Steam Reduction at Phenol Column (D-1703)

TE Division

Technical Engineering Mgr.
Mr. Thitiwat Choocharoenprakit

P1 - TE







P2 - TE



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Group of P2-TE

Peeradech Tree-Umnak
Leader

1. Creating the concept of Saving
2. Advising and Supporting
3. Coordinating with other departments

Pathompat Thammakrang
Member

Tosak Kuwmool
Member

1. Collecting technical data
2. Preparing the presentation
3. Preparing plan of meeting
4. Analyzing data and cooperating with the people concerned

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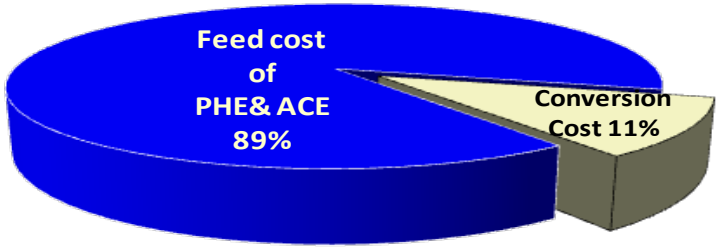
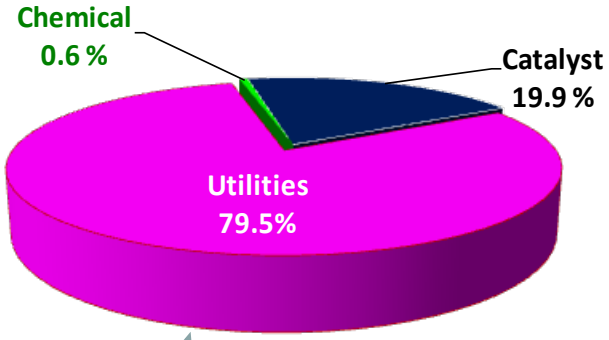
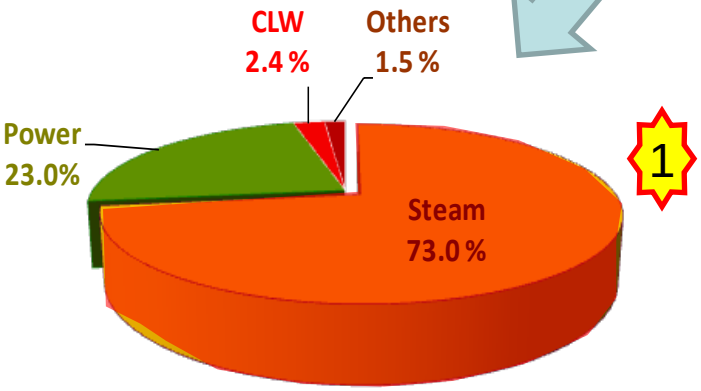
Cost structure of BPA Plant



BPA Production Cost



Conversion Cost



Utilities Cost

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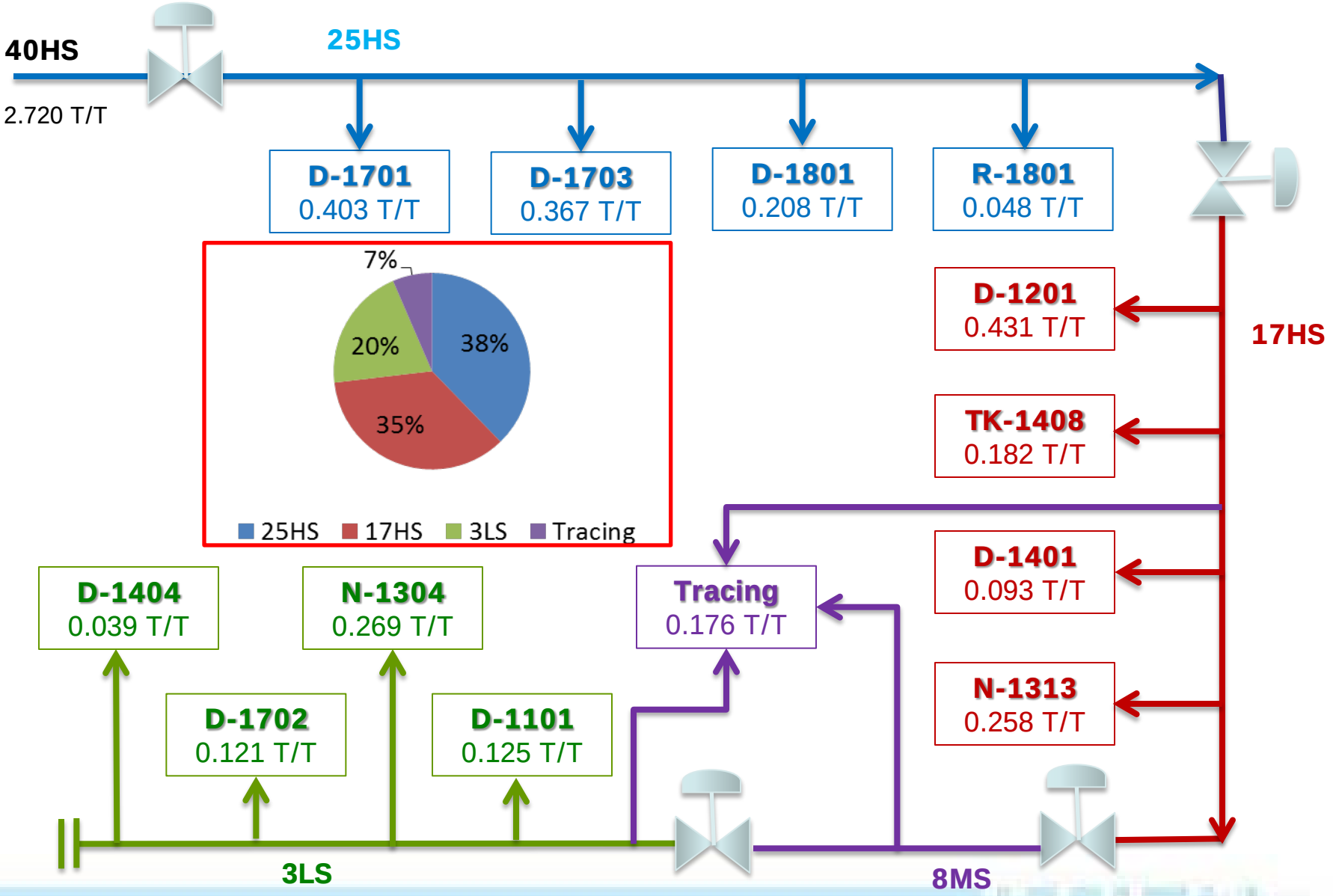
Steam mapping of BPA plant



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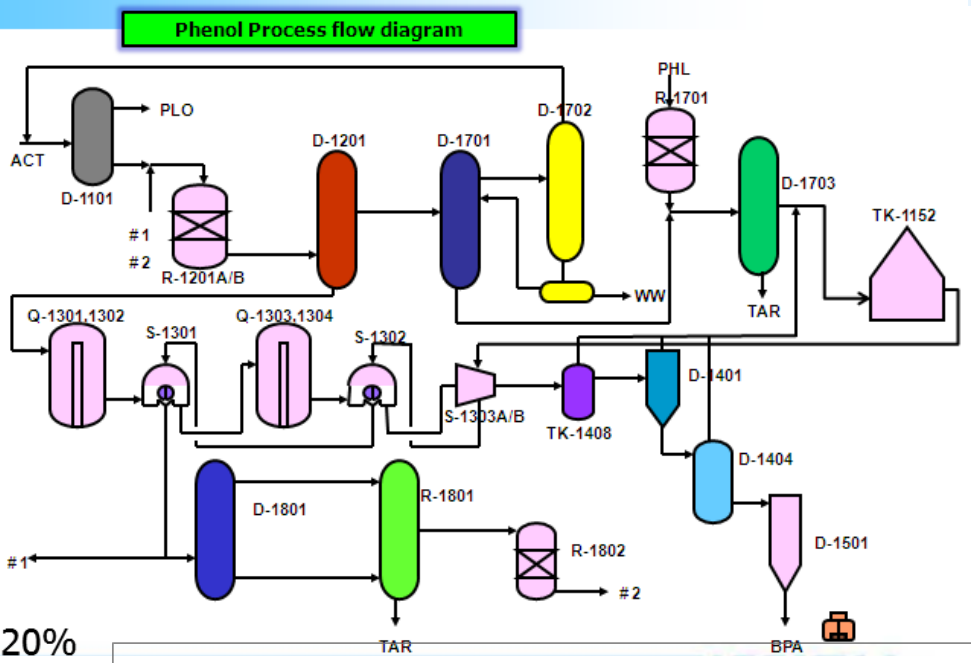
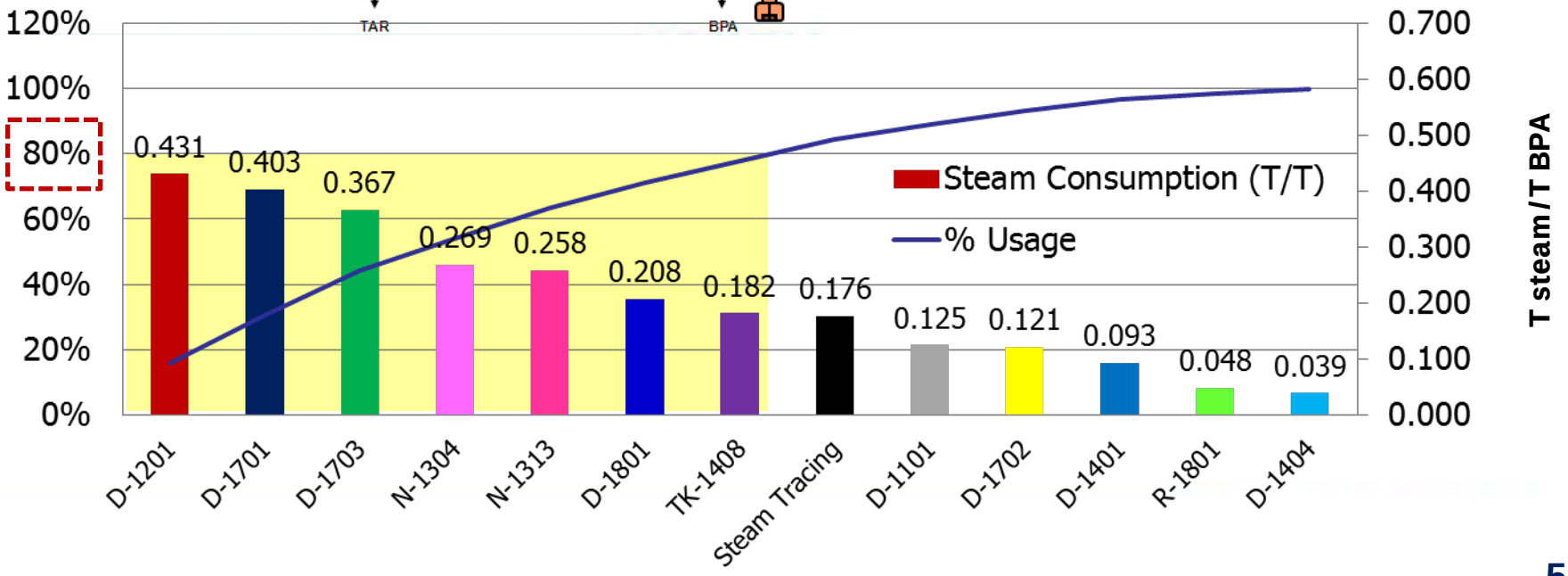
Problem Assessment



Steam consumption each user
Year 2014



Value Assessment Matrix (VAM)

Problem	Impact				Possible				Value
	1	2	3	4	1	2	3	4	
Dehydrator (D-1201)				✓		✓			8
Water Column (D-1701)				✓			✓		12
Phenol Column (D-1703)				✓				✓	16
Phenol evaporator (D-1801)			✓				✓		9
Solution Vessel (N-1304)			✓			✓			6
Melt Vessel (N-1313)			✓		✓				3
Preflasher (TK-1408)		✓			✓				2

Impact : Cost Impact
Possible : Solving Problem Possibility

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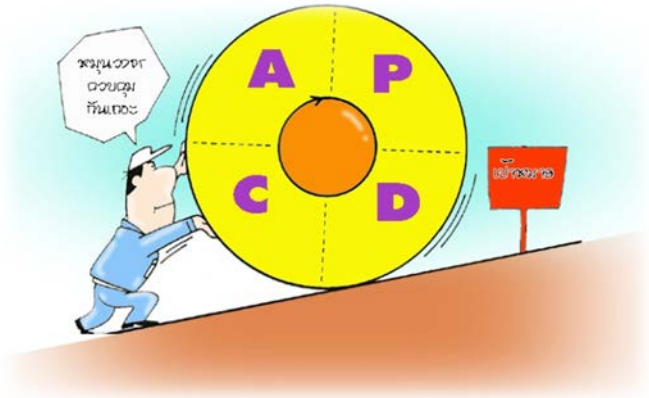
Objective and Target

Objective

Reduce steam consumption at Phenol Column (D-1703)



Target

Steam Reduction
10 %

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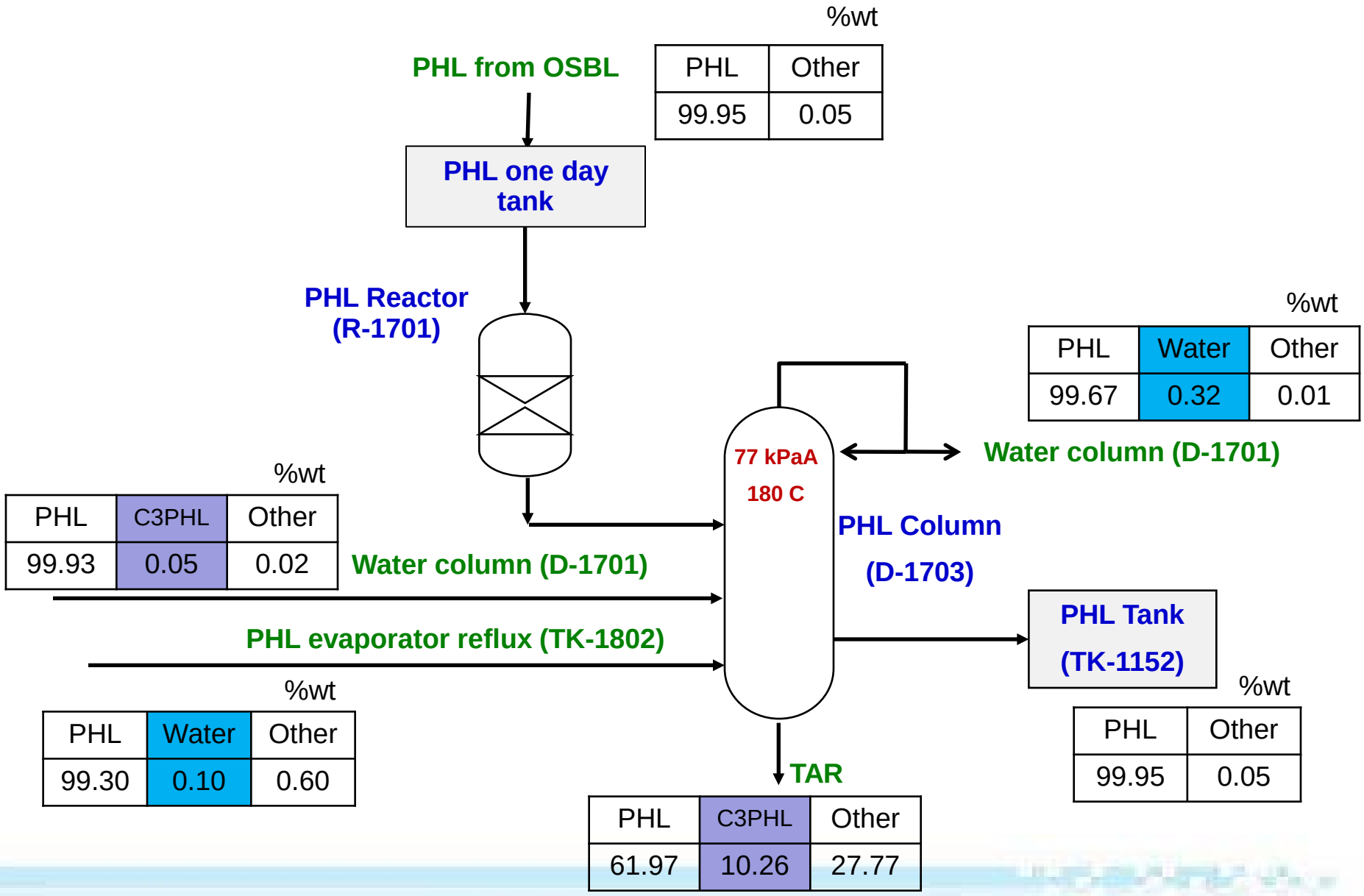
Outline of Process



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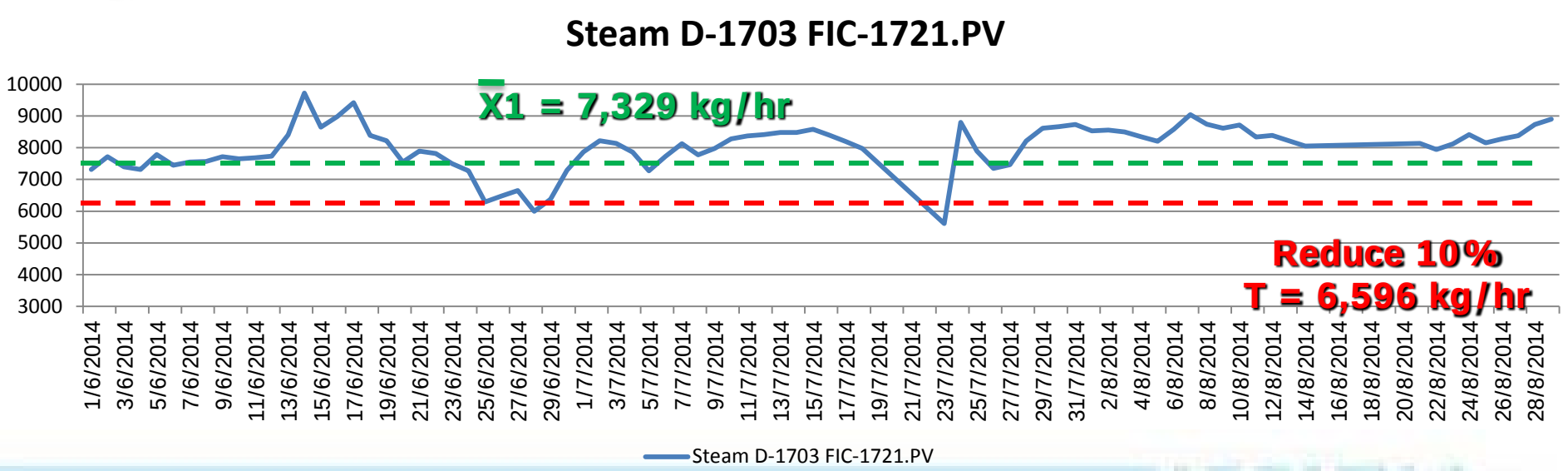
Situation Before Improvement

Loss Table and Graph "Before"

Loss	Average (Kg/hr)	Average (Baht/hr)
Steam consumption at Phenol Column (D-1703) Year 2014	7,329	8,062

Calculation	Low pressure steam (3LS)	1 kg = 1.1 Baht
		= 1.1 x 7,329 = 8,062 Baht/hr



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Improvement Plan

Responsibility		Theme (Loss)	Before		Target			2014											2015										
No.	Leader		Amount (kg/hr)	(Baht/hr)	Amount (kg/hr)	(Baht/hr)		4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
P2-TE	Peeradech	Steam Reduction at Phenol Column (D-1703)	7,329	8,062	6,596	7,255	Plan			P	D											D				S		
							Actual			P	D											D						

Saving Target = 8062 – 7255 = 807 baht/hr

Or 7.06 Mil. Baht/year

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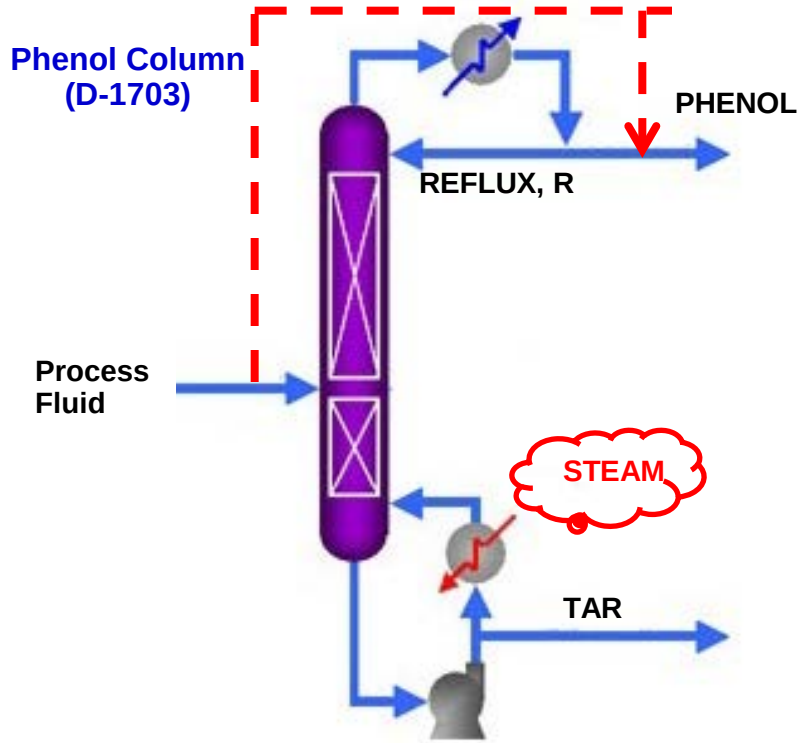
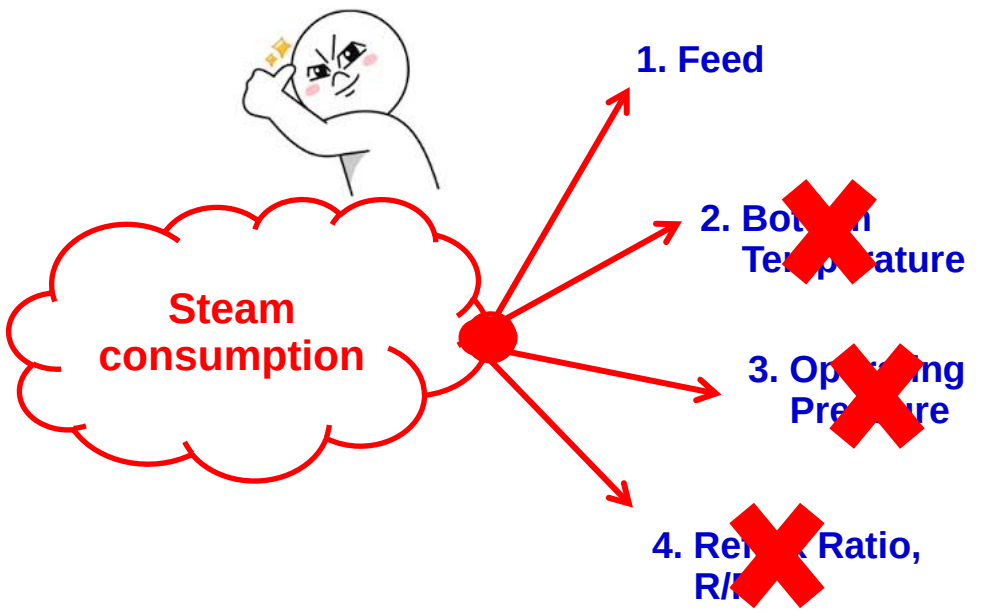
Analysis





No. 2,3,4 ∞ Purity of Phenol, TAR Production

Decrea ed Flow

Adjust
Process
Fluid Flow

Bypass Feed Flow

Improvement Content

Item	1
Flow (kg/hr)	16,500

Item	2
Flow (kg/hr)	4,125

Item	3
Flow (kg/hr)	12,375

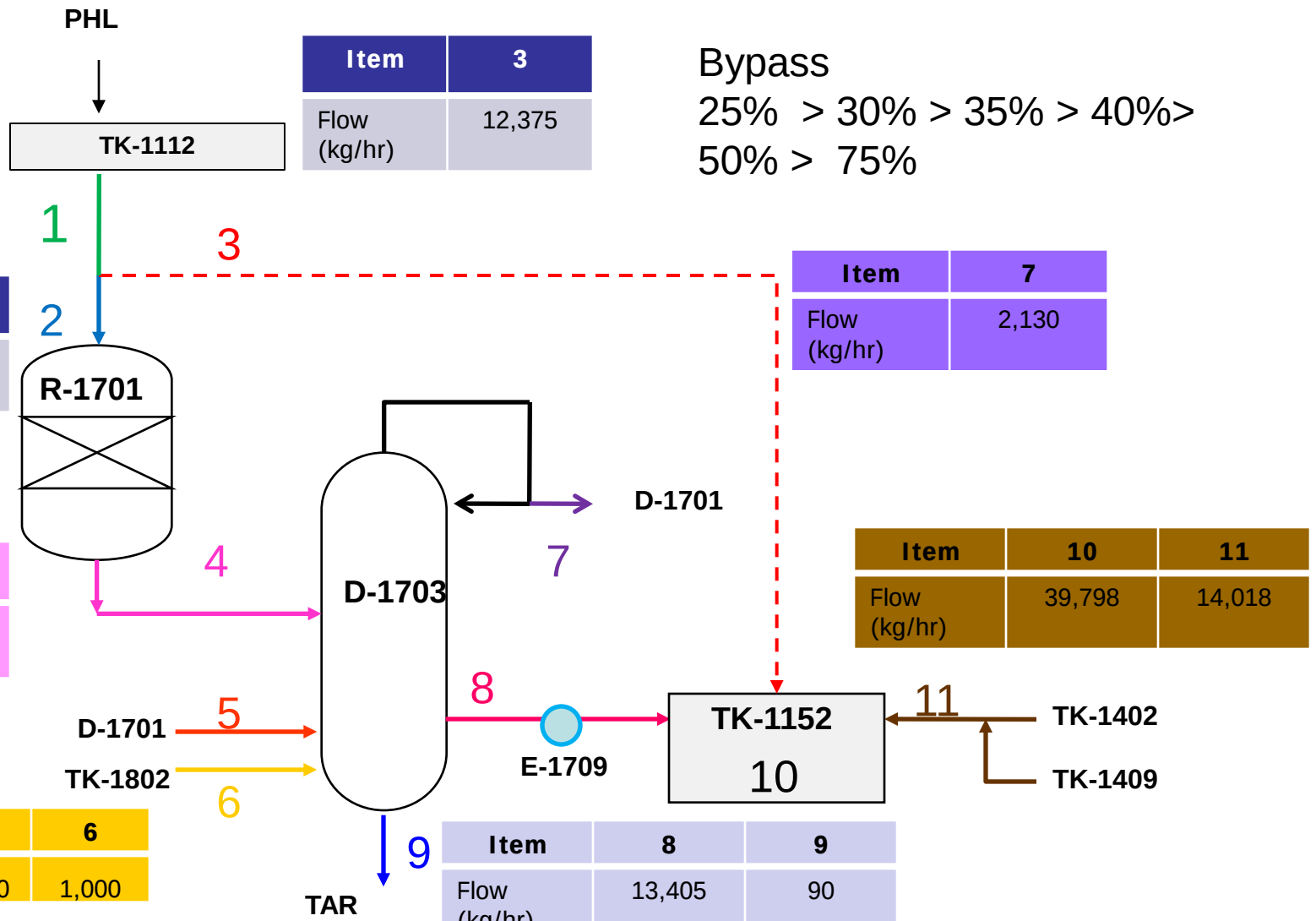
Item	4
Flow (kg/hr)	4,125

Item	5	6
Flow (kg/hr)	10,500	1,000

Item	7
Flow (kg/hr)	2,130

Item	8	9
Flow (kg/hr)	13,405	90

Item	10	11
Flow (kg/hr)	39,798	14,018



Bypass
25% > 30% > 35% > 40%>
50% > 75%

Control Caustic color TK-1152 ≤15 ppm

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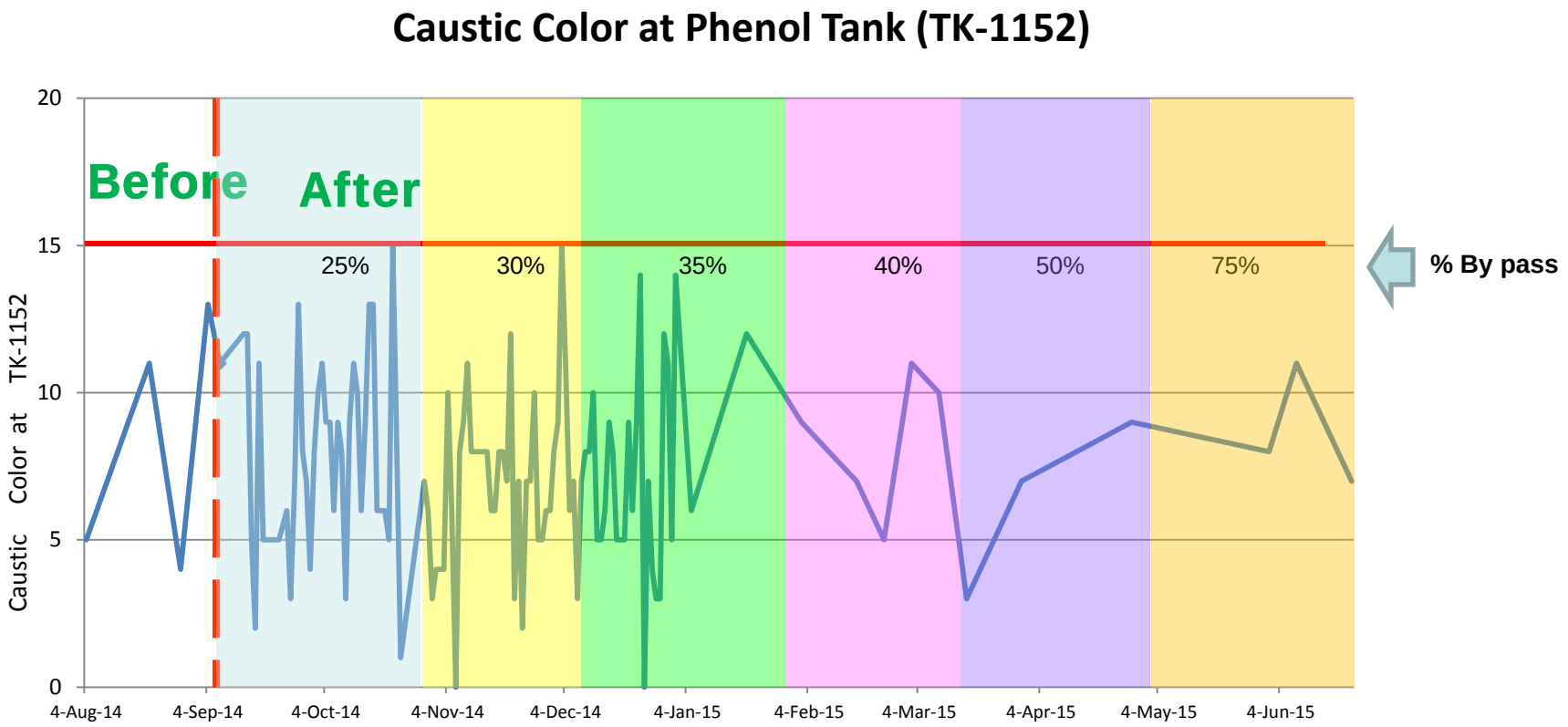
Improvement Content



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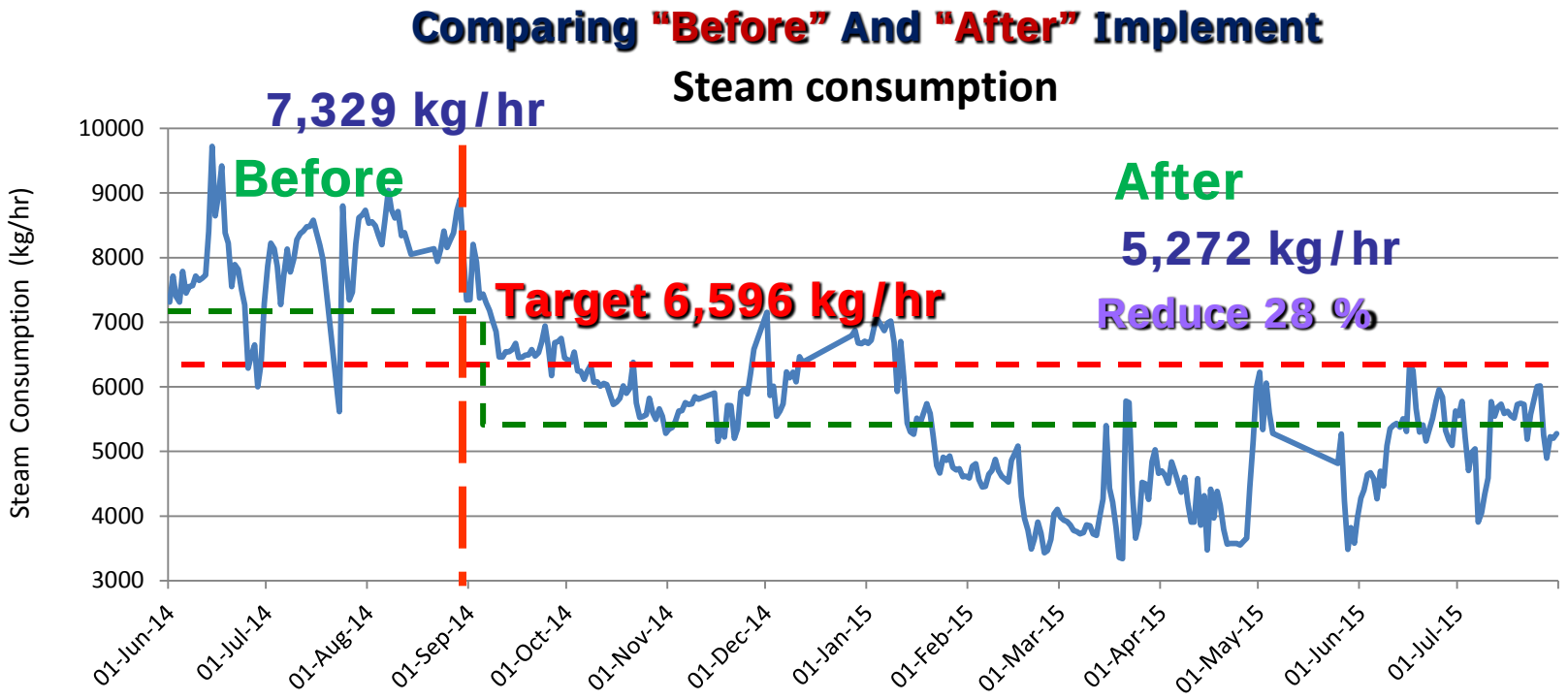
Results



Comparing Table "Before" and "After" Implement

Action	Steam Consume (kg/hr)		Steam Consume (baht/hr)		Saving (baht/year)
	Before	After	Before	After	
Bypass R-1701	7,329	5,272	8,062	5,800	19,821,252

Note: Base on Steam cost 1.1 baht/kg

Standardized Solution

Tentative operating window of D-1703
At unit monitoring document

“100% Bypass at D-1703”

Next action:

Try to increase bypass R-1701 to 100%

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