APPENDICES

Measuring the performance of your own milk harvesting system is one of the first steps in planning for a change. This involves using some key performance measures and taking some measurements on your own farm.

The benefits of analysing your system include:

- identifying bottlenecks in the existing system;
- planning changes that will rectify the problems in the system; and
- determining what is reasonable by comparing it with what others are achieving.

These appendices detail the data you will need to collect from your farm to determine milk harvesting performance and present some of the workings behind the various performance measures. They also cover how on-farm measurement should be tackled to calculate the work routine time and the unit time. Sections include:

1. Working out performance measures

The CowTime 'Milking Monitor' is a remote fax and web-based milk harvesting assessment service that helps calculate your farm data. Use the CowTime Milking Monitor to input the data and get it to do the calculations for you!

The CowTime Milking Monitor is available at www.cowtime.com.au or fax the completed 'Farm Data Collection Form' to (03) 5624 2290.

Alternatively, you can calculate your performance independently using the Farm Data Collection Form and the calculations sheets in this section.

Collecting your figures

Go through the questions on the Farm Data Collection Form and answer them as accurately as you can.

Think back to the peak of the season and answer the question according to what you were doing at that time. Peak of season for this purpose is the time when the most milk was leaving the farm.

Just remember that if your system has to cope with peak performance, then it is best if you look at a peak time, when it is under greatest stress.

Most of the questions are straightforward, but if you are unsure then measure it! Accurate inputs will give meaningful answers.

CowTime Quick Note 2.1

2.1 Using the CowTime Milking Monitor

The CowTime Milking Monitor provides an opportunity to evaluate your own milk harvesting performance. This is the first step in planning a change for easier and more productive milking.

CowTime is designed to challenge you to examine the factors that you can change on your own farm that will give you a milk harvesting system that best suits your farm and family goals. The Milking Monitor is an integral part of other CowTime activities (such as CowTime Clinics and CowTime Courses) and technical material.

How to use the CowTime Milking Monitor

Step 1 : You can receive a personalised CowTime Milking Monitor report for your farm by completing the simple questions overleaf about your own milk harvesting process. If you are unsure of an answer then go out there and measure it – after all measurement is the first step towards a better understanding.

Step 2 : Submit your figures: Place your farm information in the appropriate spaces overleaf.
Fax the sheet back to CowTime on (03) 56242290, OR
Input them directly over the web at www.cowtime.com.au

Step 3: A personalised report will be faxed or mailed back to you by return OR appear on your screen ready for printing.

Notes concerning specific questions

1. The questions should be answered for **your peak production time** or time of greatest production for year-round milking enterprises.
2. The amount of labour units to include sometimes causes confusion. For example:

Question 7 – examines the number of labour units used in the dairy. If someone helps for about half of the milking then count them as 0.5 of a person. Therefore if one person always milks and the runner helps out in the pit for about half the time, then the total number of milkers should be shown as 1.5.

Question 9 – examines the machine cleaning time. Estimate the labour time used in completing this task rather than the time the machine takes to wash. In automated systems the actual labour use will be much smaller than manual cleaning systems.

Question 11 –examines the number of labour units used in yard cleaning. If more than one person completes this task add together the time that each person spends on this task to get the total labour time used.

CowTime Milking Monitor

Privacy Statement

We take your right to privacy very seriously. As part of the CowTime project's research efforts we collect certain details about the users of our 'Milking Monitor' service. Farm performance data collected by the service will be used to develop new benchmarking figures for the dairy industry. Personal details will be removed from the data and any results published or released will be in the form of aggregated figures only.

Personal information collected from this service will be kept strictly confidential and will not be shared with outside parties.

CowTime may contact some users of this service for evaluation or other purposes.

Fax Back to National Milk Harvesting Centre (03) 5624 2290, or
Enter Your Figures on our Interactive Website Yourself at
www.cowtime.com.au

Place your farm information in the appropriate spaces below

Milking Monitor Farm Data Collection Form

Please use times from your peak milk production time for these answers.

1. How many cows do you milk at the peak of the season?.....Q1_____ Cows
2. How many minutes on average does it take to bring the cows from the paddock to the dairy for a milking?.....Q2_____ Minutes
3. What is the average distance (metres) walked by the herd from the paddock to the dairy for each milking ?.....Q3_____ Metres
   (Questions 2&3 are used to calculate walking speed. If you wish, take a known distance and measure the time it takes the herd to cover that distance.)
4. What is the number of **milking clusters** in your dairy? .....Q4_____ Clusters
5. How many milking times are undertaken in a 24 hour period? (tick one)

   ☐ once per day, ☐ twice per day,

   ☐ three times per day, ☐ other _____
6. **Over a 24 hour period** (typically 2 milkings), what is the total time **(minutes)** spent milking **(first cups on to last cups off)**?.....Q6_____ Minutes
7. How many operators normally milk in the dairy at a milking?.....Q7_____ Operators
8. How much milk goes into the vat each day during your peak production time?.....Q8_____ Litres
   (*please include the volume of milk used for other purposes (ie for calves) as we are seeking the total amount of milk harvested per day*.)
9. What is the average labour time taken to clean the milking machines each morning? .....Q9_____ Minutes
   (*This is the total labour time required to do the activity – not the machine cycle time*.)
10. What type of system is used to clean the milking machines? (tick one)

    ☐ reverse flow, ☐ bucket,

    ☐ clean in place/jetter, ☐ other _____
11. What was the average labour time (mins) taken for yard wash down in the morning? .....Q11_____ Minutes
    (if 2 people are used, add the time each spent to get the total)
12. What system do you use to clean your yard down? (tick one)

    ☐ hose, ☐ flood wash, ☐ mounted on backing gate

    ☐ hose & scraper, ☐ hydrant wash ☐ other _____
13. How many hours out of a 24 hour day are spent on milk harvesting activities on a typical day at peak lactation?.....Q13_____ Hours
    (include all the time taken from when cows are collected in the paddock to the end of cleaning up, for each milking in a 24 hour period)
14. What type of dairy shed do you have? (tick one)

    ☐ rotary, ☐ double up herringbone, ☐ walk-through

    ☐ swingover herringbone, ☐ double up rapid exit, ☐ other _____

Contact Details

Please complete the following:

First Name _____ Surname* _____ Telephone* (___) _____

Postal Address _____Postcode* _____ Fax* (___) _____

_____Email _____

* These items *must* be filled in to access the CowTime 'Milking Monitor' service and to contact you with your results.

Fax back to (03) 5624 2290 or online at www.cowtime.com.au

Calculations — How to do them

Use your answers from the previous page to do these simple calculations for your own farm.

Performance measure	Data required from the Farm Data Collection Form	Calculations**	Answer
Cows operator hour (cups on cups off)	Q1 _____ cows (A) Q5 _____ milkings (E) Q7 _____ operators (G) Q6 _____ minutes (F)	A x E ÷ G ÷ F x 60	Cows/ operator/ hour
Litres operator hour (cups on cups off)	Q8 _____ litres (H) Q7 _____ operators (G) Q6 _____ minutes (F)	H ÷ G ÷ F x 60	Litres/ operator/ hour
Kilometres/hour – cow walking speed	Q3 _____ metres (C) Q2 _____ minutes (B)	C ÷ 1000 ÷ B x 60	Kilometres/ hour
Minutes of labour – machine cleaning	Q9 _____ minutes (I)	I	Minutes
Minutes of labour – yard cleaning	Q11_____ minutes (K)	K	Minutes
Clusters/operator	Q4 _____ clusters (D) Q7 _____ operators (G)	D ÷ G	Clusters/ operator
Cows/cluster/hour	Q1 _____ cows (A) Q5 _____ milkings (E) Q4 _____ clusters (D) Q6 _____ minutes (F)	A x E ÷ D ÷ F x 60	Cows/ cluster/ hour
Litres/operator/hour (TMHT)	Q8 _____ litres (H) Q7 _____ operators (G) Q9 _____ minutes (I) Q11_____ minutes (K) Q6 _____ minutes (F) Q2 _____ minutes (B) Q5 _____ milkings (E)	60 x H ÷ [I + K + (F x G) + (B x E)]	Litres/ operator/ hour (TMHT)

** Remember to calculate what is in the brackets first.
Now transfer the answers to the appropriate space on the next page.

Recording the answers

Remember, the CowTime Milking Monitor service can do this report for you. If you have done the calculations manually, write your answers here.

Cows/operator/hour (cups on cups off)	_____	(graph 1)
Litres/operator/hour (cups on cups off)	_____	(graph 2)
Kilometres/hour – cow walking speed	_____	(graph 3)
Minutes of labour – machine cleaning time	_____	(graph 4)
Minutes of labour – yard cleaning time	_____	(graph 5)
Clusters/operator	_____	(graph 6)
Cows/cluster/hour	_____	(graph 7)
Litres/operator/hour (TMHT)	_____	(graph 8)

Now you have recorded the milk harvesting performance for your farm, it is time to compare your results with the results of others using the Industry Performance Graphs.

Industry performance graphs, p132.

2. Working out work routine time

The milking work routine

The tasks that a milker must complete for each cow at milking make up the work routine time. Measured in seconds per cow, these tasks determine how many cows a milker can handle in an hour. Going into the dairy and measuring the time taken to perform work routine tasks is one of the first steps towards a more-efficient routine at milking. The tasks in a typical milking work routine are:

- Cow entry – time spent from when the entry gate is opened until the last cow is in place or the first cluster is attached.
- Feeding – time required for the milker to feed the cows.
- Teat preparation – time spent preparing teats prior to clusters being attached for milking.
- Cluster attachment – the time spent putting the cluster onto the cow.
- Cluster removal – time required to remove the cluster from the cow.
- Teat disinfection – time required to apply disinfectant to teats after milking.
- Cow exit – time spent from when the exit gate opens until the 'cow entry' time starts.
- Miscellaneous – time spent on other tasks, such as removing test buckets, drafting, checking tail paint, dealing with cluster slips and the like.

Measuring work routine time

Have someone record the amount of time you take for each of the tasks during an 'ordinary' milking and complete the times for each on the 'Work Routine Time Recording Sheet'. When added together, the total time to complete the work routine tasks equals the total work routine time required for each cow that is milked in your dairy.

Cow entry

To work out the time required for cow entry, take the time from when the entry gate is opened until the last cow is in place. Divide this time (measured in seconds) by the number of cows in the row or batch. If cluster attachment begins before all cows are in place, time only until cluster attachment begins.

Cow entry time for a rotary dairy should be 0. However, some time may be required of the milker to load cows when things are not running smoothly. Try to estimate this time over a couple of minutes and divide it by the number of cows that have been milked in that time. It will hopefully average only a few seconds across the whole period.

Feeding

In dairies with automated feeding systems no time may be required of the milker to feed the cows. In dairies where each cow is fed manually by pulling cords or the like, this time should be recorded if it happens when other tasks could be performed, such as cluster attachment. Take the time required for the batch and again divide it by the number of cows in the batch. If this is done as the cows are entering, little time is taken up beyond cow entry time.

This time is generally 0 for rotary dairies, as the operator is rarely involved with feeding.

Teat preparation

Time can be spent preparing teats prior to clusters being attached by washing or cleaning them. Take the total time required for the task for a row and divide that time by the number of cows in a batch. In dry conditions for many herds this time is 0.

An estimate of the time needed to prepare teats on a rotary dairy can be made by timing the 'cups on' operator(s) over several minutes and dividing it by the number of teats prepared (excluding any cluster attachment time).

Cluster attachment

This is the time required putting the cluster onto the cow. Record the length of time taken to attach clusters to an entire batch by the milker and allow them time to return to the starting point for the next task. However, not all dairies are able to work with such clear boundaries between tasks. In these cases, time how long it takes to attach, say, 5 clusters and divide that time by 5.

An estimate of the time needed to attach clusters on a rotary dairy can be made by timing the 'cups on' operator(s) over several minutes and dividing it by the number of clusters attached (excluding any teat preparation time).

Cluster removal

This is the time required to check that milking is finished, remove the cluster from the cow and hang it up or swing it over. Record the time required by the milker to remove the clusters from an entire batch and divide this number by the number of clusters on that side. This can be complicated if a number of clusters need to be checked a couple of times to see if the cow is milked out. Cluster removers would generally remove this task from a work routine.

The time needed to remove clusters on a rotary dairy can be determined by timing the 'cups off' operator(s) over several minutes and dividing it by the number of clusters removed (excluding any teat disinfection time).

Teat disinfection

Time is required to apply disinfectant to teats if this task is not automated. Teat disinfection is best worked out by treating an entire run, but is also frequently determined by treating a small number of cows and then working out how much time was used per animal.

An estimate of the time needed to disinfect teats on a rotary dairy can be made by timing the 'cups off' operator(s) over several minutes and dividing it by the number of cows disinfected (excluding any cluster removal time).

Cow exit

Cow exit time is the time in your system that the milker is waiting for the cows to exit the platform and is not able to do other milking-related jobs. If all cows walk out before the next side is allowed to enter then the exit time for the batch is divided by the cow numbers to work out the time required per cow. In some dairies, cows coming onto the platform follow the exiting cows. This results in reduced time for both entry and exit.

Cow entry time for a rotary dairy should be 0. However, some time may be required of the 'cups off' milker to encourage cows to get off the platform when things are not running well. Try to estimate this time over a couple of minutes and divide this by the number of cows that have been milked in that time. It will hopefully average only a few seconds across the whole period.

Miscellaneous

This section is used to include miscellaneous tasks that occur during milking such as removing test buckets, drafting, checking tail paint, dealing with cluster slip and so on. In a simple routine, this time is generally at least 10% of the total work routine.

In a rotary dairy, estimate the time spent on miscellaneous duties for both the 'cups on' and 'cups off' operators over several minutes and divide by the number of cows passing their position.

Herringbone work routine time recording sheet

Work routine task	Seconds/cow
Cow entry	
Feeding	
Teat preparation	
Cluster attachment	
Cluster removal	
Teat disinfection	
Cow exit	
Miscellaneous	
TOTAL WORK ROUTINE TIME	SECONDS PER COW

Your calculated work routine time is _____ seconds per cow.

Rotary work routine time recording sheet

A slightly different table should be used for each of the 'cups on' and 'cups off' operators in a rotary situation. Milkers at each position on the rotary work independently of each other.

Task	Cups on (Seconds/cow)	Cups off (Seconds/cow)
Cow entry		
Feeding		
Teat preparation		
Attach cluster		
Remove cluster		
Disinfect teats		
Cow exit		
Miscellaneous		
TOTAL WORK ROUTINE TIME	SECONDS PER COW	SECONDS PER COW

Your calculated work routine time is
'Cups on' : _____ seconds per cow.
'Cups off' : _____ seconds per cow.

The milking work routine, p91; Work routine time, p185.

3. Working out unit time

Unit time

The unit time is the amount of time that cows need to have a milking cluster available to be fully milked. Measured in minutes, this time is made up of the:

- milk out time – the time that the cluster is attached to the udder; and
- cluster idle time – the time that the cluster is not attached to the udder.

Measuring unit time

For practical purposes, in herringbone dairies, unit time can be calculated from the time it takes to milk an average batch of cows.

Unit time equals the time it takes to milk the herd ('cups on' to 'cups off'), divided by the number of batches put through over the milking. If the number of batches is not known, they can be estimated by dividing the total number of cows by the number of clusters in the following way:

- swingover – number of cows milked ÷ number of clusters; and
- double up – number of cows milked ÷ number of clusters x 2.

In rotary dairies, the unit time is equivalent to the average time for a complete revolution of the platform. This should be timed at a typical milking. Back calculating this figure from the total cows milked, milking time and number of clusters does not correct for stall use efficiency.

Unit time worksheet

Swingover unit time recording sheet

Total time to milk herd per milking _____ minutes

Total number of cows milked _____ cows

Number of clusters (excluding lazy clusters) _____ clusters

Unit time = _____ minutes ÷ _____ cows x _____clusters

Your calculated unit time is _____ minutes.

Double up unit time recording sheet

Total time to milk herd per milking _____ minutes

Total number of cows milked _____ cows

Number of clusters (excluding lazy clusters) _____ clusters

Unit time = _____ minutes ÷ _____ cows x _____clusters x 2

Your calculated unit time is _____ minutes.

Rotary unit time recording sheet

Start time _____ Finish time _____
Total monitored time_____ minutes

Number of platform revolutions completed during monitored time
_____ revolutions

Average revolution time = _____ minutes ÷ _____ revolutions

Average time for the platform to rotate _____ minutes

Your unit time is _____ minutes.

Cluster throughput, p179.