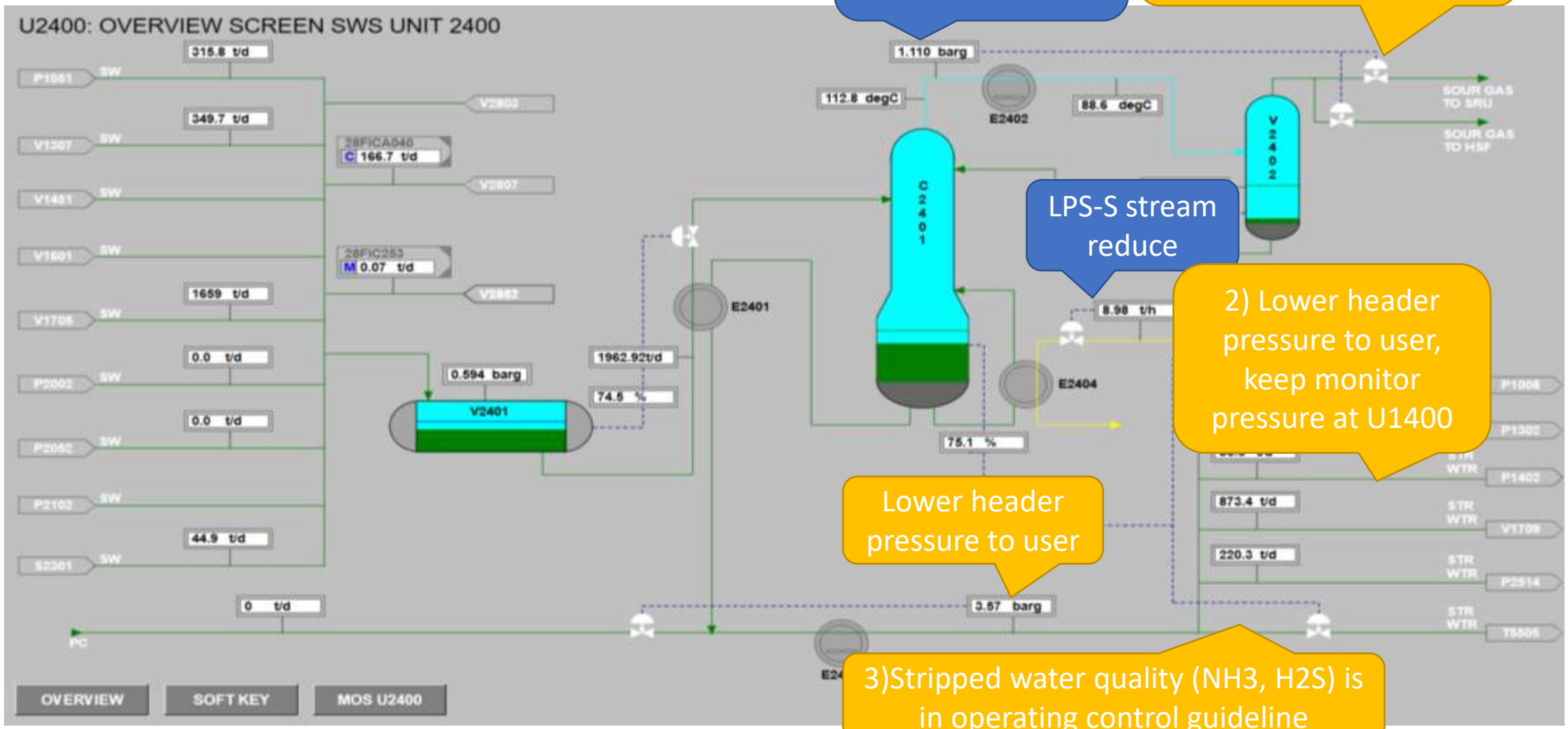
SWS pressure reduction

Abstact

- In the past, Sour Water Stripper column pressure is reduced to 1barg to save LP steam while stripped water quality is controlled in the same range. However, it was found that the header pressure of stripped water is reduced. At the end of the last cycle, the pressure is increased back to 1.4barg due to fouling. stripped water supply pump has to run 2 pumps to recovery the header pressure.

- After SWS system cleaning in turnaround 2019, SWS header pressure is increased. Then SWS column pressure is reduced again. LP steam is saved and SWS supply pump runs only 1 pump for 1 year, total benefit 11MTHB/year.

Background



Reduce column pressure

1) Lower column pressure, potential control valve full open

LPS-S stream reduce

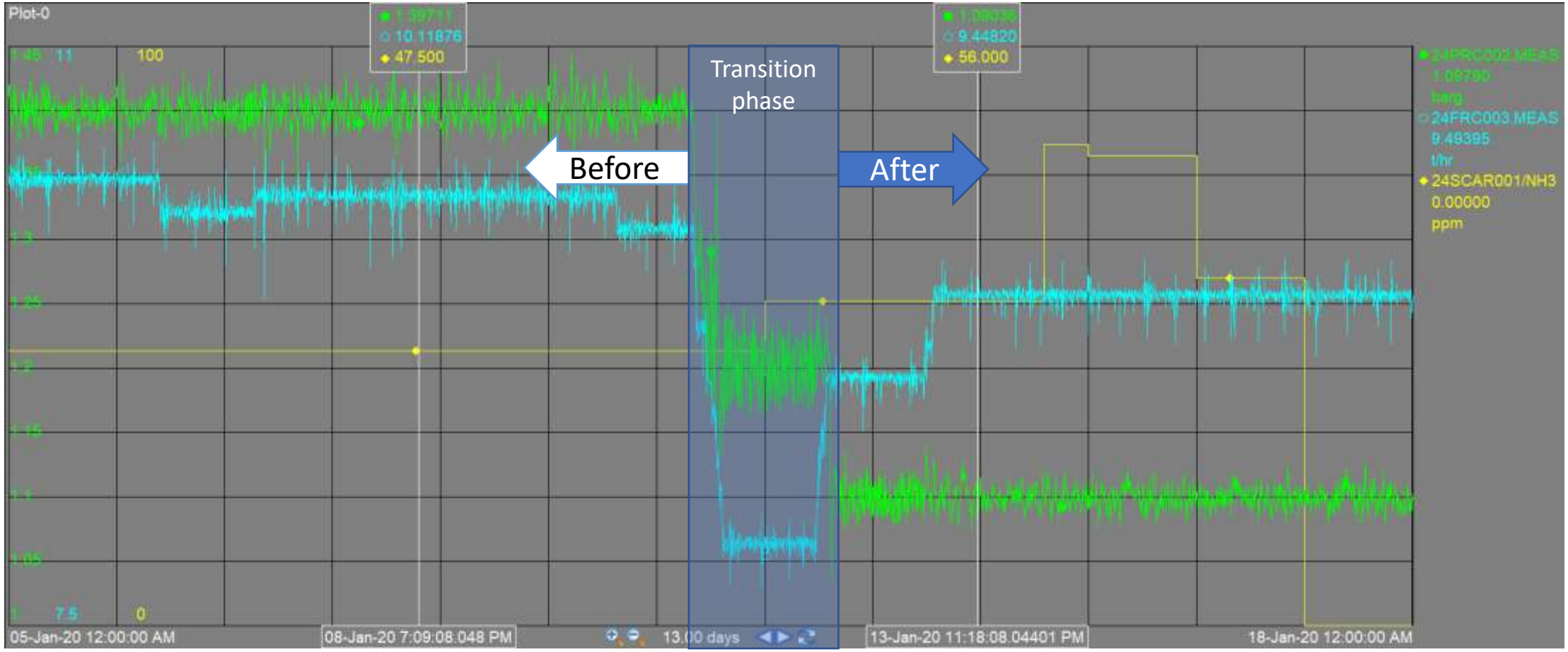
2) Lower header pressure to user, keep monitor pressure at U1400

Lower header pressure to user

3)Stripped water quality (NH3, H2S) is in operating control guideline

Result

Stream consumption is reduced while NH3 on spec <100ppm



Benefit calculation

SWS Pressure Reduction

Original Project Goal	27,706	GJ/year
Actual saving Energy	35,405	GJ/year
Saving more than target	7,699	GJ/year

24FRC003.MEAS

From 15-01-20 9.382429137T/h

To 01-10-20

Target

	Existing	Optimize	LPS saving
SWS operating pressure (barg)	1.40	1.10	
LPS consumption (t/h)	**10.35**	**9.60**	**0.75**

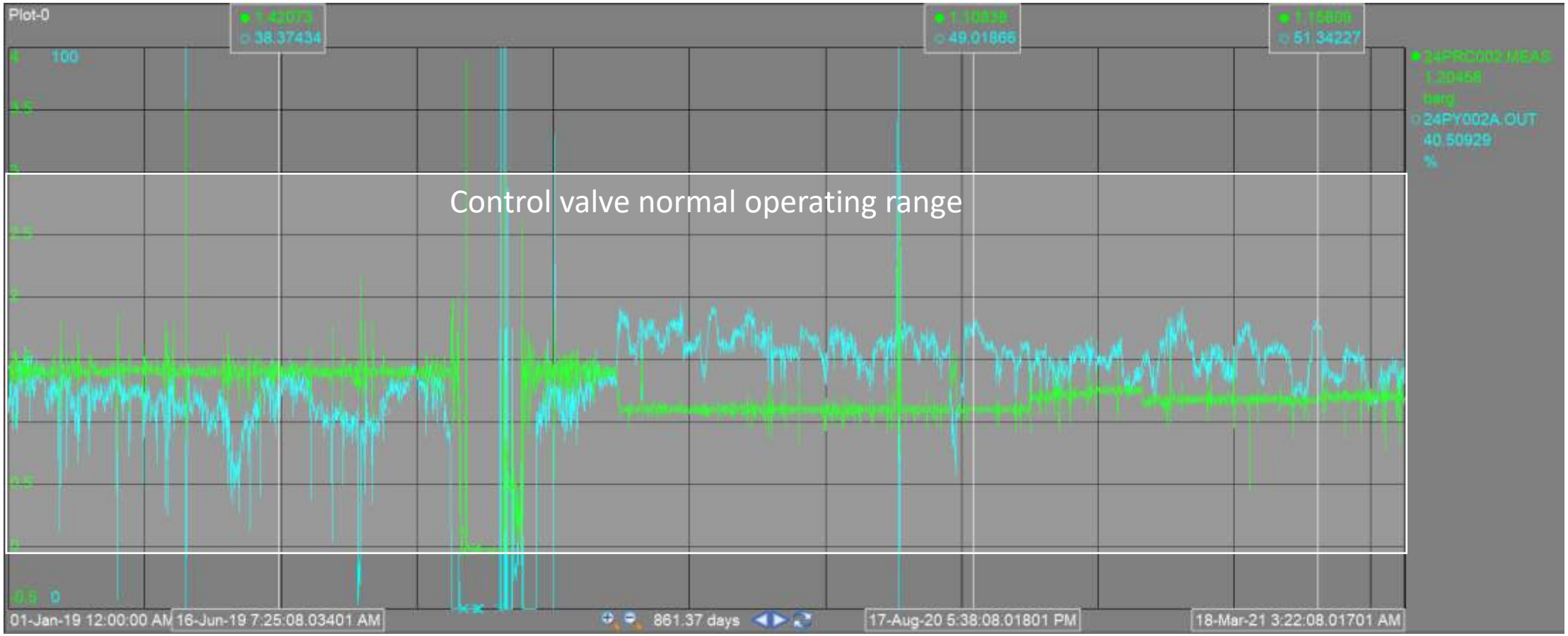
Total steam saving	18	Ton/day
IPS enthalpy	3.08	MMBTU/Ton
LPS enthalpy	2.70	MMBTU/Ton
NCC enthalpy	0.21	MMBTU/Ton
Cogen factor	0.65	
NG consumption	3.83	MMBTU/Ton LPS
Steam saving	68.92	MMBTU/day
Day in a year	365	days
	25,156.02	MMBTU/year
	26,540	GJ/year
One more pump will be stopped	37	kW
	324,120	kWh/year
	1,167	GJ/year
	1,106	MMBTU/year
Total saving	27,706	GJ/year
Average NG process price	321	Baht/MMBTU
	8,075,084	Baht/year
Electricity price	1.9	Baht/kWh
	615,828	Baht/year
Total	8,690,912	Baht/year

Actual

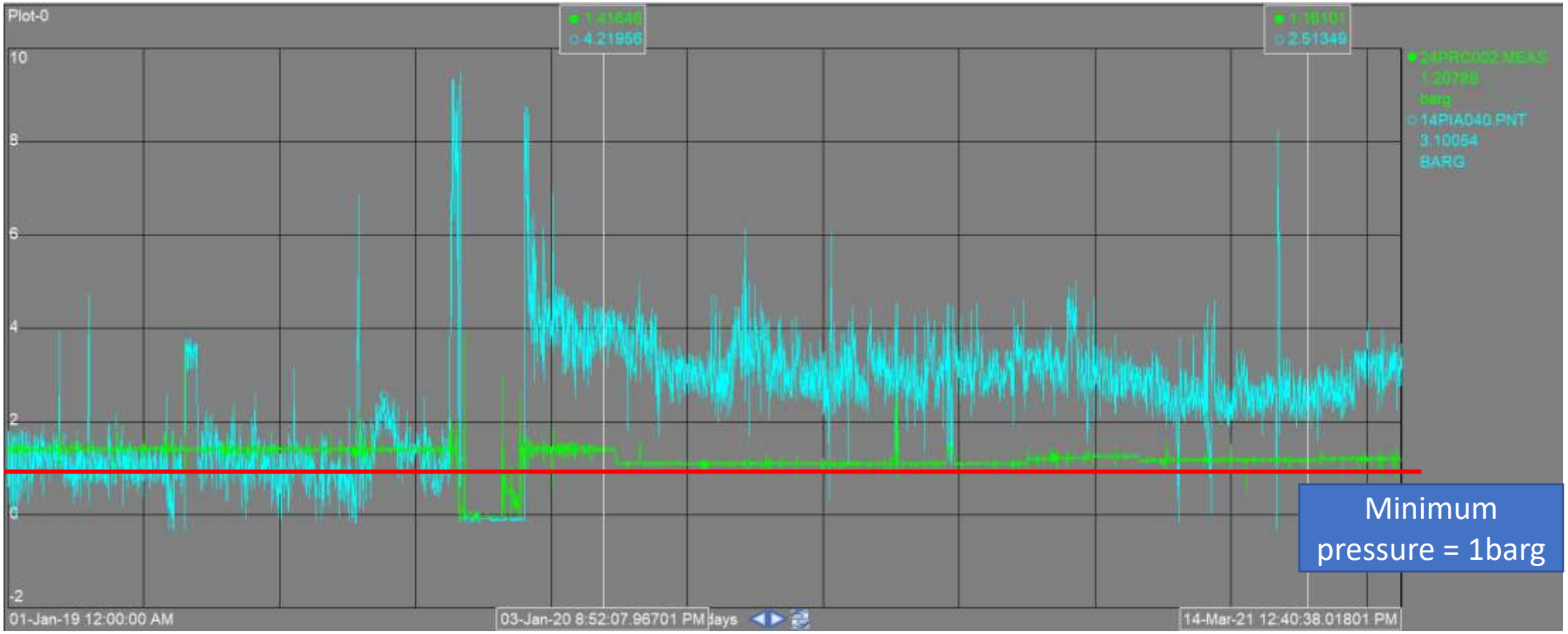
	Existing	Optimize	LPS saving
SWS operating pressure (barg)	1.40	1.10	
LPS consumption (t/h)	**10.35**	**9.38**	**0.97**

Total steam saving	23	Ton/day
IPS enthalpy	3.08	MMBTU/Ton
LPS enthalpy	2.70	MMBTU/Ton
NCC enthalpy	0.21	MMBTU/Ton
Cogen factor	0.65	
NG consumption	3.83	MMBTU/Ton LPS
Steam saving	88.91	MMBTU/day
Day in a year	365	days
	32,453.65	MMBTU/year
	34,239	GJ/year
One more pump will be stopped	37	kW
	324,120	kWh/year
	1,167	GJ/year
	1,106	MMBTU/year
Total saving	35,405	GJ/year
Average NG process price	321	Baht/MMBTU
	10,417,621	Baht/year
Electricity price	1.9	Baht/kWh
	615,828	Baht/year
Total	11,033,449	Baht/year

Result: 1)Control valve opening is 40-50%, increase from before reducing pressure around 10%. However, it is in normal operating range of 10-80% opening



Result: 2) Lower pressure header to user. Pressure of stripped water to user is higher than minimum operating pressure



Result: 3)Stripped water quality (NH3, H2S) is in operating control guideline

Operating control guideline : NH3 <100 ppm and H2S < 10 ppm. NH3 is sometime higher than target, then the stream is increased to reduce NH3 in stripped water. However, the stream consumption still lower than the previous