APPENDIXES
APPENDIX A

Questionnaire for farm

Date: ..........................

General Information

1. Farm ID .......................... MCC .......................... COOP ..........................

2. Owner ................................ age ................................

3. Number of milkers ................. Man .................. Woman ..................

4. Number of years in dairy farming .......... years .......... months

5. Have the farmer ever had a dairy farming education?
   □ No  .................................. □ Yes from ..................................

6. Income
   Average daily milk production .......... kg ........ milk price/ kg .......... baht
   (Average monthly income .......... baht)

Barns and Environment

7. Barns typing  .......................................................................................... □ Yes  .................................. □ No

8. Barn’s environment
   8.1 Ventilation  .................................................................................. □ Good  .................................. □ Fair  .................................. □ Poor
   8.2 Floor  ....................................................................................... □ Dry  .................................. □ Wet
   8.3 Milking area  .......................................................................... □ found the feces  .................................. □ not found the feces
   8.4 Manure management  .................................................................. □ Good  .................................. □ Poor
Milking hygiene

9. Milking cow’s cleanliness □ Good □ Fair □ Poor

10. Cow washing □ Yes □ No (if “No” skip to 12)

11. Dry the cow □ > 15 minute □ < 15 minute

12. Udder preparation

12.1 clean the udder with disinfectant solution □ Yes □ No

12.2 type of disinfectant □ Chlorine □ Others

12.3 dry the udder before attach the teat cup □ Yes □ No

12.4 use individual towel per cow □ Yes □ No

12.5 milk stripping □ Yes □ No

12.6 CMT checking □ Yes □ No

12.7 pre dipping □ Yes □ No

12.8 attach the teat cup with in 1 min. □ Yes □ No

12.9 post dipping □ Yes □ No

12.10 teat dipping solution

12.11 dip the teat cup in disinfectant solution before next milking cow □ Yes □ No

12.12 milk filter □ Yes □ No

13. Started milking time morning _____ a.m. afternoon _____ a.m.

Finished milking time morning _____ a.m. afternoon _____ p.m.

14. Milk transportation □ by themselves □ by the others
15. Started transportation time  
   morning _____ a.m.  afternoon _____ p.m.

   Finished transportation time  
   morning _____ a.m.  afternoon _____ p.m.

**Milkers**

16. Hands washing before milking  □ Yes  □ No (if “No” skip to 18)

17. Washing hands by 
   □ water  □ soap

**Equipment**

18. Milking technique  □ hand milking  □ machine milking
   
   (if “hand milking” skip to 19.5)

19. Milking machine
   
   19.1 age of milking machine ____________ years
   19.2 age of teat cup liner ____________ months
   19.3 cleanliness of teat cup liner  □ Good  □ Poor
   19.4 cleanliness of long milk tube  □ Good  □ Poor
   19.5 cleanliness of bucket  □ Good  □ Poor
   19.6 cleanliness of milk tank  □ Good  □ Poor

**Mastitis**

20. Mastitis in the farm
   
   20.1 number of milking cows _________
   20.2 number of milking cows without mastitis _____________
   20.2 number of milking cows with 1-time mastitis _____________
   20.3 number of milking cows with more than 1-time mastitis ______
21. If the cow was sick, ____________

☐ treat the cow by the farmer

☐ treat the cow by the volunteer veterinary technician of DLD

☐ treat the cow or consult with by the veterinarian

☐ others __________________

22. Have the farmer’s milk ever been rejected?

☐ No.

☐ Yes, because of the high bacterial number.

☐ Yes, because of the high somatic cell count.

☐ Yes, because of the antibiotic residue.

☐ Yes, because __________________
APPENDIX B

Questionnaire for Milk Collecting Center

Date_____________________

1. MCC ______________________ COOP ______________________

2. Number of members ______________________

3. Number of technicians ______________________

4. MCC management style
   □ Private □ Cooperative □ Academic organization □ Others

5. Received milk time: morning start _____ a.m. finish _____ a.m.
   evening start _____ a.m. finish _____ a.m.

6. Total milk: morning ________ Ton evening ________ Ton

7. How does the MCC determine to buy any milk?
   □ Antibiotic residue test by technique ___________
   □ Alcohol test
   □ Test for specific gravity by technique ___________
   □ Others ___________ by technique ___________

8. How does the MCC determine about the price of milk?
   □ Methylene blue reduction test □ Resazurin test
   □ Test for antibiotic residue □ Delivery time
9. Does the MCC have clean water for cleaning the farmer's milk tank?
   □ Yes  □ No

10. Number of Cooling Tank _______ Size _________

11. Temperature setting of Cooling Tank _________ °C

12. Temperature of cooling tank at collecting time _________ °C

13. Does the MCC clean the pipeline and cooling tank by CIP system?
   □ Yes  □ No

14. Solutions which are used to clean the pipeline and cooling tank

   □ cleaned water _____ min _______ times
   □ basic solution _____ min _______ times
   □ acidic solution _____ min _______ times
   □ others __________________

15. How often does MCC clean the pipeline and cooling tank?
   □ 1/day  □ 2/day  □ Others__________

16. Have the milk of MCC ever been rejected?
   □ No

   □ Yes, because of high bacterial contamination.

   □ Yes, because of antibiotic residues.

   □ Yes, because of __________________________

17. Milk delivery to the dairy plants _______ times/day at _______ a.m./p.m.

18. Cooling system of cooling tank __________________________
19. Temperature of the milk will get to the set point in ______________ hours

20. Milk collecting area’s ground  □ wet  □ dry

21. Other details of MCC.
APPENDIX C

The correlation of the microbiological quality between the indirect method of (MB) and the direct method (SPC, CC, LPC)

<table>
<thead>
<tr>
<th></th>
<th>MB</th>
<th>SPC</th>
<th>CC</th>
<th>LPC</th>
</tr>
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<tbody>
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<td>1.000</td>
<td>-0.657</td>
<td>-0.570</td>
<td>-0.227</td>
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<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
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<td>N</td>
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<td>262</td>
<td>263</td>
<td>251</td>
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<tr>
<td>SPC</td>
<td>-0.657</td>
<td>1.000</td>
<td>0.656</td>
<td>0.357</td>
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<td>Sig. (2-tailed)</td>
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<td>&lt;0.0001</td>
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<tr>
<td>N</td>
<td>262</td>
<td>262</td>
<td>262</td>
<td>250</td>
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<tr>
<td>CC</td>
<td>-0.570</td>
<td>0.656</td>
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<td>N</td>
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<td>262</td>
<td>263</td>
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<tr>
<td>LPC</td>
<td>-0.227</td>
<td>0.357</td>
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APPENDIX D

Microbiological quality (SPC, CC, LPC) of bulk milk from monthly samples
of 11 milk collecting centers

<table>
<thead>
<tr>
<th>MCC</th>
<th>SPC (mean ± SE cfu/ml)</th>
<th>CC (mean ± SE cfu/ml)</th>
<th>LPC (mean ± SE cfu/ml)</th>
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<tbody>
<tr>
<td>1</td>
<td>4,064,433 ± 1.19 (N=25)</td>
<td>41,976 ± 1.37 (N=25)</td>
<td>7,311 ± 1.24 (N=25)</td>
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<tr>
<td>2</td>
<td>2,032,357 ± 1.11 (N=26)</td>
<td>19,409 ± 1.18 (N=26)</td>
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<td>3</td>
<td>1,541,700 ± 1.12 (N=24)</td>
<td>17,620 ± 1.21 (N=24)</td>
<td>6,577 ± 1.52 (N=24)</td>
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<td>4</td>
<td>506,991 ± 1.12 (N=24)</td>
<td>6,998 ± 1.12 (N=25)</td>
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<td>5</td>
<td>1,798,871 ± 1.22 (N=23)</td>
<td>25,942 ± 1.31 (N=23)</td>
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<td>6</td>
<td>1,745,822 ± 1.22 (N=24)</td>
<td>28,840 ± 1.22 (N=24)</td>
<td>3,420 ± 1.23 (N=23)</td>
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<td>7</td>
<td>1,230,269 ± 1.13 (N=23)</td>
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<td>8</td>
<td>1,892,344 ± 1.26 (N=22)</td>
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<td>668,344 ± 1.14 (N=23)</td>
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<td>2,978,516 ± 1.15 (N=24)</td>
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<td>405,509 ± 1.19 (N=24)</td>
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<td>1,300 ± 1.22 (N=23)</td>
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<tr>
<td><strong>Name</strong></td>
<td>Miss Sukolrat Boonyayatra</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Birth Date</strong></td>
<td>6 September 1978</td>
<td></td>
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<td><strong>Academic history</strong></td>
<td>1994, certificate of Mathayom VI from The Institute for Non-Formal Education Standard, Bangkok</td>
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<tr>
<td></td>
<td>2001, Doctor of Veterinary Medicine (second class honor) from Chulalongkorn University, Bangkok, Thailand</td>
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<tr>
<td><strong>Scholarship</strong></td>
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