Wine Delivery Automation

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Technical Engineering Manager,

Orlando Wines, Pernod Ricard Pacific

"Sustainability through Technology"

WEA Conference - 2009

Pernod Ricard Overview

- Pernod Ricard
  - The world's co-leader in wine and spirits
  - A turnover of 7.7 billion Euros consolidated sales
  - 15 key brands
  - Jacobs Creek one of the of our strategic brands
  - Decentralised management structure
- Our Brands
  - Jacobs Creek : 18 million cases

Orlando Wines

Orlando Wines Overview

- Our Brands
  - Jacobs Creek +8 million cases
  - Wyndham Estate +1 million cases
  - Richmond Grove, Russet Ridge, Morris
  - Sparkling, Ready to drink, bag & box
- Grape Intake
  - 170,000 tonnes grapes
- Storage
  - Rowland Flat, Barossa – 125 ML
  - Richmond Grove, Barossa – 95 ML
  - Wickham Hill, Griffith – 20 ML

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Winery Network Strategy – 2006

- Develop efficiency projects to improve wine quality, reduce production costs and reduce our environmental impact.
- Highlight two of these projects:
  - Direct to Fill
  - Wine Delivery Automation
- Specialise and simplify wineries by quality, blend size and winery operation i.e. blending & filtration utilisation.

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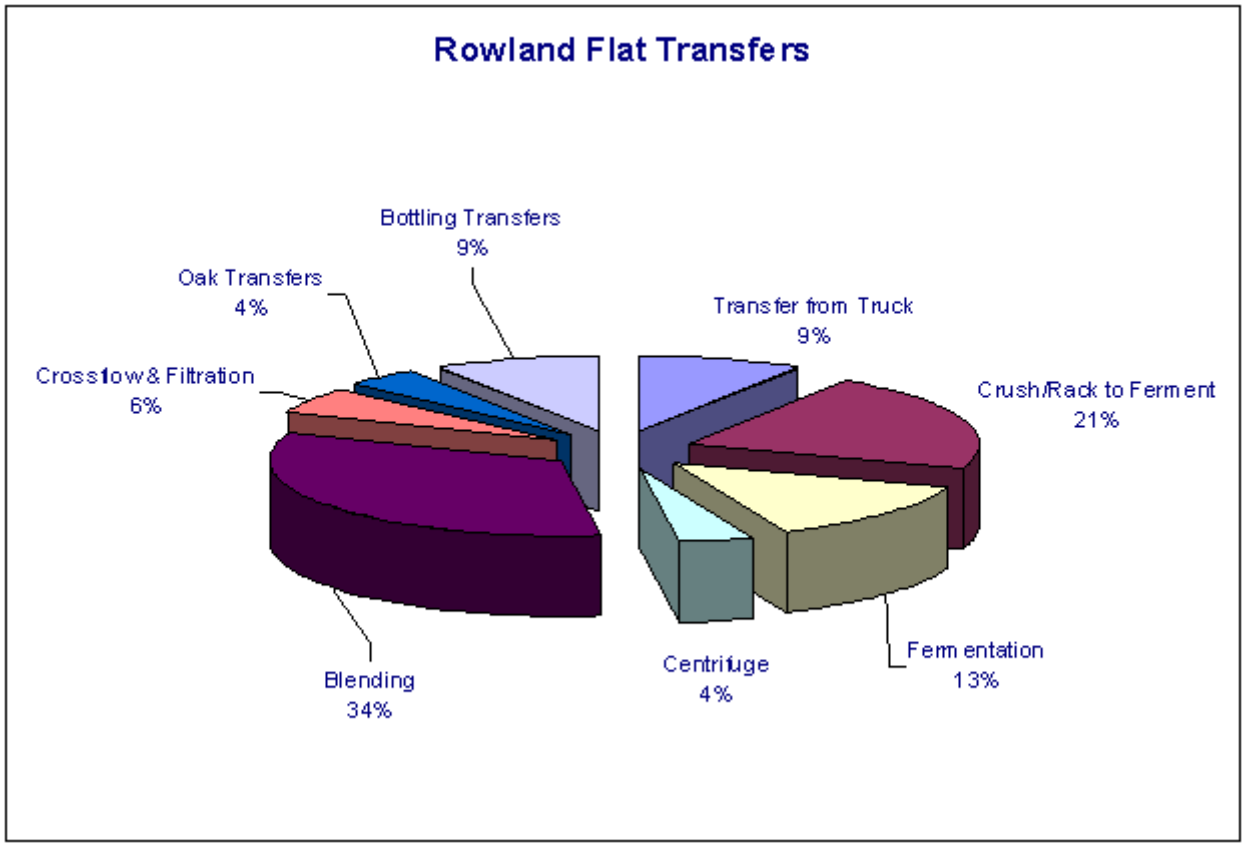
Transfer minimisation – key strategy



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Rowland Flat Site

Direct to Fill

- Delivery of wine directly from source tank via an automated mobile pump to bottling buffer tanks avoiding “pack downs or bottling splits” and unnecessary transfers.
- Benefits
  - Less transfers
  - Prevent target tank accidental wine overflow
  - Reduce DO pickup from emptying a tank

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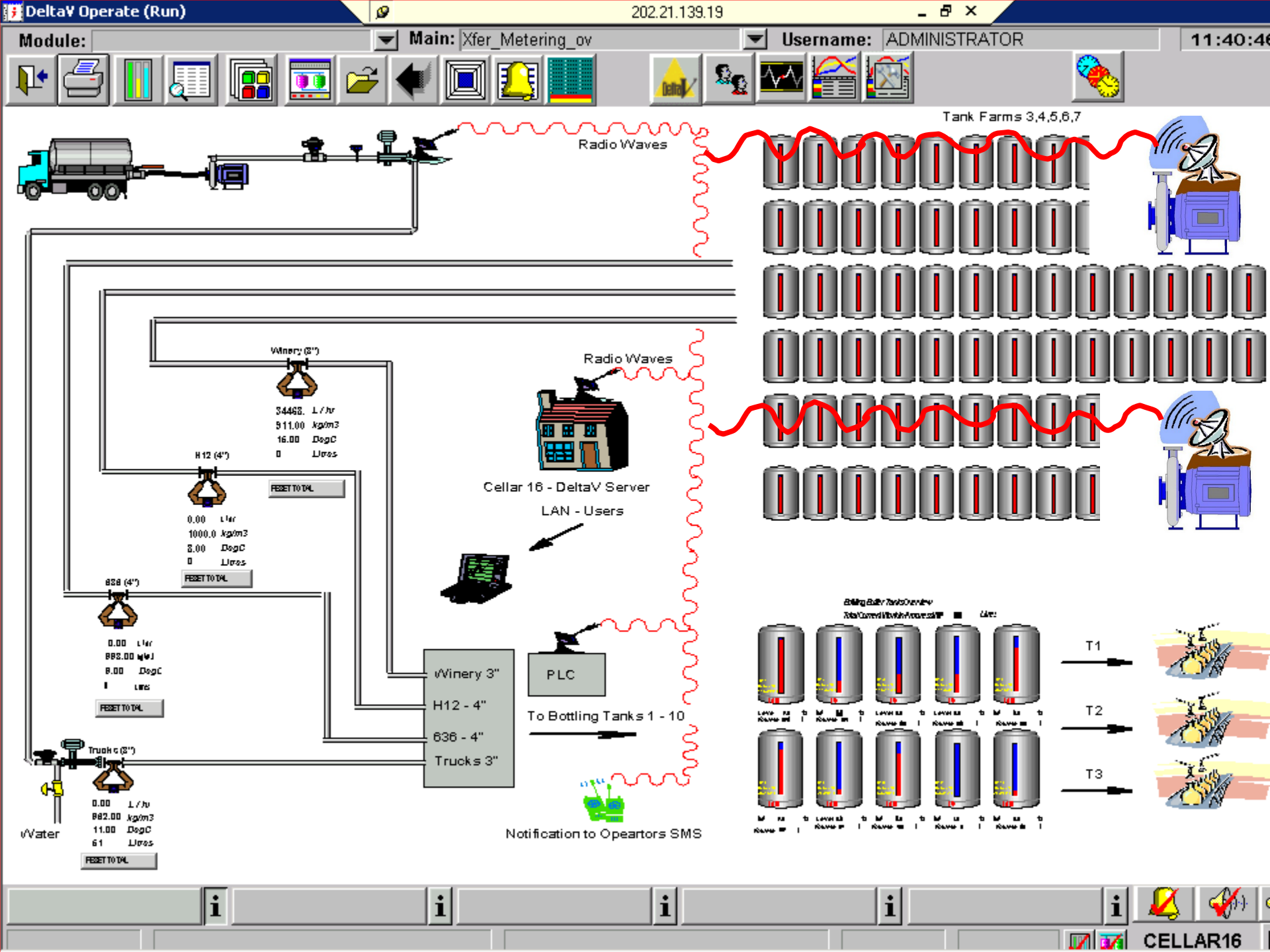
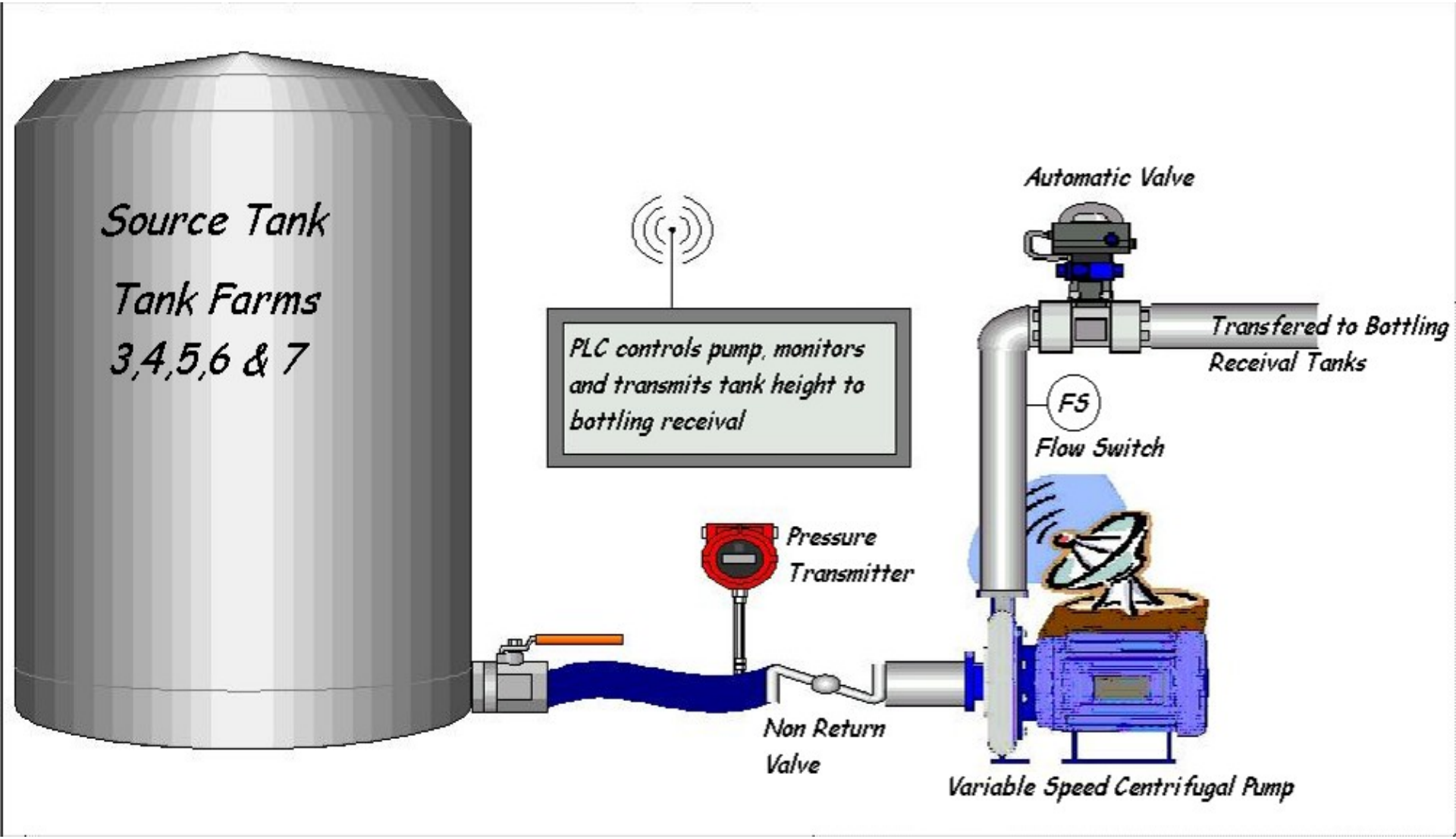

DeltaV Operate (Run)
202.21.139.19
Module:
Main: Xfer_Metering_ov
Username: ADMINISTRATOR
11:40:46
Tank Farms 3,4,5,6,7
Radio Waves
Radio Waves
Winery (8")
34468. L / hr
911.00 kg/m3
16.00 DegC
0 Litres
RESET TO TAL
H12 (4")
0.00 L/hr
1000.0 kg/m3
8.00 DegC
0 Litres
RESET TO TAL
636 (4")
0.00 L/hr
882.00 kg/m3
8.00 DegC
0 Litres
RESET TO TAL
Trucks (3")
0.00 L / hr
882.00 kg/m3
11.00 DegC
61 Litres
RESET TO TAL
Water
Cellar 16 - DeltaV Server
LAN - Users
PLC
To Bottling Tanks 1 - 10
Winery 3"
H12 - 4"
636 - 4"
Trucks 3"
Notification to Opeartors SMS
T1
T2
T3
CELLAR16

Direct to Fill - Automation



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Wine Delivery Automation – Improvement Opportunity ?

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Wine Delivery Automation – Improvement Opportunity ?

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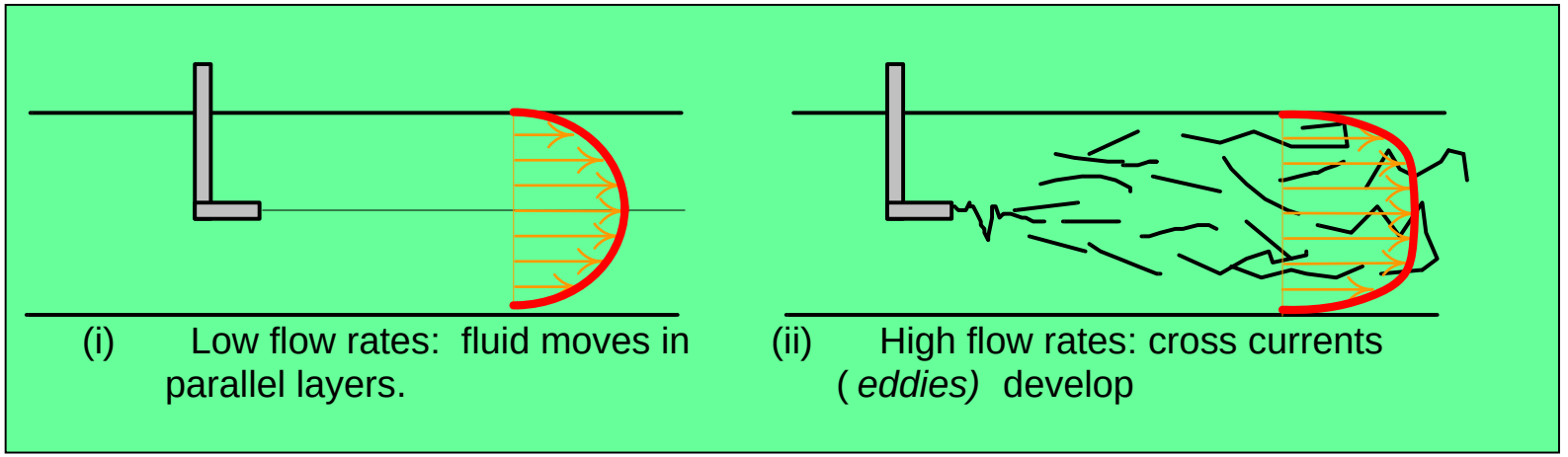
Flow in Pipes



- *(i) Laminar flow* at low flow rates
  - fluid moves as parallel layers
  - no cross-mixing occurs
  - Parabolic velocity profile
- *(ii) Turbulent flow* at higher flow rates
  - cross mixing due to *eddy* formation

» Source : Dr. Chris Colby Process Engineering Session

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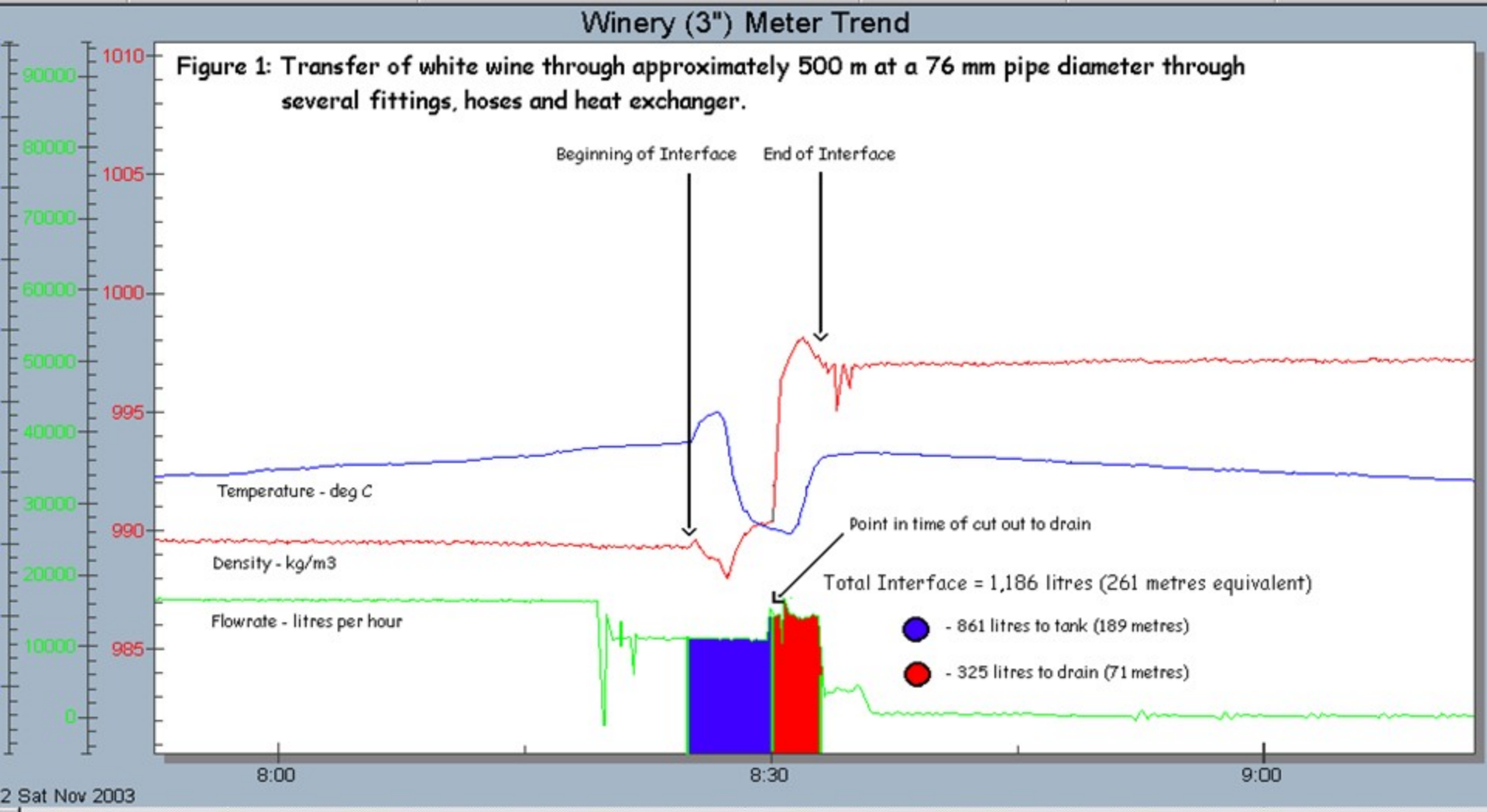
Process History View - [meter1]

File Edit View Chart Trend Events Window Help



arameter Reference	Descriptor	Value	Units	Timestamp
MTR1DENS/AI1/OUT.CV	Meter 1 Density	990.6	kg/m3	11/22/03 8:30:04 AM
MTR1FLOW/AI1/OUT.CV	Meter 1 Flow	14526.8	L/h	11/22/03 8:30:04 AM
MTR1TEMP/AI1/OUT.CV	Meter 1 Temperature	16.0	°C	11/22/03 8:30:04 AM

Record 1

Events: PPS Chronicle History:

Wine Delivery Automation

Implement a scalable, hard pipe, “piggable” system that supplies wine from bottling tanks to the fillers.

- Improved wine quality.
  - Reduced dissolved oxygen ingress to wine.
  - Cleaner tanks & lines by using pigging & CIP set.
- Improved efficiencies
  - Reduced wine/water to wastewater.
  - Increased yield to bottle.
  - Reduced changeover time between products.
- Expandable system for future filling line(s).

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Pigging

- Using a FDA approved silicon pig to push wine from a pipe using inert gas instead of water
- The wine/water interface

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Pigging

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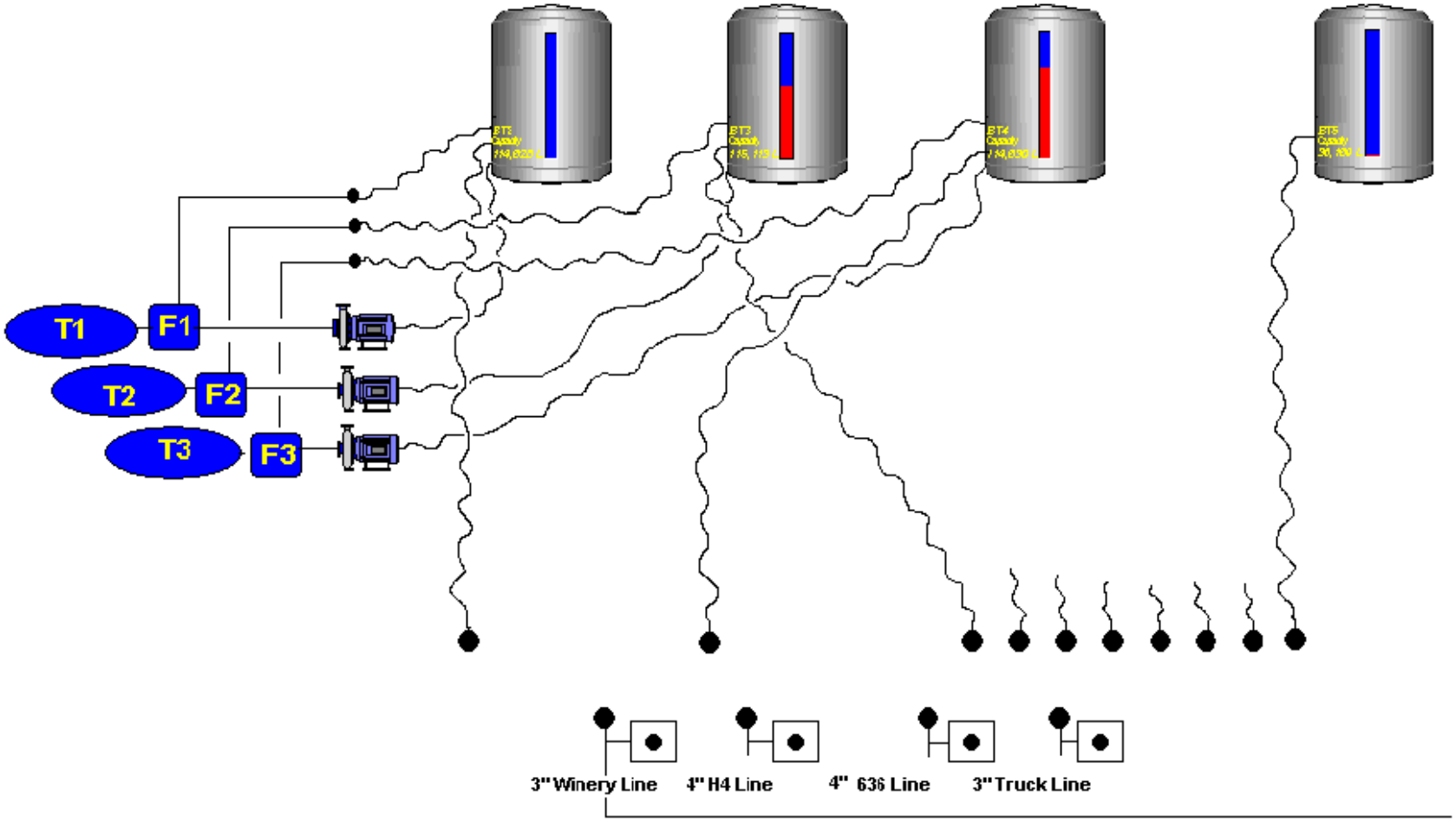
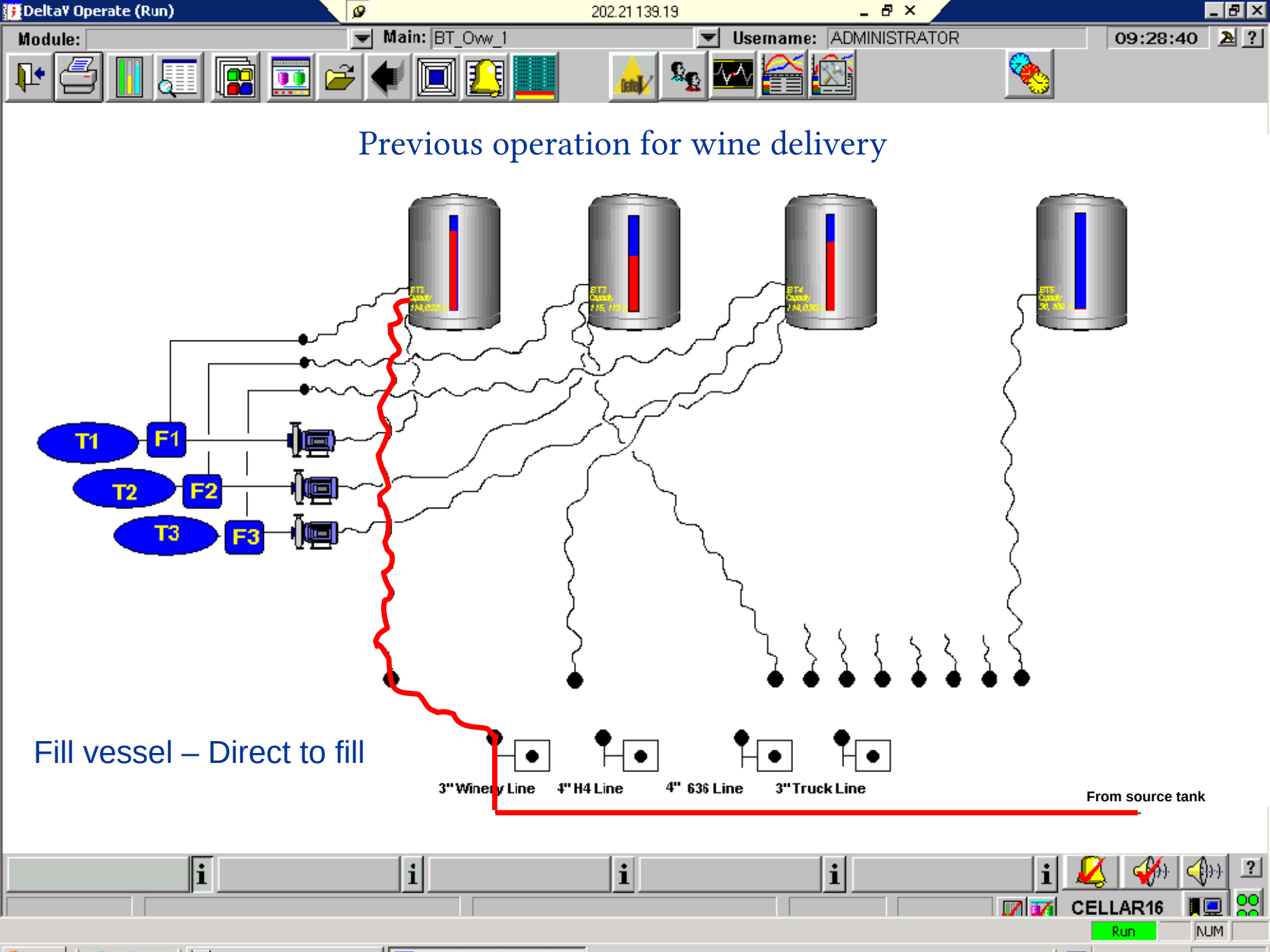
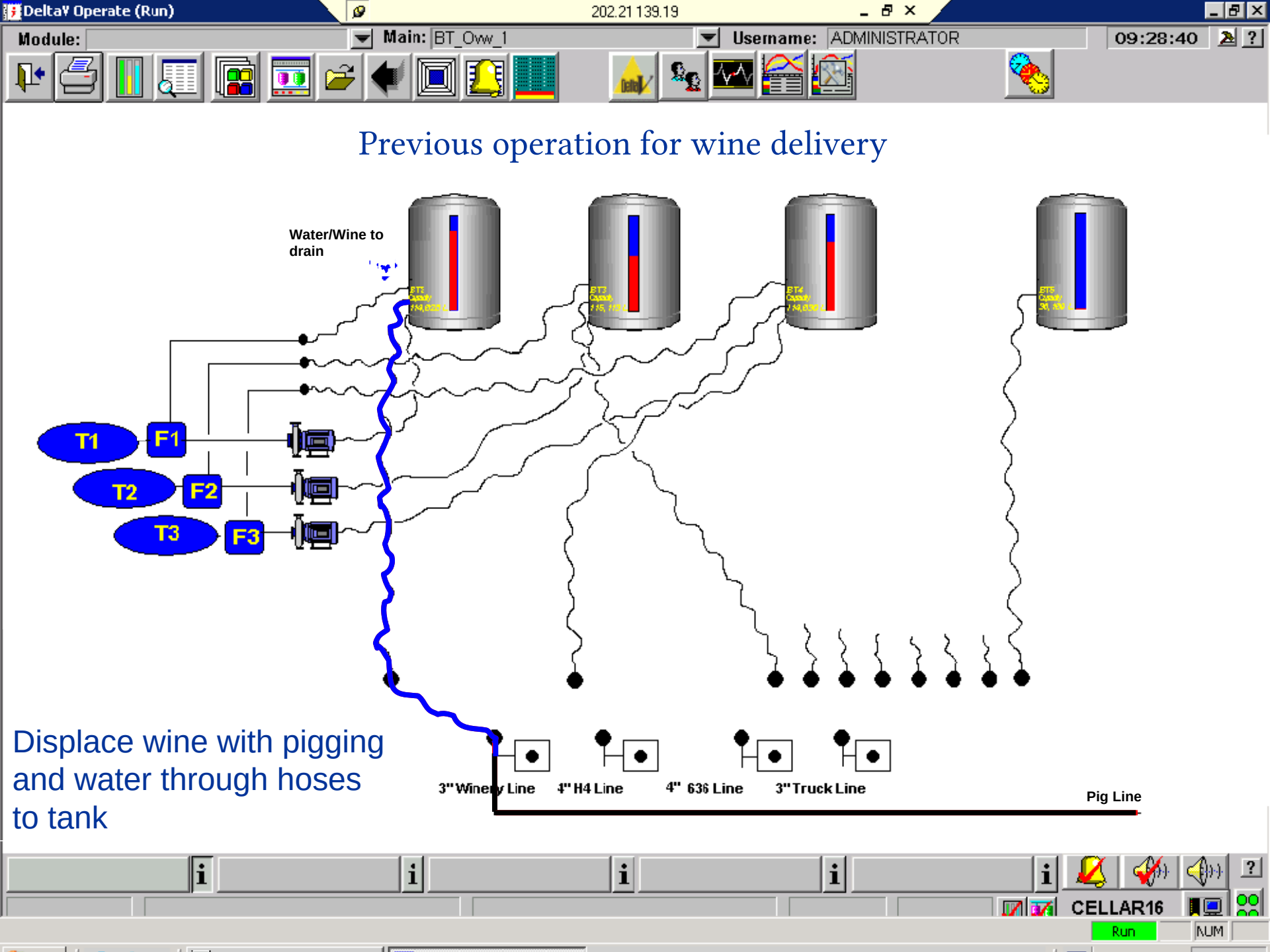
Previous operation for wine delivery

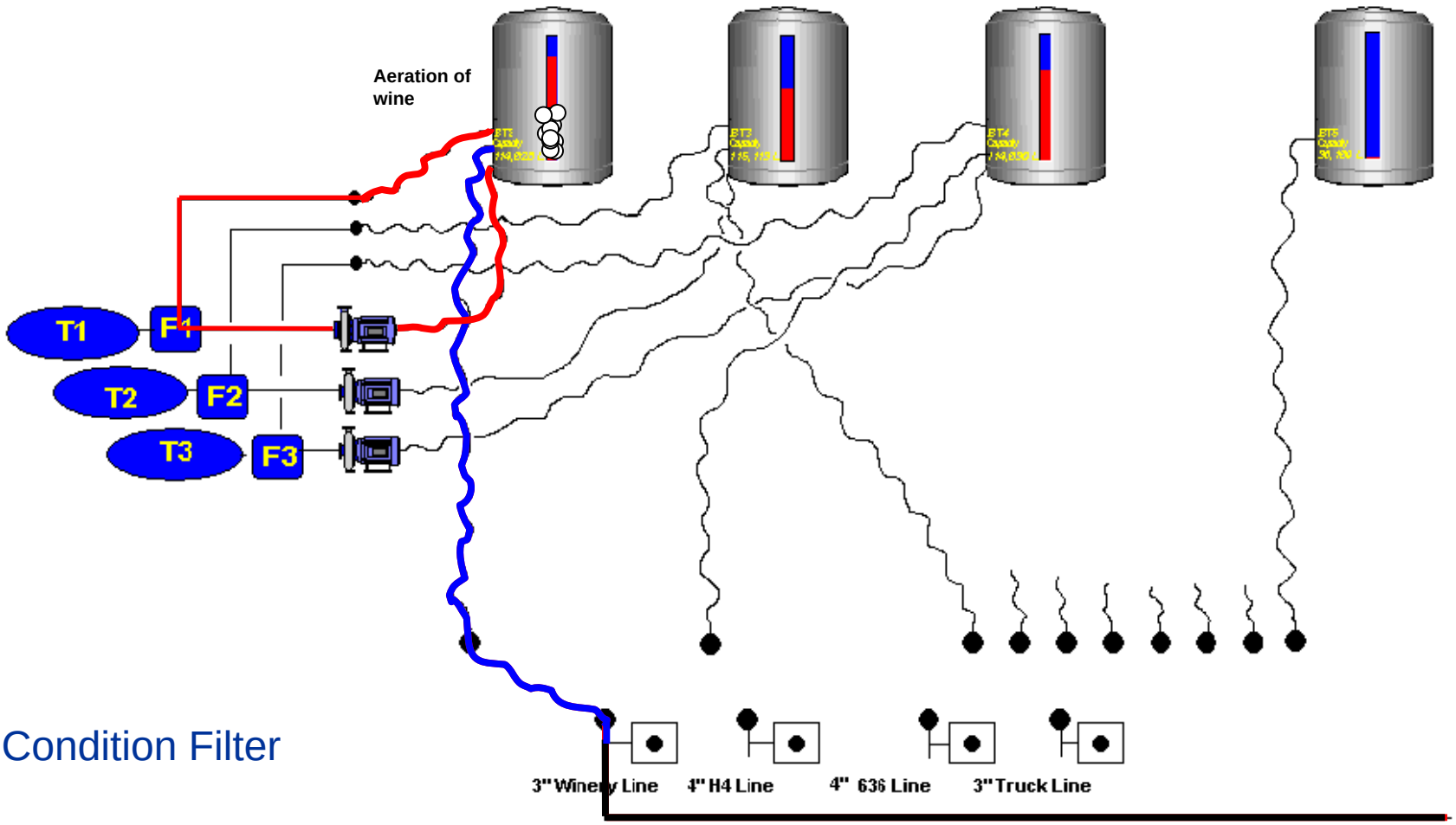




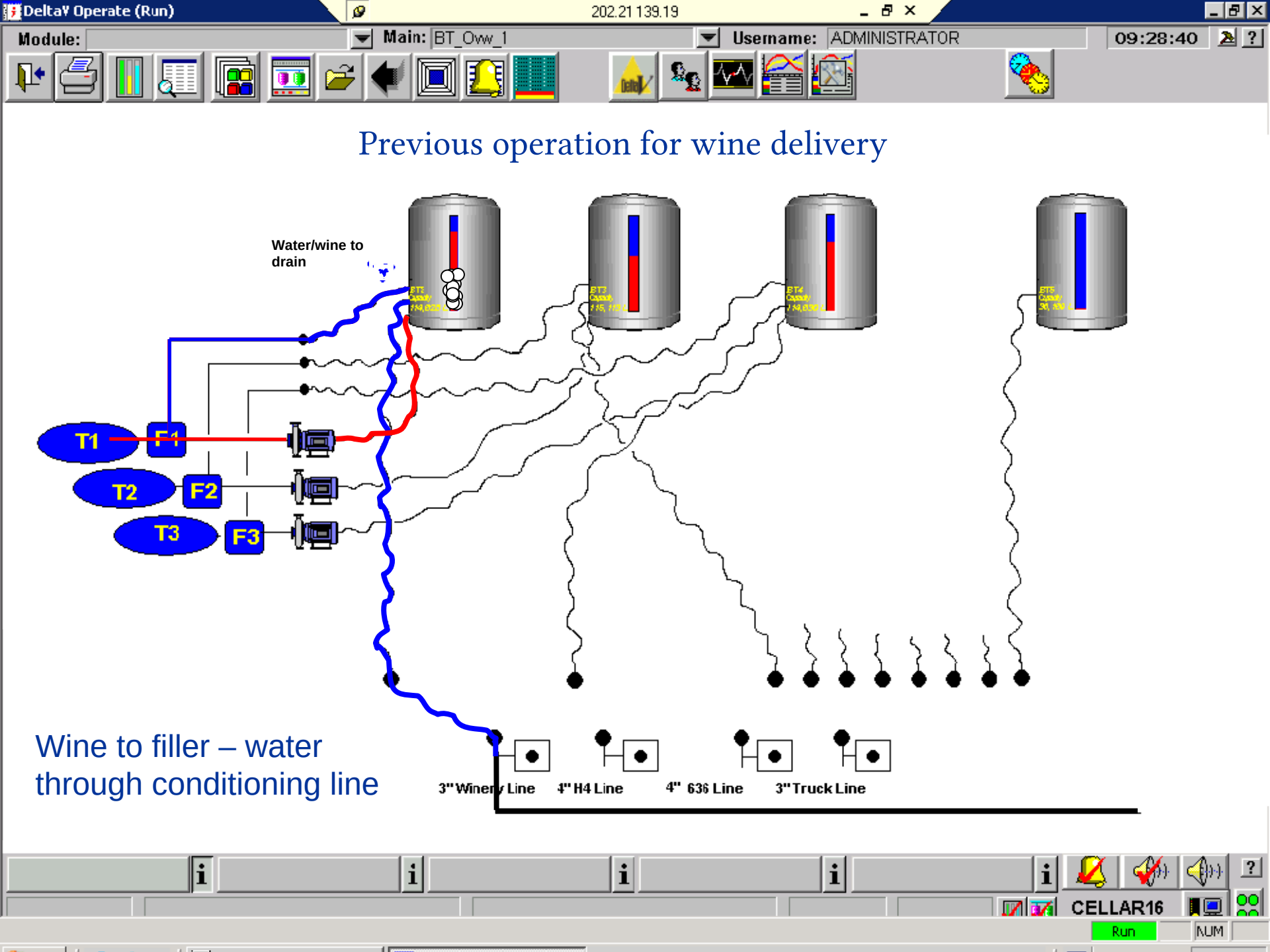
Fill vessel – Direct to fill


DeltaV Operate (Run)
202.21.139.19
Module:
Main: BT_Oww_1
Username: ADMINISTRATOR
09:28:40
Previous operation for wine delivery
Water/Wine to drain
T1
F1
T2
F2
T3
F3
3" Winery Line
4" H4 Line
4" 636 Line
3" Truck Line
Pig Line
Displace wine with pigging and water through hoses to tank
CELLAR16
Run
NUM

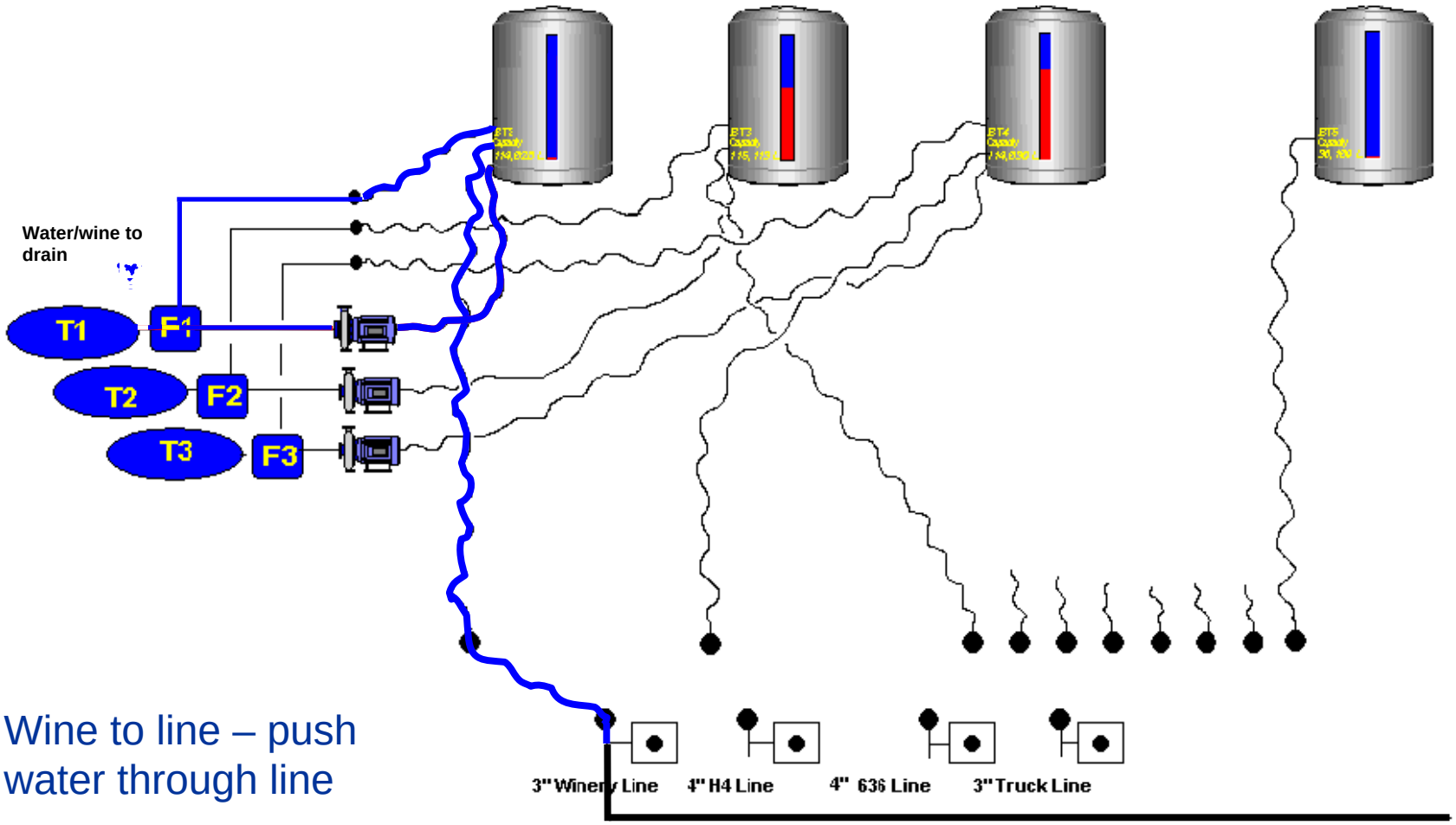
Previous operation for wine delivery



Condition Filter


DeltaV Operate (Run)
202.21 139.19
Module:
Main: BT_Ovw_1
Username: ADMINISTRATOR
09:28:40
Previous operation for wine delivery
Water/wine to drain
T1
F1
T2
F2
T3
F3
3" Winery Line
4" H4 Line
4" 636 Line
3" Truck Line
Wine to filler – water through conditioning line
CELLAR16
Run
NUM

Previous operation for wine delivery

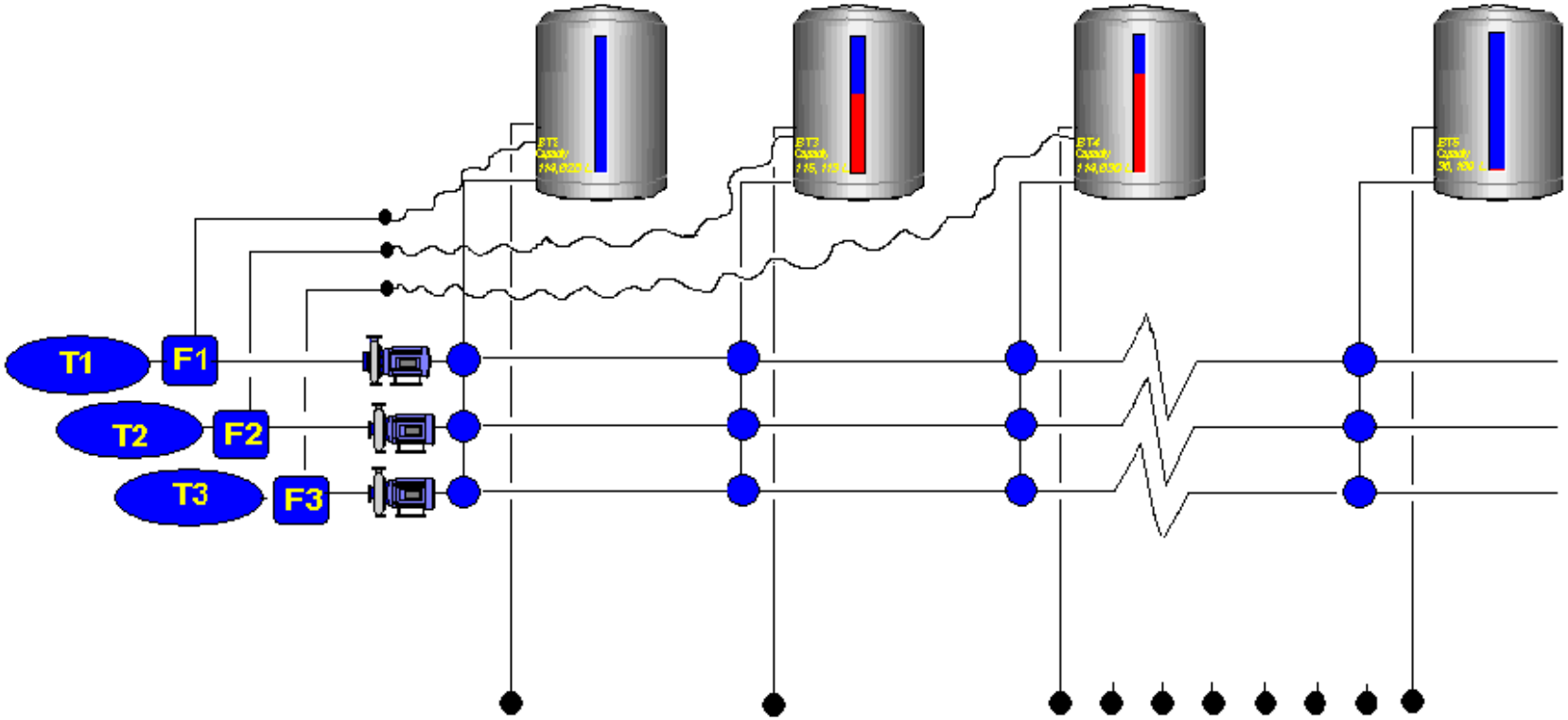


Wine to line – push water through line

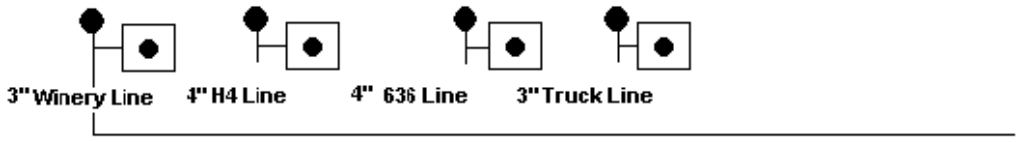
DeltaV Operate (Run) 202.21.139.19

Module: Main: BT_Ovw_1 Username: ADMINISTRATOR 09:28:40

Wine delivery automation project proposal



Hard piped, piggable mix proof valves with scalable design for 4th filler



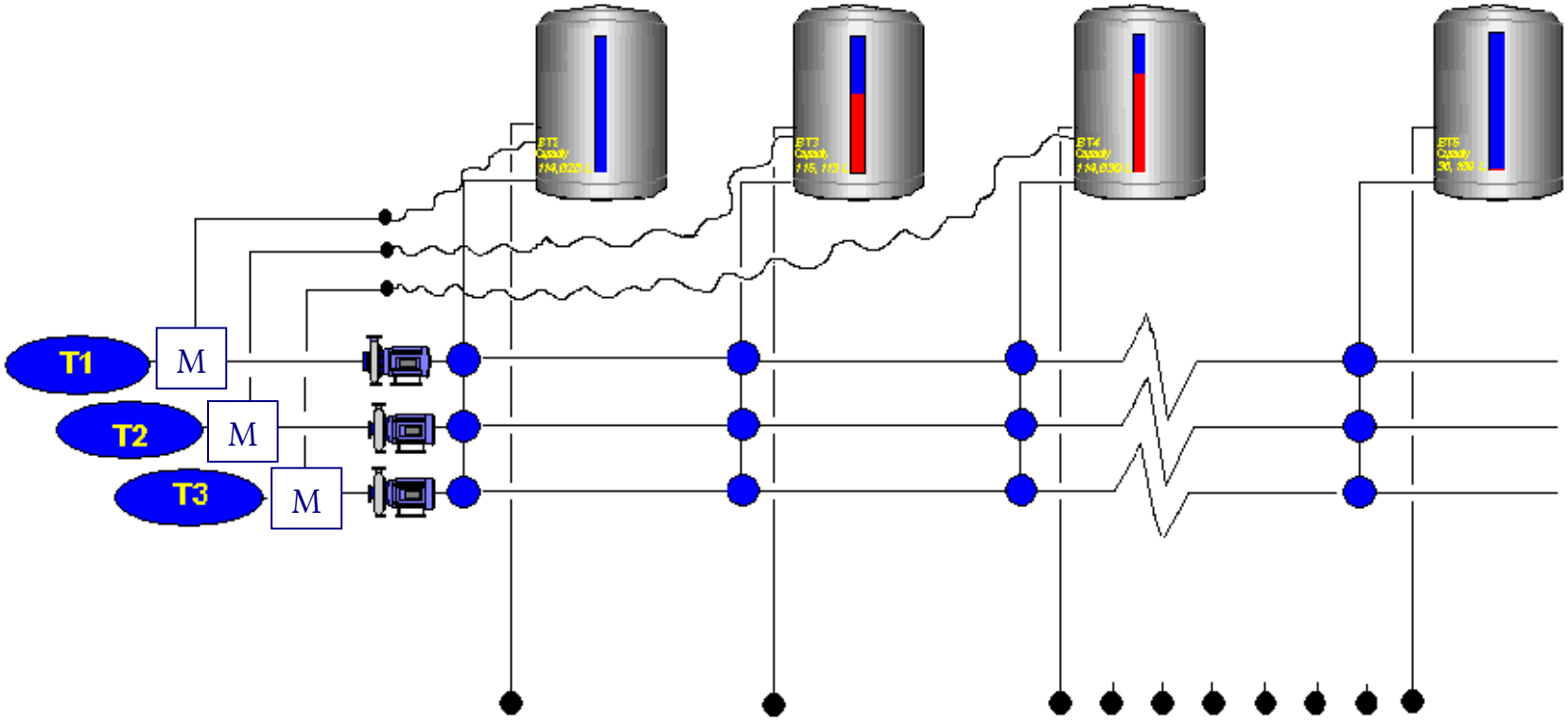
CELLAR16

Run NUM

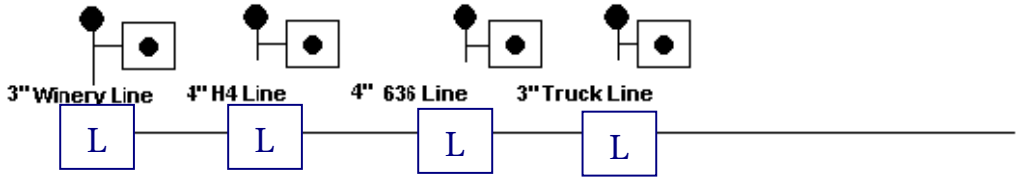
DeltaV Operate (Run) 202.21.139.19

Module: Main: BT_Ovw_1 Username: ADMINISTRATOR 09:28:40

Wine delivery automation project proposal



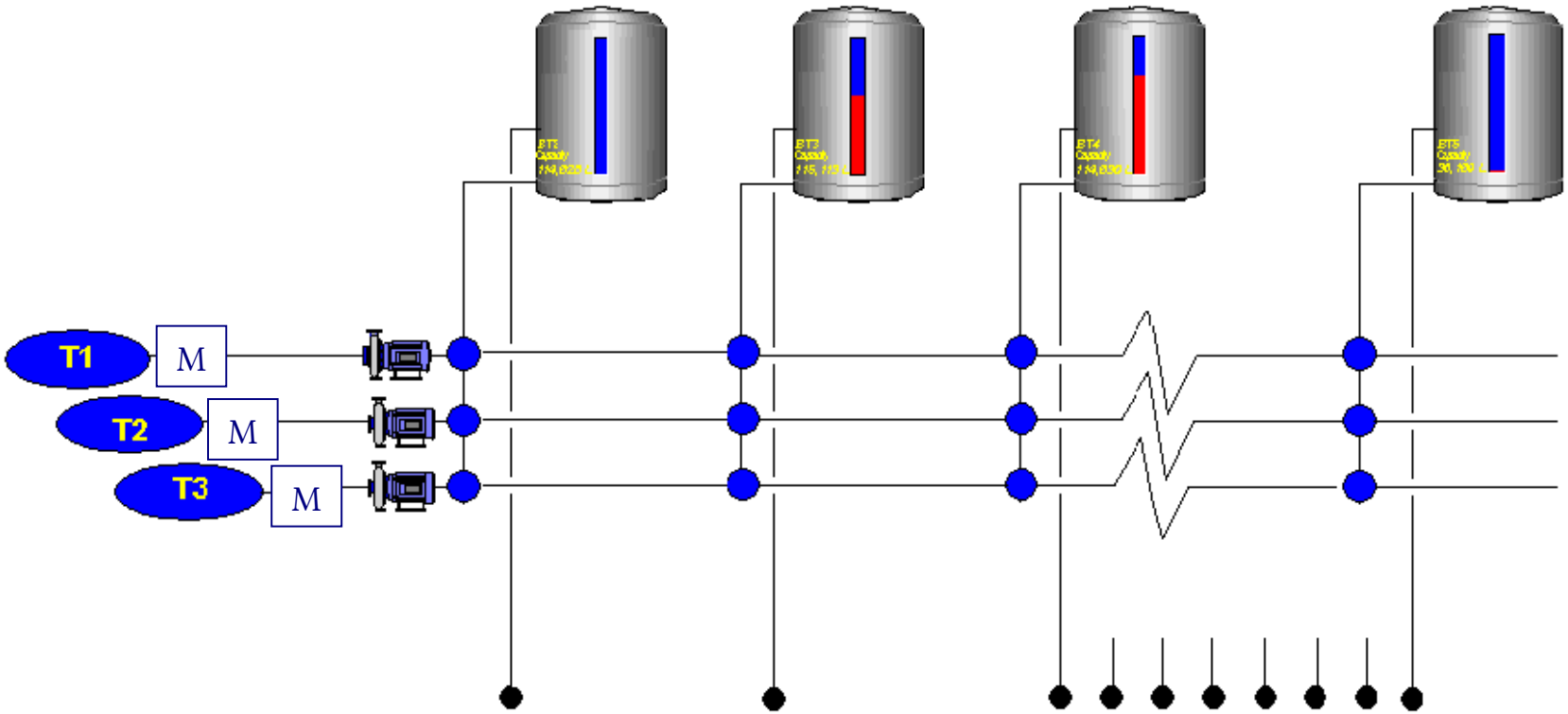
Relocate Filters



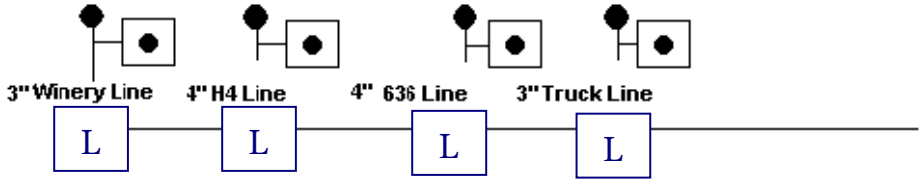
CELLAR16

Run NUM

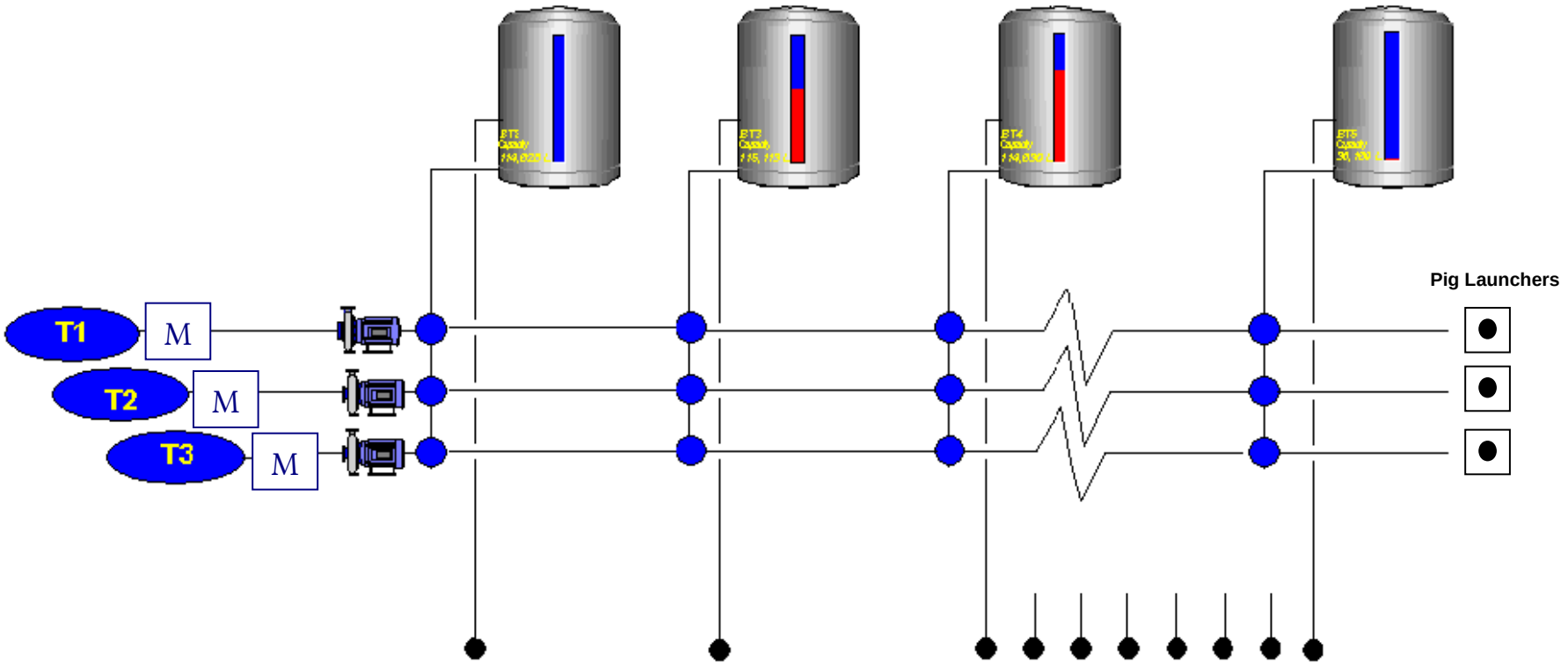
Wine delivery automation project proposal



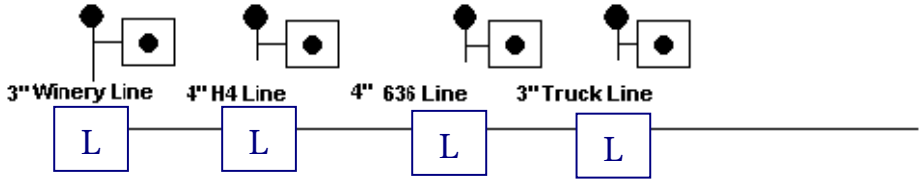
Eliminate filter conditioning and corresponding pipework

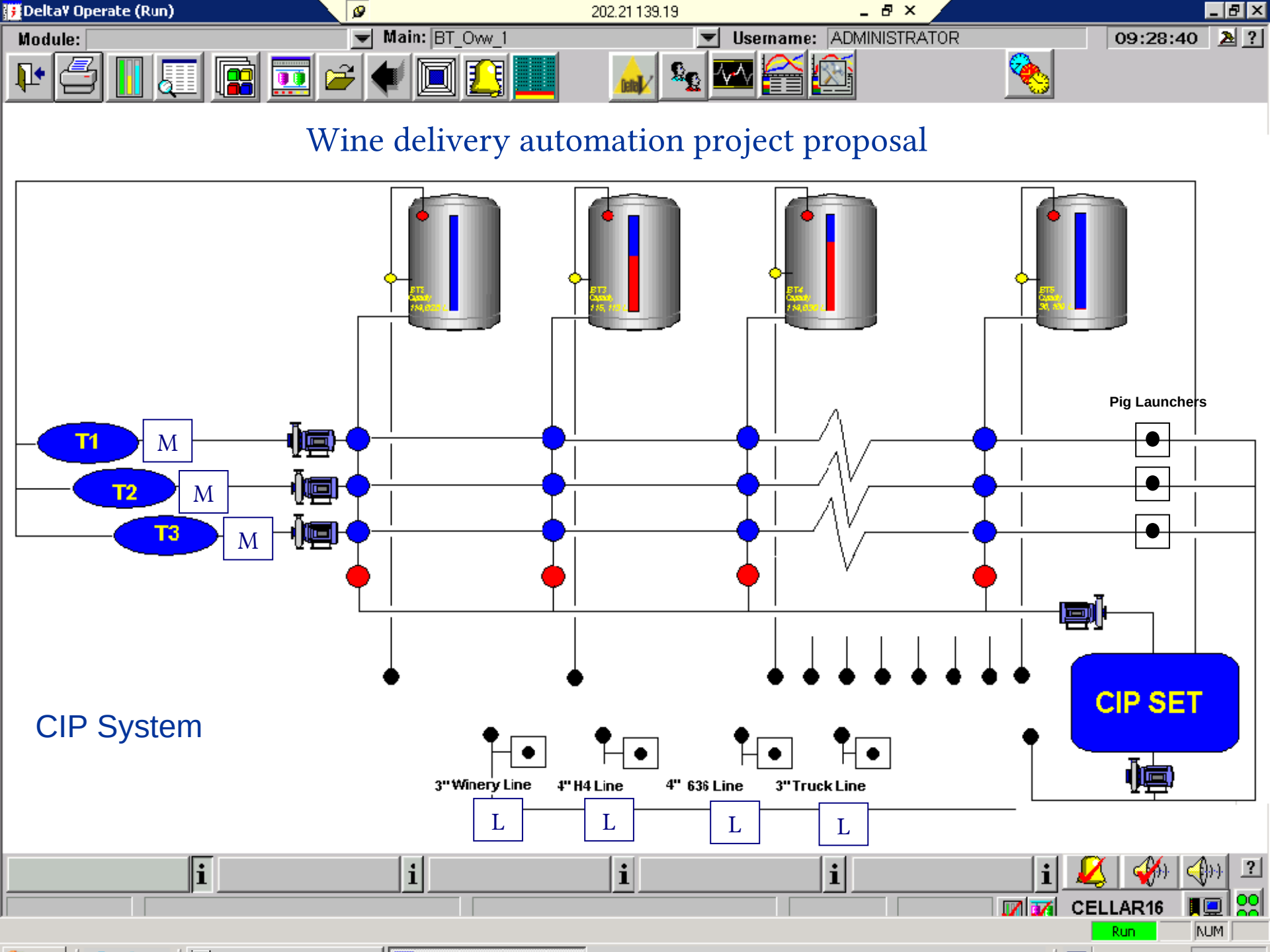


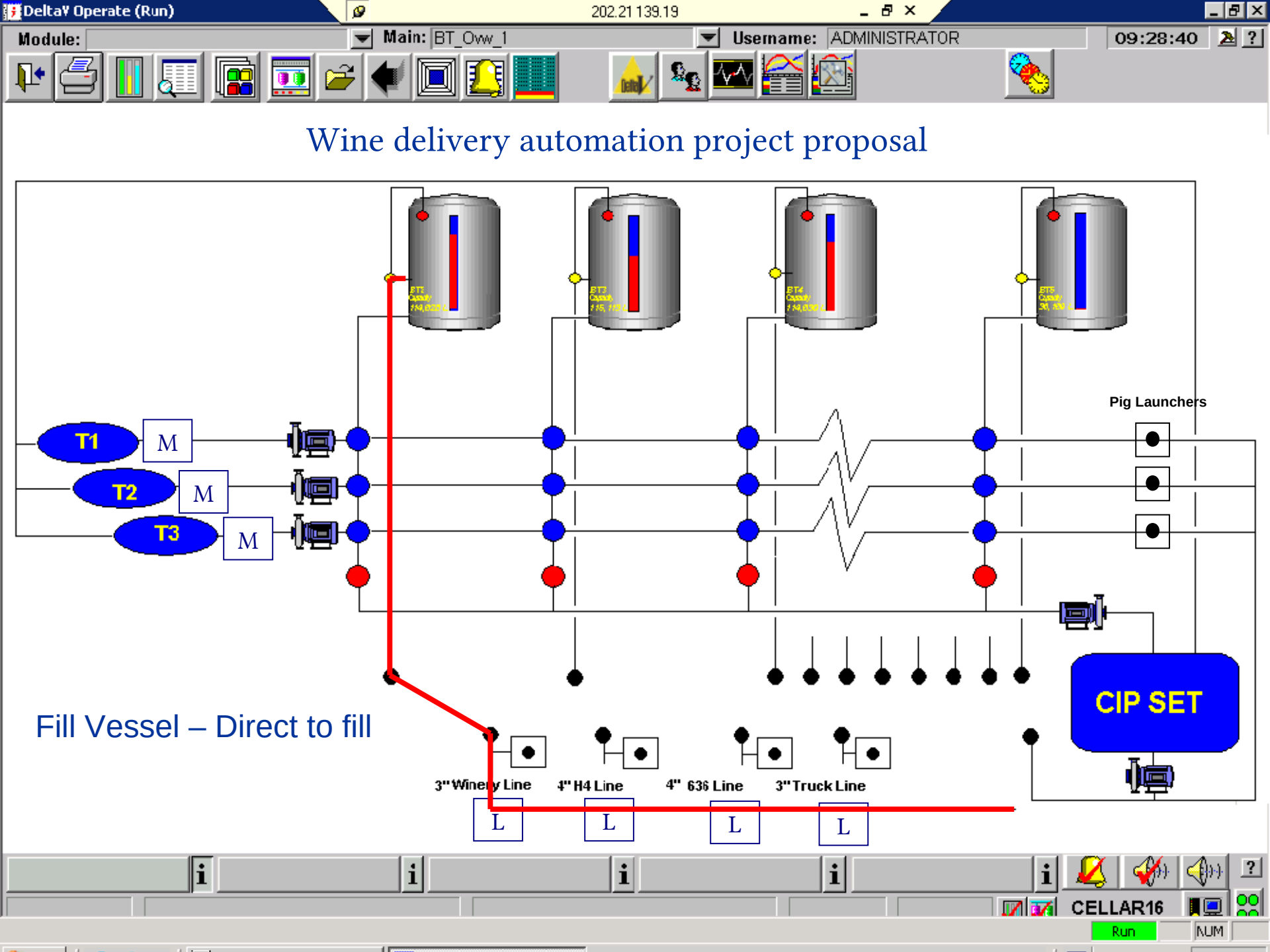
Wine delivery automation project proposal

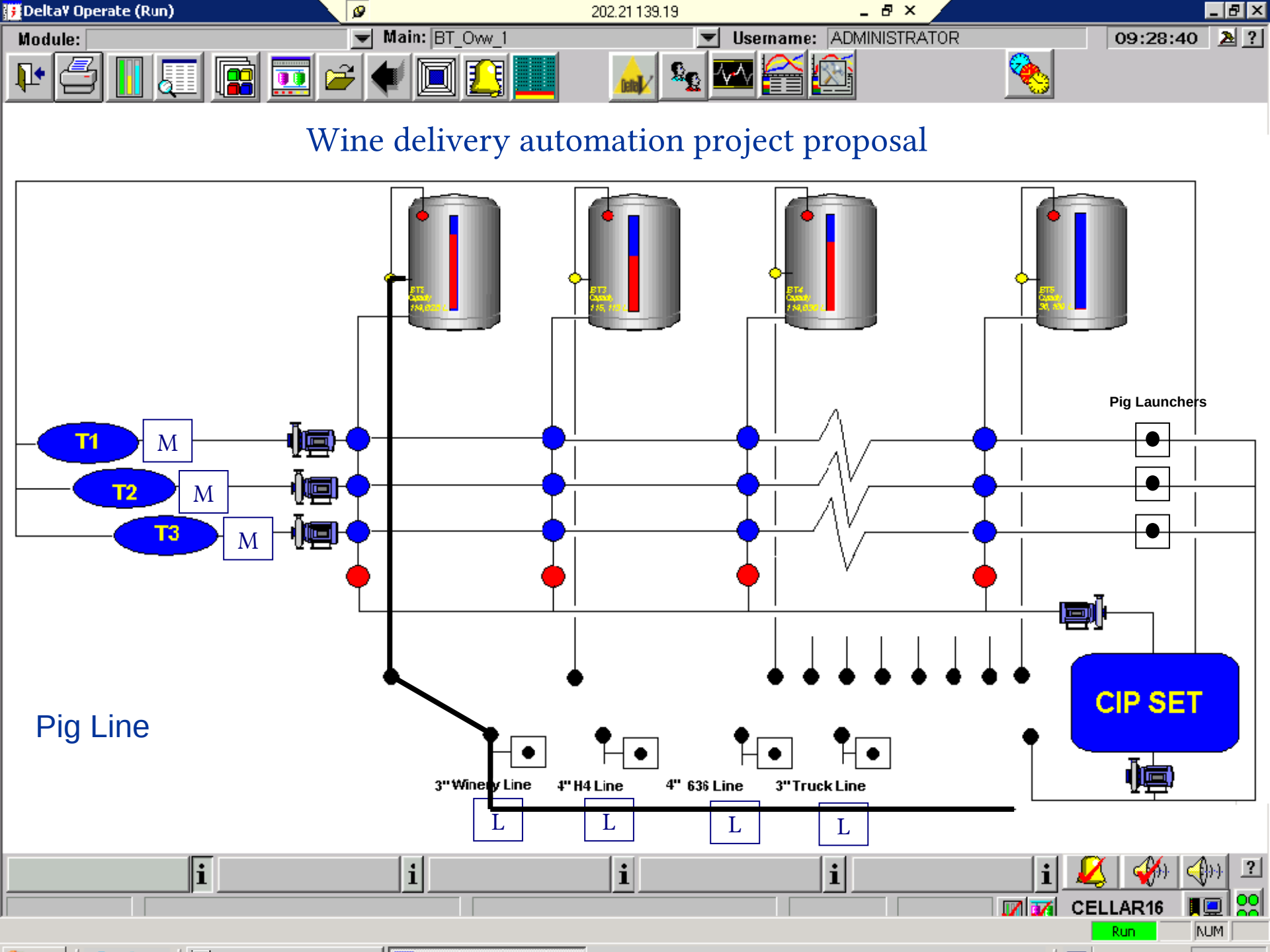


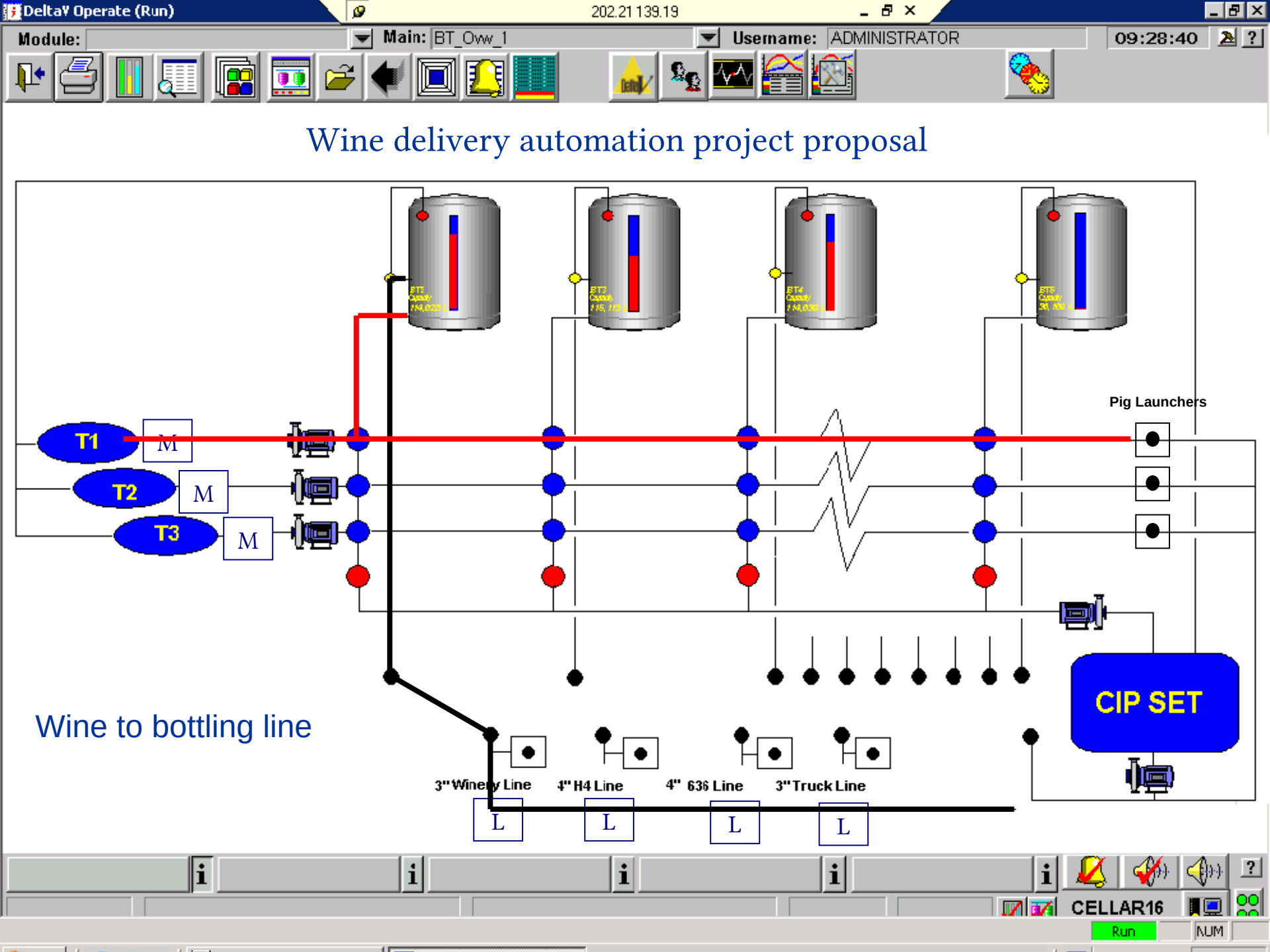
Pig Lines

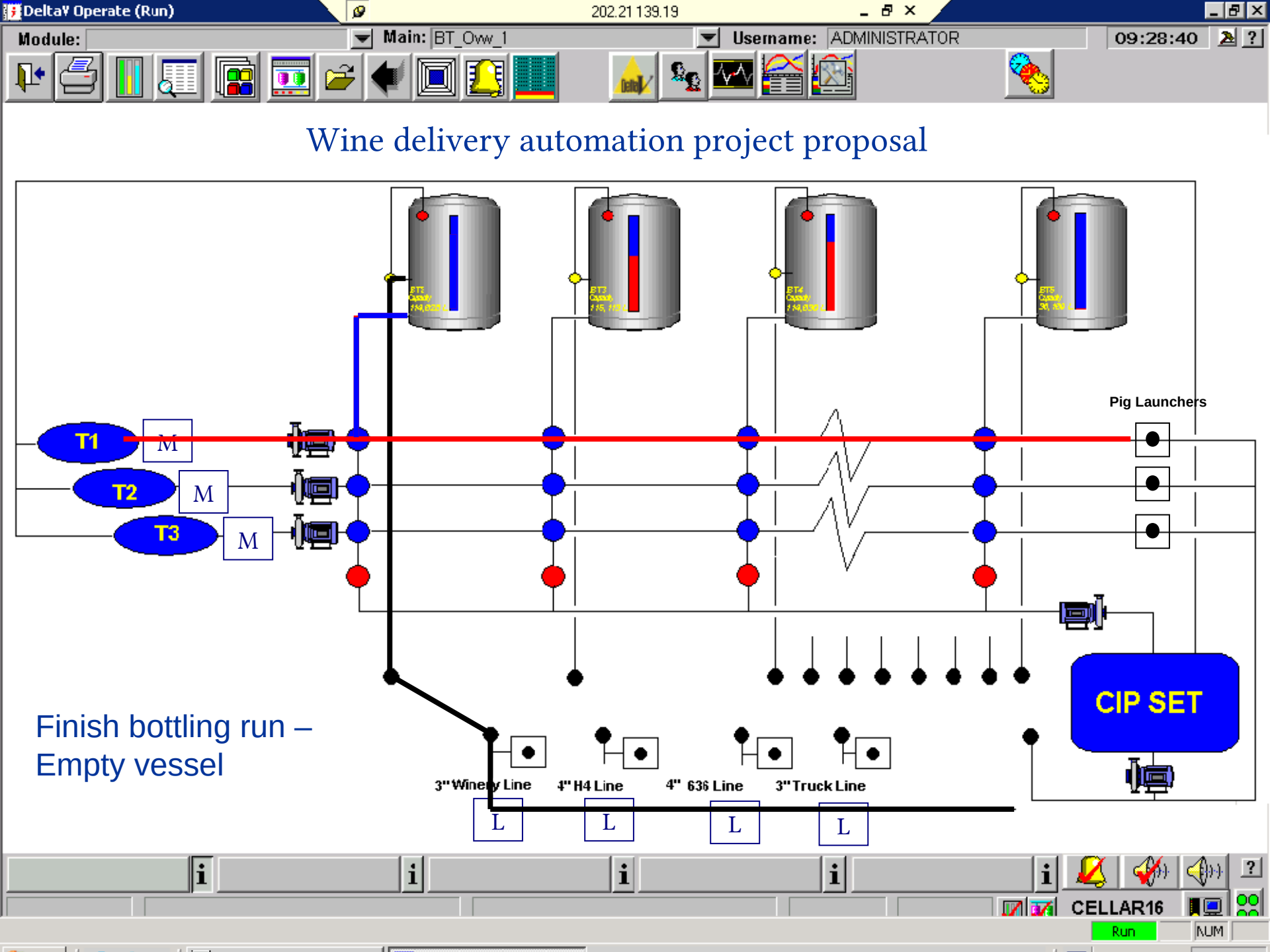


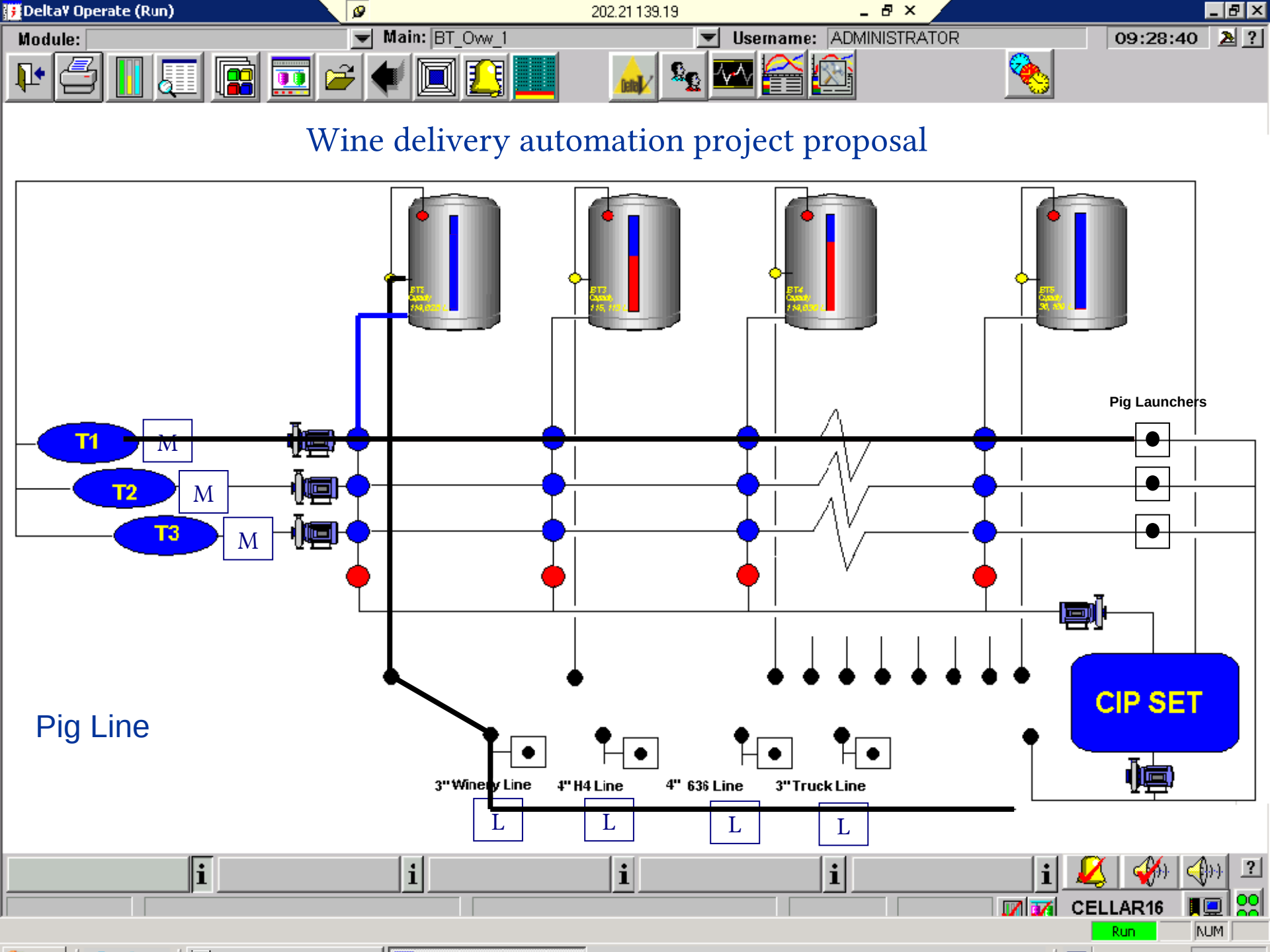

DeltaV Operate (Run)
202.21.139.19
Module:
Main: BT_Oww_1
Username: ADMINISTRATOR
09:28:40
Wine delivery automation project proposal
T1
T2
T3
M
M
M
Pig Launchers
CIP SET
CIP System
3" Winery Line
4" H4 Line
4" 636 Line
3" Truck Line
L
L
L
L
CELLAR16
Run
NUM

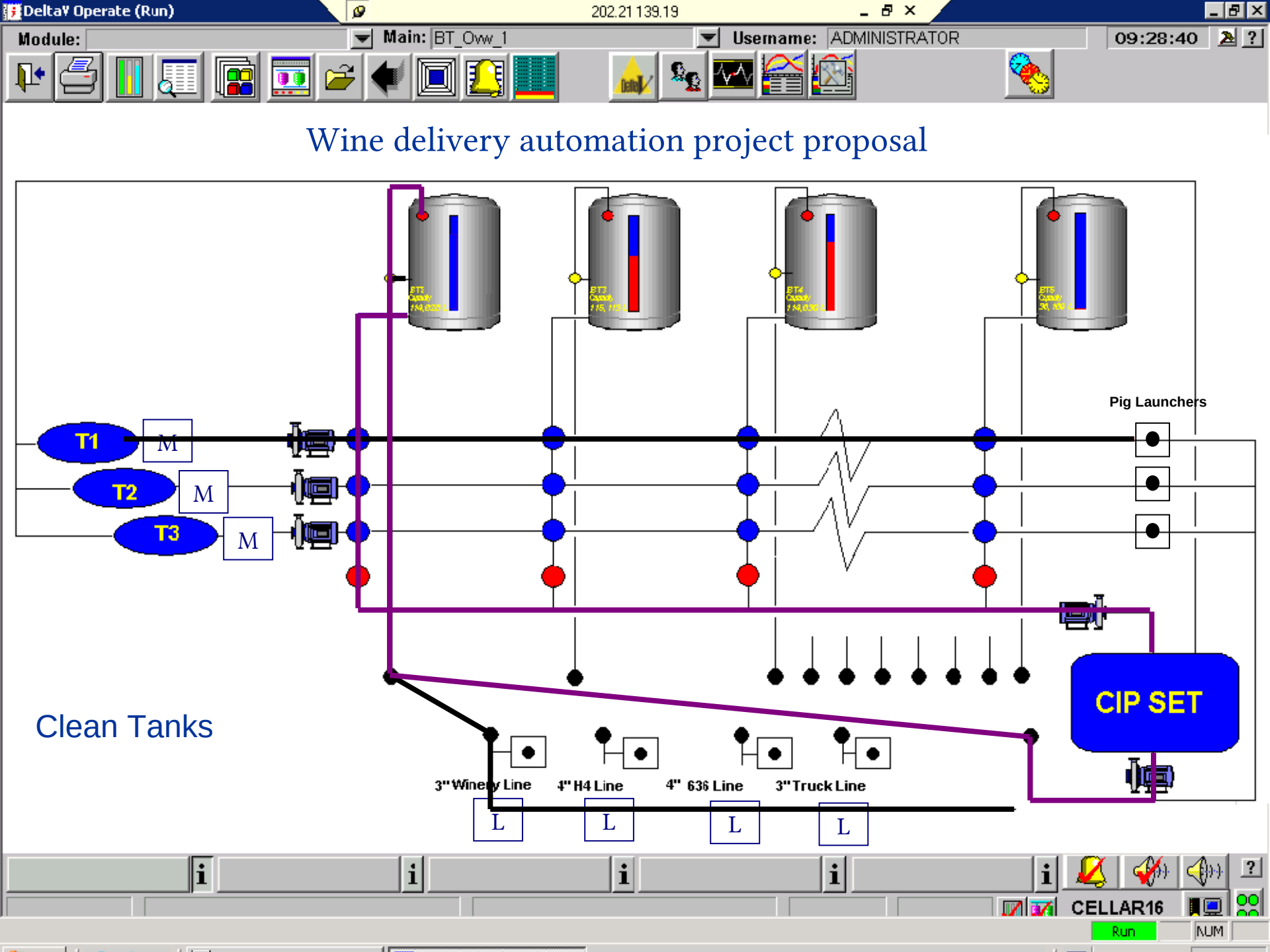

DeltaV Operate (Run)
202.21.139.19
Module:
Main: BT_Oww_1
Username: ADMINISTRATOR
09:28:40
Wine delivery automation project proposal
T1
T2
T3
M
M
M
Pig Launchers
CIP SET
Fill Vessel – Direct to fill
3" Winery Line
4" H4 Line
4" 636 Line
3" Truck Line
L
L
L
L
CELLAR16
Run
NUM

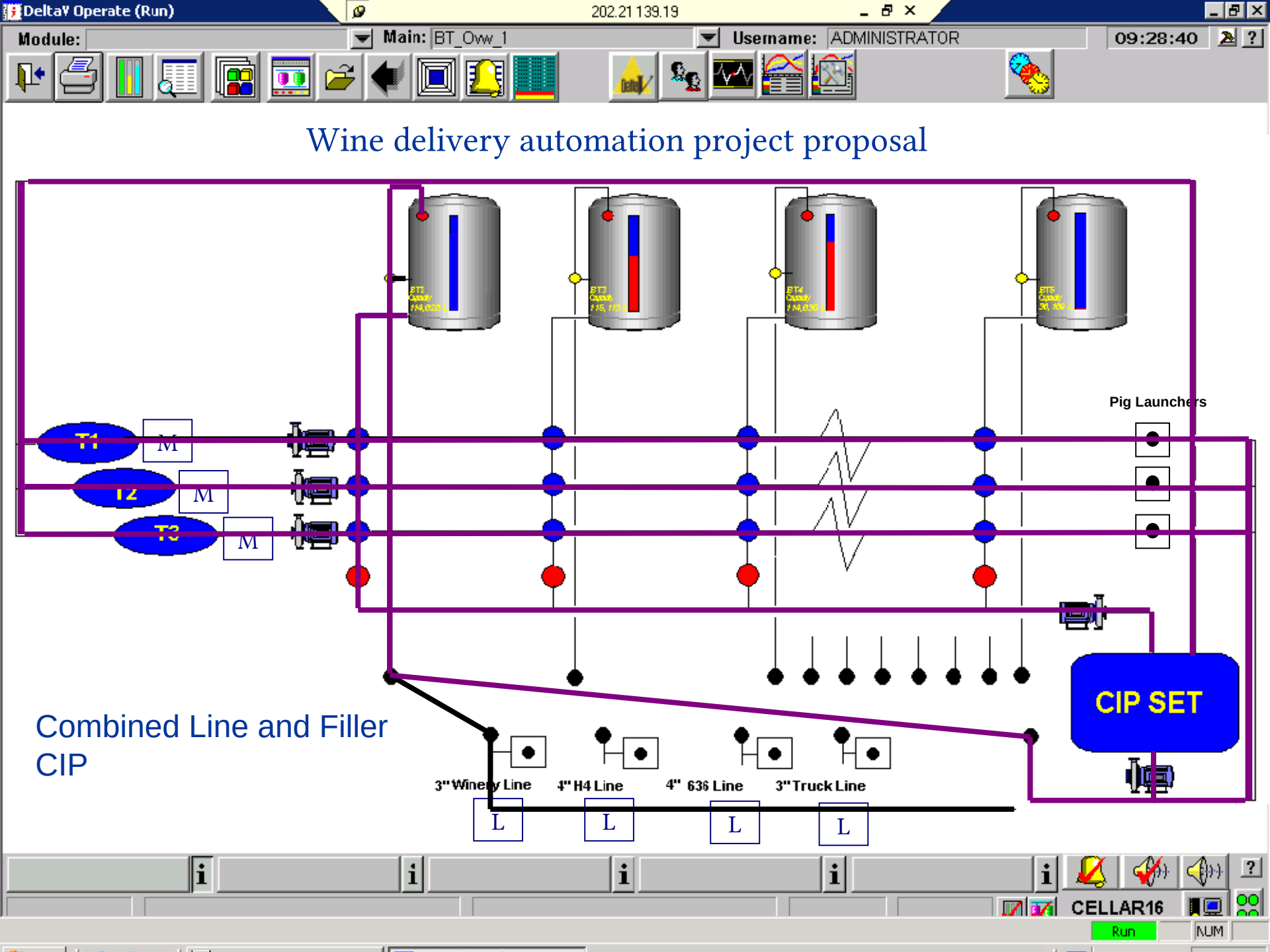

DeltaV Operate (Run)
202.21.139.19
Module:
Main: BT_Oww_1
Username: ADMINISTRATOR
09:28:40
Wine delivery automation project proposal
T1
T2
T3
M
M
M
Pig Launchers
CIP SET
Pig Line
3" Winery Line
4" H4 Line
4" 636 Line
3" Truck Line
L
L
L
L
CELLAR16
Run
NUM


DeltaV Operate (Run)
202.21.139.19
Module:
Main: BT_Oww_1
Username: ADMINISTRATOR
09:28:40
Wine delivery automation project proposal
Pig Launchers
T1
T2
T3
M
M
M
CIP SET
Wine to bottling line
3" Wine Line
4" H4 Line
4" 636 Line
3" Truck Line
L
L
L
L
CELLAR16
Run
NUM

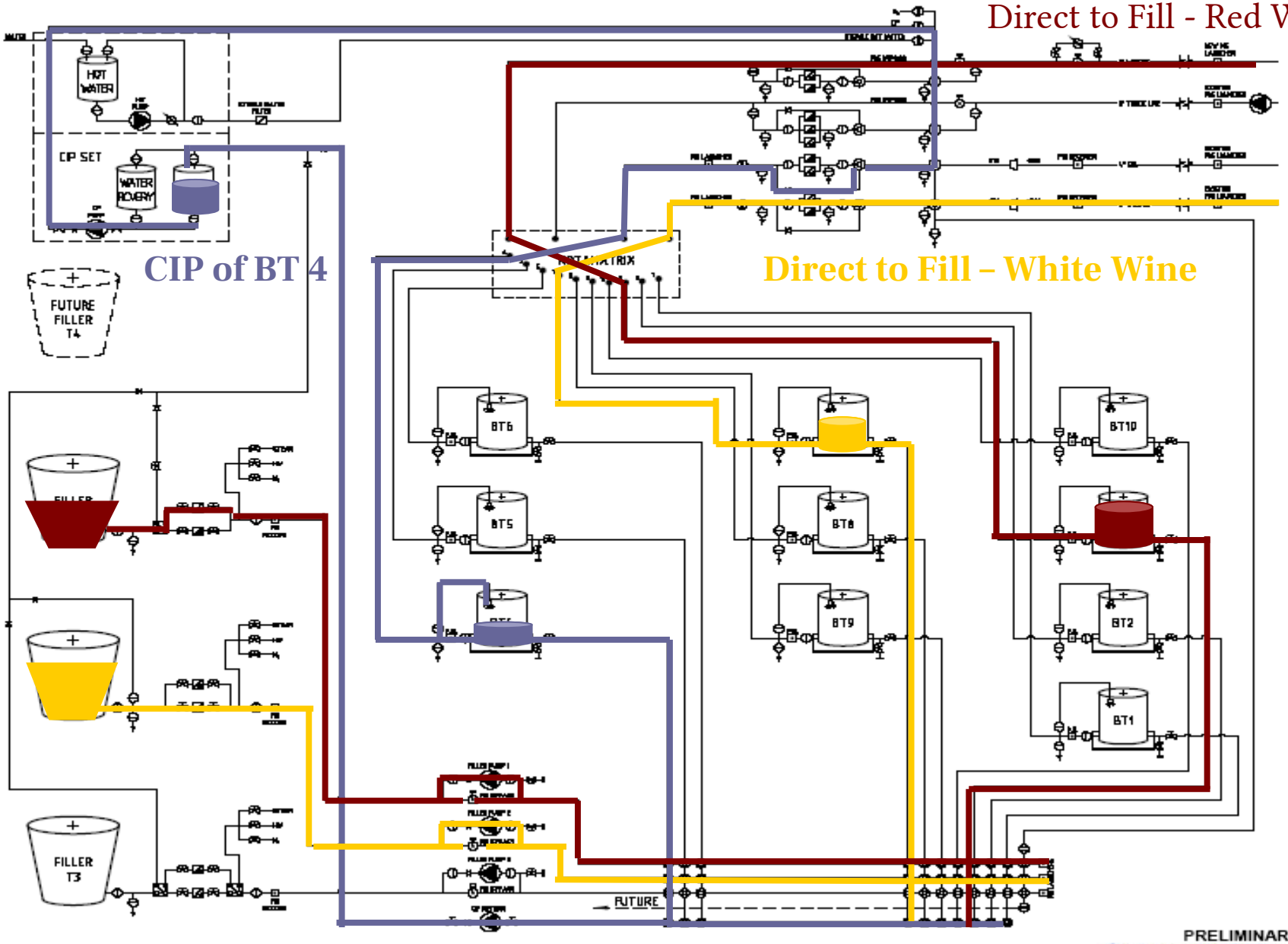

DeltaV Operate (Run)
202.21.139.19
Module:
Main: BT_Oww_1
Username: ADMINISTRATOR
09:28:40
Wine delivery automation project proposal
Pig Launchers
T1
T2
T3
M
M
M
CIP SET
3" Winery Line
4" H4 Line
4" 636 Line
3" Truck Line
L
L
L
L
Finish bottling run –
Empty vessel
CELLAR16
Run
NUM


DeltaV Operate (Run)
202.21.139.19
Module:
Main: BT_Oww_1
Username: ADMINISTRATOR
09:28:40
Wine delivery automation project proposal
Pig Launchers
T1
T2
T3
M
M
M
CIP SET
Pig Line
3" Winery Line
4" H4 Line
4" 636 Line
3" Truck Line
L
L
L
L
CELLAR16
Run
NUM


DeltaV Operate (Run)
202.21.139.19
Module:
Main: BT_Oww_1
Username: ADMINISTRATOR
09:28:40
Wine delivery automation project proposal
Pig Launchers
T1
T2
T3
M
M
M
CIP SET
Clean Tanks
3" Winery Line
4" H4 Line
4" 636 Line
3" Truck Line
L
L
L
L
CELLAR16
Run
NUM


DeltaV Operate (Run)
202.21.139.19
Module:
Main: BT_Oww_1
Username: ADMINISTRATOR
09:28:40
Wine delivery automation project proposal
Pig Launchers
T1
T2
T3
M
M
M
CIP SET
3" Wine Line
4" H4 Line
4" 636 Line
3" Truck Line
L
L
L
L
Combined Line and Filler CIP
CELLAR16
Run
NUM

Wine Delivery Automation



Wine Delivery Automation - Rotamatrix

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Wine Delivery Automation – Filters

Wine Delivery Automation – Filters

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Wine Delivery Automation – Pig Tank Receivers

Wine Delivery Automation – CIP Set

Wine Delivery Automation – Matrix Valves

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Wine Delivery Automation – Matrix Valves

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Wine Delivery Automation – Dissolved Oxygen Sensors

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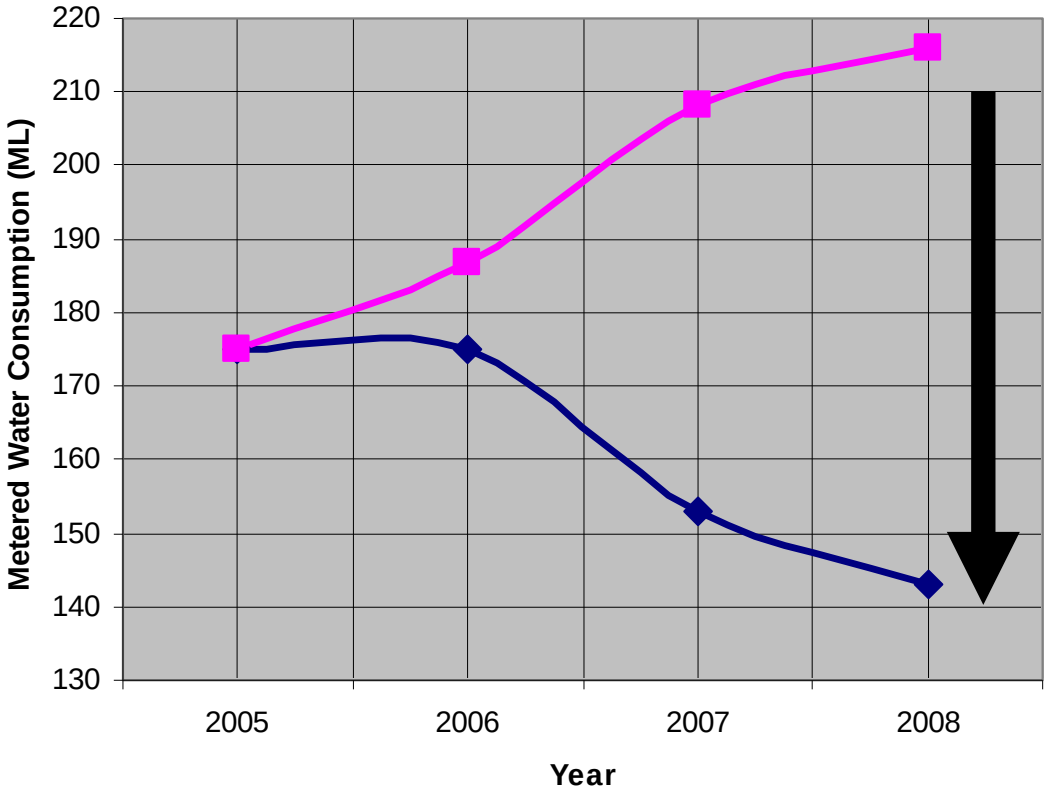
Reduced Water Consumption

Figure 1: Metered water consumption at Orlando Wines, Rowland Flat site compared with extrapolated water usage based on 2005 consumption per wine inventory



Reduced Water Consumption:

- Pigging
- Wine autoblending
- Wine delivery automation
- Direct to fill
- Additional refrigeration capacity
- Tank & equipment cleaning efficiency
- Site awareness & water minimisation initiatives

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Thank you

- Acknowledgements to contractors
- Questions

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