# MODIPALM ENGINEERING SDN BHD

## CONTINOUS STERILISATION FORUM 2

## UPDATES AND LATEST IMPROVEMENTS

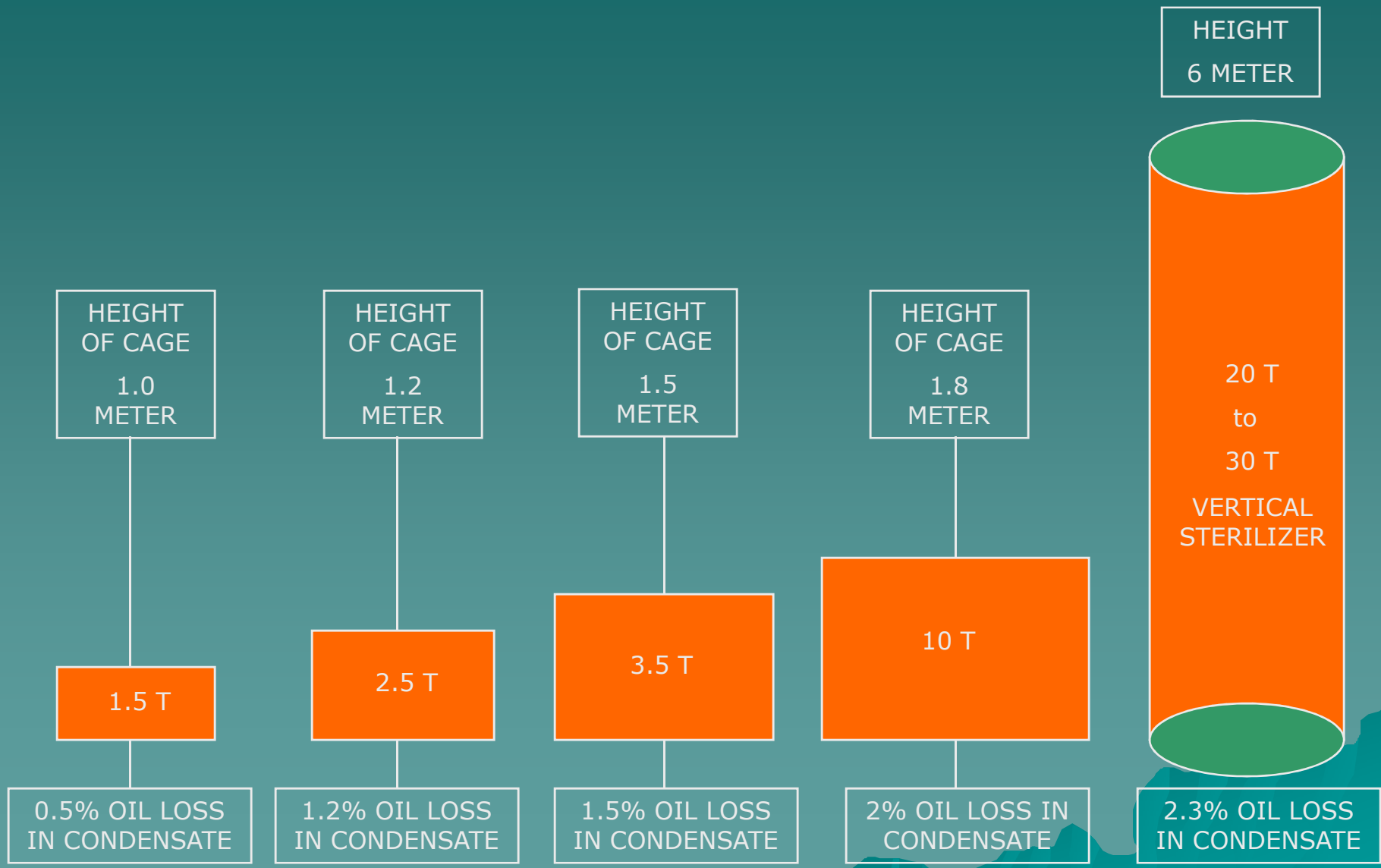
# CONTINUOUS STERILIZATION STEPS

1. PRE-STERILIZATION : FFB IS CONDITIONED USING BUNCH CONDITIONER

2. STERILIZATION : FFB IS CONTINUOUSLY STERILISED AT ATMOSPHERIC PRESSURE OR WITH LOW PRESSURE

3. POST-STERILIZATION : FURTHER HEATING OF FRUITLETS USING THE POST-HEATING VESSELS AND THE HORIZONTAL DIGESTER

# THE BIGGER THE CAGES THE HIGHER THE OIL LOSS DURING STERILIZATION



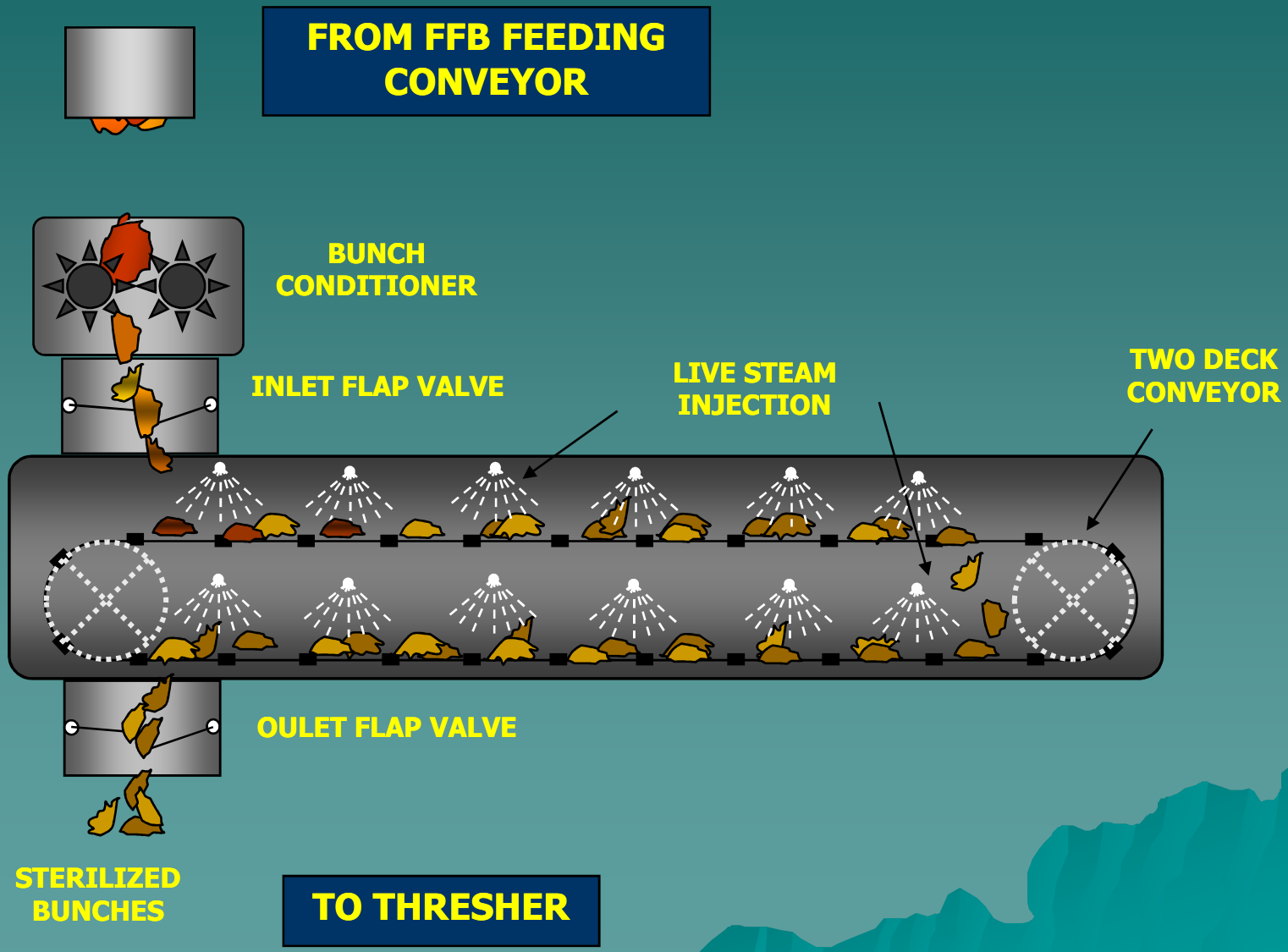
# FFB STERILIZATION STATION


**FFB IS CONDITIONED USING THE BUNCH CRUSHER BEFORE STERILIZATION**

# CONTINUOUS STERILIZER

- USE OF LIVE STEAM INJECTION WITH STEAM DRAWN FROM BACK PRESSURE VESSEL
- FFB CARRIED OVER A TWO-DECK CONVEYOR
- STERILIZATION PERIOD 60 – 80 MINUTES

# CONTINUOUS STERILIZATION CONCEPT



# WHAT ARE THE BENEFITS OF MODIPALM CONTINUOUS STERILIZATION?

- BETTER SAFETY & CLEANER WORKING ENVIRONMENT FROM FFB RECEPTION TO THE THRESHING STATION
- NOT A PRESSURE VESSEL AND EASY TO OPERATE
- AUTOMATION OF OIL MILL TO REDUCE LABOR
- SUBSTANTIAL SAVINGS ON LABOR AND MAINTENANCE
- MORE ENVIRONMENT-FRIENDLY
- MORE ENERGY EFFICIENT
- HIGHER OIL EXTRACTION FROM THE FRUITS
- BETTER OIL QUALITY IN TERMS OF DOBI

Intermittent black smoke emissions from a conventional palm oil mill


Consistently clean emission from a Modipalm palm oil mill

# CRUDE PALM OIL
# THAT IS GOOD FOR REFINING

- MILLERS WILL NOT ONLY BENEFIT FROM LABOR REDUCTION, LOWER OPERATING COSTS, A CLEANER & SAFER WORKING ENVIRONMENT AND LOWER PROCESSING LOSSES, BUT ALSO CRUDE PALM OIL WITH HIGH DOBI * VALUE (>3.0)

* - Deterioration of Bleachebility Index or (DOBI Value) is a unit of measurement of the degree of difficulty to bleach the crude palm oil during refining. DOBI < 2.3 is bad.

# Number of Process Operators Per Shift

| Mill Capacity | Batch Sterilization | Continuous Sterilization |
|---|---|---|
| 10 | 15 | 8 |
| 20 | 20 | 10 |
| 30 | 25 | 12 |
| 45 | 30 | 12 |

# COST SAVINGS ON LABOR & MAINTENANCE

| Cost Center | Cost savings (RM/t FFB) |
|---|---|
| Reduction in process labor | 2.50 |
| Reduction in overall maintenance | 1.18 |
| **Total cost savings** | **3.68** |

**A 40-TPH MILL PROCESSING 200,000 mt FFB/YR COULD SAVE AS MUCH AS RM700,000 A YEAR**

# IMPACT OF CONTINUOUS STERILIZATION PROCESS ON PROCESS LABOR COST

| Average monthly wage (RM) | Process labor cost (RM) | | |
|---|---|---|---|
| | Batch Sterilization[+] | Continuous Sterilization[++] | Cost saving (RM/t FFB) |
| 750 | 450,000 | 180,000 | 1.88 |
| 1000 | 600,000 | 240,000 | 2.50 |
| 1250 | 750,000 | 300,000 | 3.13 |

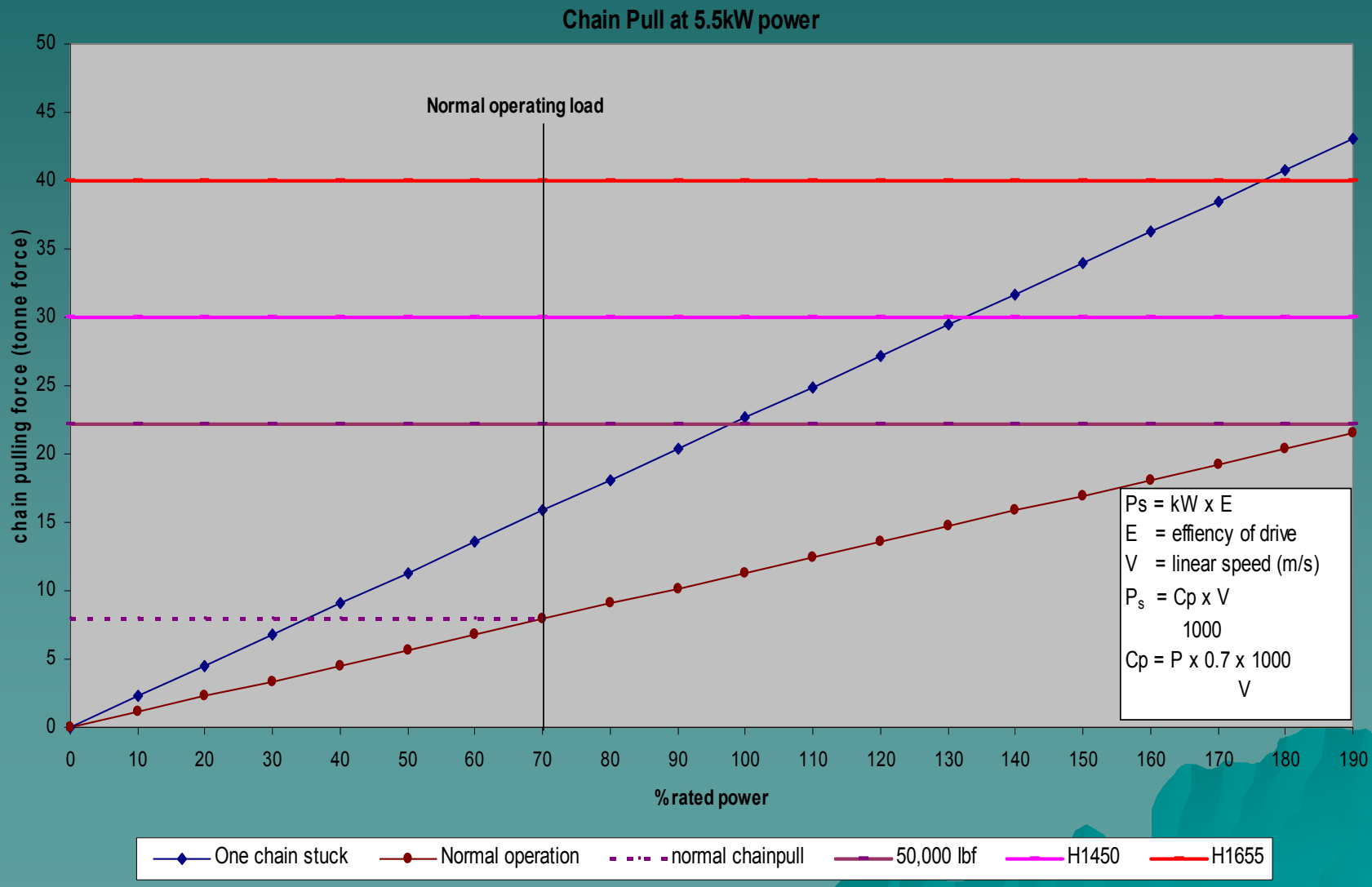
[+] Based on 25 operators per shift

[++] Based on 10 operators per shift

# HIGHER OIL RECOVERY RATES

- OIL RECOVERY EFFICIENCY OF A CONVENTIONAL MILL IS GENERALLY ABOUT 92.4%
- OIL RECOVERY EFFICIENCY OF THE MODIPALM MILL IS HIGHER AT ABOUT 93.3%
- IT MEANS AN ADDITIONAL 400 MT OF CPO FOR A 40-TPH MILL PROCESSING 200,000 MT FFB/YR

# CHAIN SELECTION



# LATEST UPGRADED VERSION OF MODIPALM CONTINUOUS STERILIZATION SYSTEM

**HYDRAULIC TENSIONING SYSTEM**

- For ensure even tensioning of the chains at all time

# LATEST UPGRADED VERSION OF MODIPALM CONTINUOUS STERILIZATION SYSTEM

**EXISTING BOLT & NUT TYPE**


**QUICK OPENING DOORS**

- Easy for maintenance works

# LATEST UPGRADED VERSION OF MODIPALM CONTINUOUS STERILIZATION SYSTEM

**EXISTING DRIVE SHAFT**


**NEW ASSEMBLY DRIVE SYSTEM**

- To minimise the angular deflection on the shaft

# LATEST UPGRADED VERSION OF MODIPALM CONTINUOUS STERILIZATION SYSTEM

# OIL ANALLYSIS IN EFB THROUGH EFB PRESS

OIL in $EFB_F$ = 1.8%

OIL in $EFB_L$ = 3.0%

$\frac{EFB_F}{EFB}$ = 70%

$\frac{EFB_L}{EFB}$ = 30%

$\frac{OIL}{EFB}$ = 1.8 X 70 + 3 X 30

= 126 +90

= 0.216%

$\frac{OIL}{FFB}$ = 0.216 x 22

= 0.475%

# MILL PERFORMANCE – SELABAK POM

| NO | PARAMETERS | CONTRACT | 26/11 | 27/11 | 28/11 | 29/11 | 30/11 | AVERAGE |
|---|---|---|---|---|---|---|---|---|
| | OIL RECOVERY | | | | | | | |
| 1 | Moisture | <0.10 | 0.11 | 0.12 | 0.1 | 0.11 | 0.1 | 0.11 |
| 2 | Dirt | <0.02 | 0.018 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 |
| 3 | Press Cake Fibre | <0.60 | 0.4 | 0.47 | 0.42 | 0.36 | 0.56 | 0.442 |
| 4 | Oil Loss in Nut | <0.08 | 0.02 | 0.04 | 0.03 | 0.04 | 0.03 | 0.032 |
| 5 | Oil Loss in Final Effluent | <0.50 | 0.52 | 0.49 | 0.47 | 0.44 | 0.46 | 0.476 |
| 6 | Fruit in Empty Bunch | <0.05 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| 7 | Extraction Efficiency | >92.00 | 93.42 | 93.08 | 93.35 | 94.04 | 93.52 | 93.48 |
| | KERNEL RECOVERY | | | | | | | |
| 1 | Moisture | <7.00 | 4.76 | 5.26 | 3.78 | 4.68 | 4.86 | 4.67 |
| 2 | Dirt | <6.00 | 6.82 | 6.25 | 6.1 | 4.91 | 4.91 | 5.91 |
| 3 | Broken Kernel | <10.00 | 11.26 | 17.25 | 18.47 | 18.64 | 20.14 | 17.15 |
| 4 | Kernel Loss in LTDS | <0.15 | 0.06 | 0.04 | 0.05 | 0.04 | 0.04 | 0.05 |
| 5 | Kernel Loss in Fibre Cyclone | <0.15 | 0.15 | 0.11 | 0.09 | 0.11 | 0.11 | 0.11 |
| 6 | Kernel Loss in Hydrocyclone | <0.05 | 0.09 | 0.07 | 0.07 | 0.05 | 0.05 | 0.07 |

# MILL PERFORMANCE – JERANGAU POM

## FELDA HOLDINGS BHD

### Quality

| Date : 24.02.09 | | |
|---|---|---|
| TEST | Limit (%) | Actual (%) |
| FFA CPO Production | 4.0% | 3.21% |
| DOBI | >2.31 | 3.04 |
| Oil Loss in Fibre | 9.0% | 8.61% |
| Oil Loss in Empty Bunch | 3% | 1.92% |
| Nut Breakage (Press Cake) | 10.0% | 2.7% |
| Kernel loss in Fibre Cyclone | 2.0% | 0.20% |
| Kernel Loss in LPTS 1 | 2.0% | 0.6% |
| Kernel Loss in LPTS 2 | 2.0% | 1.8% |
| Kernel Loss in Wet Shell | 2.0% | 2.1% |
| HB/USB | 1%/5% | 0.0%/0% |

# MILL PERFORMANCE – JERANGAU POM

## FELDA HOLDINGS BHD

### Quality

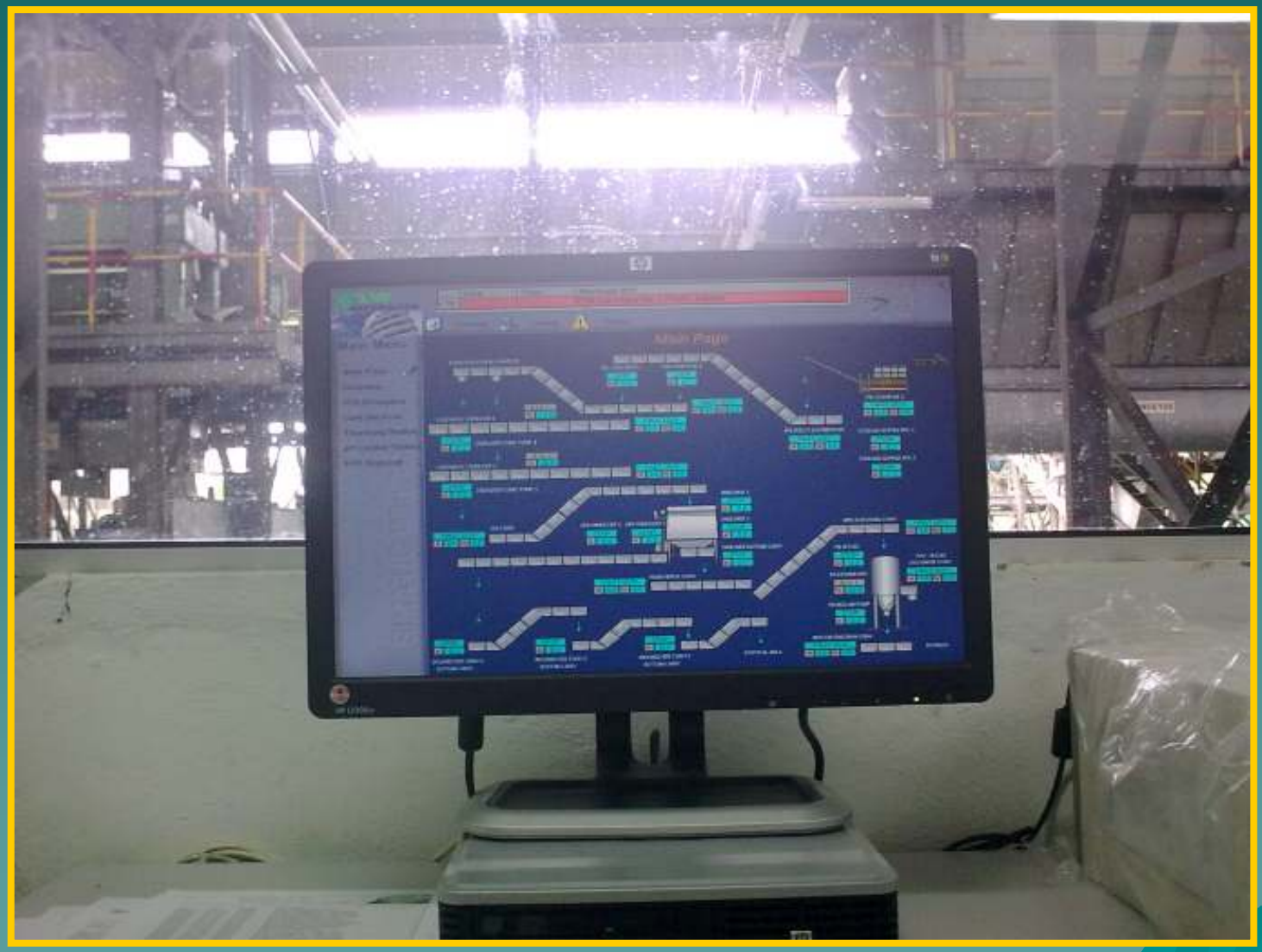
| Date : 25.02.09 | | |
|---|---|---|
| TEST | Limit (%) | Actual (%) |
| FFA CPO Production | 4.0% | 3.46% |
| DOBI | >2.31 | 2.92 |
| Oil Loss in Fibre | 9.0% | 8.28% |
| Oil Loss in Empty Bunch | 3.0% | 1.94% |
| Nut Breakage (Press Cake) | 10.0% | 3.20% |
| Kernel loss in Fibre Cyclone | 2.0% | 0.20% |
| Kernel Loss in LPTS 1 | 2.0% | 0.8% |
| Kernel Loss in LPTS 2 | 2.0% | 1.4% |
| Kernel Loss in Wet Shell | 2.0% | 1.40% |
| HB/USB | 1% / 5% | 0% / 0.0% |

# MILL PERFORMANCE – JERANGAU POM

## FELDA HOLDINGS BHD

### Quality

| **Date : 26.02.09** | | |
|---|---|---|
| TEST | Limit (%) | Actual (%) |
| FFA CPO Production | 4.0% | 3.27% |
| DOBI | >2.31 | 3.20 |
| Oil Loss in Fibre | 9.0% | 8.87% |
| Oil Loss in Empty Bunch | 3.0% | 1.70% |
| Nut Breakage (Press Cake) | 10.0% | 1.85% |
| Kernel loss in Fibre Cyclone | 2.0% | 0.6% |
| Kernel Loss in LPTS 1 | 2.0% | 1.30% |
| Kernel Loss in LPTS 2 | 2.0% | 1.73% |
| Kernel Loss in Wet Shell | 2.0% | 1.28% |
| HB/USB | 1%/5% | 0%/0% |



KERNEL RECOVERY PLANT

# A FLOATING MODIPALM MILL

A FLOATING MILL - FIRST IN THE WORLD

# A FLOATING MODIPALM MILL

PALM OIL MILL – 20 TPH

# A FLOATING MODIPALM MILL

PALM OIL MILL – 20 TPH (IN OPERATION)

# A FLOATING MODIPALM MILL

PALM OIL MILL – 30 TPH (UNDER CONSTRUCTION)

# A FLOATING MODIPALM MILL

PALM OIL MILL – 30 TPH (UNDER CONSTRUCTION)

# FIRST 45 MT/HR MILL USING CONTINUOUS STERILIZATION

# 45 MT/HR MILL USING CONTINUOUS STERILIZATION

# End of Presentation

# Thank You for Your Attention