Seek professional advice if problems persist

To recommend an effective plan to solve a client’s mastitis problem, advisers must be confident that they have clearly defined the problem. This does not happen in a single step but requires sequential re-definition as additional information is assessed.

A clear problem definition describes:
- the nature of the problem, for example, whether it is rising bulk milk cell count, high clinical case rate, or poor teat condition;
- when it is occurring; and
- what bacteria are causing the problem in the herd.

It is also important to develop a good sense about what factors are contributing to the problem in a particular herd. A handy way of getting an overview of the issues faced by individual herds is to consider:
- The people involved, for example – Is there good communication and feedback between team members? Are responsibilities for various tasks allocated to specific people? Are the protocols for various tasks well understood? Are there any tensions between staff, managers or owners? What other pressures are the managers facing?
- The cows, for example – Is it an older herd? Have cows of unknown mastitis status been introduced in the past couple of years?
- The dairy shed, for example – Is the plant and equipment old or new? Is it well maintained and regularly serviced?
- The environment, for example – Does it pose a particular mastitis risk for any reason?

Defining the problem is likely to require co-ordinated input from several disciplines – veterinarians, milking machine technicians, and other dairy advisers. (See flow chart on page 4.)

Once the advisory team has investigated and clearly defined the problem, the task is to develop a plan that works for the farm. This involves agreeing to a few key factors (usually 3-4) that must be addressed if progress on the problem is to be made, and then working with the farm team to establish specific actions for implementation.

This Technote provides a tool kit that advisers can use to gather relevant information when undertaking a full mastitis investigation. The Countdown Downunder Mastitis Investigation Pack includes checklists and recording sheets for use during farm visits. It also contains an Investigation Master Sheet to help collate, interpret and prioritise information, and develop a workable plan for the farm. An electronic version of the Countdown Downunder Mastitis Investigation Pack is available from the website www.countdown.org.au.
13.1 Seek professional advice from your veterinarian, factory field officer or AMMTA-qualified milking machine technician if mastitis indexes are above warning levels.

Farmers are urged to seek professional advice if problems persist in their herds or if a warning sign exceeds a certain level. The warning levels given in the Countdown Downunder Farm Guidelines for Mastitis Control are based on extensive field experience (e.g. teat condition), economic penalties (e.g. bulk milk cell counts), commonsense (e.g. the presence of Strep agalactiae), and expert opinion (e.g. measuring mastitis spread using individual cow cell counts).

### Background to the warning levels listed in Farm Guideline 13

<table>
<thead>
<tr>
<th>Background</th>
<th>Factor</th>
<th>Warning level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technote 11.2</td>
<td>Bulk milk</td>
<td>Average for past six months above 250,000 cells/mL OR More than five consecutive 10-day periods above premium threshold</td>
</tr>
<tr>
<td>Technote 4</td>
<td>Clinical case rate (in herds that do not routinely use forestripping)</td>
<td>100 cows in the first month of lactation OR More than two clinical cases per 100 cows in subsequent months of lactation.</td>
</tr>
<tr>
<td>Technote 5</td>
<td>Cultures</td>
<td>The presence of Strep agalactiae</td>
</tr>
<tr>
<td>Technote 12.3</td>
<td>Individual Cow Cell Counts</td>
<td>Have peak cell counts over 250,000 cells/mL each month.</td>
</tr>
<tr>
<td>Technote 9.1</td>
<td>Teat condition</td>
<td>Unacceptable teat condition that does not improve three weeks after changes are made to machines, management, the environment or disinfectant mix.</td>
</tr>
</tbody>
</table>

**Confidence – High**

Because mastitis is a multifactorial disease, Countdown Downunder recommends a team approach by relevant professionals for solving problems.

**Research Priority – Low**

Warning levels are likely to be refined following feedback from advisers who conduct mastitis investigations.

Herds with BMCC above this level would not receive premium payments for most of the lactation

This clinical case rate has been observed in 'problem' herds

Strep agalactiae is highly infectious and, if it is present on the farm, stringent milking hygiene is required to avoid an explosive outbreak

This estimate is an indicator of the spread of infection, especially in seasonally calving herds

Teat condition reflects the quality of milking management, the dairy system and the environment
The warning levels in the Farm Guidelines indicate that a problem does exist.

Farmers who have participated in the Countdown Downunder Farmer Short Course are familiar with the concept of using ‘triggers’ for their herd – where they carefully monitor and follow-up selected events that exceed a pre-set level. An example of a trigger for a particular farm might be ‘any bulk milk cell count above 250,000 cells per millilitre’. Triggers are often set at or below the warning levels, depending on the farm’s goals.

Countdown Downunder strongly recommends advisers to use a team approach to trouble-shoot problems because a robust plan frequently requires the expertise of more than one profession.

Someone needs to take a lead role to activate and coordinate the advisory team (those involved in interpreting information and developing the control plan), and to keep other interested parties informed of progress.

The advisory team needs to reach early agreement on:
• What tests and observations are appropriate to investigate the problem;
• How they will organise the farm visits;
• How often and when they will consolidate and discuss their results; and
• How to interact with the farm manager at strategic points: such as ensuring the planned investigation meets their expectations, communicating the initial findings and discussing the control options.

Mapping out a timetable that is realistic and achievable, and sticking to it, is both satisfying and professionally stimulating for the team.

There is an extended advisory network to draw upon both within the regions and nationally (through Countdown-L). Consulting an experienced mentor at critical points in the investigation boosts the team’s confidence and can help them reach agreement on difficult issues.

Contact details of dairy professionals from across Australia who have completed Countdown Downunder courses can be obtained from the website at www.countdown.org.au. This site also describes an e-mail forum, Countdown-L, for dairy advisers to discuss topical mastitis issues relevant to Australia.
Flow chart showing the general approach to investigating a mastitis problem

1. Describe the presenting problem
   - Describe the problem as the farmer sees it
   - Examine and interpret the available information and identify information gaps
   - Make your preliminary definition of the problem
   - Plan how to start gathering the next set of critical information

2. Define the problem more specifically using milk culture results
   - Interact with a vet to determine what milk cultures are available. If adequate milk culture results are not available, the vet should plan the detailed milk sampling strategy and organise sampling and transport of samples to the laboratory
   - Interpret milk cultures to determine the bacteria causing the problem in the herd
   - Consider the likely sources and modes of transmission of the bacteria in the herd

3. Activate your advisory team
   - Identify who needs to be involved in this investigation
   - With the advisory team, plan relevant examinations using the Investigation Master Sheet
   - Do the tests and analyse the results

4. Collate and assess findings with the advisory team
   - With the advisory team, collate and assess the results using the Investigation Master Sheet
     - Consider bouncing ideas off an experienced mentor
     - Identify further examinations, do them and assess the results
     - Agree to the key factors critical to resolving the problem (check against presenting and re-defined problem)
   - Report initial findings to the farm owner and discuss options for plan development

5. Develop a farm plan with the farm team
   - Organise a farm meeting and involve the whole team in planning practical ways of addressing the key areas needed to resolve the problem for this herd
   - Summarise them on a report (e.g., Farm Mastitis Action Plan)
   - Activate processes, agree to triggers for action and set a date for review

6. Review progress
   - Measure progress in each of the key areas and make a date to review overall progress

In some circumstances, Boxes 2 and 3 may be done in reverse order.
### The Countdown Downunder Mastitis Investigation Pack

The Countdown Downunder Mastitis Investigation Pack consists of:
- the Investigation Master Sheet (Sheet A) for co-ordinating the investigation and formulating a plan of action; and
- 12 recording sheets (Sheets B to M) for gathering and interpreting relevant information.

This Technote contains a brief description of each element of the pack and how to use it. Investigators need to be familiar with how to use the pack before starting a farm investigation.

Early on in the investigation, the advisory team should determine what testing needs to be done to complement existing information and then allocate tasks to team members. The team should use the Mastitis Investigation Pack to ensure factors that may impact on the problem are checked and to collect and analyse data using the relevant recording sheets.

This approach often uncovers issues which are not directly relevant to the current problem. They are marked on the Investigation Master Sheet as ‘different problem’ and should be dealt with separately.

A completed Mastitis Investigation Pack for Felix Feelgood’s herd is shown on pages 16-29.

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#### Facesheet of the Countdown Downunder Mastitis Investigation Pack


Use a new copy of the pack (27 pages) for each investigation.

See revised Technote 13 page 15 (February 2003) for tips on how to collect data most efficiently at a milking-time visit.

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#### Countdown Downunder Mastitis Investigation Pack

<table>
<thead>
<tr>
<th>Sheet</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Investigation Master Sheet</td>
</tr>
<tr>
<td>B</td>
<td>Farm Profile</td>
</tr>
<tr>
<td>C</td>
<td>Milk Cultures</td>
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<td>D</td>
<td>Individual Cow Cell Counts</td>
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<td>E</td>
<td>Milking Machine Dry Test</td>
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<td>F</td>
<td>Performance Tests of Milking Machines</td>
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<td>G</td>
<td>Milking Routines, Teat Cup Slips</td>
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<tr>
<td>H</td>
<td>Environment</td>
</tr>
<tr>
<td>I</td>
<td>Teat Condition</td>
</tr>
<tr>
<td>J</td>
<td>Cow Behaviour/Milking Time per Cow</td>
</tr>
<tr>
<td>K</td>
<td>Completeness of Milking Cluster Alignment</td>
</tr>
<tr>
<td>L</td>
<td>Teat Disinfectant</td>
</tr>
</tbody>
</table>

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**Read revised Technote 13 (February 2003) pages 5-15 for a guide to using these sheets and tips for efficient data collection.**
General approach to investigating a mastitis problem

A. Investigation Master Sheet (see example, pages 16-19)

The mastitis status of the herd changes continuously depending on the rate that cows move from one category to another. Advisers can use this chart to demonstrate the effect of various factors on mastitis dynamics. Group mastitis investigation findings according to whether they influence the rate that:

- clean cows become infected;
- infected cows are cured;
- infected cows enter the herd; and
- infected cows leave the herd.

The Herd Mastitis Dynamics Chart (Sheet A7) enables advisers to construct a pictorial summary of how farm management is impacting on mastitis in the herd (see below). This enables the team to keep perspective of mastitis control in the herd while tackling the seasonal and high priority issues.

To enhance the likelihood of your investigation leading to a solution for a problem:

- Identify the factors you have rated as 3 or 4 in importance in the right hand column of the Investigation Master Sheet.
- Mark these on the Herd Mastitis Dynamics Chart (Sheet A7) according to their area of influence.
- Consider the Herd Mastitis Dynamics Chart in the light of the epidemiology of the major pathogen(s) in the herd.
- Allocate priorities to the factors most likely to effectively solve the problem.
- List these factors in the box on the front page of the Investigation Master Sheet (Sheet A1) and incorporate them in your report to the farmer.

An example of a completed chart is shown on page 19.

Herd Mastitis Dynamics Chart
B. Farm Profile (see example, pages 20-22)

The Farm Profile is a 5-page questionnaire that is used to:
• summarise the presenting problem (Box 1 of the flow chart);
• establish existing information that is already available for assessment by the team; and
• suggest leads for advisers to investigate.

The first page of the Farm Profile gives advisers a ‘big picture’ overview of the client and the herd, and can be collected by any competent person in the business as details are factual and do not explore technical aspects of the problem.

Farm Profile B2-B5 are used to assess farm management practices that influence mastitis and need to be completed by one of the advisory team - usually a veterinarian. The questionnaire has been kept short so that it maintains focus and yields good quality information. Countdown recommends that advisers obtain the information by personal interview (either phone or face-to-face) and fill in the pages themselves. This ensures that questions are put into context and appropriate responses are received. It also provides an opportunity to follow up interesting comments with your own line of questioning.

Note: The Farm Profile is the only sheet in the Mastitis Investigation Pack to obtain information on Bulk Milk Cell Count trends, numbers of clinical cases, drying-off strategy and the culling policy for mastitis.
C. Milk Cultures (see example, page 23)

A critical step in the development of a clear problem definition is to establish which bacteria are causing the problem in the herd (Box 2 of the flow chart). This can only be done by assessing an adequate set of milk cultures. A common error in mastitis investigations is to base the assessment on too few sample results, often because there is a real or perceived reluctance of farmers to pay for culturing. This is a false economy because, if the bacteria are not defined, the likelihood of a targeted and cost-effective solution is much reduced. It is usually the responsibility of the veterinarian in the team to organise and interpret the milk cultures. Clear communication with the farmer about the importance of this step is required.

The objective is to determine which bacteria are present in the herd and which are causing the problem. To make this decision it is important to have at least 20 effective milk culture results (excluding contaminated samples) and, to achieve this, milk samples should be collected from at least 25 cows.

If clinical cases are the presenting problem, samples should be taken from all cases as they are detected and prior to treatment. These samples can be frozen and submitted in batches. Some samples (or results) may already be available.

If high cell counts are the problem, selection of cows to sample is usually based on mastitis history or recent Individual Cow Cell Counts. In these circumstances it is important for the veterinarian to choose the particular cows rather than leave the selection to the farmer. Pick a range of cows: a mix of age groups including heifers, a mix of animals with recent and persistent elevations in cell count, and those with peak cell counts ranging from 250,000 to over a million.

Once the cows have been selected, the sampling strategy may be to collect ‘composite samples’ (a roughly equal volume of milk from each quarter into a single sample jar for each cow) or to examine each quarter with a cow-side test (such as a conductivity meter or Rapid Mastitis Test) and sample individual quarters that are positive. Quarter testing requires extra time at sampling but decreases the chance of ‘no growth’ or ‘contaminated’ results.

Milk Cultures Sheet C can be set up as a pre-prepared list of cows to sample. A separate copy of Sheet C should be used to track the information and results for each batch of samples.
D. Individual Cow Cell Count Analysis (see example, page 24)

Herd-level analyses of Individual Cow Cell Counts (ICCC) can be used to assess the apparent prevalence of mastitis in different groups of cows (for example different ages, stages of lactation or management groups), and estimate the rate of new infections occurring in the herd.

Most ICCC data on farms are available in print-and-paper form. Electronic data can nearly always be obtained from the herd improvement service involved.

Some herd improvement organisations provide a herd-level ICCC analysis. A number of specialist programs have been developed, both in Australia and overseas, to assist analysis and interpretation of ICCC data, but the most common approach is for the advisers doing the investigation to make some relatively simple assessments of the ICCC data by hand or with a spreadsheet.

The analyses summarised on Sheet D provide:

- Comparison of mastitis prevalence in different groups of cows
  The proportion of cows in different groups (for example, the autumn-calving cows) that have had any cell count above 250,000 cells/mL. This gives a guide to the likely prevalence of infection in the groups. Note, however, that it is often difficult to interpret data from small groups of cows.

- An estimate of the rate of new infections occurring in the herd
  The proportion of first lactation animals that have peak cell counts above 250,000 cells/mL. This gives an estimate of the new infection rate in the herd. As a guide, an unacceptably high new infection rate in the herd is suspected if more than 20% of heifers have a peak ICCC of above 250,000 cells/mL by the end of their first lactation. In seasonal-calving herds this can also be expressed as a warning if an extra 1% of heifers had a peak cell count above 250,000 cells/mL each calendar month.

- The number of persistent infections
  The proportion of cows with persistent mastitis infections (cell counts above 250,000 cells/mL in the current and the previous lactation). This provides a guide to the chronicity of the problem and the effectiveness of the last dry period mastitis management.

Analyses of ICCCs should be based on regular herd testing data, not on single ‘spot’ tests. It is recommended to have at least five ICCCs to determine the status of a cow during a lactation.

A cow is classed as infected or uninfected according to her highest (or peak) cell count taken during the lactation. In Australia, where *Staph aureus* and *Strep uberis* are the main pathogens, cows are designated as ‘infected’ if their ICCC ever exceeds 250,000 cells/mL. It is assumed that they remain infected throughout the lactation irrespective of the value of subsequent ICCCs.

Technote 23 page 3 shows a herd analysis of ICCCs produced at each test day.

Technote 12 describes methods of analysing and interpreting ICCCs.
E. Milking Machine Dry Test (AMMTA test or equivalent dry test) (see example, pages 24-25)

To be confident in the quality of testing and standard of reporting, Countdown Downunder recommends the use of technicians who are Australian Milking Machine Trade Association (AMMTA) qualified or competency tested by the National Milk Harvesting Centre to perform a dry test on the milking machine. This ensures the equipment is comprehensively tested, and that results are recorded on AMMTA or equivalent report forms and interpreted using the AMMTA specifications. Examples of other dry test procedures and recording forms that may be regarded as equivalent include the International Standard ISO 6690:1996 Annex E; the standard New Zealand machine test report form; or the Bou-Matic VIP System Analysis.

When assessing the impact that machines may be having on the mastitis problem (Boxes 3 and 4 of the flow chart), the advisory team should review the key points of the milking machine Dry Test report.

F. Performance Tests of Milking Machines (see example, page 26)

Milking-time machine tests provide a measure of the ‘goodness of fit’ between the milking herd and the milking equipment. These performance tests include:

- Assessing cluster components to ensure compatibility – so that cluster position and weight balance are good; liners fit shells and claw nipples and are suitable for the average teat size; and cluster air admission meets guidelines.
- Assessing the effectiveness of vacuum regulation – specifically, vacuum change at regulator, unit fall-off test, and vacuum undershoot and overshoot.
- Assessing vacuum stability in milkline and receiver.
- Measuring mean claw vacuum by wet testing or milking-time testing.

When assessing the impact that machines may be having on the mastitis problem (Boxes 3 and 4 of the flow chart), use the guidelines for performance tests given in the revised Technote 25 (February 2003).

These performance tests are designed to build on the results of the milking machine Dry Test and they often help to pinpoint the underlying causes of frequent liner slips (Sheet G), poor teat condition (Sheet I), poor cow behaviour or slow milking (Sheet J), or incomplete milking (Sheet K).
G. Milking Routines and Cup Slips (see example, page 26)

Milking Routines

This checklist for milking routines (Sheet G) is designed for advisers to fill in from their own observations in the shed at milking (don't give the sheet directly to staff to fill in). In most of the lists, one or more of the tick box lists may be appropriate.

Careful assessment of the milking routine often identifies factors contributing to the presenting problem (Boxes 3 and 4 of the flow chart). When it comes to developing a farm plan (Box 5), building good routines and communication with the on-farm team members is low-cost and motivational, as well as benefiting mastitis control.

Cup Slips

Because cup slips or falls occur randomly and infrequently in many herds, experienced observers usually listen and watch for these events while they are engaged primarily in recording other events (such as milking routines or cow behaviour). The rate of slips or falls per 100 cows milked can be estimated from the average number of cows per milked per hour if the time of the first and last recorded slip or fall was also noted.

H. Clinical Cases (see example, page 26)

The robustness of clinical case management can be assessed by looking at the quality of the clinical case records (Farm Profile Sheet B3) and using Clinical Cases Sheet H to check what is happening at milking, discuss issues with the milkers and assess the technique used for treatment of cases.

I. Teat Condition (see example, page 27)

Formal assessment of the herd’s teat condition aids detection of any milking machine induced, management or environmental factors, or infectious agents, influencing teat and udder health (Boxes 3 and 4 of the flow chart).

Teat skin condition can be checked before milking. All other parameters on Sheet I should be assessed immediately after milking.

Technotes 5 and 6 provide guides to interpreting milking routine observations.

Technotes 6 page 7 lists the common causes of cup slips and falls.

A handy technique is to use a ‘Post-It’ note to record audible cup slips or falls. You can move this note page to the top of each recording sheet as you work.

Technotes 4 and 10 describe recommended methods of detecting and treating clinical cases.

Technote 8 gives a guide to hygiene requirements.

Revised Technote 9 page 12 (February 2003) gives a guide for making and interpreting teat observations in commercial herds.

Remember to exclude pigmented teats when assessing teat colour.
J. Cow behaviour and milking time per cow (see example, page 28)

Cow Behaviour

A cow’s behaviour is an indicator of her comfort or discomfort with the milking environment, milking routine and machine.

Observations are made at different stages during milking: whilst cows are in the stalls waiting to be milked, during cow preparation and cluster attachment; during the first 2 minutes of milking; and during the last 2 minutes of milking.

In herringbone sheds, cow behaviour and milking time per cow can be observed concurrently for each cow (working across the sheet). In rotaries, it is usually more efficient to observe different groups of cows.

See the tips on efficient data collection on page 14.

Milking Time per Cow

Three valuable pieces of information can be derived from careful measurements on a representative sample of cows:

- the proportion of cows exhibiting signs of delayed milk let-down (minimal if fewer than 10% of cows, or moderate if fewer than 20% of cows)
- the average milk flow time per cow (which can be compared with guidelines in Technote 6)
- the average length of the overmilking period per cow (minimal if the mean overmilking time is less than 1 minute per cow; moderate if between 1 and 2 minutes per cow).

The results of a few careful time-measurements can provide a solid framework for advice on how to improve milking management. In addition, they will help to explain the underlying causes of new mastitis infections, frequent liner slips (Sheet G), poor teat condition (Sheet I), poor cow behaviour (Sheet J) or incomplete milking (Sheet K). For example, warning bells should ring if overmilking occurs in conjunction with pulsation failure (Sheet E).
**K. Completeness of milking and cluster alignment (see example, page 28)**

**Completeness of Milking**

Although there is conflicting information about whether undermilking affects new infection rate, its measurement provides information about whether the milking machine and staff are operating optimally and may help uncover issues such as teat cup crawl (applicable to Boxes 3 and 4 of the flow chart).

If the herd is not milking out completely (under milking), this can be established by hand stripping at least 25 cows or 100 quarters at the end of milking.

**Cluster Alignment**

The effect of poor cluster alignment on completeness of milking can be demonstrated simply by manually aligning the cluster at about the time when milk flow from any cow has almost ceased. Hold the cluster squarely under the udder by manipulating the long milk tube - without putting additional downwards pressure on the cluster. Often, milk will start flowing again from one or more quarters into clusters that are poorly aligned.

A pattern of different strip yields from rear versus front quarters, or between quarters on the right versus the left side of udders, usually indicates a problem of poor cluster positioning or uneven weight balance between the four teat cups.

**Teat Size**

Visual assessment of herd teat size and shape is useful when liner selection is being reviewed.

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**L. Teat Disinfectant (see example, page 29)**

Sheet L helps advisers check issues associated with use of teat disinfectant before application (Boxes 3 and 4 of the flow chart), from selection of the stock product through to mixing and storage. Issues of teat coverage are checked when assessing the milking routine (Sheet G of the Mastitis Investigation Pack).

The section of Sheet L on mixing is not needed for farms using a ready-to-use teat disinfectant product.

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**M. The Environment (see example, page 29)**

The environmental checklist helps advisers assess a herd’s level of exposure to environmental contamination, especially at calving and immediately after milking. It is necessary to think about potential problem areas and physically inspect them at the most appropriate time of year, for example the calving paddock at calving time.

Assessment of udder contamination prior to milking is recorded on Sheet G.
Tips for efficient data collection during milking-time tests and observations

Getting the numbers right

A common limitation in mastitis investigations has been that sample sizes for milking-time observations have been too small. When sample sizes are too small, the professionals who collected the information have largely wasted their time and effort because it is impossible to draw confident conclusions.

Countydown recommends that the new guidelines for the number of observations to evaluate teat condition are also applied to other milking-time observations, particularly for cow behaviour and milk flow times per cow (Sheet J) and completeness of milking (Sheet K).

Efficient teamwork for data collection

According to anecdotal reports, many udder health advisers and milking machine technicians are investing four or more person-milkings to collect all the data required at milking-time to provide comprehensive recommendations. One pair of experienced technical people found that they needed two milking-time visits to complete most of the tests and observations. They each recorded their own data.

Some options that have been used to shorten this time-consuming, labour-intensive and expensive process are described below:

- Conduct a quick test of the regulator undershoot and overshoot before milking. This is a partial substitute for monitoring receiver vacuum during milking.
- Measure the mean claw vacuum, before milking, in 3-5 clusters using a flow simulator set at a controlled liquid flow rate of 5 litres per minute. This wet test is an acceptable substitute for measuring the mean claw vacuum on 6-10 real cows during milking. In fact, it is a better measurement in some ways because the simulator flow rate is known and is highly repeatable.

If the above options are adopted, then milkline vacuum stability is the only milking-time machine test that needs to be done during milking. This test should be conducted in the first 15 minutes of milking when milk flow rates are likely to be highest. The measurement can be made at any convenient empty stall for one rotation in a rotary dairy. In a herringbone dairy, the measurement can be made at any convenient milking unit and recorded while the first complete side of clusters is removed and re-applied.

In dairies where the milkline size and slope comfortably meet the current guideline tables for effective milkline capacity, it could be argued that the milking-time measurement of milkline stability is not necessary. Nevertheless, it does provide a neutral ‘activity’ for a visiting technician while the milking staff settle into their routine and forget about the visitors, before observations are made on milking routines, cow behaviour, etc. Furthermore, the actual milking-time performance test with all the ‘warts’, including operator actions, often gives extra insight and also allows correlation of events with measurements.

New guidelines given in the revised Technote 9 (February 2003) for the numbers required to evaluate teat condition are as follows:

- In herds of up to 500 cows, assess all teats on at least 25 randomly selected cows, or 10% of the herd, whichever option provides the greater number of cows.
- In herds of more than 500 cows, assess all teats on at least 50 randomly selected cows.
If a flow simulator is not available, then the measurement of mean claw vacuum is simplified greatly by pre-installing 3-5 T-pieces between the claw outlet and long milk tube. These T-pieces are capped when not in use. The vacuum recorder is connected to record mean vacuum at 30 seconds and 90 seconds of milking for one cow then it can be moved immediately to the next available milking unit without having to wait for the first cow to finish milking. One group of 3-5 cows can be recorded as soon as milkline vacuum stability has been measured. A second group of 3-5 cows can be recorded later in the milking.

Consider asking a member of the farm family to help with recording the data.

It should be possible to collect all or most of the data by using two persons at one milking (with the option for one person to return for a follow-up visit if necessary) by organising tasks along the following lines:

**Before milking**

Both observers should arrive at the farm at least one hour before milking. One person evaluates possible environmental factors. The more technically-oriented person assesses liners, measures Working Vacuum, regulator undershoot and overshoot, claw air vents (either hole size or individual claw air admission), mean claw vacuum with flow simulator, and/or pre-installs T-pieces.

**During milking**

Adviser One evaluates teat condition for the first two-thirds of milking and observes milking routines for the last third.

Adviser Two:
- Records milkline vacuum stability (15 minutes) and receiver vacuum (if necessary).
- Records mean claw vacuum (if necessary) on the first group of 3-5 cows.
- Observes cow behaviour and milking times per cow:
  - In a herringbone dairy, observe groups of 3-4 cows (for a total of 25 or more cows).
  - In a rotary dairy, it is more efficient to observe cow behaviour for 25 (or more) cows near the cow entry position, while noting the approximate stall position when milk starts flowing strongly into most claw bowls. When this average starting point for milk flow has been estimated, the observer moves to a convenient vantage point near the cups off position. A different group of 25 (or more) cows is observed to determine:
    - The average stall position at which milk flow slows or stops for the majority of cows
    - The average stall position at which most clusters are detached
    - Cow behaviour during the last 2 minutes of cups on.
  The total cups on time and average milk flow time per cow can be calculated by measuring the rotation time of the platform, including normal repeatable stoppages but not unusual events during the time of the observations.
- Listens for and records any audible cup slips and falls as they occur.
- Records mean claw vacuum (if necessary) on the second group of 3-5 cows
- Measures completeness of milking by hand-stripping all quarters of 25 cows preferably, dictating results into a tape recorder or with help from the teat evaluation assistant for the last third of available milking time. It is not necessary to continue stripping any quarter after it becomes obvious that the strip yield exceeds 100 millilitres. It is quicker and more efficient to stop, record the quarter as ‘High’, and move on to the next teat.

**Follow-up visit(s)**

If two milking-time visits are planned, it is well worth including one morning and one afternoon milking due to the differences commonly seen in cows’ production level and changes in milking staff.
INVESTIGATION
MASTER SHEET

Presenting problem
On 23/6/22
High BCS, and High...
Number of clinical cases...

Re-defined problem
Chronic high BCS due to clinical, and subclinical infections with Strep. Agripne.

Agreed key factors to resolve the problem
(Use A7 to identify and allocate priorities)

Equipment - Producers’ linear/cluster alignment
Test disinfection
Culling policy and herd health
Cups, materials - milking technique

Advisory team
Name: O.A.
Company: Veterinary Clinic
Phone:
Fax:
Email:

Name: A.K.
Company: Murrion Congowen Coop
Phone:
Fax:
Email:

Name: R.T.
Company: Healthy Cows Coop
Phone:
Fax:
Email:

Recommendation signing:
Client: Felix Freemark
### Investigation Master Sheet

**Technote 13**

**A5**

**I. Test Condition**

<table>
<thead>
<tr>
<th>Test Condition</th>
<th>TN</th>
<th>Yes</th>
<th>Unsure</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low light change In condition (cause ruminating animals) excessive worm load</td>
<td>5</td>
<td>✓</td>
<td></td>
<td></td>
<td>*Near threshold of concern for first 1,2 pairs</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>✓</td>
<td></td>
<td></td>
<td>*30% rough + worn rough feet ticks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**J. Cow Behaviour - Milking Time per Cow**

<table>
<thead>
<tr>
<th>Cow behaviour observed during milking</th>
<th>TN</th>
<th>Yes</th>
<th>Unsure</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow either not comfortable in all stages, e.g. when overloaded</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>*Look comfortable when overloaded</td>
</tr>
<tr>
<td>cow loses control of forelimb</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>*B.3 mind on</td>
</tr>
<tr>
<td>Cow appears restless and uncomfortable, e.g. cow looks down, pulls milk bags, *20% of cows</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>*20%</td>
</tr>
</tbody>
</table>

**K. Compliance of Milking Cluster Alignment**

<table>
<thead>
<tr>
<th>Compliance of milking cluster alignment</th>
<th>TN</th>
<th>Yes</th>
<th>Unsure</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 50% of cluster</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>*Need to work out why milk flow is so low</td>
</tr>
<tr>
<td>Cluster being currently used</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>*Twisted milk and pulsation tubes</td>
</tr>
</tbody>
</table>

**A6**

**L. Test Disinfectant Preparation**

<table>
<thead>
<tr>
<th>Test disinfectant preparation</th>
<th>TN</th>
<th>Yes</th>
<th>Unsure</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The product is diluted by MPA</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>*Unacceptable</td>
</tr>
<tr>
<td>High concentration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*High concentrate</td>
</tr>
</tbody>
</table>

**M. The Conclusion**

<table>
<thead>
<tr>
<th>Conclusion</th>
<th>TN</th>
<th>Yes</th>
<th>Unsure</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow came in free and dry environment</td>
<td>2</td>
<td>✓</td>
<td></td>
<td></td>
<td>*Got back through muddy lane and field</td>
</tr>
<tr>
<td>Milking process was okay in the first hour after milking</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>*Half way out on muddy track, some milking</td>
</tr>
</tbody>
</table>

**Feeding**

**Graze**

Seek advice
Herd Mastitis Dynamics Chart

Technote 13 page 7

Major pathogen(s): Staphylococcus aureus (90% cultures)

Key control points:

- Machines
  - Y. Korn rubber me + liners
  - Blocks
  - Effective routine wash
  - Block adjustment
  - Cluster alignment

- Routine
  - Cows
  - Piglet yield
  - Feed
  - Water

- Other
  - Top hygiene

140 liters each cow

Clean cow

Mastitis score (clinical mastitis)

- Blanket set last year, selective culling
- Haphazard culling policy
- Detection + treatment of clinicals

Other key issues:

- Need to herd feet regularly

Churn Feedgood
**Farm Profile**

**Client details**

- **Name:** Tony Treadgood
- **Contact person:** Tony Treadgood
- **Phone:**
- **Address:**

**Client description of the problem**

- **Problem:** Reduced BMCC until last 5 years
  - **Description:**

**About the farm**

- **Hard stock:** 1900
- **Number of culling staff:** 5

**Milk records**

- **Number of samples:** 24
- **COLlected from:** DH and AK
- **Date of last milk test:** 22/10/02

**AMHTA score**

- **Date of last milk test:** 22/10/02
- **Tested by:** (field test) [Milkwise & Co.]

**Clinical case records**

- **Are they:**
  - **Diagnosed:**
  - **Treated:**

**Description of the problem**

- **Problem:** Reduced BMCC until last 5 years
  - **Description:**

**People**

- **Do you employ milking staff?**
  - **Yes**
  - **No**
- **Number of operators:** 2
  - **Is the herd ever milked more than once a day?**

**Gains**

<table>
<thead>
<tr>
<th>Year</th>
<th>How many first cows in the herd (Approx.)</th>
<th>How many native cows in the herd (Approx.)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>This year</td>
<td>112</td>
<td>278</td>
<td>400</td>
</tr>
<tr>
<td>Last year</td>
<td>93</td>
<td>207</td>
<td>300</td>
</tr>
</tbody>
</table>

**Have any cows in your milking herd been introduced from external sources in the last 3 years?**

- **Yes**
- **No**

**If yes, please describe**

- **Date:**
  - **Source:**
  - **No. cows:**
  - **No. milked hours:**
  - **Total:**

**Have you added cows belonging to other hands in your dairy in the last 3 years?**

- **Yes**
- **No**

**If yes, when:**

**Other relevant information**

- **Other details:**

**Technote 13**

Seek advice
Farm Profile

Environment:
Are there areas around the farm that are likely to develop into muddy or wet areas?
- Yes
- No

Are there any small ponds or ditches around the farm?
- Yes
- No

Are there any ecosystems or natural habitats present on the farm?
- Yes
- No

Are there any areas that are prone to flooding?
- Yes
- No

Where do cows calve?
- Calvages
- Farrow
- Cows

Do you have a feed pen?
- Yes
- No

Are there any other points you would like to discuss about the farm?
- Climate
- Soil types
- Veterinary

---

Clinical mastitis:
In the last 8 days, there have been 13 cows with clinical mastitis.

<table>
<thead>
<tr>
<th>Day</th>
<th>Quality Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Jul</td>
<td>BMCC</td>
<td>550,000</td>
</tr>
<tr>
<td>15 Jul</td>
<td>BMCC</td>
<td>598,000</td>
</tr>
<tr>
<td>22 Jul</td>
<td>BMCC</td>
<td>483,000</td>
</tr>
<tr>
<td>02 Aug</td>
<td>BMCC</td>
<td>348,000</td>
</tr>
<tr>
<td>12 Aug</td>
<td>BMCC</td>
<td>380,000</td>
</tr>
<tr>
<td>22 Aug</td>
<td>BMCC</td>
<td>478,000</td>
</tr>
<tr>
<td>05 Sep</td>
<td>BMCC</td>
<td>485,000</td>
</tr>
<tr>
<td>16 Sep</td>
<td>BMCC</td>
<td>562,000</td>
</tr>
<tr>
<td>27 Sep</td>
<td>BMCC</td>
<td>390,000</td>
</tr>
<tr>
<td>07 Oct</td>
<td>BMCC</td>
<td>445,000</td>
</tr>
</tbody>
</table>

Date: 23/10
Client: [Signature]
Individual Cow Cell Counts

Comparison of mastitis prevalence in different groups of cows

<table>
<thead>
<tr>
<th>Group</th>
<th>No. cows with any cell count above 250</th>
<th>Total No. cows in group</th>
<th>Percent above 250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice location heifers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mature cows</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Estimating the rate of new infections in first lactation heifers

<table>
<thead>
<tr>
<th>Herd Test Date</th>
<th>No. heifers with any cell count above 250</th>
<th>No. of heifers tested</th>
<th>Percent above 250</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The number of persistent infections

<table>
<thead>
<tr>
<th>No. cows with any cell count above 250</th>
<th>No. that ALSO had a cell count above 250 last lactation</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Date: ____________________________  
Client: __________________________

LACTATION
### PULSATION CHAMBER VACUUM RECORDINGS

<table>
<thead>
<tr>
<th>No.</th>
<th>Milking No.</th>
<th>Chute No.</th>
<th>Date</th>
<th>Time</th>
<th>Chute W</th>
<th>Milk Type</th>
<th>VMT</th>
<th>Pressure</th>
<th>Vacuum</th>
<th>Milking No.</th>
<th>Chute No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1/12</td>
<td>08:00</td>
<td>136</td>
<td>0</td>
<td>7.0</td>
<td>19.1</td>
<td>135.0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1/12</td>
<td>08:00</td>
<td>136</td>
<td>0</td>
<td>7.0</td>
<td>19.1</td>
<td>135.0</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

### Performance Tests of Milking Machines

**Vacuum Levels and Differences**

- **Vacuum reading**
  - A1
  - A2
  - A3

- **Collected data**
  - P1
  - P2
  - P3

**Vacuum stability in milking and receiver**

- **Vacuum reading**
  - A1
  - A2
  - A3

**Drop 1-2**

- **Peak reading**
  - P1
  - P2
  - P3

---

*Note: Further details and specifications can be found in the original document.*
Seek advice
## Cow Behaviour

<table>
<thead>
<tr>
<th>Cow No.</th>
<th>In milking (s)</th>
<th>As per pump (s)</th>
<th>In latest (s)</th>
<th>Male/Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>8</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
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<tr>
<td>9</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>11</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>12</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>13</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
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<tr>
<td>14</td>
<td>15</td>
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<td>15</td>
<td>15</td>
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<td>15</td>
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</tr>
<tr>
<td>16</td>
<td>15</td>
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<tr>
<td>17</td>
<td>15</td>
<td>15</td>
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<tr>
<td>18</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>19</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>20</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

### Cluster Alignment

**Cluster alignment:**
- Declines being overly on rear leg
- Weak
- Fulling or dragging and weak
- Head over heel
- Too far from the front
- Close to the rear
- Too close to the front
- Too close to the rear
- Too far from the front
- Too far from the rear
- Too close to the front
- Too close to the rear

**Estimated Ties size and shape:**
- Length, the ties:
  - Tied:
    - In front:
    - In the rear:
    - In the middle:
    - In the back:
    - In the flank:
  - The ties:
    - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:
  - The ties:
    - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:
  - The ties:
    - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:

**Cluster width and shape:**
- The width, the ties:
  - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:
  - The width, the ties:
    - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:
  - The width, the ties:
    - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:

**Cluster length and shape:**
- The length, the ties:
  - Tied:
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    - In the back:
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    - In the flank:
  - The length, the ties:
    - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:
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- The width, the ties:
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    - In the back:
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    - Tied:
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    - In the back:
    - In the middle:
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    - In the flank:
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    - In the front:
    - In the back:
    - In the middle:
    - In the flank:
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    - In the back:
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    - In the back:
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    - Tied:
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    - In the back:
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    - In the flank:
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    - In the flank:
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    - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:
  - The length, the ties:
    - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:

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    - In the back:
    - In the middle:
    - In the flank:
  - The width, the ties:
    - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:
  - The width, the ties:
    - Tied:
    - In the front:
    - In the back:
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    - In the flank:
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    - In the back:
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    - In the back:
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    - In the flank:

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    - In the back:
    - In the middle:
    - In the flank:
  - The length, the ties:
    - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:
  - The length, the ties:
    - Tied:
    - In the front:
    - In the back:
    - In the middle:
    - In the flank:
**Test Disinfectant**

**Technote 7**

- **The stock product (as purchased):**
  - Brand name: [Redacted]
  - Volume: [Redacted]
  - Purchase date: [Redacted]
  - NRA approved: [Redacted]
  - No. [Redacted]

- **Product type:**
  - For animal use in food animal or milk production
  - [Redacted]

- **The active:**
  - Chemical Name: [Redacted]
  - Concentration: 25%
  - [Redacted]

- **Contents unaltered:**
  - No: [Redacted]
  - Yes: [Redacted]

- **Storage on farm:**
  - [Redacted]

- **Product occasion is used at: farmer's discretion:**
  - No: [Redacted]
  - Yes: [Redacted]

- **Commence:**
  - [Redacted]

- **Product expiry date:**
  - 4th Sept 2004

**Application**

- **Applied:**
  - By: [Redacted]
  - [Redacted]

- **In the course of normal activities in:**
  - [Redacted]

- **The area being treated:**
  - [Redacted]

- **The spray method:**
  - [Redacted]

- **Volume of prepared test treatment used per cow:**
  - [Redacted]

- **Water and preparation:**
  - [Redacted]

- **Mixing:**
  - Do not complete the estimated dose if using the Ready-to-use product.

**Test disinfectant mix (as prepared)**

- **Chemical name in each batch:**
  - [Redacted]

- **The case:**
  - Concentrate: [Redacted]
  - Water: [Redacted]

- **Added amount:**
  - [Redacted]

- **Calculated active in milk:** [Redacted] %

- **If applicable, the test active:**

- **Calculated amount in milk:**
  - [Redacted]%

**The water used**

- **Source:**
  - [Redacted]

- **TDS:**
  - [Redacted]

- **Calculation factor:**
  - [Redacted]

- **Test results:**
  - [Redacted]

**Any recent changes?**

- [Redacted]

**Other comments:**

- [Redacted]

---

**The Environment**

**Technote 7**

The calving area was inspected

- No: [Redacted]
- Yes: [Redacted]

- Calving area does not exceed one cow

- Ash: [Redacted]
- [Redacted]

- The calving area does not exceed one cow

- Water: [Redacted]
- [Redacted]

- Any quiescent area to remain dry

- Holes in the same areas as to cover

- [Redacted]
- [Redacted]

- Yards, lanes and waterways

- Yards and waterways impassable

- [Redacted]

- Water: [Redacted]

- Waterways or drainage likely to be becoming polluted

- [Redacted]
- [Redacted]

- Cow can enter water channels or other waterways

- [Redacted]

- Sprinklers are used to keep cows cool in heat waves

- [Redacted]

- The feed used

- [Redacted]

- [Redacted]

- [Redacted]

- [Redacted]
13.2 Record problems and actions taken.

The aim is to develop a workable plan for the farm: formulate the plan with the on-farm team, write a clear report, ensure the required activities are detailed on a wall chart or some other visible checklist, and schedule follow-up.

To increase the likelihood of your recommendations being adopted, it is important that clients see the suggested changes as relevant, offering real rewards (preferably financial), and not too complex for the available resources (Gardner 1990). A plan that they build themselves, with guidance from an adviser, is more likely to be workable and implemented.

Providing a clear written report

The Investigation Master Sheet in the Countdown Downunder Mastitis Investigation Pack is used by the advisory team to collate and prioritise findings and re-define the problem until solutions can be recommended. More steps are then needed to convert the findings of the investigation into do-able steps to promote implementation on farms. This process is usually achieved through written reports to the owner/manager and through meetings of the farm staff and adviser(s) where the team members develop an approach suitable for their herd and allocate appropriate resources.

Clear written reports provide a permanent record of the problems and recommendations for the owner and are more likely to be implemented correctly. They may form the basis of discussion at future visits and are necessary when other professionals advise the farmer. Reports should contain:

• The specific objectives of the original visit.
• The salient points of the investigation.
• The agreed list of what must be done, by when, and who is responsible.
• Arrangements for follow-up.

Because excessive detail buries important points, a short (preferably single page) report is recommended. Report writing doesn’t have to be an onerous task. Time invested in setting-up a customised template (e.g. on word processing software) will help to structure and simplify the process. As an example, the advisory team’s first report to Felix Feelgood (following the mastitis investigation on his farm) is shown on the next page.

It is important to encourage the owner and staff to record relevant information as they implement the plan. To avoid the need to keep extra records it may be possible to incorporate some of this within the Quality Assurance records on the farm.

Following-up

The report must indicate what areas need to be tackled after the immediate changes have been made in order to maintain progress. Specifically, it needs to clearly state what the tasks ahead are, when they should be discussed in more detail, and who should be involved.

Key papers

Report of a mastitis investigation for Felix Feelgood

20 November 2002
Dear Felix,

Report of Mastitis Investigation conducted in October / November 2002
Thank you for the opportunity to conduct a mastitis investigation in your herd.

The problem
Your herd has had a high BMCC (usually between 300,000 – 600,000) for the last five years and many clinical cows are repeatedly infected despite your best attempts at treatment.

Our investigation
Our understanding of the mastitis and milk quality problem in your herd is based on information provided by you and observations made on the farm between 22 October and 14 November. Our technical findings and interpretation are summarised in a Mastitis Investigation Pack that will be kept on file at ... vet clinic for future reference.

Milk cultures confirmed that the problem in your herd is caused by the bacteria Staph aureus. This infection can spread to uninfected cows at milking – see pages 3, 27 and 37 of the Countdown Farm Guidelines. Many cows with chronic Staph aureus infections cannot be cured by antibiotics – page 58 of the Farm Guidelines explains the value of culling these cows from the herd.

Major factors contributing to the problem in your herd
Factors promoting spread of infection between cows in your herd that are of special concern to us are:
* those that reduce teat health in the herd - badly functioning pulsators, old or worn liners, and over milking;
* those that increase the number of Staph aureus at teat ends - inadequate teat disinfection, not wearing gloves especially when dealing with suspect clinical cases, poor cup removal technique (forcing bacteria into the teat canal beyond the reach of teat disinfectant) and retaining chronically infected cows in the herd.

Our action plan
Many of the immediate actions relate to changes in the milking shed as discussed and agreed to by the farm team at the meeting yesterday. These are summarised below:

<table>
<thead>
<tr>
<th>Farm Guideline</th>
<th>What to change</th>
<th>Who’s involved</th>
<th>By When</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 (page 33)</td>
<td>Install new pulsators and correct cluster alignment</td>
<td>John Clarke</td>
<td>Immediately</td>
<td>✔</td>
</tr>
<tr>
<td>6.3 (pages 35-36)</td>
<td>Change liners every 2,500 milkings</td>
<td>Felix</td>
<td>Immediately</td>
<td>✔</td>
</tr>
<tr>
<td>As per Milkcare</td>
<td>Start keeping a permanent written clinical case record</td>
<td>Felix</td>
<td>Immediately</td>
<td>✔</td>
</tr>
<tr>
<td>Fact Sheet G (pages 103-104)</td>
<td>Prepare 20 mL of teat disinfectant per cow for each milking</td>
<td>Felix, Les</td>
<td>Immediately</td>
<td>✔</td>
</tr>
<tr>
<td>4 (pages 20-24)</td>
<td>Only treat cows when changes in milk persist for more than</td>
<td>All milking staff</td>
<td>Immediately</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 squirts (wear gloves!)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.7 and 5.8 (page 30)</td>
<td>Reduce over milking and change the cups off technique</td>
<td>All milking staff</td>
<td>Within one week</td>
<td></td>
</tr>
<tr>
<td>7.6 (page 39)</td>
<td>Ensure all teats are adequately covered with teat disinfectant at each milking</td>
<td>All milking staff</td>
<td>Within one week</td>
<td></td>
</tr>
<tr>
<td>5.2 (page 27)</td>
<td>Foremilk strip ALL cows when there are clots on the filter or a sharp rise in BMCC</td>
<td>All milking staff</td>
<td>Apply</td>
<td></td>
</tr>
</tbody>
</table>

It was great to see how the milking staff (especially Peter and Les) picked up on why some changes were required to the current routine and what could be done in your shed. However, it is important to keep in mind that we will only start to see benefits once the chronically infected cows are removed from the herd. In early January, we need to spend about half a day assessing the herd and generating a culling list.

At the next farm meeting, scheduled on 11 February, we will check that progress is on track, consider some of the longer term changes that are required (including a dry cow strategy for the herd and the benefits of milk recording), and update the action plan accordingly. Please feel free to contact us if you have any further inquiries before then.

Regards,
Your advisory team