



O-P1-2018/061 : Modification at OLE1 Hydrogen header for transfer pure hydrogen from OLE3 to OLE2

Present to VAC/PIC | Date: 22 June 2021

Presenters:

Project Engineer	: Chawal M. (TP-PP-PA/1331)
Process Engineer	: Kankamol B (O-P1-TE/5335), Warawat Si (U-TM-TE/4758),
Project Initiator	: Thanat K. (U-PC-PM/1639)



<div>Project Information</div>	<div>MoC No: O-P1-2018/061</div> <div>Project No.: CP-1031-18005</div> <div>Project Title: (M5318593) Modification at OLE1 Hydrogen header for transfer pure hydrogen from OLE3 to OLE2</div> <div>Project Location: O-P1</div>																															
<div>Current Status</div>	<div><div><div><div><div>Phase I</div><div>Plan Gate1: DD MMM YYYY Actual Gate1: DD MMM YYYY</div></div><div><div>Phase II</div><div>Plan Gate2: DD MMM YYYY Actual Gate2: DD MMM YYYY</div></div><div><div>Phase III</div><div>Plan Gate3: DD MMM YYYY Actual Gate3: DD MMM YYYY</div></div><div><div>Phase IV</div><div>Plan Gate4: DD MMM YYYY Actual Gate4: DD MMM YYYY</div></div></div><div><div>Gate 1</div><div>Gate 2</div><div>Gate 3</div><div>Gate 4</div></div></div><div><div>We are here</div></div><div><div>MEETINGS</div><div>PASSED: ✓ VAC 15/08/2018 ✓ NEXT: ❑ Sub-PIC/PIC DD MMM YYYY ❑ Other (if any, please specify) DD MMM YYYY</div></div><div><div>Current Phase: Phase IV</div><div>✓ e-MOC Status : Completed ✓ SAP Status : Closed ✓ Execution Lookback Status : Published</div></div></div>																															
<div>Today's Objective</div>	<div><div>Project request PIC to endorse as following details.</div><div><div>Proposal for: Performance Lookback</div><div>Investment Type: Operational Excellence (budget <300MB)</div><div><table><tr><td rowspan="6">Performance Lookback Information:</td><td>Evaluating items</td><td>Estimated</td><td>Actual 2020</td><td>Actual June 2021 And forecast 2021</td><td></td></tr><tr><td>Budget (MTHB)</td><td>9.55</td><td>5.88</td><td>5.88</td><td>Achieved</td></tr><tr><td>Schedule</td><td>1 Jun 18 – 30 May 19</td><td>1 July 18 – 30 May 19</td><td></td><td>Achieved</td></tr><tr><td>Benefit (MTHB/Year)</td><td>4.94</td><td>0.29</td><td>29.8</td><td>Not Achieve</td></tr><tr><td>IRR (%)</td><td>31</td><td>-5.26%</td><td>100.58%</td><td>Not Achieve</td></tr><tr><td>Payback (Year)</td><td>2.05</td><td>20.3</td><td>2.25</td><td>Not Achieve</td></tr></table><div>Achieve the Estimated Benefit/Not Achieve the Estimated Benefit</div></div></div></div>	Performance Lookback Information:	Evaluating items	Estimated	Actual 2020	Actual June 2021 And forecast 2021		Budget (MTHB)	9.55	5.88	5.88	Achieved	Schedule	1 Jun 18 – 30 May 19	1 July 18 – 30 May 19		Achieved	Benefit (MTHB/Year)	4.94	0.29	29.8	Not Achieve	IRR (%)	31	-5.26%	100.58%	Not Achieve	Payback (Year)	2.05	20.3	2.25	Not Achieve
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Agenda

- 1. Introduction**
- 2. Project Background, Objectives & Scope**
- 3. Project Benefit & Justification Evaluation**
- 4. Gap Identification**
- 5. Project Lessons Learned**

1. Introduction

MOM: Sub PIC Meeting on 28 June 2018



บริษัท พีทีที โกลบอล เคมิคอล จำกัด (มหาชน)

Group Performance Center - Olefins

รายงานการประชุม

เรื่อง	การประชุม Plant Management Team (PMT)	ครั้งที่	11/2561
		วันที่	28 มิ.ย. 2561
		สถานที่	ห้องประชุมราชพฤกษ์ชัยฤกษ์, Warehouse I-4
		เวลา	13:30 – 17:30 น.

ผู้เข้าร่วมประชุม			
คุณบุญชัย	คุณวริศ	OLE	ประธานการประชุม
คุณอมปติ	ศิริสวรรค์	O-P2	
คุณไพลาธิ์	มีนัง	O-P1-OP1	
คุณธนพล	ศรีปัส	O-P1-OP2	
คุณอเล็กซ์	เทพคำดี	O-P2-OS	
คุณราตรี	ลาวิบุตร	O-P2-TE	
คุณอดุล	เนติวิมลกุล	O-P3-OS	
คุณอนุลักษณ์	ธนอมสัทกุล	Q-SH-01	
คุณมธุวิน	เวศนาเนนเวร	สังกัด Q-SH-02	
คุณฐกษิธร	ประเสริฐวิธา	สังกัด O-MN-03	
คุณธนพล	บุญอนอม	สังกัด O-MN-03	
คุณภัค	จันทร์เทพ	สังกัด O-MN-02	
คุณอภิษฎ์	บุญคือปี	T-TA-WM	
คุณสุรศักดิ์	คณิ	TP-OR-CN	
คุณพัฒนพงศ์	สุพรรณสุกุล	สังกัด E-PE-PS	
คุณกิตติพันธ์	ประเสริฐกุล	U-TM-TE	
คุณรัชชัย	มาธิตาภาณุ	TP-PP-PA	
คุณทรงพล	สุนัน	สังกัด TP-PP-PA	
คุณไพฑิณี	จีนน้อย	สังกัด TP-PP-PA	
คุณชวาล	มาแจ้ง	สังกัด TP-PP-PA	
คุณกานต์กร	บุญรัตน์	สังกัด O-P1-TE	
คุณราโมนา	กวันกิตติเดช	สังกัด U-PC-PM	
คุณวรวรรณ	ศิริจรรยาพร	สังกัด U-TM-TE	
คุณเจนวีร์	สิริสิทธิ์	สังกัด O-P2-TE	
คุณกิตติยา	กรองโรชกุล	สังกัด H-BP-OL	
คุณพรชัย	แจ้ง	O-OL-PP	บันทึกการประชุม

<ul style="list-style-type: none"> <u>O-P1-2018/061 "Modification at OLE1 Hydrogen header for transfer pure hydrogen from OLE3 to OLE2"</u> <p>รายละเอียดตั้ง เอกสารแนบ 6.2.2 M5318593 Modification at OLE1 Hydrogen header</p> <p>Project budget: 6M THB</p> <p>Benefit: Max IL4 target 4.94 MTHB/Yr 4</p> <p>IRR: Max IL4 target 65%, Payback 1.53 Yr</p> <p>Project Schedule: Jun-Dec 2018</p> <p>Propose to use Mid-year Y2018 budget to order long lead items.</p> <p>Proposal : New vessel need to be installed to be buffer of acetylene convertor</p> <p>Objective : Utilize PTTGCH2 system between OLE1/2/3 grid and REF/ARO grid.</p> <p>Transfer hydrogen from OLE3 to REF in order to turndown HMU. by increase OLE3 discharge pressure to transferring 2,000-2,500 Nm³/h (4.3-5.4 TPD)</p> <p>Status : กรรมการในที่ประชุมเห็นชอบ</p>	<p>TP-PP-PA</p> <p>O-P1-TE</p> <p>U-PC-PM</p>	เพื่อพิจารณา
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1. Introduction

MOM: VAC Meeting on 15 Aug 2018



MINUTES OF MEETING

VAC

MEETING TITLE	VAC Meeting 15 August 2018			
AGENDA	<p><u>Gate1 Request OPEX Study budget >2M THB:</u></p> <ul style="list-style-type: none"> None <p><u>Gate2:</u></p> <ul style="list-style-type: none"> None <p><u>Gate3: (Project MAX)</u></p> <ul style="list-style-type: none"> O-P1 (M5318593) Modification at OLE1 Hydrogen header for transfer pure hydrogen from OLE3 to OLE2/ 6M THB/ Sustain Core (Operational Excellence) by Chawal M <TP-PP-PA> <p><u>Gate3:</u></p> <ul style="list-style-type: none"> E-GC (M5516798) Extension of EO supply capacity for future EO derivative plants/ 86M THB/Sustain Core (Operational Excellence) by Thanadkit B <TP-PP-PC> E-GC MEG and Rundown Bund Wall/ 97.9M THB/ BAU (Law and Regulation) by Chakkrit Chanchad U-P1 Install New demin unit 120 m3/h for ORP Project (Phase-I)/ 277.4M THB/ BAU (Maintain Reliability) by Thammanoon P <TP-UR-PC> R-RM Install platform at new ETP polymer tanks/ 4.1M THB/ BAU (Safety) by Sumate W <TP-PP-PB> <p><u>Project revise budget:</u></p> <ul style="list-style-type: none"> None <p><u>Project cancel:</u></p> <ul style="list-style-type: none"> None <p><u>Performance Lookback:</u></p> <ul style="list-style-type: none"> A-P1 CP-1021-16001 Heat recovery from hot condensate bypass by Supansa T <A-P1-TE> 			
LOCATION	GC6 REF Baan Rao 1 Time: 13:30 – 17:00	Date	15 August	2018
ATTENDEES	<p><u>Gate Keeper and SME member:</u> Werasak C <TP-PM>, Chonlavit S <TP-PM-CO>, Veravong P <TP-PM-CC>, Pichate R <T-TE-DM>, Thanasan T <T-TE-PT>, Varutrit Ji <T-TE-PT/2151> and Lursukd N <Q-TE-TS></p> <p><u>Project capex present teams:</u> Thanadkit B <TP-PP-PC>, Thepchan Promtong, Chakkrit Chanchad, Pongpen A <E-GC-TE>, Anan S <Q-SH-EO>, Thammanoon P <TP-UR-PC>, Kittipong P <U-TM-TE>, Warawat Si <U-TM-TE>, Chartchai K <TP-UR-DM>, Chawal M <TP-PP-PA>, Kankamol B <O-P1-TE>, Sumate W <TP-PP-PB>, Panya J <R-RM-OP> and Supansa T <A-P1-TE></p> <p><u>Integrator:</u> Teerasak T <TP-PM-CO>, Ratthanee I <TP-PM-CO> and Maetavee S <TP-PM-CO> (Recorder)</p>			
APOLOGY	<p><u>SME member:</u> Kriengkrai B <TP-PQ-CE> and Theerachai T <TP-PQ-DM></p> <p><u>Project capex present teams:</u> -</p>			

4	<p>O-P1 (M5318593) Modification at OLE1 Hydrogen header for transfer pure hydrogen from OLE3 to OLE2 Project request Sub-PIC to endorse Gate 3 (+10%) Project budget: 6M THB (Request CAPEX 5.2M THB, Received OPEX 0.8M THB) Investment type: Sustain Core (Operational Excellence)</p> <p>Benefit: 4.94M THB/Year (Max IL4 target) IRR: 65% (Max IL4 target) Payback: 1.53 Year (Max IL4 target)</p> <p>Project Schedule: June 2018 – December 2018</p> <p>Passed VAC Gate-3 and can propose to gate decision committee with comments. Comments from VAC committees;</p>	Project Team	-
	<p>1. Plant shall reconfirm the required pure H2 flowrate with ORP to ensure that the current design is enough. 2. Project team to confirm the HMU ramp up rate with REF to ensure that it is enough for this case.</p>		



1. Introduction

MOM: VAC Meeting on 22 June 21



MINUTES OF MEETING

VAC

MEETING TITLE	VAC Meeting on 22 June 2021			
AGENDA	<p><u>Gate1 (Verify OPEX study budget >2 MTHB):</u></p> <ul style="list-style-type: none"> PH-P1 Heat Recovery at Crude Acetone Column (V-2401), Sustain Core (Energy saving), Budget 44.42 MTHB, By Nuttachai K <TP-PP-PC> <p><u>Gate2:</u></p> <ul style="list-style-type: none"> None <p><u>Gate3:</u></p> <ul style="list-style-type: none"> O-P2 Install new ethylene metering for Plant I-4 EAST battery limit, BAU (Law & Regulation), Budget 23.7 MTHB, By Jirawat B <TP-PP-PA> <p><u>Project revise budget:</u></p> <ul style="list-style-type: none"> None <p><u>Project cancel:</u></p> <ul style="list-style-type: none"> None <p><u>Performance Lookback:</u></p> <ul style="list-style-type: none"> O-P1 Modification at OLE1 Hydrogen header for transfer pure hydrogen from OLE3 to OLE2 by Kankamol B <O-P1-TE> 			
LOCATION	Microsoft Teams Meeting Time: 8:30 – 11:00	Date	22 June	2021
ATTENDEES	<p><u>Gatekeeper and SME members:</u></p> <p>VAC Chairman: Chatree Sa <TP-PM/1353></p> <p>Gatekeeper: Chonlavit S <TP-PM-CO></p> <p>SME Project Management/Risk: Chatree Sa <TP-PM/1353></p> <p>SME Procurement Management: Teerachai S <PM-P2-PJ></p> <p>SME Cost Estimate: Voravit W <TP-PM-CC></p> <p>SME Benefit justification & Calculation: Suwanna H <U-PC-PM/1404>; Noraphol S <Q-TS-TS>; Lursuk N <Q-TS-TS/1230></p> <p>SME Process Technology: Pichate R <T-TE-DM/2259>; Nittaya B <T-TE-PE/1166>; Sukuman S <T-TE-DP>; Arupong W <T-TE-DP/6779>; Sirisak P <T-TE-DM>; Thanasan T <T-TE-UP/1286>; Vinitchai M <T-TE-UP/1169></p> <p>SME Process/Technical Safety: Noraphol S <Q-TS-TS>; Lursuk N <Q-TS-TS/1230></p> <p>SME Static Equipment: Thanunkorn T <T-RE-SE/2357>; Varanon P <T-RE-SE/1782></p> <p>SME Instrument & Control: Panida D <T-RE-IN/2397>; Tienchai S <T-RE-IN/1235></p> <p>SME Materials and Corrosion: Jitawat C <T-II-MC></p> <p>SME Civil & Structure: Theerachai T <TP-PQ-DM/1180></p> <p><u>Project canex present teams:</u></p> <p>Item1: Nuttachai K <TP-PP-PC/3893>; Poochet H <PH-P1-TE/3935></p> <p>Item2: Jirawat B <TP-PP-PA/5927>; Chonnawee L <O-P2-TE/5847></p> <p>Item3: Kankamol B <O-P1-TE/5355>; Thanat K <U-PC-PM/1639></p> <p><u>Other (Support/Observation):</u></p> <p>Rathanee I <TP-PM-CO>; Sitanan N <PH-P1-TE>; Tanut P <PH-P1-TE/3952>; Jarupong Pinratn; Prapas S <PH-P1-TE/3859>; Tharinee K <PH-P1-TE/3937>; Tanatat Pi <PH-P1-TE/3938>; Parichat Pr <PH-P1-TE/3942>; Tassan J <TP-PP-PA/5708>; Duangjai Watcharapobkum; Varinya T <M-CM-OC/8061></p> <p><u>Integrator:</u></p> <p>Jakkrapong A <TP-PM-CO>; Pakorn Su <TP-PM-CO> (Recorder)</p>			

3

O-P1: Modification at OLE1 Hydrogen header for transfer pure hydrogen from OLE3 to OLE2

Project Request: PIC to endorse Performance Lookback

Evaluating items	Estimated	Actual
Budget (MTHB)	9.55	5.88
Schedule	1 Jun 18 – 30 May 19	1 July 18 – 30 May 19
Benefit (MTHB/Year)	4.94	0.29
IRR (%)	31	-5.26%
Payback (Year)	2.05	20.3

Lookback: Not Achieve both Estimated Benefit and IRR

Result: Passed VAC with comments

Meeting Notes:

- N/A

Comments from VAC Committee:

- To add the saved benefit of Y2021.
- To mention flexibility gained from this project.
- To mention catalyst replacement effect to other projects in lesson learn.
- Project team shall incorporate all applicable VAC's comments and re-submit the revised presentation for review before PIC meeting.

Process Team

Next PIC Meeting



1. Introduction

Comments Closure:

Comments from MOM: VAC Meeting on 15 Aug 2018	Status	Clarifications/Notes
1. Plant shall reconfirm the required pure H2 flowrate with ORP to ensure that the current design is enough.	Closed	ORP informed that no H2 import normally but require H2 500 – 1500 Nm3/h for start up only. The existing pipe already designed covering ORP import case maximum to 1500 Nm3/h.
2. Project team to confirm the HMU ramp up rate with REF to ensure that it is enough for this case.	Closed	HMU always keep turndown at 20,800 Nm3/h (45 t/d) which is prompted to ramp up in urgently case. HMU ramp up rate 4600 Nm3/h (10t/d) per 15 mins.

2. Project Background, Objectives & Scope

Project Background:

All of pure H₂ from OLE2 (36tpd) & ARO2 (72tpd) transfers to REF as economic driver but still insufficient to HMU turndown, nevertheless the pure H₂ at OLE3 have been available 7.6 tpd (3,500Nm³/h).

However, the existing facility is not able to transfer pure H₂ from OLE3 to REF.

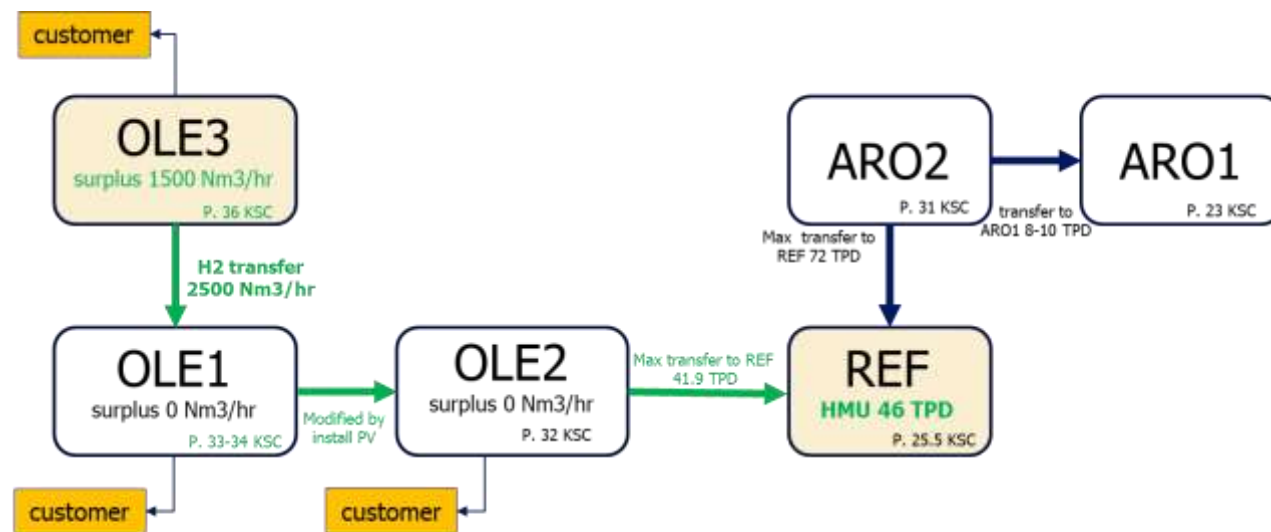
The transferring concept should be routed from OLE3-->OLE1-->OLE2-->REF.

Project Objectives:

Utilize PTTGC H₂ system between OLE1/2/3 grid and REF/ARO grid. Transfer hydrogen from OLE3 to REF in order to turndown HMU. by increase OLE3 discharge pressure to transferring 2,000-2,500 Nm³/h (4.3-5.4 TPD)

Project Scope:

- Install pressure control valve; PV (with bypass globe valve)
- Install On-off valve; XV (with bypass gate valve)
- Install two flow indicator (FI) and one pressure indicator (PI)
 - Install PT to display on DCS and add interlock to trip XV
 - Laying instrument cable route directly to CCB for interlocking H₂ Shedding
- Provide 4" connection valve with blind



Plant Investment Management

3. Project Benefit & Justification Evaluation

Benefit calculation			
	Min case	Likely case	IL4 register
Investment	9.55 M THB	9.55 M THB	9.55 M THB
Benefit	9.89 MTHB	11.90 MTHB	4.94 M THB
IRR	53%	61%	31%
Payback year	0.96Yr	0.80Yr	1.93 Yr

2.2) Growth or Core uplift or Business As Usual (Energy & Reliability) Project Categorization	
Total Investment Cost (฿)	9,550,000
Project Starting Year	2018
Project Completion Year	2019
Residual Value (฿)	-
Utilities (฿/year)	
Labour (฿/year)	
Maintenance (% of total investment cost)	2.0%
Catalyst & Chemicals (฿/year)	-
Benefits (฿/year)	4,940,000
Profit (฿/year)	4,749,000
Simple Payback (Year)	1.93
IRR	30.83%

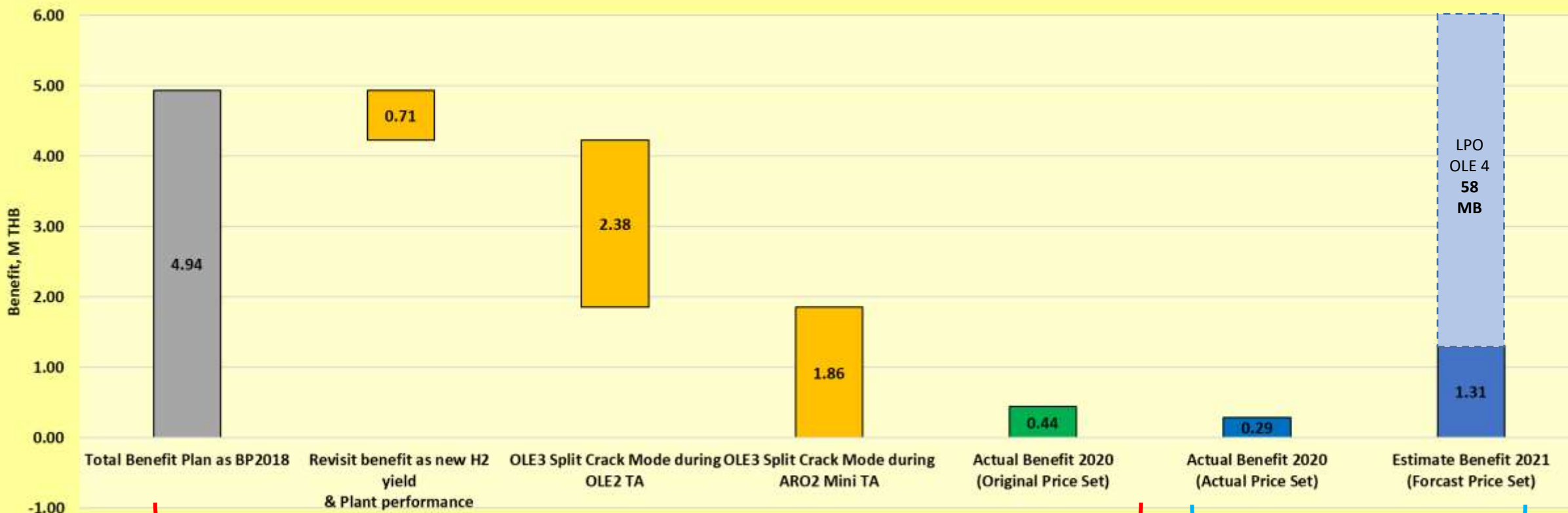
3. Project Benefit & Justification Evaluation

Economic Evaluation:

Parameter	Unit	Estimated Value	Actual Value 2020	Actual June 2021 And forecast 2021
Investment cost	THB	9,550,000	5,880,000	5,880,000
Benefit	THB/Year	4,940,000	289,097	29,800,000
Reduce HMU load	T/D	5.4	4.7	4.1
Operation hours	Day/Year	365	5	33
Payback Period	Year	2.05	20.3	2.25
NPV	THB	21,202,864	-	
IRR	%	31	-5.26	100.58
		Information during project was approved	Actual Information during stable operation	Estimate benefit 2021 with new price set

3. Project Benefit & Justification Evaluation

Benefit Clarification:



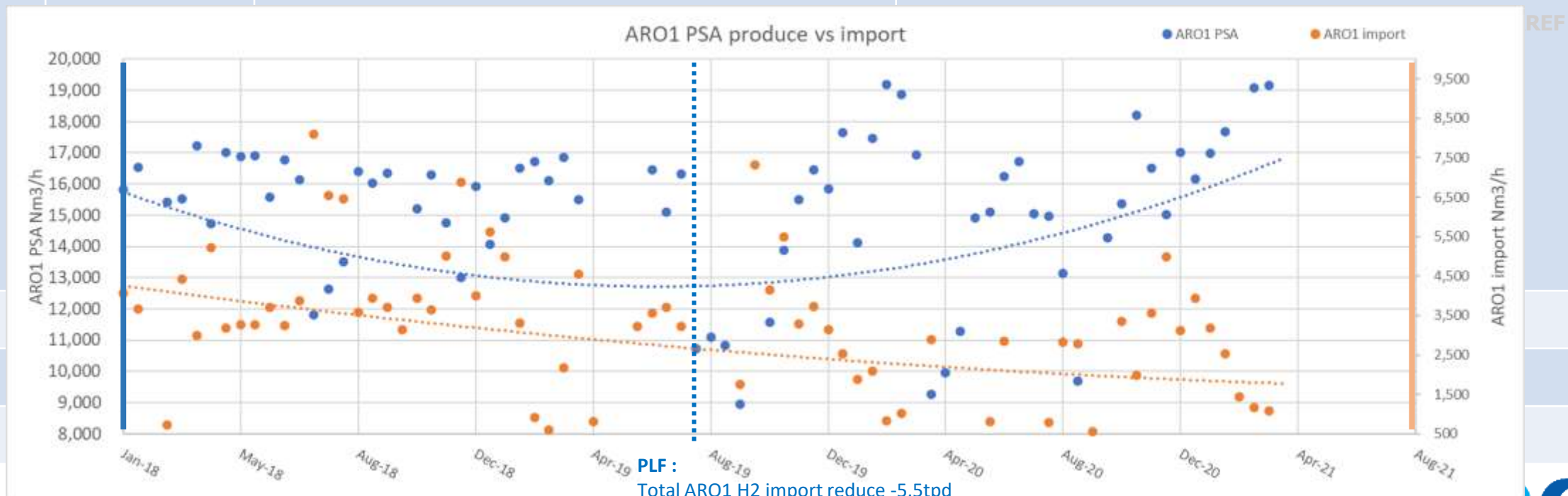
Identify gap +/- that have an effect to economic evaluation
(* used original price set)

Estimate based
on new price set

4. Gap Identification

All gaps are identified and explained as table below.

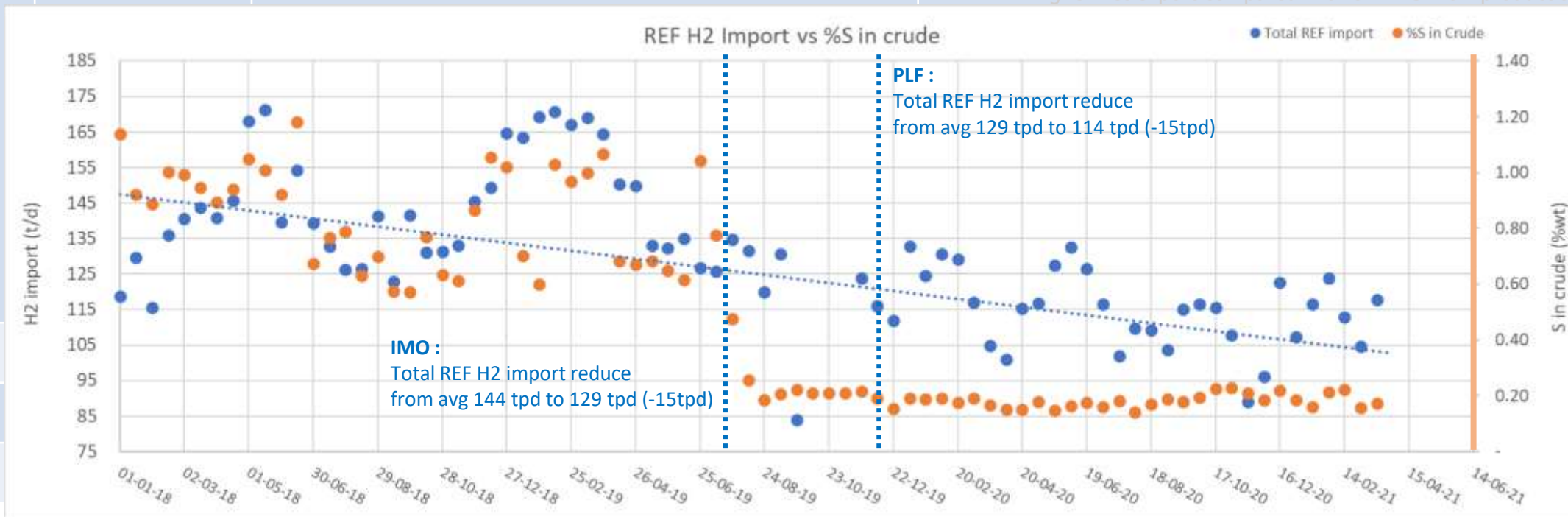
Benefit Items	Gap (MTHB/Year)	Reason of Deviation	Mitigation or Suggestion
Revisit benefit as new H2 yield & Plant performance	Revisit benefit as new H2 yield & Plant performance	<p>Opportunity to utilize PV3002 & XV8104 has been reduced to only OLE2 T/A (15Jan20-18Feb20) and ARO2 Mini S/D (2-20May20).</p> <p>The benefit deviation to transfer 2,500 Nm³/h (4.3t/d) of pure H₂ from OLE3 to REF (via OLE1 and OLE2) as uncertainty affect to H₂ consumption has been changed from</p> <ul style="list-style-type: none"> - PLF catalyst change out of ARO1 (May19) and optimize PSA - REF IMO implement (Jul19) - PLF catalyst change out of REF (Oct19) 	<ul style="list-style-type: none"> - 5 years project consideration. - This modification is be advantaged by utilized in many propose as; <p>: Keep OLE1 H2 header pressure stability during H2 export/import</p> <ul style="list-style-type: none"> • Increase OLE1 PSA reliability during customer fluctuation and do not shedding customer • Higher net export compared with own PSA1&2 production



4. Gap Identification

All gaps are identified and explained as table below.

Benefit Items	Gap (MTHB/Year)	Reason of Deviation	Mitigation or Suggestion
Revisit benefit as new H2 yield & Plant performance	-0.71	<p>Opportunity to utilize PV3002 & XV8104 has been reduced to only OLE2 T/A (15Jan20-18Feb20) and ARO2 Mini S/D (2-20May20).</p> <p>The benefit deviation to transfer 2,500 Nm3/h (4.3t/d) of pure H2 from OLE3 to REF (via OLE1 and OLE2) as uncertainty affect to H2 consumption has been changed from</p> <ul style="list-style-type: none"> PLF catalyst change out of ARO1 (May19) and optimize PSA REF IMO implement (Jul19) PLF catalyst change out of REF (Oct19) 	<ul style="list-style-type: none"> 5 years project consideration. This modification is be advantaged by utilized in many propose as; <p>: Keep OLE1 H2 header pressure stability during H2 export/import</p> <ul style="list-style-type: none"> Increase OLE1 PSA reliability during customer fluctuation and do not shedding customer Higher net export compared with own PSA1&2 production



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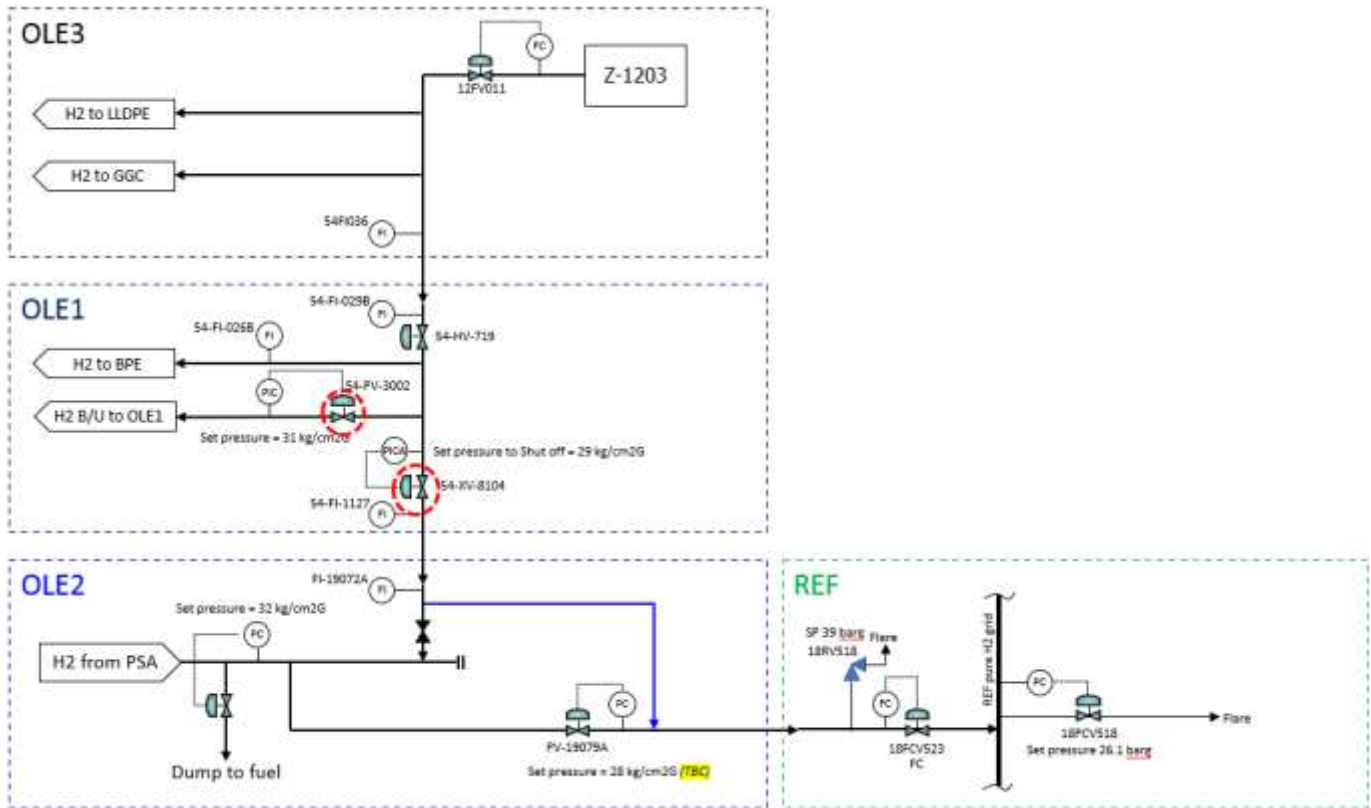
Benefit Items	Gap (MTHB/Year)	Reason of Deviation	Mitigation or Suggestion
Revisit benefit as new H2 yield & Plant performance	-0.71	<p>Opportunity to utilize PV3002 & XV8104 has been reduced to only OLE2 T/A (15Jan20-18Feb20) and ARO2 Mini S/D (2-20May20).</p> <p>The benefit deviation to transfer 2,500 Nm3/h (4.3t/d) of pure H2 from OLE3 to REF (via OLE1 and OLE2) as uncertainty affect to H2 consumption has been changed from</p> <ul style="list-style-type: none"> - PLF catalyst change out of ARO1 (May19) and optimize PSA REF IMO implement (Jul19) - PLF catalyst change out of REF (Oct19) 	<ul style="list-style-type: none"> - 5 years project consideration. - This modification is be advantaged by utilized in many propose as; <ul style="list-style-type: none"> : Keep OLE1 H2 header pressure stability during H2 export/import <ul style="list-style-type: none"> • Increase OLE1 PSA reliability during customer fluctuation and do not shedding customer • PSA1&2 production decreased due to operation mode to 5+3 • OLE1 can maintain import OLE3 H2 to continuously supply to customer



4. Gap Identification

All gaps are identified and explained as table below.

Benefit Items	Gap (MTHB/Year)	Reason of Deviation	Mitigation or Suggestion
Revisit benefit as new H2 yield & Plant	-0.71	<p>Opportunity to utilize PV3002 & XV8104 has been reduced to only OLE2 T/A (15Jan20-18Feb20) and ARO2 Mini S/D (2-20May20).</p> <p>The benefit deviation to transfer 2,500 Nm3/h (4.3t/d) of pure H2 from OLE3 to REF (via OLE1 and OLE2) as uncertainty affect to H2 consumption has been</p>	<ul style="list-style-type: none"> - 5 years project consideration. - This modification is be advantaged by utilized in many propose as; <p>: Keep OLE1 H2 header pressure stability during H2 export/import</p> <ul style="list-style-type: none"> • Increase OLE1 PSA reliability during customer fluctuation and do not shedding customer • PSA1&2 production decreased due to operation mode to 5+3 • OLE1 can maintain import OLE3 H2 to continuously supply to customer <p>: H2 loop Integration of OLE1&OLE3&OLE4 and OLE2&ARO&REF</p> <ul style="list-style-type: none"> • Increase the GC reliability such as; <ul style="list-style-type: none"> ➢ HMU turndown during ARO2 or OLE2 T/A ➢ External sport sell to BIG= 2.06 MB/year ➢ Back up OLE4 loss saving since delay S/U=58 MB <p>: Future project require</p> <ul style="list-style-type: none"> • OIP require H2 2,940 Nm3/h • Swop H2 OLE3 & ARO2 to GGC 2,300 Nm3/h for reliability backup



4. Gap Identification

All gaps are identified and explained as table below.

Benefit Items	Gap (MTHB/Year)	Reason of Deviation	Mitigation or Suggestion
Revisit benefit as new H2 yield & Plant performance	-0.71	<p>Opportunity to utilize 54PV3002 & 54XV8104 are reduce to only OLE2 T/A (15Jan20-18Feb20) and ARO2 Mini S/D (2-20May20).</p> <p>The benefit deviation to transfer 2,500 Nm³/h (4.3t/d) of pure H2 from OLE3 to REF (via OLE1 and OLE2) as uncertainty affect to H2 consumption has been changed from</p> <ul style="list-style-type: none"> - REF IMO implement (Jul19) --> Total REF H2 import reduce from 144 tpd to 129 tpd (-15tpd) - PLF catalyst change out of ARO1 (May19) and optimize PSA --> Total ARO1 H2 import reduce from 8 tpd to 2.5 tpd (-5.5tpd) - HCU/DHDS/PLF catalyst change out of REF (Oct19) --> Total REF H2 import reduce from 129 tpd to 114 tpd (-15tpd) 	<p>-This modification is be advantaged by utilized in many propose as;</p> <ol style="list-style-type: none"> 1. Keep OLE1 H2 header pressure stability during H2 export/import <ul style="list-style-type: none"> - Increase OLE1 PSA reliability during customer fluctuation and do not shedding customer - Higher net export compared with own PSA1&2 production 2. H2 loop Integration of OLE1&OLE3 and OLE2&ARO&REF <ul style="list-style-type: none"> Increase the GC reliability such as; - HMU turndown during ARO2 or OLE2 T/A - Back up I-1 group customer during OLE1 T/A - Back up ORP during commissioning/startup - Back up during OLE3 T/A or Split Crack mode 3. Future project require <ul style="list-style-type: none"> - OIP require H2 2,940 Nm³/h - M/U new high sulfur GO feed to DHDS
OLE3 Split Crack Mode during OLE2 TA	-2.38	Economic drive OLE3 run as Split crack mode during OLE2 TA 2020	This scenario will not be occurred as economic drive ORP plant
OLE3 Split Crack Mode during ARO2 Mini TA	-1.86	Economic drive OLE3 run as Split crack mode during COVID19 since Apr20 to Sep20	This scenario will not be occurred as economic drive ORP plant

5. Project Lessons Learned

Detail of Lessons Learned and Recommendation for next project

Technical	<ul style="list-style-type: none">• In case of catalyst replacement, yield for by product for fuel gas, H2 and utility balance shall be focused.• Develop catalyst replacement for long term plan.
Price	<ul style="list-style-type: none">• No H2 cost/price lesson learn.
Volume	<ul style="list-style-type: none">• Plant condition has been always changed (Plant performance, Catalyst replacement, Feed quality and yield). Project team must update with plant owner in any period.
Other (if any)	

Thank You



Backup

Presentation slides of previous gate endorsement