(3) The **Target** is set at the level achieved by the **"best" 25% of herds. One in four of the 500 herds in the sample achieved this level or better**.

(4) The inter-quartile range encompasses half the study herds. It is the difference in performance between a herd achieving the target (**best 25% value**) and a herd at the **worst quartile (75% value)**.

Table 1(b) Summary of Key Performance Indicators derived from analysis of 500 NMR milk recording herds for the year ending 31st August 2017 – Somatic Cell Count (SCC) and mastitis parameters.

Parameter	Median (1)	1st – 3rd quartile (25% - 75%) (2)	Target (3)	Inter-quartile range (4)
V. Herd SCC ('000 cells/ml)	179	145 - 223	**145**	78
W. % milk samples with **High** SCC (*)	19%	15% - 23%	**15%**	8%
X. % milk samples with SCC >=500,000 cells/ml	7%	5% - 9%	**5%**	4%
Y. % cows with **High** SCC at 1st recording in lactation (*)	16%	13% - 22%	**13%**	9%
Z. % **Chronic** milk samples (**)	10%	7% - 13%	**7%**	6%
ZA. Dry period cure (High:Low) (***)	77%	69% - 84%	**84%**	15%
ZB. Dry period protection (Low:Low) (***)	86%	80% - 90%	**90%**	10%
ZC. % Low at last recording of previous lactation (*)	71%	60% - 78%	**78%**	18%
ZD. % samples New SCC category (**)	7%	5% - 9%	**5%**	4%
ZE. % cows dried-off with no High SCC samples in the lactation (*)	43%	35% - 51%	**51%**	16%
ZF. Threshold Index new high / new low (****)	1.28	1.16 - 1.42	**1.16**	0.26
ZG. % of cows with New/First/Repeat sample that are Low SCC at next recording (**)	54%	49% - 59%	**59%**	10%
ZH. % of cows with Chronic sample that are low SCC at next recording (**)	19%	15% - 23%	**23%**	8%
ZI. Percentage drying off with no mastitis cases[+]	80%	73% - 87%	**87%**	14%
ZG. Mastitis rate (cases/100 cows in milk/year)[+]	32	20 - 48	**20**	28
ZK. Cows with Index mastitis case by Day 30[+]	6%	3% - 8%	**3%**	5%
ZL. Index mastitis rate after Day 30[+]	20%	12% - 28%	**12%**	16%

(*) **HIGH** SCC is a milk sample with >=200,000 cells/ml milk;
LOW SCC is a milk sample with below 200,000 cells/ml milk

(**) **CHRONIC** / **NEW** / **FIRST** and **REPEAT** are the Herd Companion categories describing high SCC cows. See Appendix 2 for definitions.

(***) **Dry period protection (High:Low):** The percentage of cows finishing a lactation with a HIGH SCC sample that starts the new lactation with a LOW SCC sample;
Dry Period Cure (Low:Low): The percentage of cows finishing a lactation with a LOW SCC sample that starts the new lactation with a LOW SCC sample.

(****) **Threshold Index:** The total cows changing from Low to High SCC divided by the total cows changing from High to Low SCC at consecutive milk recordings.

(1) The median is the middle value (so 250 herds were better and 250 were worse than this value).

(2) The **first quartile (25% value) and third quartile (75% value)** describe the lower and upper limits of performance achieved by the middle 50% of herds. 25%, or one in four, herds achieve "better" and 25% "worse" than the limits for that parameter.

(3)   The **Target** is set at the level achieved by the **"best" 25% of herds**. **One in four of the 500 herds in the sample achieved this level or better**.

(4)   The inter-quartile range encompasses half the study herds. It is the difference in performance between a herd achieving the target (**best 25% value)** and a herd at the **worst quartile (75% value)**.

 +   **The mastitis parameters are derived from a group of 262 herds (within the 500 herds in the study) where mastitis rate >5 cases per 100 cows in milk / year.**

Appendix 1. Key Performance Indicators definitions

In the following definitions the average population of cows is calculated using animal days. Every day that animal is present in the population at risk during the period of study is a 365th of an animal year. The total animal days is divided by 365 to give animal years, which equates to the average population at risk.

Parameter	Description
A. Culling rate	The number of cows dying or culled during the 12 month period expressed as a percentage of the average cow population for the same 12 month period.
B. Percentage culled / died 100 days after calving	The percentage of heifers/cows calving during the 12 month period that exit within 100 days after calving.
C. Age at exit (years)	The average age (in days) of cows culled/died in the analysis period, divided by 365.24
D. Age at exist by lactations	The average number of lactations completed by cows culled/died in the analysis period.
E. Percentage Served by day 80	The percentage of cows reaching the 80th day after calving that have been served at least once.
F. Percentage conceived 100 days after calving	The percentage of cows reaching 100 days after calving that have conceived.
G. Calving to 1st service interval (days)	The average days between calving and 1st service for all cows served for the first time in a lactation during the analysis period.
H. Calving interval (days)	The interval between calvings, in days, for all re-calvings recorded in the analysis period.
I. Age at 1st calving (years)	The age at first calving for all cows calving for the first time during the analysis period.
J. Conception rate	The number of conceptions as a percentage of the total number of services (services to cows culled are included) during the analysis period.
K. Percentage service intervals at 18-24 days (Heat detection)	The percentage of all service intervals for cows returning to service during the analysis period that are between 18 and 24 days (equating to one oestrus cycle after the previous service).
L. Percentage service intervals >50 days	The percentage of all service intervals for cows returning to service during the analysis period that are over 50 days.
M. Percentage of cows eligible for service that were served (Submission rate)	The percentage of cows that are eligible for service (42 days+ after calving and not barren) during the analysis period that are served.
N. Percentage of cows eligible for service that conceived (Pregnancy rate)	The percentage of cows that are eligible for service (42 days+ after calving) during the analysis period that conceived.
O. Lifetime milk / cow/day (kg)	The total milk produced per cow and heifer place in the year. The total milk produced in the year, divided by the average population of cows (both in milk and dry) and heifers (including heifer replacements being reared elsewhere), divided by 365.

Parameter	Description
P. Milk / cow / year (kg)	The total milk produced per cow place in the year. The total milk divided by the average population of cows (both in milk and dry).
Q. Average protein%	The weighted average protein% of all milk recorded during the analysis period.
R. Average fat%	The weighted average fat% of all milk recorded during the analysis period.
S. 305 day yield (kg)	The average 305 day production for all cows reaching 305 days after calving during the analysis period.
T. 305 day protein (kg)	The average 305 day production of milk protein for all cows reaching 305 days after calving during the analysis period.
U. 305 day fat (kg)	The average 305 day production of milk fat for all cows reaching 305 days after calving during the analysis period.
V. Average SCC ('000 cells/ml)	The weighted average somatic cell count of all milk recorded during the analysis period.
W. Percentage SCC >=200,000 cells/ml	The percentage of all recorded milk samples during the analysis period that had an individual SCC reading of 200,000 cells/ml or higher.
X. Percentage SCC >=500,000 cells/ml	The percentage of all recorded milk samples during the analysis period that had an individual SCC reading of 500,000 cells/ml or higher.
Y. Percentage 1st recording SCC >=200,000 cells/ml	The percentage of all cows starting new lactations that had a high SCC (>=200,000 cells/ml) reading at the first milk recording in the lactation.
Z. Percentage chronic SCC >=200,000 cells/ml	The percentage of all milk samples taken in the analysis period that originated from chronic SCC cows where the current and previous milk samples both had SCC levels of 200,000 cells/ml milk or greater.
ZA. Percentage Dry period cure (High:Low)	Of re-calving cows recorded starting a new lactation during the analysis period: the percentage of cows ending the previous lactation with a HIGH SCC (>=200,000 cells/ml) that started the new lactation with a LOW SCC (<200,000 cells/ml).
ZB. Percentage Dry period protection (Low:Low)	Of re-calving cows recorded starting a new lactation during the analysis period: the percentage of cows ending the previous lactation with a LOW SCC (<200,000 cells/ml) that also started the new lactation with a LOW SCC (<200,000 cells/ml).
ZC. Percentage Low at end of previous lactation (SCC<200,000 cells/ml)	Of re-calving cows recorded starting a new lactation during the analysis period: The percentage that had a LOW SCC (<200,000 cells/ml) at the last milk recording in the previous lactation.
ZD. Percentage New SCC >=200,000 cells/ml	The percentage of all recorded milk samples that were of the "New" SCC Category, namely the first HIGH SCC (>=200,000) in a lactation following one or more low SCC samples.

Parameter	Description
ZE. Percentage Dried-off with no SCC >=200,000 cells/ml	The percentage of cows completing a lactation without recording a high SCC (cows recording only LOW SCC samples (<200,000 cells/ml) in the previous lactation).
ZF. Threshold Index new high / new low	Of cows with consecutive milk records in the same lactation, the number of cows changing from Low SCC at the previous to High SCC at the next recording divided by the number of cows going from High SCC at the previous to Low SCC at the next recording.
ZG. Recovery percentage of new/first/repeat infections	Of HIGH SCC cows (>=200,000cells/ml) that at the previous recording were either low SCC or not yet in milk, the percentage that were LOW SCC (<200,000 cells/ml) at the following recording.
ZH. Recovery percentage of chronic infections	Of CHRONIC High SCC cows (High SCC cows that at the previous recording were also High SCC), the percentage of those milked that were LOW SCC (<200,000 cells/ml) at the following recording.
ZI. Percentage drying off with no mastitis cases	The percentage of cows completing a lactation without recording a mastitis case.
ZJ. Mastitis rate (cases/100 cows in milk per year)	The total cow cases of mastitis recorded divided by the average population of cows in milk, represented as a % (cases/100 cows in milk).
ZK. Index mastitis case by Day 30	The percentage of cows calving during the12 month period that recorded a mastitis case by day 30 of the lactation.
ZL. Index mastitis rate after Day 30	The incidence rate of *index* mastitis cases in cows that have passed 30 days since calving.