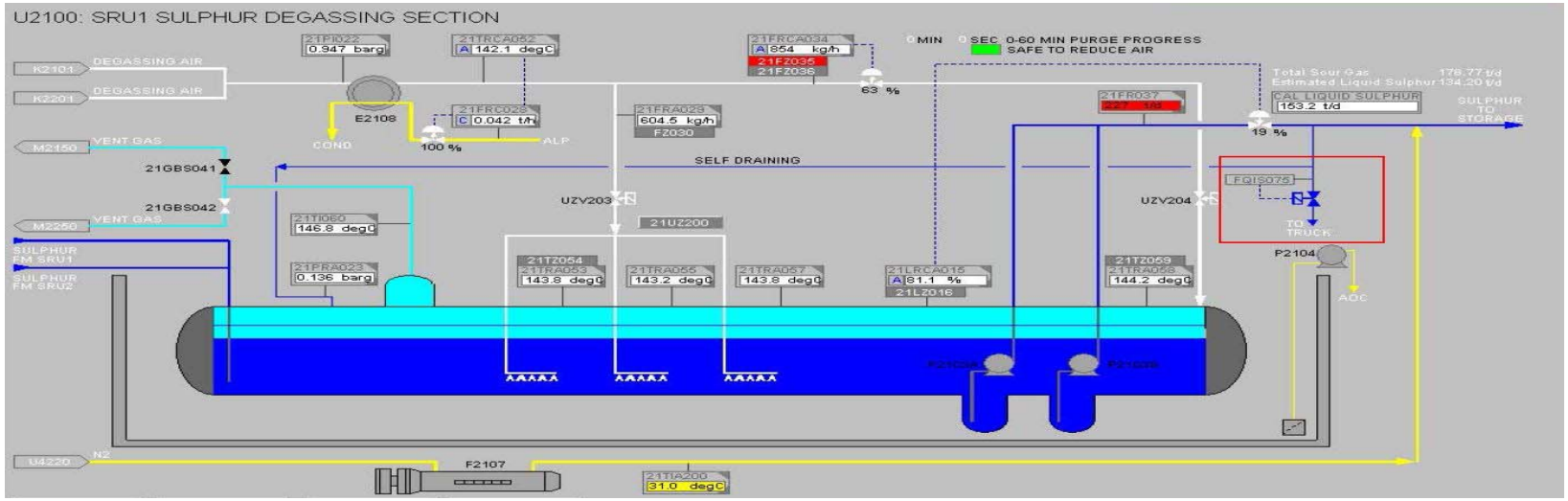
ID: 26003656	Name: Mr. Bunharn Tupsrikaew	Indicator : R-MN-RM
Position: Reliability Engineer	Skill group: Instrument	Date: 01/03/2020
Evidence: Install monitoring temperature sensor along Sulphur line to tank by using non intrusive wireless temperature measurement	Competency: 1.1.2 Basic Process and Utilities Knowledge. Understand interrelation among the process unit and its impact to equipment.	

SITUATION (S)

There was incident liquid Sulphur rundown line from SRU to storage tank plugging leading to can't transfer liquid Sulphur to storage tank.

It is effect to refinery plan reduce crude throughput from 20.04 kt/d to 19 kt/d and

Manage liquid Sulphur by use chemical truck to takeoff liquid Sulphur from SRU Unit (before degassing vessel full) to customer site.



1.1.2 Basic process and utilities knowledge	- Basic understanding of process and utilities knowledge of refinery and petrochemical process	- Understand control and safeguarding function for basic process units - Understand process conditions and its impact to the equipment	- Understand interrelation among the process units and its impact to equipment due to operation condition changes	- Able to understand process, profitability and influence on maintenance decision making	- Able to develop overall asset management strategy centered on process availability

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SITUATION (S)

Total lost = 9.95 MTHB

Major/Hi-light Activity : Refinery process and movement

Sulphur rundown plug from RTL to process

Immediate Maintenance cost




Item	Cost
HPWJ	6.0 MB
SCF/INSL for cleaning	0.6 MB
Electrical equipment	0.55 MB
Waste disposal	0.8 MB
Other service	0.2 MB
Total	8.15 MB



Sulfur r/d line from process to T2706/07 plugging

Crude throughput as planned	20.04	KTD
Crude throughput during sulfur sulfur r/d line plugged	18.90	KTD
Days of incident	1	day(s)
Reduced crude throughput	(8,450.91)	Bbl
Est. Crude Margin	6.00 $/Bbl	
LPO from crude throughput reduction	*(50,705)*	*$*

1.1.2 Basic process and utilities knowledge	• Basic understanding of process and utilities knowledge of refinery and petrochemical process	• Understand control and safeguarding function for basic process units • Understand process conditions and its impact to the equipment	• Understand interrelation among the process units and its impact to equipment due to operation condition changes	• Able to understand process, profitability and influence on maintenance decision making • Able to develop overall asset management strategy centered on process availability

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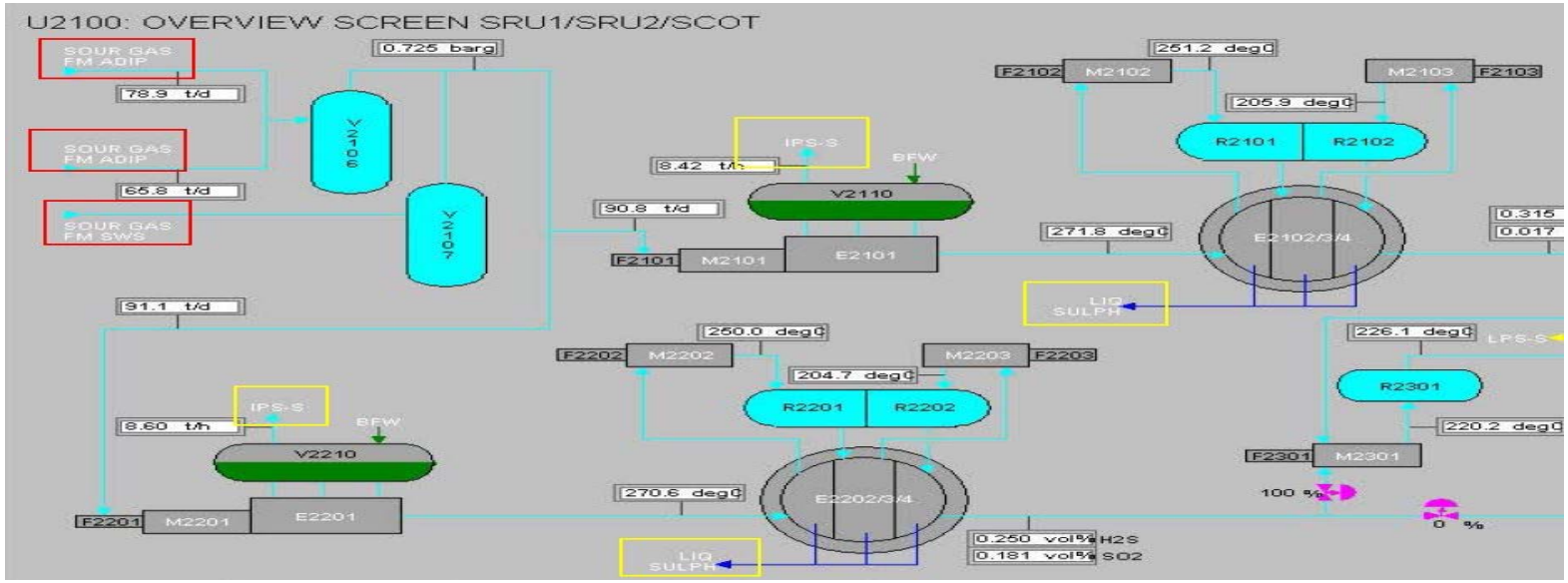
SITUATION (S)

SRU unit objective function :

The objective of SRU 1 is to desulphurize sour gas from the Adip Regenerator Unit 2000 and from the Sour Water Stripper Unit 2400. This is done by converting the H_2S from the sour gas into elemental sulphur by means of the Claus process. The SRU unit has a thermal stage followed by two catalytic stages. The overall sulphur recovery is around 95% at normal capacity. To increase the sulphur recovery rate to 99.8% the SRU tail gas is further treated in the SCOT Unit 2300 (which includes an H_2S absorber). In the incinerator, the SCOT off-gas is heated and oxidized to convert the remainder of the H_2S into SO_2



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SITUATION (S)

According to incident investigation recommendation , One of action to prevent liquid Sulphur line plugging is install temperature transmitter to monitor temperature Along the line from SRU unit to storage tank Road Truck Loading (RTL).

Liquid Sulphur line distance from SRU unit to Storage tank.

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TASK (T)

Study and propose solution option for installation alternative temperature monitoring temperature liquid Sulphur rundown line.

Lead and drive project install monitoring temperature sensor along liquid Sulphur rundown line to monitor temperature of liquid Sulphur line from SRU unit to storage tank.

ACTION (A)

Lead and drive to study alternative option for installation temperature transmitter along liquid Sulphur line and propose to team.

Study result for 2 option.

Option 1.Hardwire 4-20 mA for conventional HART communication.

Advantage.	**Disadvantage.**
*High reliability.	*Require wiring cable signal.
*Low maintenance require.	*Require more scaffolding work and excavation work some installation point.
*Real time monitoring.	*High installation cost , especially scaffolding and excavation cost. (> 4MB)

Option 2 Install nonintrusive wireless temperature transmitter.

Advantage.	**Disadvantage.**
*Not require thermowell because this sensor can measure at skin temp and compensate by calculation thermal conductivity of piping property.	*Use for monitor only , Control and safeguarding function can't implement.
	*Battery lifetime 5 years at sampling rate 1 minute (Can't real time monitoring)
*Easy to installation reduce installation time and can install by ourselves.	*Maximum distance wireless signal about 250 m , It require repeater for this application.
*Low installation cost (No wiring cost , No excavation cost) about 1.26 MB	

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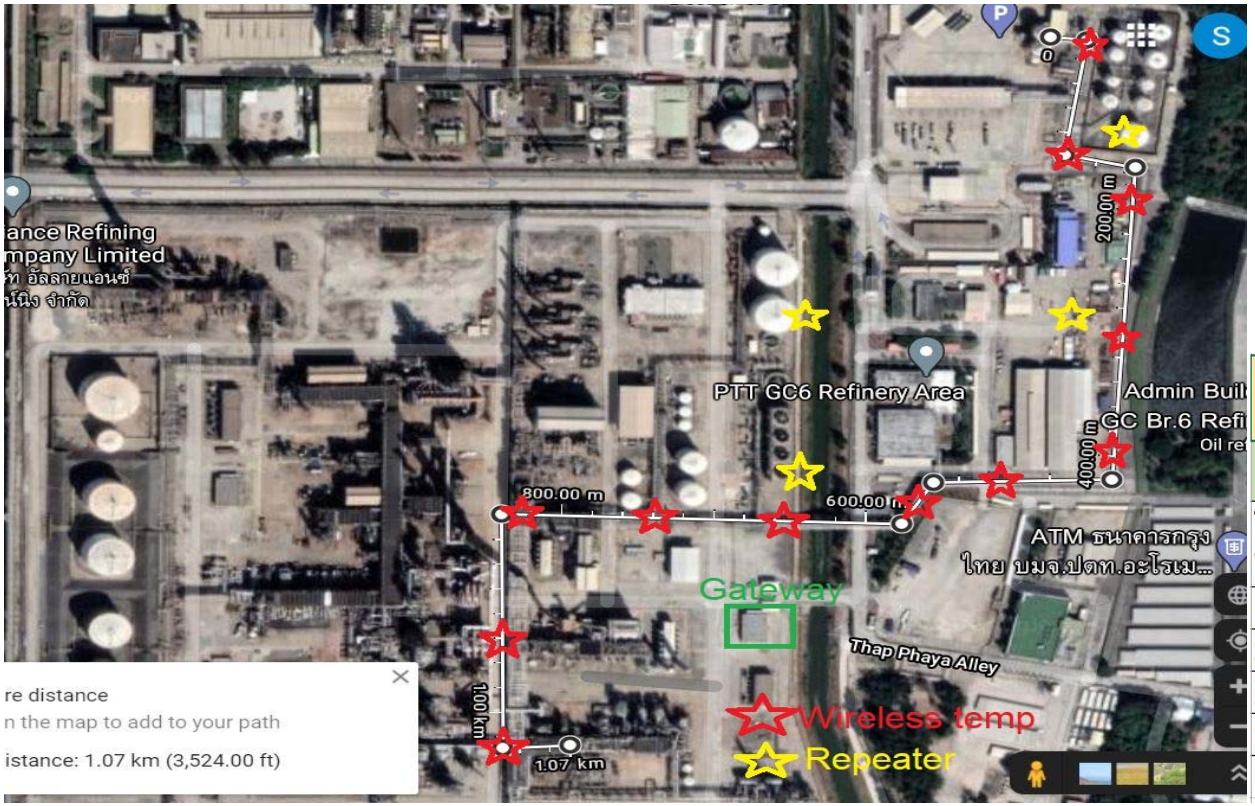
ACTION (A)

Team agree to implement with option 2 Install nonintrusive wireless temperature transmitter.



Instrusive wireless Temperature Transmitter Installation cost.

Detail	Cost per unit (Baht)	Number of use	Total cost (Baht)
Temperature sensor + Wireless Transmitter.	90,000	10 ea.	900,000
Repeater.	30,000	4 ea.	120,000
Scaffolding cost	20,000	6 point	120,000
Insulation cost	20,000	6 point	120,000
Sumarize cost			**1,260,000**

Note 1: Cover R-P1 area and MO area , Wireless gateway will be installed at FAR30.

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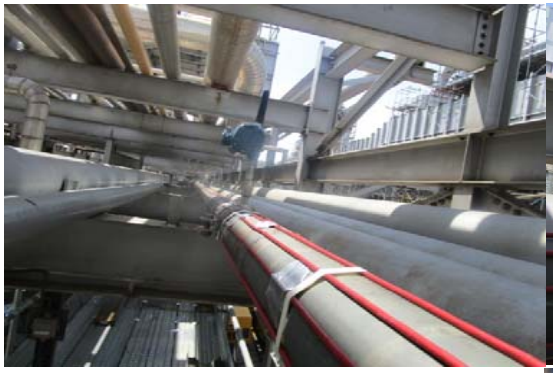
ACTION (A)

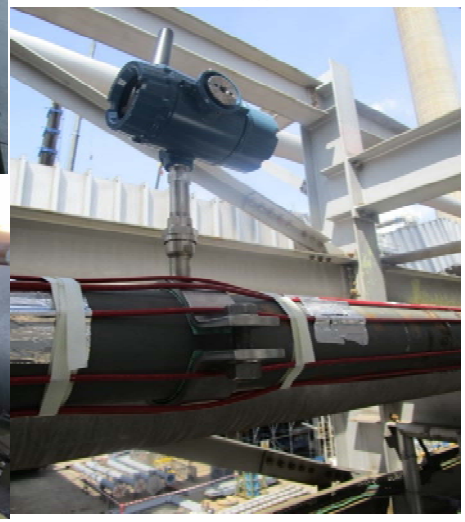
Execution work.

Installation nonintrusive wireless temperature transmitter along liquid Sulphur rundown line to storage tank.









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ACTION (A)

Execution work.

Network configuration , Modbus address mapping , network diagnostic.

EMERSON. Process Management

Smart Wireless Gateway

Network Device Status | admin

192.168.1.10
- Diagnostics
  - Network
    - Overview
    - Devices
    - Join failures
    - Invalid MICs
  - Advanced
- Monitor
- Explorer
- Setup
- Help

HART Tag	Node state	Active neighbors	Service denied	Reliability	Missed updates	Path stability	RSSI	Joins	Join Time
21RPT001	●	32QIA003 32QIA004 21RPT002 27RPT003 27TIA201 27TIA204 27TIA206	●	99.9 %	0	75.6 %	-76 db	3	11/08/19 09:44:20
21RPT002	●	wihartgw REPEATER-02 27TIA202 REPEATER-05 27TIA203 21RPT001 27RPT003 27RPT004 27TIA201	●	100.0 %	0	89.6 %	-66 db	1	10/19/19 18:52:11
21TIA203	●	21TIA204	●	98.0 %	1	81.4 %	-72 db	8	02/20/20 04:06:21
21TIA204	●	21TIA205 21TIA203 21TIA207 wihartgw	●	99.7 %	0	81.4 %	-72 db	9	01/24/20 06:24:56
21TIA205	●	21TIA204 21TIA206	●	99.8 %	1	82.5 %	-80 db	1	10/21/19 10:36:57

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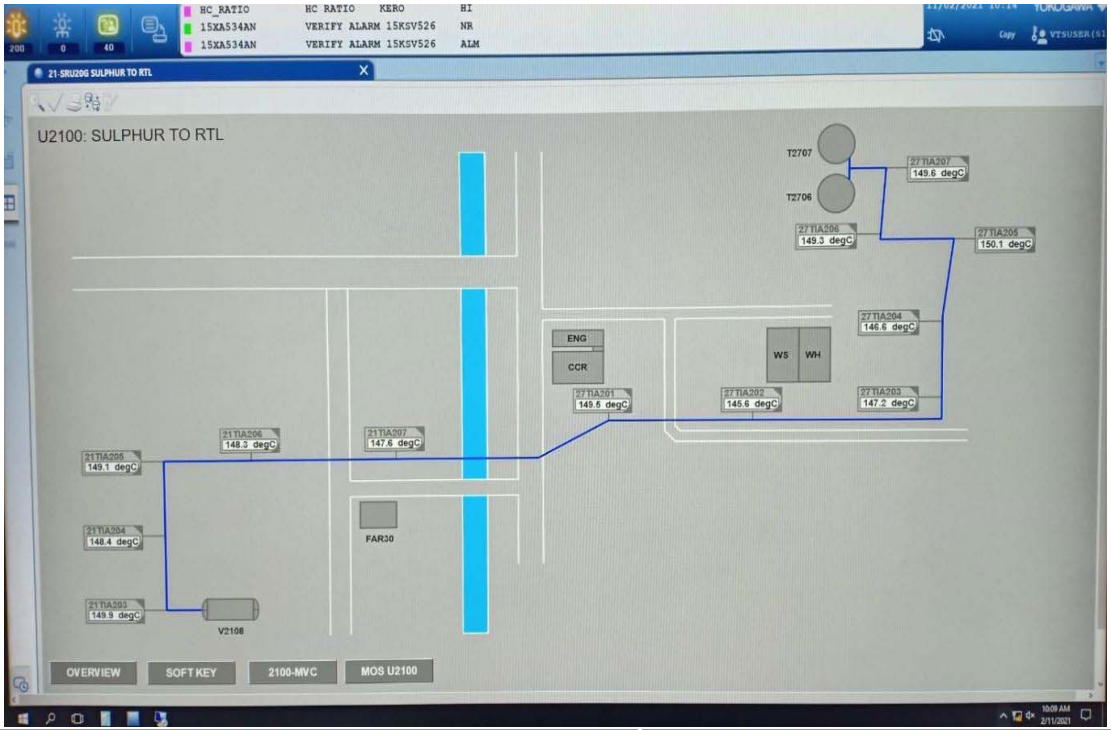
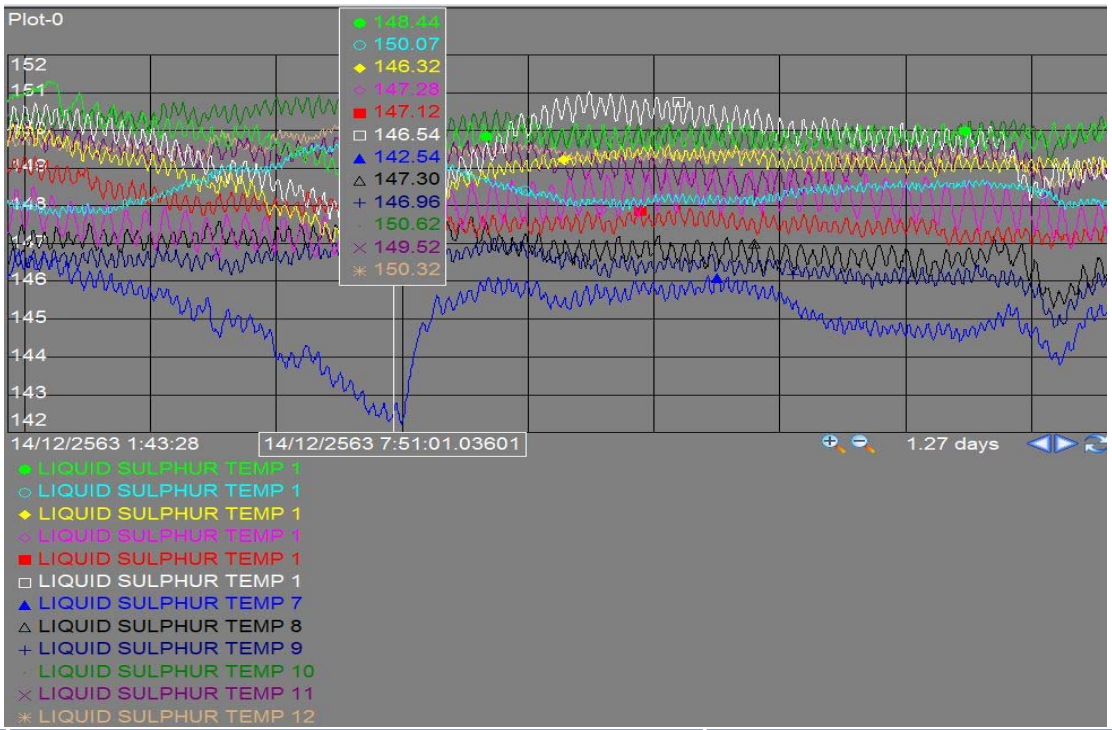
Result (R)

Completed install and commissioning for project installation nonintrusive wireless temperature transmitter.

All wireless transmitter working well.





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Result (R)

- **Achieve objective , We have temperature monitoring liquid Sulphur rundown line to tank to warning operator when liquid Sulphur temperature lower than alarm setting (<135 Dec C) that help prevent liquid Sulphur plugging in line.**
- I have learned about process unit objective of SRU Unit and leaned linkage of SRU Unit with other unit comply with competency 1.1.2 basic process and utility knowledge.
- I have learned about nonintrusive wireless temperature transmitter , wireless gateway , Modbus communication between wireless gateway and DCS.

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Q & A

Thank You

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Adobe Acrobat Document

White paper for X-well.

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