

CHAPTER V

DEVELOPMENT OF SHIFT HANDOVER SYSTEM

5.1 Shift Handover

Consider the situation when a person with sole responsibility for a task takes a break from work, then returns to the same task following their absence. If the task has not been progressed or altered by someone else, communication is not an issue. Contrast this with work, which is shared between more than one people or continues during an absence. Under such conditions, communication and co- ordination assume crucial importance. In industries, which operate continuous processes, continuity is maintained across shift changes via shift changeover. Shift changeover typically includes

- A period of preparation by outgoing operator team,
- Shift handover, where outgoing and incoming operator communicate to exchange task-relevant information and
- Cross-checking of information by incoming personnel as they assume responsibility for the task

The goal of shift handover is the accurate, reliable communication of task-relevant information across shift changes, thereby ensuring continuity of safe and effective working.

Oil refinery production units are continuous 24-hour operations. Their goal is to maximize production or support functions without compromising safety. Complex technical systems place demands on the operator's information-processing and decision- making skills. The operator may be physically remote from the system, and rely on an internal "mental model" to understand and control the invisible process. The accuracy of this model determines how effectively operator's start-up, monitors, adjusts and shutdown the process. Successful control requires three components to be present:

- Clear specification and understanding of the future goals of production
- An accurate mental representation of the current state of the process
- An accurate internal model of process dynamics.

Many continuous process tasks are characterized by long system response times between process alterations and effects. Actions may not have their effects until subsequent shifts. Without adequate communication of information at shift handover, diagnosis of effects resulting from actions on previous shifts is problematic.

Furthermore, refinery workers can be exposed to high noise levels, both on and offduty, which increases potential for misunderstood verbal communication.

5.2 Development of Logbook and Log sheet for shift handover

According to the existing problems found in the logbook and log sheet system. It found that there is no set of standardization on the essential contents on logbook and log sheet system. Also the requirement of the system should contain in the report.

The proper report system and the way of description of communication o incoming operation must be developed to reduce the risk such as problem and enhancement the system of the operation for shift change.

As well as face-to-face communication is essentially needed to transfer and received quite effectively in shift handover. There would be another possibility of information channels that have been communicate for the shift change.

5.2.1 Information, knowledge and understanding

Regarding to "R. Lardner, Safe Communication at shift handover, The Keil Centre" state that, Information theory analyses information flow in terms of a system whose purpose is to transmit information between separate locations.

A channel links information source and destination. Information from the source must be transfer in a form suitable for receiver at the destination. System performance is limited by channel capacity, transmission rate and noise.

According to information theory, information is transmitted when reduction in uncertainty regarding the content of the transmitted message results. This definition is related to the commonplace definition of information; namely data which increases knowledge and thereby reduces uncertainty.

"Staw, B. and Cummings, L. (Eds)" also mention that information channels have been categorized in terms of their richness. Face-to-face communication is the richest channel for information. It provides immediate feedback thus allowing understanding to be checked and corrected. It is argued that face-to-face communication is most effective for mitigating ambiguity and creating shared understanding. In contrast, written information is lower in richness, lacking the capacity for rapid feedback.

"Anderson, J.R." state that Knowledge can be defined as the body of information possessed by an individual. Two types of knowledge can be distinguished: procedural and declarative. Procedural knowledge refers to practical operational knowledge about how to do something. Such knowledge may be implicit and difficult to verbalize. Declarative knowledge consists of facts about the world, which are accessible consciously.

The notion of achieving understanding or comprehension via communication relates to the use of information from a dialogue, in combination with existing knowledge, to arrive at a shared meaning. In their attempt to reach shared understanding, dialogue participants must each assess the mental world or mental state of their conversational counterpart to determine what information is required to achieve understanding.

Having distinguished between information, knowledge and understanding, we now return to the notion of "effective communication" of information.

5.3 Drafting and construct a logbook

After the result and literature review from the experiences have been precisely conclude what should be contained in the shift handover logbook.

The concept to draft and construct a logbook was based on the two categories that have mention in the previous section of this chapter. But in the deep detail of these problems are in the fundamental of Human factor, first of all the initial of human framework analysis to get overview of constructed shift logbook.

A combination of information on the role of the operator in the process industries and the research literature on potential human error was used as the basis for an internal workshop which sought to create an initial listing of human errors to provide a theoretical Framework.

Several of the categories could be combined in the above sense, initially, on the basis of the fact that they were inter-related subsets. Therefore it can then construct level structure in the theoretical Human Factor Framework as the figure below.

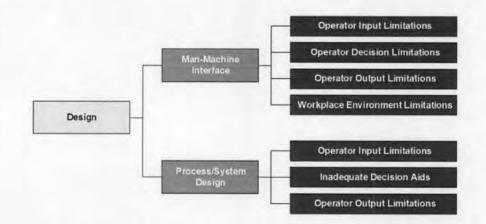


Figure 7: Example of the three level structures in the Human Factors Framework

5.3.1 Design and construct a logbook

Regarding to "R. Lardner, Safe Communication at shift handover, The Keil Centre" state that, categories of key information for inclusion in structured logbooks throughout the refinery. It can be divided into two categories, which are:

- 1. Mandatory categories
- 2. Discretionary categories

1 Mandatory categories

In this section, explains items that need to be concern to the plants to the reader to be able to understand the plant up to date condition. There are six items, which are need to be concluded which are:

- Safety
- Maintenance
- Technical problem
- Work outstanding
- Comment and remarks
- Signature or name of person who written the log

2 Discretionary categories

In this section, explains items that need to be concern on what is the actual condition and what it has to be done for the next shift. And people who might need to be contact. There are seven items that are needed to be concluding which are:

- Plant condition status update
- Production including in term of quality of the product
- Environment matters
- Personal issues
- External Events
- Actions taken during shift
- Routine duties

From the result of pilot test or questionnaires revealed the improving resulting from the introduction of structured logs was visible. The more information that has received on the maintenance and technical problems was being recorded, safety issues were being flagged up and timings of event were being recorded more precisely and consistently.

The comparison between log sheet before implementation and after implementation for each position illustrate as below.

ITEM	TIME	ACTIVITY
1.	10:00	Spot llos. / check coke, frame, air.
2.	20:20	Check of free and - V-101: after built N, = 3 Bas
		again.
		- month Og free / heap o.s bag
4		- provin black calu UBSY-111, PCV001 .
		- Myonu space
	•	dram V-101
		V-102 - Block vieles 1105. 1020 B/V HOW
194.14	····	- blevd. Cith - Front line of via
		V-104. (servin & to hog 165)
-		+ MU/Vão. nou spode Ng.
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	23:00	Smith steried water
	Osies	Sout Oler.
	-	
		2
		· · · ·
STATL	JS	
ITEM	TIME	ACTIVITY
		· · · · · ·
*		

Figure 8: Illustrate format of log sheet for field operator before implement.

Thai Lube Base Co.LTD	ПНАЦИВЕ	Boad Man Are	a "A"	
DATE	[Day Shift	Shift	A
DCS Operator	Field ()perator;		
Safety&Environmental:-				
Maintenace Complete				
Maintenance in Progress				
Abnormal/Technical problem				
VDU plant conditions:-				
SRU plant conditions:-				
PDA plant conditions:-				
SWS Plant Conditions				
Filed Activities				
Note for Comments				

Figure 9: Illustrate format of log sheet for field operator after implement

<	Before in	and the second se			and the second se				
-		nplemente	be		-				
			Lead	THAIL Team O		Report			
the second second									
Date	2-Feb-08								
Shift	A	в	С	D		2	Day Shift	Night Shif	t
								-	
	the second se	gsak Thamn Team Opera				arta	La-ong Sri Shift Super		
	Leau	ream oper					Shint Super	intendent.	
VACUUM	DISTILLATI	ON UNIT (1	00L)						
	Flow T/D	Temp. °C	% Yield	Tank	Vis. Lab.	Vis. Online	FP, FBP	dis10%,CCR	
Feed	2696.22	368.30		T-101C					
LVGO	72.52	98.28	2.69	T-104B					
60VGO	331.68	195.55	12.30	T-105A	13.36	12.75	n/a	n/a	
150VGO	456.47	247.10 278.46	16.93 0.01	T-109	n/a	5.535	233.00		
SOOVGO	701.09	305.68	26.00	T-110C	n/a	15.36	n/a	n/a	
	0.24	353.24	0.01						
				I THE REAL PROPERTY AND INCOME.	-1-			1	
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HSL VR to PDA VR to Tank	756.31 165.18	172.67	37.89	T-102	n/a				
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Figure 10: Illustrate format of log sheet lead team operator before implemented

MP REFINING UNIT (300L)

RAFF YIELD %wt. =

	Flow. t/d	Temp. °C	Prees bar	Level %	Tank No.	Level(m)	
Treating Feed rate	1548.50	61.59	4.200	35.52	T-101	7.016	
Solvent rate	1706.75	65.96	0.195	48.98	T-102	0.575	
Inter.cool rate	2399.57	47.92			T-103	0.042	
Water injection.	34.86	105.95					
Gradient. Temp.		12.24			C-109 Strip S	. (t/h)	0.459
Solvent Ratio	1.102				C-106 Strip S	. (t/h)	0.429

56.65

Stream	Rate TPD	Unit Tank No	VI	Vis @40 °C	Vis @100 °C	Solvent Cont. PPM	RI Lab	RI Online
Feed	1548.50	T-110B		n/a	n/a		n/a	
Raff.	877.16	HFU	100.53	98.94	11.33	6.19	1.4773	1.4780
Extract	997.67	T-105B			1-12	21.61	1.5489	
OVHD-C-101			1	1 March		0.33		

MPU note. 500 Raff. RI 1.4740-1.4755 VI >106, Solvent cont. Raff. < 10 ppm , Ext. < 20 ppm , OVHD < 50 ppm

HTR YIELD %wt. =

1. Decrease wash rate 1.10 to 1.05 .

2. Decrease feed from 1550 T/D to 1525 T/D.

Decrease solvent temp from 88 °C to 82 °C.
 Decrease flow intercooler from 2400 T/D to 2200 T/D.

5. Increase stripping steam to C-108 from 0.4 tph to 0.425 tph.

HYDROFINISHING UNIT (500L)

Reactor Condition					
press.(bar)	temp. °C	diff.temp.°C			
69.73	324.84	-15.14			
C-104 Strip S	1.195				
C-102 Strip S	0.045				
a the out b	- land	0.040			

Stream	Rate TPD	Sulfur % Wt	flash point °C	Tank/Unit	
Feed	866.71			MPU	
HT Raff.	916.25	n/a	n/a	SDU	
Distillate	5.83				
Naphtha	0.011			Result	Spec.
H ₂ make up	9.800		H ₂ mark up	88.59	>85
H ₂ to F/G	8.987		H ₂ recycle	87.88	>85

105.72

HFU note 500 HT Raff. Sulphur 0.20-0.35 %wt, FP >237°C

Normal condition

ADIP UNIT (550L)

	Flow t/d		Top, BTM	Ratio	Level %
	Acid gas	Lean Adip	Temp °C		
C-101	61.70	153.57		2.493	60.02
C-102	10.89	75.16		6.881	70.17
C-103		345.71	102.26		85.16
C-104	40.01	13.19	35.13	0.330	64.91
A/G to SRU	12.23		44.34		
				T-101	10.85

	Result	Spec.
ATB	22.30	Dif. <3
RFB	26.82	26-32%
H ₂ S	881.33	<900PPM
Foaming	210.00	<140
PH	10.82	>10.5
\$\$	33.33	<10
Treat HP	0.01	<10
Treat LP	0.01	<100

ADIP note.

1. 08:12hr. Stop make up lean adip to C-103 (make 5% of tank).	
2. Skim oil C-101 and C-102.	

Figure 11: Illustrate format of log sheet lead team operator before implemented

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SOLVENT DEWAXING UNIT (400L)

	Flow(t/d)	Temp. °C	Ratio, Press
Feed to SDU. (TPD)	849.84	68.03	1
First dilution ratio (initial dilution)	1595.76	27.91	1.88
Second dilution ratio	0.01	28.41	0.00
Third dilution ratio	0.27	28.07	0.00
Forth dilution ratio	43.30	28.62	0.05
Fifth dilution ratio (final dilution)	974.06		1.15
Fitration Temp. (V-102)		-16.15	
Solvent Temp.		-17.77	
Cross over Temp.		-0.57	
Primary cold wash	749.62		
Repuip cold wash	460.60		1
Inject boot ratio	719.36		
Vacuum Pump pressure			-0.722
Dehydrate Pump pressure	25.743		1,798

80.13	5		
1.11	FILTERS		DPE/DPC
1	M-101	1	E-121
4	M-102	\checkmark	E-122
1	M-103	1	E-123
1	M-104 PRI.	1	E-124
	M-104 REP.		E-125
1	M-105	4	E-126
4	M-106	1	E-131
		1	E-132
	M-109A	1	E-133
	M-109B		E-134
			E-106A
		1	E-106B
		1	E-106C

K-401 Condition		Flow t/d	Temp. °C	Press bar	Level %
1 st Suction		806.49	-25.27	0.123	-1.168
2 nd Suction		317.23	-4.17	3.166	24.546
Discharge		1018.77	108.40	20.198	36.497
Ampare	156,59				-

Tank No.	Level(m)
T-101	0.604
T-102	0.529
T-103	0.020
T-104	0.304

Stream	Rate TPD	Pour Pt. °C	VI, oil cont	vis@40°C	vis@100,FP	MEK cont	Tolu cont	RI,PPonline	Unit/Tank
HTR				n/a	n/a	1			HFU
DWO	681.15	-10.00	94.78	96.88	10.820	13.49	22.29	-11.95	T-116C
SLW	109.21		3.67	1		13.04	19.73	1.4721	T-106A

DWO yield %wt. =

SDU Note. 500 DWO PP -9°C to -10°C, VI 94.8-95.4, Vis@100oC 10.8-11.25cst, oil cont <10%.

1. Hot wash filter = 8 time.

2. Increase filtration temp from -16.25 °C to -15.75 °C.

Safeguard System and Chemical. Abnormal ✓ Normal Fire tube System Oil mist(turbo 46) V Normal Abnormal

HOT OIL BELT UNIT (560L)

	Flow t/d	Temp oC	Press bar	Level, O2 %	Efficiecy %	Hot oil coil		
Hot Oil Supply	18685.75	351.77	15.80		1	4215.14		
Hot Oil Return		266.83				4517.74		
V-101		267.60	5.60	21.37		4708.60		
F-101				5.60	87.94	4754.19		

HOU note. F/O firing 19 burner , F/G firing no 2, 5, 8, 14, 17

Normal condition

Receive oil

Figure 12: Illustrate format of log sheet lead team operator before implemented

SOUR WATER STRIPPER UNIT (600L)

	Flow T/D	Temp. oC	Tank
Feed	470.97	77.04	VDU , PDA , Adip , HFU
Sour Gas	0.275	67.80	Flare
Stripper Water	447.91	41.94	ETP.
Steam-ratio	2.553	118.38	0.131

	Result	Spec
H ₂ S	0.00	< 5 ppm
PH	9.13	6.0-10.0
\$\$	20.80	<100mg/l
Ammonia	0.00	< 50 mg/l
Oil content	4.00	< 100 mg/l
COD	374.00	< 1000 mg/l

SWS note.

1. Cont. skim oil from C-101 to V-101.

Chemical & Iubricant Anti Foam I Normal Abnormal

SULPHUR RECOVERY UNIT (700L)

	SR	SRU-1		U-2	
	Flow T/D	Temp. °C	Flow T/D	Temp. °C	
Acid Gas	12.081		0.594		
Sour Gas	0.405		0.002	1	
Flue Gas	0.001		0.400		
F-101/201		1109.08		1019.65	
F-102/202		750.37		750.15	
	R-101	R-102	R-201	R-202	
Top Temperature. °C	229.17	219.65	235.84	219.90	
Btm Temperature. °C	307.96	241.65	225.79	211.33	
Diff Temperature. °C	78.79	22.00	-10.04	-8.58	

	T	GT.	
	Flow T/D	Temp. °C	
E-301		257.36	
R-301 Top		264.28 280.13	
R-301 Btm.			
H ₂	0.108		
PH	7.44	level/ton/h	
T-101 %	47.25	0.163	

	Analyzer % vol.
H ₂ S/SO ₂	2.236
H2	2.59

SRU note. SRU-1 run acid gas, SRU-2 keep hot stand by, keep 055L-PV-019-2 to closed, control C-301 PH 7-7.5

1. Balance flow A/G = 11.50 -12.0 T/D for control alarm SOX high.

2. Change water 700L-C-301 = 8 time for adjust PH.

Chemical & lubricant Ammonia (NH₃) Vormal Abnormal

EMISSION MONITORING

Source	Value	(PPM)	Condition			
	NOX	SOX				
Stack 100L	98.0	363.8	1	Normal		Abnormal
Stack 700L	27.4	588.9	J	Normal		Abnorma
Stack 800L	20.8	20.6	1	Normal		Abnormal
Flare Stack	100000		1	Normal		Abnormal

Remark Condition limit SOX < 950 ppm. NOX < 200 ppm.

Figure 13: Illustrate format of log sheet lead team operator before implemented

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BITUMEN BLOWING UNIT (800L,850L)

BBU-1 YIELD %wt.	=	-292.38
BBU-2 YIELD %wt.	=	#VALUE!

	BBU-1			BBU-2		
	Flow T/D	Temp. °C	Tank	Flow T/D	Temp. °C	Tank
Bitumen Feed	0.92	152.08	T-118B	0.00	101.36	T-118B
Bitumen Rundown	-2.70	35.60	T-119D	Bad	29.02	T-119A
Air- %op valve	0.22	-6.90		0.00	-6.90	-
Reactor		87.62			83.32	
Incinerator	24.02	740.12				1
Feed Viscosity	S/D			S/D		
R/D Pen Jsoftenning	S/D	S/D		S/D	S/D	
Grade/premature fuming	60-70	n/a		60-70	n/a	

BBU note. Aim pen 63-68 mm.

Unit BBU-1 and BBU-2 on shut down. Incinerator is hot stand by. Cont. by pass Unit BBU-1, 2 to R/D tank. 1. Cont. Open steam out 800L, 850L -C-101, R-101 and V-101. 2. 17:30hr. Switch rundown T-119D to T-119A.

Safeguard System Fire tube System 🔽 Normal 🗌 Abnormal

PROPANE STORAGE UNIT (3000L)

Level m. Press. Bar F/O per day F/O sum. eff % F-101 V-101 1.009 VDU heater 9.14 28.61 73396 87.79 V-102 0.997 9.10 H/O heater 74.79 45051 87.94 Total F/O, TOP 83.50 103.41 Safeguard System Hydrolic System ✓ Normal Abnormal F/O Tank No. □ T-202A ✓ T-202B ✓ V-102 Fire tube System Abnormal V Normal ✓ Normal F/O Strainer Abnormal Flame Detector V Normal Abnormal

1. Cont. by pass F/G from TOP. (420L-PV-005-1) 2. Cont. orack CFO from T-202B to mix RFO with ratio 3 / 5.

UTILITY CONSUMPTION

Utility	Start	End	Concumption	Spec.	
Date/Time	2/2/2008 8:00	2/2/2008 17:00		from DI	
Raw Water	99051.36	98783.43	-17.86	<25.6	
Nitrogen	14749.24	14746.06	-3.18	4.2 - 4.61	
Fuel Gas	9475.76	9468.57	-0.479	<0.72	
Fuel Oil	118494.34	118446.91	-3.16	<3.5	
Hydrogen	8653.69	8650.58	-0.21	<0.17	
MPS	1982.09	1456.79	-35.02	<36	
Condensate	81041.66	80776.42	-17.68	>19.5	

note. Utility consumption per 100 ton LR feed new spec. from TT.

UTILITY STEAM FLOW RATE

FLARE UNIT (2900L) & FUEL OIL (4200L)

Unit	MPS.	LPS.	design
VDU	10.092	2.385	10.8/3.3
J-101	9.050		
J-102	0.897		
J-103	0.079		-
J-104	0.066		
PDA	0.563	3.067	0.1/2.9
MPU	1.182	2.124	1.4/1.35
HFU	1.387	0.430	1.2/0.3
SDU	5.719	-3.389	0.0/1.8
ADIP		1.402	1.4
SWS	2.553	0.018	2.0/0.03
SRU	0.830		>0.3/0.0
BBU-1	0.002	0.000	>0.2/0.1
BBU-2	0.041	0.505	0.1/0.2
Total	22.368	6.542	28.910

Figure 14: Illustrate format of log sheet lead team operator before implemented

UTILITY CONDITION **Chemical Dosing** Service Rate % Flow (TPD) Temp.(°C) or kg/hr. Press, PH Level (%) id Gas To Flare 2900L-V-103 201.85 26.25 60.86 450L-P-104 Г LP. Steam let down. 4000L 450L-P-105 Г 145.87 2.80 Fuel Gas 4200L-V-101. 16.08 3.00 450L-Cl2 Tempered water Supply, 44001. Tempered water Return, 44001. 2503.47 7.68 34.41 470L-P-102 2 2 40.0 Intf Shut 37.91 470L-P-103 40.0 Raw water make up. 4500L 545.99 74.95 470L-P-104 2 30.0 Raw water to filter. 4500L 9.15 470L-P-106 Potable water used. 4500L 0.14 78.57 470L-P-107 Cooling water Supply. 4700L 470L-Cl2 ~ Intf Shut 27.66 7.91 95.06 0.50 Hypo-Chol Cooling water Return. 4700L 72770.95 26.68 Instrument air System. 5500L 21.66 7.79 H₂SO₄ drip. 1 Plant air System. 5500L 0.70 7.82 1 90 Chge. pack Nitrogen Supply. 5700L 5.97 7.08 26.81 -0.06 Utility note. Normal condition Mov. / offsite Activities M 1. Receiving RSO from TOP to 4200L-V-102. 53.00 1.985 AOC 2. Sending Wild Naphtha from VDU/HFU to TOP. 62.71 1.590 3. Receiving HCB from TOP to 3000L-T-101B. 4. Sending 60VGO from T-105A to TOP. 5. Close tank T-105A , T-119D 6. Blending bitumen feed to T-118B (ratio 880 / 116), transfering to T-103B and to product tank T-119A. 7. 12:00hr - 18:00hr. Cir T-119D. 8. 16:30hr. Start sending 500SLW T-106B to TOP. MAINTENANCE WORK On PACER Under repair 3000L-mov 025 can not full close. 1. 3000L-T-116B Clean and inspection 2. 100L-K-103 Overload trip. 3. 030L-FV-068 Bounet valve leak. 4. 300L-MOV-002 can not full close 5. 300L-MOV-024 can not full close

Figure 15: Illustrate format of log sheet lead team operator before implemented

		ator Repor				er implem			
-				THAIL	URF				
Date	2-Sep-08			THAIDIL					
Shift	А	B	с	D	1	V	Day Shift	Night S	hift
	\$	awat Baotho	ng	1000000	tructured	****	Adirek Sa	ngaroon	
	Lea	d Team Opera	ator.	import	ant item		Shift Supe	rintendent.	-
Safety &	Environm	ent		V			_		
Source	and the second second	Value	(PPM)	Op	erateing Wind	dow			
		NOX	SOX						
Stack 100L		6.4	23.8	Maximum	SOX ppm	< 950			
Stack 700L		26.4	46.5	Maximum	NOX ppm	< 200			
		data link fr process	om	New struct				e details	
Mintena	nce Compl	ete					desc	cription	
		Engineer insta	lled maximu	um stop of co	mpbustion a	air flow to VDL	heaterio	prevent over	firring
		tails in Shi			Concerne of the				
Mainter							-		
	ance in pro			4 4001 0 44	00 Turbler	damaged			
	110A Shaft is lo 03 Over load t				0B Turbine is 0B Mech sea			-	
. INAT-1	vo over load t	np cnecking		0. 100L-P-11	uc meen sea	i is leaking.		New stru	
3 30001 -T-	1188 Renairin	a tank due to a	heanello						
3. 3000L-T-	118B Repairin	g tank due to o	ollapsed.					important	item
Abnorma 1. 3" M 2. Traci	al/Technica P steam a ng steam t		stack is le	eaking awa	aiting for s	huting dov I for energ	vn repair y consen	New	structured rtant item
Abnorma 1. 3" M 2. Traci Outstand	al/Technica IP steam al ng steam t ding Item	al Problem t the flare s to Extract a	stack is le ind Raffir	ate lines a	are colsec	for energ	vn repair y consen	New	structured rtant item
Abnorma 1. 3" M 2. Traci Outstand Bitumen	al/Technica IP steam a ng steam t ding Item Storage ta	al Problem t the flare s o Extract a ank T-118	stack is leand Raffir	nate lines a	are colsec	for energ	vn repair y consen	New	structured rtant item
Abnorma 1. 3" M 2. Traci Outstand Bitumen	al/Technica IP steam a ng steam t ding Item Storage ta	al Problem t the flare s to Extract a	stack is leand Raffir	ate lines a	are colsec	for energ	vn repair y consen	New	structured rtant item
Abnorma 1. 3" M 2. Traci Outstand Bitumen CONDITIC	al/Technica IP steam a ng steam t ding Item Storage ta DNS OF VAC	al Problem t the flare s o Extract a ank T-118	stack is leand Raffir	nate lines a	are colsec	for energ	vn repair y consen	New	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen CONDITIC	Al/Technica P steam a ng steam t ding Item Storage ta DNS OF VAC Flow T/D 2747.28	al Problem t the flare s o Extract a ank T-118 d D CUUM DISTII	stack is le ind Raffir ata link fror rocess	nate lines a nanic ha JNIT (100L) Tank T-101A	nd for rep	l for energ	y consen	New impo	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen CONDITIC	Al/Technica P steam a ng steam t ding Item Storage ta DNS OF VAC Flow T/D 2747.28 188.15	al Problem t the flare s to Extract a ank T-118 d b CUUM DISTI Temp. ⁹ C. % 366.64 111.98	ata kink fror occess ATION I % Yield 6.70	nate lines a nanic ha JNIT (100L) Tank T-101A T-1048	nd for rep Vis. Lab.	f for energ	FP, FBP	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen Bitumen <u>CONDITIC</u> Feed LVGO 60VGO	Al/Technica P steam a ng steam t ding Item Storage ta DNS OF VAC Flow T/D 2747.28 188.15 229.99	al Problem t the flare s to Extract a ank T-112 di D CUUM DISTII Temp. ⁹ C. % 366.64 111.98 211.07	ata link fror occess ATION I % Yield 6.70 8.50	nate lines a national contracts JNIT (100L) Tank T-101A T-1048 T-105A	nd for rep Vis. Lab.	Vis. Online	FP, FBP	New impo	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen CONDITIC Feed LVGO 50VGO 150VGO	Al/Technica P steam a ng steam t ding Item Storage ta DNS OF VAC Flow T/D 2747.28 188.15 229.99 532.93	al Problem t the flare s to Extract a ank T-112 d ank T-112 d ank T-112 d ank Temp. ⁹ C. ⁴⁶ 366.64 111.98 211.07 250.15	ata link from rocess ATION I % Yield 6.70 8.50 18.80	nate lines a nanic ha JNIT (100L) Tank T-101A T-1048	nd for rep Vis. Lab.	f for energ	FP, FBP	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen CONDITIC Feed LVGO 50VGO 150VGO LSL	Al/Technica P steam a ng steam t ding Item Storage ta DNS OF VAC Flow T/D 2747.28 168.15 229.99 532.93 Bad	al Problem t the flare s o Extract a ank T-112 d D CUUM DISTI Temp. ⁹ C. ⁴⁶ 366.64 111.98 211.07 250.15 282.48	ata link from rocess ATION I % Yield 6.70 8.50 18.80 #VALUE!	Tank T-101A T-105A T-108	nd for rep Vis. Lab.	Vis. Online 13.36 5.435	FP, FBP	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen CONDITIC Feed LVGO SOVGO 150VGO LSL 500VGO	Al/Technica P steam a ng steam t Storage ta Storage ta DNS OF VAC Flow T/D 2747.28 188.16 229.99 532.93 Bad 773.45	al Problem t the flare s o Extract a ank T-112 ank T-112 D CUUM DISTI Temp. ⁹ C, ⁴⁶ 366.64 111.58 211.07 250.15 282.48 308.53	ata link from rocess ATION I % Yield 6.70 8.50 18.80 #VALUE! 27.30	nate lines a national contracts JNIT (100L) Tank T-101A T-1048 T-105A	nd for rep Vis. Lab.	Vis. Online	FP, FBP	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen CONDITIC Feed LVGO SOVGO 150VGO LSL 500VGO HSL	Al/Technica P steam a ng steam t ding Item Storage ta DNS OF VAC Flow T/D 2747.28 188.15 229.99 532.93 Bad 773.45 0.23	al Problem t the flare s o Extract a ank T-112 ank T-112 D CUUM DISTI Temp. ⁹ C, % 366.64 111.58 211.07 250.15 282.48 308.53 335.70	ata link from rocess ATION I % Yield 6.70 8.50 18.80 #VALUE! 27.30 0.01	Tank T-101A T-1048 T-105A T-108 T-108 T-110A	Nis. Lab.	Vis. Online 13.36 5.435	FP, FBP	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstance Bitumen CONDITIC CONDITIC Feed LVGO 50VGO 550VGO 45L VR to PDA	Al/Technica P steam a ng steam t ding Item Storage ta DNS OF VAC Flow T/D 2747.28 188.15 229.99 523.93 Bad 773.45 0.23 802.51	al Problem t the flare s o Extract a ank T-118 ank T-118 CUUM DISTII Temp. ⁹ C. % 366.64 111.98 211.07 250.15 282.49 308.53 335.70 177.99	ata link from rocess ATION I % Yield 6.70 8.50 18.80 #VALUE! 27.30	Tank T-101A T-1048 T-105A T-108 T-108 T-108 T-110A PDA	nd for rep Vis. Lab.	Vis. Online 13.36 5.435	FP, FBP	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen CONDITIC Feed LVGO S0VGO 150VGO LSL S00VGO HSL VR to PDA VR to Tank	Al/Technica P steam a ng steam t Storage ta DNS OF VAC Flow T/D 2747.28 188.15 229.99 532.93 Bad 773.45 0.23 802.51 152.55	al Problem t the flare so o Extract a ank T-118 ank T-118 D CUUM DISTI Temp. ⁹ C. % 366.64 111.98 211.07 250.15 282.48 308.53 308.570 177.89 177.83	ata link from rocess ATION I % Yield 6.70 8.50 18.80 #VALUE! 27.30 0.01	Tank T-101A T-104B T-105A T-105A T-108 T-108 T-108 T-104 T-104 T-104 T-104 T-104	Nis. Lab.	Vis. Online 13.36 5.435	FP, FBP	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen Bitumen CONDITIC Feed LVGO 60VGO 150VGO LSL 500VGO LSL 500VGO HSL VR to PDA VR to Tank NAPHTHA	Al/Technica P steam a ng steam t Storage ta DNS OF VAC Flow T/D 2747.28 188.15 229.99 532.93 Bad 773.45 0.23 802.51 152.55 Tag not found	al Problem t the flare so o Extract a ank T-118 problem Temp.*C. % 366.64 111.98 211.07 250.15 282.48 308.53 308.570 177.89 177.83	ata link from rocess ATION I % Yield 6.70 8.50 18.80 #VALUE! 27.30 0.01	Tank T-101A T-1048 T-105A T-108 T-108 T-108 T-110A PDA	Nis. Lab.	Vis. Online 13.36 5.435	FP, FBP	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen Bitumen CONDITIO Feed LVGO 60VGO 150VGO LSL 500VGO HSL VR to PDA VR to Tank NAPHTHA HCB inject	Al/Technica P steam a ng steam t Storage ta DNS OF VAC Flow T/D 2747.28 188.15 229.99 532.93 Bad 773.45 0.23 802.51 152.55 Tag not found 191.93	al Problem t the flare so o Extract a ank T-118 di D CUUM DISTI Temp. ⁹ C. % 366.64 111.98 211.07 250.15 282.48 308.53 335.70 177.89 177.89 177.89	ata link fror occess ATION I % Yield 6.70 8.50 18.80 #VALUE! 27.30 0.01 33.70	Tank T-101A T-104B T-105A T-108 T-108 T-108 T-100 T-100 T-100 T-102 TOP	Vis. Lab. n/a n/a n/a	Vis. Online 13.36 5.435 15.22	FP, FBP n/a n/a	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen Bitumen CONDITIO Feed LVGO 60VGO 150VGO LSL 500VGO HSL VR to PDA VR to PDA	Al/Technica P steam a ng steam t Storage ta DNS OF VAC Flow T/D 2747.28 188.15 229.99 532.93 Bad 773.45 0.23 802.51 152.55 Tag not found 191.93	al Problem t the flare so o Extract a ank T-118 problem Temp.*C. % 366.64 111.98 211.07 250.15 282.48 308.53 308.570 177.89 177.83	ata link fror occess ATION I % Yield 6.70 8.50 18.80 #VALUE! 27.30 0.01 33.70	Tank T-101A T-104B T-105A T-108 T-108 T-108 T-100 T-100 T-100 T-102 TOP	Vis. Lab. n/a n/a n/a	Vis. Online 13.36 5.435 15.22	FP, FBP n/a n/a 327.10	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen Bitumen CONDITIO Feed LVGO 60VGO 150VGO LSL 500VGO HSL VR to PDA VR to PDA VR to PDA VR to PDA CONDITIO CONDITIONE CONDI CONDITIONE CONDITIONE CONDITIONE CONDITIONE CO	Al/Technica P steam a ng steam t Storage ta Storage ta DNS OF VAC Flow T/D 2747.28 188.15 229.99 532.93 Bad 773.45 0.23 802.51 152.55 Tag not founc 191.93 60VGO Vis 1	al Problem t the flare so o Extract a ank T-112 d ank	ata link fror rocess ATION I % Yield 6.70 8.50 18.80 #VALUE! 27.30 0.01 33.70	Tank T-101A T-1048 T-105A T-1048 T-105A T-108 T-108 T-108 T-108 T-108 T-108 T-108 T-108 T-100 T-102 TOP	Vis. Lab. n/a n/a n/a	Vis. Online 13.36 5.435 15.22	FP, FBP n/a n/a 327.10	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen Bitumen CONDITIO Feed LVGO 60VGO 150VGO LSL 500VGO HSL VR to PDA VR to PDA VR to Tank NAPHTHA HCB inject VDU note Activities: Adjusted	Al/Technica P steam a ng steam t Storage ta Storage ta DNS OF VAC Flow T/D 2747.28 188.15 229.99 532.93 Bad 773.45 0.23 802.51 152.55 Tag not found 191.93 50VGO Vis 1 50VGO Vis 1	al Problem t the flare so o Extract a ank T-112 ank T-112 CUUM DISTI Temp. ⁹ C, ⁴⁵ 366.64 111.98 211.07 250.15 282.48 308.53 335.70 177.89 177.89 4 6.99 12.5-13.0est, 1 urner, Stop n	stack is leand Raffin ata link from rocess ATION I % Yield 6.70 8.50 18.80 #VALUE! 27.30 0.01 33.70 50VGO Vis 5 50VGO Vis 5	Tank T-101A T-101A T-1048 T-105A T-10	vis, Lab. N/a n/a n/a N/a N/a N/a N/a N/a N/a	Vis. Online 13.36 5.435 15.22	FP, FBP n/a n/a 327.10	New impo vation pup	structured rtant item bose
Abnorma 1. 3" M 2. Traci Outstand Bitumen Bitumen CONDITIO Feed LVGO 60VGO 150VGO LSL 500VGO HSL VR to PDA VR to PDA VR to Tank NAPHTHA HCB inject Activities: Adjusted 11:30 Swi	Al/Technica P steam a ng steam t Storage ta Storage ta DNS OF VAC Flow T/D 2747.28 198.15 229.99 532.93 Bad 773.45 0.23 802.51 152.55 Tag not found 191.93 15/O fring 6 bit tched 150VG	al Problem t the flare so o Extract a ank T-112 d ank	stack is leand Raffin ata link from rocess ATION I % Yield 6.70 8.50 18.80 #VALUE! 27.30 0.01 33.70 50VGO Vis 5 0.1,7 to balloom T-108 t	Tank T-101A T-101A T-104B T-104B T-105A T-105A T-105A T-108 T-108 T-100 T-102 TOP t-4-5.6cst , 500 ance firring o T-109 for I	NGO Vis 14.8	Vis. Online 13.36 5.435 15.22 	FP, FBP	New impovation pup	structured rtant item bose

Figure 16: Illustrate format of log sheet lead team operator after implemented

	S OF PROPANE								1200 20
	Tank	Flow T/D	Temp. °C	Press.bar	Level %	Vis. Online	Vis/Pen Lab	-	page 2/
eed	VDU / T-102	1011.38	67.58	4.50	55.09	VIS. GUIRIE	81.10	Ratio,CCR	K-10
Pre-Dilution		506.84	37.74				01.10	1000,000	100
Dilution	1	2430.32	40.50					0.50	J 67
Ipper Coil		E-OVICE	67.58	1				2.40	50
ower Coil	2		56.46			-			느 ~
/-101		1313.88	83.03	35.51	27.93				
/-102		1767.83	37.74	15.90	26.90				
DAO. Pro.	T-111A	181.30	91.71	10.00	29.44	40.85	40.02		
Asp. Pro	T-103A	824.57	170.19		30.08	40.00	40.93	1.47	1
Note.		. 40.5-41.5 cs		Maria	30.00	1	23.00	1.4/	1
PDA Activitie		None	a, CORS 1.0	70WE					
DA Acuvite		NONE							
MD DEEIN	ING UNIT (3	0013	RAFF YIELD	96u# -	72.29	1-			
MP NET IN	ING ONT 15	UULI	NAFF HELD	28WL -	16.63	-			
	Г	Flow. t/d	Temp. °C	Prees bar	Level %	1	Solvent Tank	aval (m)	1
Treating Fee	d rate	1551.91	54.94	4.006	34.20	-			
Solvent rate	arate	1469.57	61.77	0.200	22.57	1	T-101 T-102	7.493	1
nter.cool rat		1797.53	42.61	0.200	22.01		T-102 T-103		-
	Concernation of the second second	29.22	42.61				1-103	1.793	1
Nater injection		23.22							1
Gradient. Ter			12.91				C-109 Strip S.		0.449
Solvent Ratio	2	0.947	1				C-106 Strip S.	. (t/h)	0.325
			1 11 15	1.1		he areas			
Stream		Rate	Unit	VI	Vis @40 °C	Vis @100 °C	Solvent	RI Lab	RI Onlin
		TPD	Tank No				Cont. PPM		
- E -		1551.91	T-109A		n/a	n/a	1	n/a	
		and the second state of the second state			11.2	1			
Raff.		1121.83	HFU	n/a	nla	5.02	5.21	1.4614	1.4700
Raff. Extract OVHD-C-101 MPU note.		1121.83 738.76 .4625-1.4635,	HFU T-107A VI >114, S	iolvent cont.	n/a Raff. < 20 ppr	n, Ext.<20 p	9.10 <0.01	1.5656 50 ppm	1,4700
Raff. Extract OVHD-C-101 MPU note. 1. Increas	150N RI 1. sed MPU fea	1121.83 738.76 .4625-1.4635, ed from 15	HFU T-107A VI >114, S	iolvent cont. 600 t/d refe	n/a Raff. < 20 ppr	n, Ext. < 20 p	9.10 <0.01	1.5656 50 ppm	1,4700
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decrea	sed MPU fea	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0	HFU T-107A VI >114, S	iolvent cont. 600 t/d refi 25 for redu	n/a Raff. < 20 ppr er to WOP ucing VI git	n, Ext. < 20 p	9.10 <0.01	1.5656 50 ppm	1,4700
2. Decrea	sed MPU fee	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0	HFU T-107A VI >114, S	iolvent cont. 600 t/d refe	n/a Raff. < 20 ppr er to WOP ucing VI git	n, Ext. < 20 p	9.10 <0.01	1.5656 50 ppm	1.4700
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decrea HYDROFIN	sed MPU fea ased wash ra	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L)	HFU T-107A VI >114, S	600 t/d refu 25 for redu	n/a Raff. < 20 ppr er to WOP ucing VI git	n, Ext. < 20 p .(weekly op ve away(op 106.56	9.10 <0.01 opm, OVHD < peration pla timization)	1,5656 50 ppm N)	1.4700
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decrea HYDROFIN R	sed MPU fea ased wash r NISHING UNI eactor Conditio	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L)	HFU T-107A VI >114, S	iolvent cont. 600 t/d refi 25 for redu	n/a Raff. < 20 ppr er to WOP Joing VI gi iwrt. = Rate	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur	9.10 <0.01 opm, OVHD < peration pla timization)	1.5656 50 ppm	1.4700
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Repress.(bar)	sed MPU fea ased wash ra NISHING UN eactor Conditio temp.°C	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp.°C	HFU T-107A VI >114, S	600 t/d refu 25 for redu HTR YIELD %	n/a Raff. < 20 ppr er to WOP Joing VI gi swt. = Rate TPD	n, Ext. < 20 p .(weekly op ve away(op 106.56	9.10 <0.01 opm, OVHD < peration pla timization)	1,5656 50 ppm N) Tank/Unit	1.4700
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decrea HYDROFIN R	sed MPU fea ased wash r NISHING UNI eactor Conditio	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L)	HFU T-107A VI >114, S	600 t/d refe 25 for redu HTR YIELD % Stream Feed	n/a Raff. < 20 ppr er to WOP Joing VI gi wwt. = Rate TPD 1194.37	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur	9.10 <0.01 opm, OVHD < peration pla timization)	1.5656 50 ppm n', Tank/Unit MPU	1.4700
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Riv press.(bar) 70.06	sed MPU fea ased wash ra NISHING UNI eactor Conditio temp. ⁹ C 303.64	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp °C -8.81	HFU T-107A VI >114, S	600 t/d refe 25 for redu HTR YIELD % Stream Feed HT Raff.	n/a Raff. < 20 ppr er to WOP Joing VI gi wwt. = Rate TPD 1194.37 1272.72	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur	9.10 <0.01 opm, OVHD < peration pla timization)	1,5656 50 ppm N) Tank/Unit	1.4700
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN R press.(bar) 70.06	sed MPU fea ased wash ra NISHING UNI eactor Conditio temp. °C 303.64	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff.temp.°C -8.81 1.193	HFU T-107A VI >114, S	600 t/d refe 25 for redu HTR YIELD % Stream Feed HT Raff. Distillate	n/a Raff. < 20 ppr er to WOP Joing VI gi iwr. = Rate TPD 1194.37 1272.72 4.71	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a	1.5656 50 ppm n', Tank/Unit MPU	1.4700
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN R press.(bar) 70.06	sed MPU fea ased wash ra NISHING UNI eactor Conditio temp. °C 303.64	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp °C -8.81	HFU T-107A VI >114, S	600 t/d refe 25 for redu HTR YIELD % Stream Feed HT Raff. Distillate Naphtha	n/a Raff. < 20 ppr er to WOP Joing VI git iwrt. = Rate TPD 1194.37 1272.72 4.71 0.001	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up	1.5656 50 ppm n', Tank/Unit MPU	1.4700
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN R press.(bar) 70.06	sed MPU fea ased wash ra NISHING UNI eactor Conditio temp. °C 303.64	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff.temp.°C -8.81 1.193	HFU T-107A VI >114, S	600 t/d ref 600 t/d ref 25 for redu hTR YIELD % Stream Feed HT Raff. Distillate Naphtha H ₂ make up	n/a Raff. < 20 ppr er to WOP Joing VI git wrt. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a	1.5656 50 ppm N; Tank/Unit MPU \$DU]
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Repress.(bar) 70.06 C-104 Strip S C-102 Strip S	sed MPU fea ased wash ra NISHING UNI eactor Conditio temp.°C 303.64 . (Vh) . (Vh)	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp °C -8.81 1.193 0.055	HFU T-107A VI >114, S 550 t/d to 1 .950 to 0.9	600 t/d refu 25 for redu 25 for redu 8 Stream Feed HT Raff. Distillate Naphtha H ₂ make up H ₂ to F/G	n/a Raff. < 20 ppr er to WOP Joing VI git iwrt. = Rate TPD 1194.37 1272.72 4.71 0.001	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up	1.5656 50 ppm n', Tank/Unit MPU SDU Result	Spec.
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Repress.(bar) 70.06 C-104 Strip S C-102 Strip S HFU note	sed MPU fea ased wash ra NISHING UNI eactor Conditio temp.°C 303.64 . (Vh) . (Vh) 150N HT Raff.	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp °C -8.81 1.193 0.055	HFU T-107A VI >114, S 550 t/d to 1 .950 to 0.9	600 t/d refu 25 for redu 25 for redu 8 Stream Feed HT Raff. Distillate Naphtha H ₂ make up H ₂ to F/G FP >200°C	n/a Raff. < 20 ppr er to WOP Joing VI gin iwt. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle	1.5656 50 ppm N) Tank/Unit MPU SDU Result 88.59 87.88	\$pec. >85 >85
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Repress.(bar) 70.06 C-104 Strip S C-102 Strip S HFU note 1 Decrease	sed MPU fea ased wash ra NISHING UNI eactor Conditio temp.°C 303.64 . (Vh) . (Vh) 150N HT Raff. ed reactor tmp	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp °C -8.81 1.193 0.055 . Sulphur 0, from 302 to	HFU T-107A VI >114, S 550 t/d to 1 .950 to 0.9	600 t/d refu 25 for redu 25 for redu 8 Stream Feed HT Raff. Distillate Naphtha H ₂ make up H ₂ to F/G FP >200°C	n/a Raff. < 20 ppr er to WOP Joing VI gin iwt. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle	1.5656 50 ppm N) Tank/Unit MPU SDU Result 88.59 87.88	Spec. >85 >85
Raff. Extract DVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Repress.(bar) 70.06 C-104 Strip S C-102 Strip S HFU note 1 Decrease	sed MPU fea ased wash ra NISHING UNI eactor Conditio temp.°C 303.64 . (Vh) . (Vh) 150N HT Raff.	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp °C -8.81 1.193 0.055 . Sulphur 0, from 302 to	HFU T-107A VI >114, S 550 t/d to 1 .950 to 0.9	600 t/d refu 25 for redu 25 for redu 8 Stream Feed HT Raff. Distillate Naphtha H ₂ make up H ₂ to F/G FP >200°C	n/a Raff. < 20 ppr er to WOP Joing VI gin iwt. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle	1.5656 50 ppm n) Tank/Unit MPU SDU Result 88.59 87.88 v up the resul	
Raff. Extract DVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Repress.(bar) 70.06 C-104 Strip S C-102 Strip S HFU note 1 Decrease	Sed MPU fea ased wash ra NISHING UNI eactor Conditio temp.°C 303.64 . (Vh) . (Vh) 150N HT Raff. ed reactor tmp 550L (Amin	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp °C -8.81 1.193 0.055 . Sulphur 0, from 302 to	HFU T-107A VI >114, S 550 t/d to 1 .950 to 0.9	600 t/d refu 25 for redu 25 for redu 8 Stream Feed HT Raff. Distillate Naphtha H ₂ to F/G FP >200°C toproving sulp	n/a Raff. < 20 ppr er to WOP Jcing VI gin iwt. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458 hur content i	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle Please follow	1.5656 50 ppm n) Tank/Unit MPU SDU Result 88.59 87.88 v up the resul	Spec. >85 >85 ≥85 t. es
Raff. Extract DVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Repress.(bar) 70.06 C-104 Strip S C-102 Strip S HFU note 1 Decrease	Sed MPU fea ased wash ra NISHING UNI eactor Conditio temp.°C 303.64 . (Vh) . (Vh) 150N HT Raff. ed reactor tmp 550L (Amin Flow t/d	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) IT (500L) .8.81 1.193 0.055 . Sulphur 0, from 302 to re Treating	HFU T-107A VI >114, \$ 550 t/d to 1 .950 to 0.9	600 t/d refu 25 for redu 25 for redu 8 Stream Feed HT Raff. Distillate Naphtha H ₂ make up H ₂ to F/G FP >200°C	n/a Raff. < 20 ppr er to WOP Joing VI gin iwt. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle Please follow Sc Analysis	1.5656 50 ppm n) Tank/Unit MPU SDU Result 88.59 87.88 v up the resul olvent Qualiti Result	Spec. >85 >85 ≥85 t. €\$ Spec.
Raff. Extract DVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Ru Dress.(bar) 70.06 C-104 Strip S C-102 Strip S HFU note 1 Decrease ADIP UNIT	Sed MPU fea ased wash ra NISHING UN eactor Conditio temp, °C 303.64 5. (Vh) 5. (Vh) 150N HT Raff ed reactor tmp 550L (Amin Flow tid Acid gas	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) IT (500L) IT (500L) at diff temp °C -8.81 1.193 0.055 . Sulphur 0. from 302 to le Treating Lean Adip	HFU T-107A VI >114, S 550 t/d to 1 .950 to 0.9	600 t/d refe 25 for redu HTR YIELD % Stream Feed HT Raff. Distillate Naphtha H ₂ make up H ₂ to F/G FP >200°C mproving sulp Ratio	n/a Raff. < 20 ppr er to WOP Joing VI gi 6wt. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458 hur content i Level %	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle Piease follow Sc Analysis ATB	1.5656 50 ppm n) Tank/Unit MPU SDU Result 88.59 87.88 v up the resul	Spec. >85 >85 ≥85 t. es
Raff. Extract DVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Ru Dress.(bar) 70.06 C-104 Strip S C-104 Strip S C-102 Strip S HFU note 1 Decrease ADIP UNIT	sed MPU fea ased wash ra NISHING UN eactor Conditio temp. ⁹ C 303.64 5. (Vh) 5. (Vh) 150N HT Raff ed reactor tmp 550L (Amin Flow tid Acid gas 52.44	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp °C -8.81 1.193 0.055 . Sulphur 0. from 302 to e Treating Lean Adip 105.61	HFU T-107A VI >114, \$ 550 t/d to 1 .950 to 0.9	600 t/d refu 25 for redu 25 for redu 8 Stream Feed HT Raff. Distillate Naphtha H ₂ to F/G FP >200°C toproving sulp	n/a Raff. < 20 ppr er to WOP Jcing VI gin iwt. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458 hur content i	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle Please follow Sc Analysis	1.5656 50 ppm n) Tank/Unit MPU SDU Result 88.59 87.88 v up the resul olvent Qualiti Result	Spec. >85 >85 ≥85 t. CS Spec. Dif. <3
Raff. Extract DVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Ru Dress.(bar) 70.06 C-104 Strip S C-104 Strip S C-102 Strip S HFU note 1 Decrease ADIP UNIT	Sed MPU fea ased wash ra NISHING UN eactor Conditio temp, °C 303.64 5. (Vh) 5. (Vh) 150N HT Raff ed reactor tmp 550L (Amin Flow tid Acid gas	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) IT (500L) IT (500L) at diff temp °C -8.81 1.193 0.055 . Sulphur 0. from 302 to le Treating Lean Adip	HFU T-107A VI >114, \$ 550 t/d to 1 .950 to 0.9	600 t/d refe 25 for redu HTR YIELD % Stream Feed HT Raff. Distillate Naphtha H ₂ make up H ₂ to F/G FP >200°C mproving sulp Ratio	n/a Raff. < 20 ppr er to WOP Joing VI gi 6wt. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458 hur content i Level %	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle Piease follow Sc Analysis ATB	1.5656 50 ppm n', Tank/Unit MPU SDU Result 88.59 87.88 vup the resul olvent Qualiti Result 22.30	Spec. >85 >85 >85 285 t. Diff.<
Raff. Extract DVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Ro Dress.(bar) 70.06 C-104 Strip S C-102 Strip S HFU note 1 Decrease ADIP UNIT	sed MPU fea ased wash ra NISHING UN eactor Conditio temp. ⁹ C 303.64 5. (Vh) 5. (Vh) 150N HT Raff ed reactor tmp 550L (Amin Flow tid Acid gas 52.44	1121.83 738.76 .4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp °C -8.81 1.193 0.055 . Sulphur 0. from 302 to e Treating Lean Adip 105.61	HFU T-107A VI >114, \$ 550 t/d to 1 .950 to 0.9	600 t/d refe 25 for redu HTR YIELD % Stream Feed HT Raff. Distillate Naphtha H ₂ make up H ₂ to F/G FP >200°C mproving sulp Ratio 2.007	n/a Raff. < 20 ppr er to WOP Joing VI git 6wt. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458 hur content i Level % 49.89	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle Please follow Please follow Sc Analysis ATB RFB	1.5656 50 ppm n', Tank/Unit MPU SDU Result 88.59 87.88 y up the resul olvent Qualiti Result 22.30 26.82	Spec. >85 >85 >85 285 t. Obj. 26-28%
Raff. Extract DVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Roress.(bar) 70.06 C-104 Strip S C-104 Strip S C-102 Strip S HFU note 1 Decrease ADIP UNIT C-101 C-102 C-101 C-102 C-103	sed MPU fea ased wash ra NISHING UN eactor Conditio temp. ⁹ C 303.64 5. (Vh) 5. (Vh) 150N HT Raff ed reactor tmp 550L (Amin Flow tid Acid gas 52.44	1121.83 738.76 4625-1.4635, ed from 15 ate from 0 IT (500L) n diff temp. % -8.81 1.193 0.055 . Sulphur 0. from 302 to e Treating Lean Adip 105.61 Bad	HFU T-107A VI >114, S 550 t/d to 1 .950 to 0.9 19-0.47%wt, 300 oC for in 1) Top, BTM Temp ⁹ C	600 t/d refe 25 for redu HTR YIELD % Stream Feed HT Raff. Distillate Naphtha H ₂ make up H ₂ to F/G FP >200°C mproving sulp Ratio 2.007	n/a Raff. < 20 ppr er to WOP Joing VI git wrt. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458 hur content i Level % 49.89 49.78	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 opm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle Piease follow RFB RFB H ₂ S	1.5656 50 ppm n', Tank/Unit MPU SDU Result 88.59 87.88 y up the resul olvent Qualiti Result 22.30 26.82 891.33	Spec. >85 >85 >85 285 t. Obj. <3
Raff. Extract DVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN R Press.(bar) 70.06 C-104 Strip S C-102 Strip S HFU note 1 Decrease ADIP UNIT C-101 C-101 C-102 C-104	sed MPU fea ased wash ra NISHING UNI easter Conditio temp. ⁹ C 303.64 . (Vh) . (Vh) 150N HT Raff ed reactor tmp 550L (Amin Flow t/d Acid gas 52.44 14.40	1121.83 738.76 4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp.°C -8.81 1.193 0.055 . Sulphur 0, from 302 to ie Treating Lean Adip 105.61 Bad 316.29	HFU T-107A VI >114, S 550 t/d to 1 .950 to 0.9 19-0.47%wt, 300 oC for in .) Top, BTM Temp ⁹ C 103.17	600 t/d refe 25 for redu HTR YIELD 9 Stream Feed HT Raff. Distillate Naphtha H ₂ to F/G FP >200°C nproving sulp Ratio 2.007 Bad	n/a Raff. < 20 ppr er to WOP Joing VI git iwr. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458 hur content i Level % 49.89 49.78 75.90	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 spm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle Please follow Please follow State Analysis ATB RFB H ₂ S Foaming	1.5656 50 ppm n', Tank/Unit MPU SDU Result 88.59 87.88 y up the resul Sivent Qualiti Result 22.30 26.82 891.33 210.00	Spec. >85 >85 >85 >85 Diff. <3
Raff. Extract OVHD-C-101 MPU note. 1. Increas 2. Decreas HYDROFIN Repress.(bar) 70.06 C-104 Strip S C-102 Strip S HFU note 1 Decrease	sed MPU fea ased wash ra NISHING UNI eactor Conditio temp. °C 303.64 3. (t/h) 5. (t/h) 150N HT Raff 550L (Amin Flow t/d Acid gas 52.44 14.40 35.00	1121.83 738.76 4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp.°C -8.81 1.193 0.055 . Sulphur 0, from 302 to ie Treating Lean Adip 105.61 Bad 316.29	HFU T-107A VI >114, S 550 t/d to 1 .950 to 0.9 19-0.47%wt, 300 oC for in .) Top, BTM Temp ⁹ C 103.17 35.79	600 t/d refe 25 for redu HTR YIELD 9 Stream Feed HT Raff. Distillate Naphtha H ₂ to F/G FP >200°C nproving sulp Ratio 2.007 Bad	n/a Raff. < 20 ppr er to WOP Joing VI git iwr. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458 hur content i Level % 49.89 49.78 75.90	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 spm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle Please follow State Analysis ATB RFB H ₂ S Foaming PH	1.5656 50 ppm n', Tank/Unit MPU SDU Result 88.59 87.88 9 up the resul Sivent Qualiti Result 22.30 26.82 881.33 210.00 10.82	Spec. >85 >85 >85 >85 Spec. Dif. <3
Raff. Extract DVHD-C-101 MPU note. 1. Increase 2. Decrease HYDROFIN R Press.(bar) 70.06 C-104 Strip S C-102 Strip S HFU note 1 Decrease ADIP UNIT C-101 C-102 C-103 C-104	sed MPU fea ased wash ra NISHING UNI eactor Conditio temp. °C 303.64 3. (Uh) 4. (Uh) 4. (Uh) 5. (Uh) 550L (Amin Flow tid Acid gas 52.44 14.40 35.00 7.66	1121.83 738.76 4625-1.4635, ed from 15 ate from 0 IT (500L) m diff temp.°C -8.81 1.193 0.055 . Sulphur 0, from 302 to ie Treating Lean Adip 105.61 Bad 316.29	HFU T-107A VI >114, S 550 t/d to 1 .950 to 0.9 19-0.47%wt, 300 oC for in .) Top, BTM Temp ⁹ C 103.17 35.79	600 t/d refe 25 for redu HTR YIELD % Stream Feed HT Raff. Distillate Naphtha H ₂ make up H ₂ to F/G FP >200°C mproving sulp Ratio 2.007 Bad 0.373	n/a Raff. < 20 ppr er to WOP Joing VI gi iwr. = Rate TPD 1194.37 1272.72 4.71 0.001 7.355 12.458 hur content i Level % 49.89 49.78 75.90 49.81	n, Ext. < 20 p .(weekly op ve away(op 106.56 Sulfur % Wt n/a	9.10 <0.01 spm, OVHD < peration pla timization) flash point °C n/a H ₂ mark up H ₂ recycle Please follow Sc Analysis ATB RFB H ₂ S Foaming PH SS	1.5656 50 ppm n', Tank/Unit MPU SDU Result 88.59 87.88 v up the resul olvent Qualiti Result 22.30 26.82 881.33 210.00 10.82 33.33	Spec. >85 >85 >85 Spec. Dif. <3

Figure 17: Illustrate format of log sheet lead team operator after implemented

SOLVEN	· DETFORM	5 0mm 1400	-1	DWO yield 9		43.94			page 3/6
			171 - underfalle		D		FILTERS		DPE/DP
	11 (700)		Flow(t/d)	Temp. °C	Ratio, Press		M-101		E-121
eed to SDI		10.00	1202.74	57.92			M-102		E-122
	n ratio (initial c	unnou)	357.37	37.21	0.30		M-103		E-123
econd dilu	No. of Concession, Name of Street, or other designs, or other desi		240.46	21.39	0.20	H	M-104 PRI.		E-124
hird dilutio			480.37	14.91	0.40	Ц	M-104 REP.		E-125
Forth dilutio			52.91	28.93	0.04	2	M-105		E-126
	n ratio (final di	lution)	905.03		0.75		M-106		E-131
	mp. (V-102)			-17.18		-		\Box	E-132
Solvent Ten	-			-19.22		Ц	M-109A	4	E-133
Cross over		ų.		-1.37	-	U	M-109B	~	E-134
Primary col			1030.04	-	-				
Repulp cold	The second		520.01						E-106A
Inject boot			440.22	and the second				•	E-106B
Vacuum Pump pressure				-0.684			2	E-106C	
Dehydrate F	Pump pressure	1	32.441		1.799				
							Tank No.	Level(m)	
K-401 Co	ndition	Flow t/d	Temp. °C	Press bar	Level %		T-101	0.000	
^{el} Suction		892.26	-25.04	0.117	-1.206		T-102	0.441	
2 nd Suction		359.16	-6.03	2.903	32.149		T-103	0.029	1
Discharge		1195.89	99.17	17.991	16.591		T-104	0.214	1
Ampare	159.61								-
Stream	Rate TPD	Pour Pt. °C	VI, oil cont	vis@40°C	vis@100,FP	MEK cont	Tolu cont	RI , PPonline	Unit/Tan
Feed	-		1	n/a	n/a		1	1	HFU
owo	528.49	-12.00	94.62	101.30	11.140	n/a	n/a	-12.10	T-115B
				the second s	n/a	n/a	n/a	1.4706	T-106A
Vote. Activities Hot wash		neck FP the resu			100		1		>204°C.
Note, Activities 1. Hot wash 2. 09.00H S 3 On service	150N DWO F S: filter = 13 times Sample DWO of ed DMC to Auto	s. heck FP the resu mode	°C, VI 102.8-1		100		1		>204°C.
Note, Activities 1. Hot wash 2. 09.00H S 3 On service	150N DWO F S: a filter = 13 times Sample DWO of	s. heck FP the resu mode	°C, VI 102.8-1		100		1		>>204°C.
Note, Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL	150N DWO F S: filter = 13 times Sample DWO of ed DMC to Auto BELT UNIT	s. neck FP the resu mode (560L) Flow t/d	°C, VI 102.8-1		100		1		>204°C.
Note, Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL	150N DWO F S: filter = 13 times Sample DWO of ed DMC to Auto BELT UNIT	s. neck FP the resu mode (<u>560L)</u>	°C, VI 102.8-1 /It is 211 [©] C it c	n spec	loC 29-31cst, V	∕is@100°C 5.)-5.25cst, Oil d		>204°C.
Note, Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL 1	150N DWO F S: filter = 13 times Sample DWO of ed DMC to Auto BELT UNIT	s. neck FP the resu mode (560L) Flow t/d	°C, VI 102.8-1 It is 211 °C it c Temp oC	n spec Press bar	loC 29-31cst, V	∕is@100°C 5.	Hot oil coil		>204°C.
Note, Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL 1 Hot Oil Supp Hot Oil Supp	150N DWO F S: filter = 13 times Sample DWO of ed DMC to Auto BELT UNIT	s. neck FP the resu mode (560L) Flow t/d	°C, VI 102.8-1 nt is 211 °C it c Temp oC 351.04	n spec Press bar	loC 29-31cst, V	∕is@100°C 5.	Hot oil coil 3990.95		>204°C.
Note, Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL I HOT OIL Supp Hot Oil Supp Hot Oil Retu	150N DWO F S: filter = 13 times Sample DWO of ed DMC to Auto BELT UNIT	s. neck FP the resu mode (560L) Flow t/d	² C, VI 102.8-1 It is 211 ⁶ C it c Temp oC 351.04 260.66	Press bar 15.97	Level, O2 %	∕is@100°C 5.	Hot oil coil 3990.95 4133.27		>>204°C.
2. 09.00H S 3 On service	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT	s. neck FP the resu mode (560L) Flow t/d	² C, VI 102.8-1 It is 211 ⁶ C it o Temp oC 351.04 260.66 261.22	Press bar 15.97 5.50	Level, O2 %	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74		>>204°C.
Note. Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL HOT OIL Supp Hot Oil Supp Hot Oil Return V-101 F-101 HOU note	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT	5. neck FP the resu mode (560L) Flow Vol 16291.33	² C, VI 102.8-1 at is 211 ⁶ C it of 351.04 260.66 261.22 261.22	Press bar 15.97 5.50	Level, O ₂ % 21.61 5.50	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74		>>204°C.
Note. Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL HOT OIL Supp Hot Oil Supp Hot Oil Return V-101 F-101 HOU note	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT ply arm	5. neck FP the resu mode (560L) Flow Vol 16291.33	² C, VI 102.8-1 at is 211 ⁶ C it of 351.04 260.66 261.22 261.22	Press bar 15.97 5.50	Level, O ₂ % 21.61 5.50	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74		>>204°C.
Note. Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL I HOT OII Supp Hot OII Supp Hot OII Return V-101 F-101 HOU note 1. Stopped F	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT ply arn 9. F/O firing F/O burner no. 3	5. mode (560L) Flow t/d 16291.33 18 burner , F/ 3 to reduce coll s	² C, VI 102.8-1 at is 211 ⁶ C it c 351.04 260.66 261.22 C firing no 5, skin temp.	Press bar 15.97 5.50	Level, O ₂ % 21.61 5.50	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74		
Note. Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL I HOT OII Supp Hot OII Supp Hot OII Return V-101 F-101 HOU note 1. Stopped F	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT ply arm	5. mode (560L) Flow t/d 16291.33 18 burner , F/ 3 to reduce coll s	² C, VI 102.8-1 at is 211 ⁶ C it c 351.04 260.66 261.22 C firing no 5, skin temp.	Press bar 15.97 5.50	Level, O ₂ % 21.61 5.50	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74	oont. <10%, FF	Page 4/6
Note, Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL HOT OIL HOT OIL HOT OIL HOT OIL HOT OIL HOT OIL HOU note	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT ply arn 9. F/O firing F/O burner no. 3	s. mode (560L) Flow tick 16291.33 18 burner , Fi 3 to reduce coll s	² C, VI 102.8-1 <i>I</i> t is 211 ^o C it c Temp oC 351.04 260.66 261.22 IG firing no 5, skin temp. 600L)	Press bar 15.97 5.50 8, 17, 20,	Level, O ₂ % 21.61 5.50	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74 3835.48	Result	Page 4/6 Spec
Note, Activities Activ	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT ply arn 9. F/O firing F/O burner no. 3	s. mode (560L) Flow t/d 16291.33 18 burner , F/ 8 to reduce coil s PPER UNIT (I	² C, VI 102.8-1 <i>i</i> tt is 211 ⁶ C it c Temp oC 351.04 260.66 261.22 (G firing no 5, skin temp. 600L) Temp. oC	Press bar 15.97 5.50 8, 17, 20, 1	Level, O ₂ % 21.61 5.50 F/O stop no. 3,	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74 3835.48 H ₂ S	eont. <10%, FF	Page 4/C Spec <5 ppm
Note, Activities Activ	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT ply arn 9. F/O firing F/O burner no. 3	s. mode (560L) Flow tick 16291.33 18 burner , Fi 3 to reduce coll s	² C, VI 102.8-1 <i>I</i> t is 211 ^o C it c Temp oC 351.04 260.66 261.22 IG firing no 5, skin temp. 600L)	Press bar 15.97 5.50 8, 17, 20, 1	Level, O ₂ % 21.61 5.50	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74 3835.48	Result	Page 4/C Spec <5 ppm
Note, Activities Activ	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT ply arn 9. F/O firing F/O burner no. 3	s. mode (560L) Flow t/d 16291.33 18 burner , F/ 3 to reduce coil s PPER UNIT (I	² C, VI 102.8-1 <i>i</i> tt is 211 ⁶ C it c Temp oC 351.04 260.66 261.22 (G firing no 5, skin temp. 600L) Temp. oC	Press bar 15.97 5.50 8, 17, 20, 1 Tank VDU , PDA	Level, O ₂ % 21.61 5.50 F/O stop no. 3,	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74 3835.48 H ₂ S	eont. <10%, FF	Page 4/6
Note, Activities Activ	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT BELT UNIT	s. mode (560L) Flow t/c 16291.33 18 burner , F/ 3 to reduce coil s PPER UNIT (0 Flow T/D 582.16	² C, VI 102.8-1 <i>i</i> tt is 211 ⁶ C it c Temp oC 351.04 260.66 261.22 <i>i</i> G firing no 5, skin temp. 600L) Temp. oC 83.90	Press bar 15.97 5.50 8, 17, 20, 1 Tank VDU , PDA FI	Level, O ₂ % 21.61 5.50 F/O stop no. 3,	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74 3835.48 H ₂ S PH	eont. <10%, FF	Page 4/6 Spec <5 ppm 6.0-10.0 <100mg/
Note, Activities Activities Activities Activities and an antipication and an antipication and an antipication Activities	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT BELT UNIT ply arm 9. F/O firing F/O burner no. 3 ATER STRIP	s. mode (560L) Flow t/ci 16291.33 18 burner , F/ 3 to reduce coil s PPER UNIT (/ Flow T/D 582.16 0.285 534.44	² C, VI 102.8-1 at is 211 ^e C it of 361.04 260.66 261.22 ¹ G firing no 5, skin temp. <u>500L1</u> <u>Temp. oC</u> 83.90 129.03 44.13	Press bar 15.97 5.50 8, 17, 20, Tank VDU , PDA Fk E	Level, O ₂ % 21.61 5.50 F/O stop no. 3, , Adip , HFU are TP.	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74 3835.48 H ₂ S PH SS Ammonia	Result 0 9.13 20.80 0.00	Page 4// Spec <5 ppm 6.0-10.0 <100mg < 50 mg/
Note. Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL I Hot OII Supp Hot OII Supp Hot OII Return V-101 F-101 HOU note 1. Stopped F	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT BELT UNIT ply arm 9. F/O firing F/O burner no. 3 ATER STRIP	s. mode (560L) Flow t/ci 16291.33 18 burner , F/ B to reduce coil s PPER UNIT (U Flow T/D 582.16 0.285	² C, VI 102.8-1 <i>i</i> tt is 211 ⁶ C it o Temp oC 351.04 260.66 261.22 ¹ G firing no 5, skin temp. <u>500L1</u> <u>Temp. oC</u> 83.90 129.03	Press bar 15.97 5.50 8, 17, 20, Tank VDU , PDA Fk E	Level, O ₂ % 21.61 5.50 F/O stop no. 3, , Adip , HFU are	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3390.95 4133.27 4138.74 3835.48 H ₂ S PH SS Ammonia Oil content	Result 0 9.13 20.80 0.00 4.00	Page 4// Spec < 5 ppm 6.0-10.0 <100 mg < 50 mg < 100 mg
Note, Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL HOT OIL	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT. ply arm 9. F/O firing F/O burner no. 3 ATER STRIP	s. mode (560L) Flow t/ci 16291.33 18 burner , F/ 3 to reduce coil s PPER UNIT (/ Flow T/D 582.16 0.285 534.44	² C, VI 102.8-1 at is 211 ^e C it of 361.04 260.66 261.22 ¹ G firing no 5, skin temp. <u>500L1</u> <u>Temp. oC</u> 83.90 129.03 44.13	Press bar 15.97 5.50 8, 17, 20, Tank VDU , PDA Fk E	Level, O ₂ % 21.61 5.50 F/O stop no. 3, , Adip , HFU are TP.	Fis@100°C 5.0 Efficiecy % 86.47	Hot oil coil 3990.95 4133.27 4138.74 3835.48 H ₂ S PH SS Ammonia	Result 0 9.13 20.80 0.00	Page 4/6 Spec <5 ppm 6.0-10.0
Note, Activities	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT	5. heck FP the resumed mode (560L) Flow t/d 16291.33 18 burner , F/ 3 to reduce coil s PER UNIT (1 Flow T/D 582.16 0.285 534.44 2.832	² C, VI 102.8-1 at is 211 ^e C it of 351.04 260.66 261.22 (G firing no 5, skin temp. 500L) Temp. oC 83.90 129.03 44.13 121.13	Press bar 15.97 5.50 8, 17, 20, 1 Tank VDU , PDA FI E 0,	Level, O ₂ % 21.61 5.50 F/O stop no. 3, F/O stop no. 3, Adip , HFU are TP.	Fis@100°C 5.0 Efficiecy % 86.47 21	Hot oil coil 3390.95 4133.27 4138.74 3835.48 H ₂ S PH SS Ammonia Oil content	Result 0 9.13 20.80 0.00 4.00	Page 4// Spec < 5 ppm 6.0-10.0 <100 mg < 50 mg < 100 mg
Note, Activities 1. Hot wash 2. 09.00H S 3 On service HOT OIL I Hot Oil Supp Hot Oil Return V-101 F-101 HOU note 1. Stopped F SOUR WA Feed Sour Gas Stripper Wa Steam-ratio SWS Acti	150N DWO F S: filter = 13 times Sample DWO ch ed DMC to Auto BELT UNIT Ply arm 9. F/O firing F/O burner no. 3 ATER STRIP	5. heck FP the resumed mode (560L) Flow t/d 16291.33 18 burner , F/ 3 to reduce coil s PER UNIT (1 Flow T/D 582.16 0.285 534.44 2.832	² C, VI 102.8-1 at is 211 ^e C it of 351.04 260.66 261.22 (G firing no 5, skin temp. 500L) Temp. oC 83.90 129.03 44.13 121.13	Press bar 15.97 5.50 8, 17, 20, 1 Tank VDU , PDA FI E 0,	Level, O ₂ % 21.61 5.50 F/O stop no. 3, F/O stop no. 3, Adip , HFU are TP.	Fis@100°C 5.0 Efficiecy % 86.47 21	Hot oil coil 3390.95 4133.27 4138.74 3835.48 H ₂ S PH SS Ammonia Oil content	Result 0 9.13 20.80 0.00 4.00	Page 4/ Spec < 5 ppn 6.0-10.0 <100 mg < 50 mg < 100 mg

Figure 18: Illustrate format of log sheet lead team operator after implemented

	-								
	-		U-1		20-2			Tail Gas Tre	
		Flow T/D	Temp. °C	Flow T/D	Temp. °C			Flow T/D	Temp.
Acid Gas		7.677		0.000			E-301		245.31
Sour Gas		0.007		0.000			R-301 Top		249.06
Flue Gas		0.000		0.329		-	R-301 Btm.		263.42
F-101/201			1146.45		1026.55		H2	0.077	-
F-102/202		() (1) (1)	750.33		700.71		PH	6.84	level/ton
		R-101	R-102	R-201	R-202		T-101 %	74.38	0.404
Top Temperat		224.29	214.61	235.99	217.87				
Btm Tempera		295.89	242.23	220.80	208.94				er % vol.
Diff Temperat	ure. °C	71.60	27.61	-15.19	-8.93		H2S/SO2		633 .17
SRU note. Activities: 1. Performed	SRU-1 run a sulphur product	_		stand by, k	eep 055L-PV-(019-2 to close	d, control C-		
	BLOWING U	NIT (8001 -	8501)		BBU-1 YIELD	96wt. =	-171.11	I	Page 5/
and an and a state of the		THE LANGET			BBU-2 YIELD		#VALUE!		
	E		BBU-1		BBU-2				
	-	Flow T/D	Temp. °C	Tank	Flow T/D	Temp. °C	Tank		
Bitumen Feed	1	1.32	28.62	T-118A	0.00	28.03	S/D		
Bitumen Runo	down	-2.25	30.63	T-119D	Bad	29.70	S/D		
Air-%op valv		0.00	105.00		0.00	100.00			
Reactor			29.92			28.84			
Incinerator	i i	0.01	31.62				1		
and the second se				and the second se	a company of the second se				
Feed Viscosit	v	4032			\$/D			1	
			47.00			\$/D	1		
R/D Pen./softe Grade BBU note.	Unit 800L,	65 60-70 850L on shu			S/D S/D	S/D unk]		
R/D Pen./softe Grade <u>BBU note.</u> 1. Cont. to mai	Unit 800L,	65 60-70 850L on shu on an unit 60	t down DL, 850L with M		S/D S/D s unit to R/D ta .40 bar.	nk]		(430.01)
R/D Pen./softe Grade B <u>BU note.</u> 1. Cont. to mai	Unit 800L,	65 60-70 850L on shu on an unit 60 JNIT (3000	t down DL, 850L with M L)		S/D S/D s unit to R/D ta .40 bar.	nk		& FUEL OIL	
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE	Unit 800L, Intain preservation STORAGE L	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m.	t down 0 DL, 850L with M L) Press. Bar		S/D S/D s unit to R/D ta .40 bar.	nk	F/O per day	F/O sum.	eff % F-10
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE	Unit 800L, Unit 800L, Intain preservation STORAGE U V-101	65 60-70 850L on shu on on unit 60 <u>JNIT (3000</u> Level m. 1.088	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	FLARE UN VDU heater	F/O per day 31.20	F/O sum. 79473	eff % F-10 84.15
PROPANE	Unit 800L, Intain preservation STORAGE L	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m.	t down 0 DL, 850L with M L) Press. Bar		S/D S/D s unit to R/D ta .40 bar.	FLARE UN VDU heater H/O heater	F/O per day 31.20 0.00	F/O sum. 79473 63837	eff % F-10
R/D Pen./soft Grade BBU note. 1. Cont. to mai PROPANE	Unit 800L, Unit 800L, Intain preservation STORAGE U V-101	65 60-70 850L on shu on on unit 60 <u>JNIT (3000</u> Level m. 1.088	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	FLARE UN VDU heater	F/O per day 31.20	F/O sum. 79473	eff % F-10 84.15
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities:	Unit 800L, Unit 800L, Intain preservation STORAGE U V-101	65 60-70 850L on shu on an unit 60 JNIT (3000 Level m. 1.088 0.487	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	FLARE UN VDU heater H/O heater Total F/O,TOP	F/O per day 31.20 0.00	F/O sum. 79473 63837 139.10	eff % F-10 84.15
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities:	Unit 800L, Intain preservati STORAGE I V-101 V-102 DNSUMPTIO	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	FLARE UN VDU heater H/O heater Total F/O,TOP UTILITY SI Unit	F/O per day 31.20 0.00 31.20 TEAM FLO MPS.	F/O sum. 79473 63837 139.10 V RATE LPS.	eff % F-10 84.15 86.47 design
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities: UTILITY CC 12 hour even	Unit 800L, Intain preservati STORAGE I V-101 V-102 ONSUMPTIO age consump	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 N	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	FLARE UN VDU heater H/O heater Total F/O,TOP UTILITY SI Unit VDU	F/O per day 31.20 0.00 31.20 TEAM FLO MPS. 11.288	F/O sum. 79473 63837 139.10 W RATE	eff % F-10 84.15 86.47 design
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities: UTILITY CC 12 hour ever Utility	Unit 800L, Intain preservation STORAGE I V-101 V-102 ONSUMPTIO age consump Actual	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 N N N Target	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	Total F/O,TOP	F/O per day 31.20 0.00 31.20 TEAM FLO MPS. 11.288 9.407	F/O sum. 79473 63837 139.10 V RATE LPS.	eff % F-10 84.15 86.47 design
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities: UTILITY CC 12 hour ever Utility Raw Water	Unit 800L, Intain preservati STORAGE I V-101 V-102 DNSUMPTIO age consump Actual 604.18	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 N N otion T/C Target 580.00	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	Total FIO, TOP UTILITY S Unit VDU J-101 J-102	F/O per day 31.20 0.00 31.20 TEAM FLOV MPS. 11.288 9.407 1.730	F/O sum. 79473 63837 139.10 V RATE LPS.	eff % F-10 84.15 86.47 design
R/D Pen./softw Grade BBU note. 1. Cont. to mai PROPANE PROPANE	Unit 800L, Intain preservation STORAGE U V-101 V-102 ONSUMPTIO age consump Actual 604.18 10.07	65 60-70 850L on shu on an unit 60 JNIT (3000 Level m. 1.088 0.487 N N N N N Target 580.00 7.80	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	Total F/0,TOP	F/O per day 31.20 0.00 31.20 TEAM FLO MPS. 11.288 9.407 1.730 0.080	F/O sum. 79473 63837 139.10 V RATE LPS.	eff % F-10 84.15 86.47 design
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities: UTILITY CC 12 hour ever Utility Raw Water Nitrogen Fuel Gas	Unit 800L, Intain preservation STORAGE U V-101 V-102 ONSUMPTIO age consump Actual 604.18 10.07 8.56	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 N N tion T/D Target 580.00 7.80 0.50	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	FLARE UN VDU heater H/O heater Total F/0,TOP UTILITY S Unit VDU J-101 J-102 J-103 J-104	F/O per day 31.20 0.00 31.20 TEAM FLO MPS. 11.288 9.407 1.730 0.080 0.072	F/O sum. 79473 63837 139.10 <u>V RATE</u> LPS. 2.248	eff % F-10 84.15 86.47 design 10.20/2.
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities: UTILITY CC 12 hour ever 12 hour ever 12 hour ever 12 hour ever 12 hour ever 12 hour ever 14 hour ever 15 hour ever 16 hour ever 17 hour ever 18 hour ever 19 hour ever 10 ho	Unit 800L, Intain preservati STORAGE I V-101 V-102 ONSUMPTIO age consump Actual 604.18 10.07 8.56 123.80	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 N N otion T/D Target 580.00 7.80 0.50 145.00	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	FLARE UN VDU heater H/O heater Total F/O,TOP UTILITY S Unit VDU J-101 J-102 J-103 J-104 PDA	F/O per day 31.20 0.00 31.20 TEAM FLO MPS. 11.288 9.407 1.730 0.080 0.072 0.271	F/O sum. 79473 63837 139.10 <u>V RATE</u> LPS. 2.248 3.829	eff % F-10 84.15 86.47 design 10.20/2.
R/D Pen./softe Grade BBU note. I. Cont. to mai PROPANE Activities: UTILITY CC 12 hour even Utility Raw Water Vitrogen Fuel Gas Fuel Oil Hydrogen	Unit 800L, Intain preservation STORAGE U V-101 V-102 ONSUMPTIO age consump Actual 604.18 10.07 8.56	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 0.487 N N tion T/C Target 580.00 7.80 0.50 145.00 10.20	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	FLARE UN VDU heater H/O heater Total F/O,TOP UTILITY S Unit VDU J-101 J-102 J-103 J-104 PDA MPU	F/O per day 31.20 0.00 31.20 TEAM FLO MPS. 11.288 9.407 1.730 0.080 0.072	F/O sum. 79473 63837 139.10 <u>V RATE</u> LPS. 2.248	eff % F-10 84.15 85.47 design 10.20/2. 0.65/3.2
R/D Pen./softe Grade BBU note. I. Cont. to mai PROPANE Activities: UTILITY CC 12 hour even Utility Raw Water Vitrogen Fuel Gas Fuel Oil Hydrogen	Unit 800L, Intain preservati STORAGE I V-101 V-102 ONSUMPTIO age consump Actual 604.18 10.07 8.56 123.80	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 N N otion T/D Target 580.00 7.80 0.50 145.00	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	FLARE UN VDU heater H/O heater Total F/O,TOP UTILITY S Unit VDU J-101 J-102 J-103 J-104 PDA	F/O per day 31.20 0.00 31.20 TEAM FLO MPS. 11.288 9.407 1.730 0.080 0.072 0.271	F/O sum. 79473 63837 139.10 <u>V RATE</u> LPS. 2.248 3.829	eff % F-10 84.15
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities: UTILITY CO 12 hour even Utility Raw Water Nitrogen Fuel Gas Fuel Oil Hydrogen MPS	Unit 800L, Intain preservati STORAGE I V-101 V-102 ONSUMPTIO age consump Actual 604.18 10.07 8.56 123.80 9.05	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 0.487 N N tion T/C Target 580.00 7.80 0.50 145.00 10.20	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	FLARE UN VDU heater H/O heater Total F/O,TOP UTILITY S Unit VDU J-101 J-102 J-103 J-104 PDA MPU	F/O per day 31.20 0.00 31.20 TEAM FLOY MPS. 11.288 9.407 1.730 0.080 0.072 0.271 1.038	F/O sum. 79473 63837 139.10 V RATE LPS. 2.248 3.829 0.787	eff % F-10 84.15 86.47 design 10.20/2. 0.65/3.2 1.40/1.4 1.40/0.4
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities: UTILITY CO 12 hour even Utility Raw Water Nitrogen Fuel Gas Fuel Oil Hydrogen MPS	Unit 800L, Intain preservation STORAGE I V-101 V-102 DNSUMPTIO Bge consump Actual 604.18 604.18 10.07 8.56 123.80 9.05 46.38	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 0.487 N tion T/C Target 580.00 7.80 0.50 145.00 10.20 48.00	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	Total F/0,TOP	F/O per day 31.20 0.00 31.20 TEAM FLOY MPS. 11.288 9.407 1.730 0.080 0.072 0.271 1.038 1.408	F/O sum. 79473 63837 139.10 V RATE LPS. 2.248 3.829 0.787 0.026	eff % F-10 84.15 86.47 design 10.20/2. 0.65/3.2 1.40/1.4 1.40/0.4
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities: UTILITY CO 12 hour even Utility Raw Water Nitrogen Fuel Gas Fuel Oil Hydrogen MPS	Unit 800L, Intain preservation STORAGE I V-101 V-102 DNSUMPTIO Bge consump Actual 604.18 604.18 10.07 8.56 123.80 9.05 46.38	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 0.487 N tion T/C Target 580.00 7.80 0.50 145.00 10.20 48.00	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	Total F/O,TOP UTILITY S Unit VDU heater Total F/O,TOP Unit VDU J-101 J-102 J-103 J-104 PDA MPU HFU SDU	F/O per day 31.20 0.00 31.20 TEAM FLOY MPS. 11.288 9.407 1.730 0.080 0.072 0.271 1.038 1.408	F/O sum. 79473 63837 139.10 V RATE LPS. 2.248 3.829 0.787 0.026 1.595	eff % F-10 84.15 86.47 design 10.20/2 0.65/3.2 1.40/1.4 1.40/0.4 5.60/1.5
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities: UTILITY CO 12 hour even Utility Raw Water Nitrogen Fuel Gas Fuel Oil Hydrogen MPS	Unit 800L, Intain preservation STORAGE I V-101 V-102 DNSUMPTIO Bge consump Actual 604.18 604.18 10.07 8.56 123.80 9.05 46.38	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 0.487 N tion T/C Target 580.00 7.80 0.50 145.00 10.20 48.00	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	Total F/O,TOP UTILITY S Unit VDU heater Total F/O,TOP Unit VDU J-101 J-102 J-103 J-103 J-103 J-104 PDA MPU HFU SDU ADIP	F/O per day 31.20 0.00 31.20 EAM FLO MPS. 11.288 9.407 1.730 0.080 0.072 0.271 1.038 1.408 -0.011	F/O sum. 79473 63837 139.10 V RATE LPS. 2.248 3.829 0.787 0.026 1.595 1.195	eff % F-10 84.15 86.47 design 10.20/2. 0.65/3.2 1.40/1.4 1.40/0.4 5.60/1.6 1.4 2.80/0.0
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities:	Unit 800L, Intain preservation STORAGE I V-101 V-102 DNSUMPTIO Bge consump Actual 604.18 604.18 10.07 8.56 123.80 9.05 46.38	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 0.487 N tion T/C Target 580.00 7.80 0.50 145.00 10.20 48.00	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	Total F/O,TOP	F/O per day 31.20 0.00 31.20 TEAM FLOY MPS. 11.288 9.407 1.730 0.080 0.072 0.271 1.038 1.408 -0.011 2.832	F/O sum. 79473 63837 139.10 V RATE LPS. 2.248 3.829 0.787 0.026 1.595 1.195	eff % F-10 84.15 86.47 design 10.20/2. 0.65/3.2 1.40/1.4 1.40/0.4/ 5.60/1.8
R/D Pen./softe Grade BBU note. 1. Cont. to mai PROPANE Activities: UTILITY CO 12 hour even Utility Raw Water Nitrogen Fuel Gas Fuel Oil Hydrogen MPS	Unit 800L, Intain preservation STORAGE I V-101 V-102 DNSUMPTIO Bge consump Actual 604.18 604.18 10.07 8.56 123.80 9.05 46.38	65 60-70 850L on shu on on unit 60 JNIT (3000 Level m. 1.088 0.487 0.487 N tion T/C Target 580.00 7.80 0.50 145.00 10.20 48.00	t down DL, 850L with M L) Press. Bar 9.27		S/D S/D s unit to R/D ta .40 bar.	Total F/O, TOP	F/O per day 31.20 0.00 31.20 TEAM FLOY MPS. 11.288 9.407 1.730 0.080 0.072 0.271 1.038 1.408 -0.011 2.832 1.207	F/O sum. 79473 63837 139.10 W RATE LPS. 2.248 3.829 0.787 0.026 1.595 1.195 0.006	eff % F-10 84.15 86.47 design 10.20/2 1.40/1.4 1.40/1.4 1.40/1.4 1.40/1.4 2.80/0.0 >0.3/0.0

Figure 19: Illustrate format of log sheet lead team operator after implemented

	Flow (TPD)	Temp.(°C)	Press, PH	Level (%)		Service	Rate %
Gas To Flare, 2900L-V-103	2.94	27.46		47.72			or kg/h
LP. Steam let down. 4000L		145.59	2.80		450L-P-104		
Fuel Gas 4200L-V-101.	8.14		2.99		450L-P-105		
Tempered water Supply. 4400L	3349.57		7.71	50.30	450L-Cl ₂		
Tempered water Return, 4400L	Tag not found	57.80			470L-P-102	1	40.0
Raw water make up. 4500L	723.40			57.93	470L-P-103	V	40.0
Raw water to filter. 4500L	756.90				470L-P-104	V	30.0
Potable water used. 4500L	0.57			72.23	470L-P-106	Π	
Cooling water Supply. 4700L	Tag not found	28.62	8.08	97.47	470L-P-107		
Cooling water Return. 4700L	72211.10	27.48			470L-Cl2	4	0.50
Instrument air System. 5500L	22.25		7.77		Hypo-Chol		
Plant air System. 5500L	0.14		7.92		H ₂ SO ₄ drip.	1	
Nitrogen Supply. 5700L	9.82	27.74	5.98	-0.06	Chge. pack	1	90
None						ete Weter T	-
None					Wa	ste Water Ta	nk
None Mov. / offsite Activities 1. Continue to receiving RSO from 1		1.			AOC	%	nk M.
None Mov. / offsite Activities 1. Continue to receiving RSO from 2. Continue to receiving HCB from H	HCU-2 to T-201.						-
Utility Activities None Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth	HCU-2 to T-201.				AOC	%	M.
None Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth	HCU-2 to T-201. a from VDU/HFU to				AOC	% 41.96	M. 2.406
None Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP.	TOP.	Shining star.		AOC	% 41.96	M. 2.406
None Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from 5. Completed Marine loading Bitum	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP. en product from T-	119D to MT. 1		(T-117A).	AOC	% 41.96	M. 2.406
None Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from 5. Completed Marine loading Bitum 6. Performed Product tanks stock o	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP. en product from T- losing DAO (T-1118	119D to MT. 13), 500SN (T-1	116A), 150BS (A00 000	% 41.96	M. 2.406
None Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from 5. Completed Marine loading Bitum 6. Performed Product tanks stock o	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP. en product from T- losing DAO (T-1118	119D to MT. 13), 500SN (T-1	116A), 150BS (A00 000	% 41.96	M. 2.406
None Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from 5. Completed Marine loading Bitum 6. Performed Product tanks stock o	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP. en product from T- losing DAO (T-1118	119D to MT. 13), 500SN (T-1	116A), 150BS (A00 000	% 41.96	M. 2.406
None Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from 5. Completed Marine loading Bitum 6. Performed Product tanks stock o 7. Blending bitumen T-103A+T-107D	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP. en product from T- losing DAO (T-111E H(1100/147) to T-11	119D to MT. 13), 500SN (T-1	116A), 150BS (A00 000	% 41.96	M. 2.406
None Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from 5. Completed Marine loading Bitum 6. Performed Product tanks stock c 7. Blending bitumen T-103A+T-107E MAINTENANCE WORK Raisi	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP. en product from T- losing DAO (T-111E H(1100/147) to T-11	119D to MT. 13), 500SN (T-1	116A), 150BS (A00 000	% 41.96	M. 2.406
None Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from 5. Completed Marine loading Bitum 6. Performed Product tanks stock c 7. Blending bitumen T-103A+T-107E MAINTENANCE WORK Raisin <u>On PACER</u>	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP. en product from T- losing DAO (T-111E H(1100/147) to T-11	119D to MT. 13), 500SN (T-1	116A), 150BS (A00 000	% 41.96	M. 2.406
Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from 5. Completed Marine loading Bitum 5. Completed Marine	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP. en product from T- losing DAO (T-111E H(1100/147) to T-11	119D to MT. 13), 500SN (T-1	116A), 150BS (A00 000	% 41.96	M. 2.406
Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from 5. Completed Marine loading Bitum 5. Completed Marine	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP. en product from T- losing DAO (T-111E H(1100/147) to T-11	119D to MT. 13), 500SN (T-1	116A), 150BS (A00 000	% 41.96	M. 2.406
Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from 5. Completed Marine loading Bitum 5. Completed Marine loading Bitum 5. Completed Marine loading Bitum 5. Performed Product tanks stock c 7. Blending bitumen T-103A+T-107E MAINTENANCE WORK Raisin On PACER 100L-E-122-2 sheer pin broken. 100L-P-112A Motor is noisy.	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP. en product from T- losing DAO (T-111E b) (1100/147) to T-11	119D to MT. 1 3), 500SN (T-1 18A and prod	116A), 150BS (uct to T-119A.		A00 000	% 41.96	M. 2.406
None Mov. / offsite Activities 1. Continue to receiving RSO from 1 2. Continue to receiving HCB from 1 3. Continue to sending Wild Naphth 4. Continue to sending 60VGO from 5. Completed Marine loading Bitum 6. Performed Product tanks stock c 7. Blending bitumen T-103A+T-107E MAINTENANCE WORK Raisi	HCU-2 to T-201. a from VDU/HFU to T-105A to TOP. en product from T- losing DAO (T-111E b)(1100/147) to T-11	119D to MT. 1 3), 500SN (T-1 18A and prod	116A), 150BS (uct to T-119A.		A00 000	% 41.96	M. 2.406

Figure 20: Illustrates format of log sheet lead team operator after implemented

01-Feb-08 A 8 14 18	B		D LTH SAFE			Day Shift	I	Night Shift
14			THSAF				-	
14			TH SAFE		States of the second se	A R R R L L L L L L L L L L L L L L L L	-	
14				ETY AND			12 - 2	
		Community	y Complain :		0	Time.	3. Other :	
18	Jobs.	1	No De	etails –			-	
212	Jobs.	1-	_	-	_		-	
212	People	2			_		-	
	PROC	FSSCO	RRECTIV	E ACTIO	NS AND	OUTSTAN	DINGS	
	1		1	LACIO	IIS AILD			
			1	HOLD HOT N	C reh 8			
					a action			
			-		n T-105A, Incom	ase wash rate 17	75 to 1,150.	
uct			and a second sec	and the second state		1.2	and the statistic	Not enough
			Rearby terrine	rature has 255 %	c		-	Details
			-					
	N/A	655	the second second second		24 - 1908/1			
oduct		-1	Unit SiD and S	iteam out on gol	ng.			
					_	ITIES		
				1	-		An	nount
Ually Koa	d Loading	Trucks	Tons		Daily Ma	irine Loading	Ships	MTons
Base oil		0	0]	Base oil		0	0
Bitumen		0	0		Bitumen		0	0
Extract		0	0		Extract	1. S. 199	0	0
Sulfur		0	0		LR feed	receive	0	0
llage level		1,790	metre	// COC Wa	ter Ullage le	val =	1.697	metre
					and a second			
			ering T-118B	to T-103B and	d then to prov	duct tank T-1190	. Not e	nough
culating and	heat up slack	wax in tank.					Looidi	13
		_	_					
-			SUGG	ESTIONS				
	No. 2,5,8,14 an	d 17.				Vot enough		
r used F/G N			cotrol valve a	little.	_	Details		
	P still opening	by pass of c	THE ST FREES W					
	oduct Daily Roa Base oil Bitumen Extract Sulfur Usgo (r.105 De (s reservi Inding to 7-11 0:RSO with	Plan (tpd.) 2,600 Balance VR 1,650 Balance VR 1,650 W/A Raff.RD HFU R/D HFU R/D N/A N/A Oduct S/D Daily Road Loading Base oil Bitumen Extract Sulfur VGO:T-105A) are sending Doily co-118B (830 + 117 OD is receiving to T-101B Sing to T-118B (830 + 117 D:RSO with ratio 3:5 as TC	Plan (tpd.) Actual(tpc) 2,600 2,785 Balance VR 994 1,650 1,376 N/A 697 Raff.R/D 900 HFU R/D 863 N/A 665 N/A 665 N/A 665 N/A 665 N/A 665 N/A 663 N/A 665 N/A 663 N/A 665 N/A 665 N/A 665 N/A 665 Signal -1 OF OF Base oil 0 Stumen 0 Sulfur 0 NGO (T-105A) are sending to T0P. OP is receiving to T-1018. Ming to T-118B (830 + 117 Vd.). transfe ORSO with ratio 3:5 as TC advised.	Plan (tpd.) Actual(tpd) 2,600 2,785 LR tank from 1 Balance VR 904 Solvert diution 1,650 1,376 Grade 5008N; N/A 697 Raff.RD 900 Raff.RD 900 Reactor temps HFU RD 863 Pitration temps N/A 665 1333 oduct S/D -1 Unit S/D and 5 Oally Road Loading Amount Trucks Tons Base oil 0 0 0 0 Bitumen 0 0 0 0 0 Sulfur 0 0 0 0 0 Base oil 0 0 0 0 0	Plan (tpd.) Actual(tpd) 2,600 2,785 LR tank from T-1010, HOT= 31 Balance VR 994 Solvent offution 0.521/2.31 1,660 1,376 Grade 5005N; Feed intake from N/A 697 Raff.RD 900 Raff.RD 900 Reactor temperature has 325° HFU.RD 863 Pitration temperature in a 325° N/A 665 N/A 665 N/A 665 N/A 133 oduct S/D -1 Unit S/D and Steam out on policities and and Steam out on policities	Plan (tpd.) Actual(tpd) 2,600 2,785 LR tank from T-1010, HOT+ 388 deg_C. Balance VR 904 Solvent dilution 0.501/2.31 1,660 1,376 Grade 6005N; Feed intake from T-109A, Incre- N/A 607 Raff,RD 900 Reactor temperature has 325*0 HFU R/D 863 HFU R/D 863 Filtration temperature has 325*0 N/A 665 N/A 665 N/A 133 oduct S/D -1 Daily Road Loading Amount Daily Ma Base oil D D Base oil 0 0 0 D Base oil D D Base oil 0 0 0 D Extract LR feed in Bage level = 1.790 metre // COC Water Ullage lev LR feed in VGO[-105A] are sending to TOP. DP is receiving to T-1018. Units 1188 to T-1038 and then to proto D:SO with ratio 3.5 as TC advised.	Plan (tpd.) Actual(tpd) REMARK 2,600 2,785 LR tank from T-1010, HOT= 368 deg_C. Balance VR 994 Solvent offution 0.501/2.31 1,650 1,376 Grade 5005N; Feed intake from T-105A, Increase wash rate 1.2 N/A 697 Raff.R/D 900 Raff.R/D 900 Reactor temperature has 325*0 HFU R/D HFU R/D 863 Pitration temperature has 325*0 N/A N/A 665 N/A 665 N/A 665 Sold and Steam out on going. OFFSITE & LOADING & UTILITIES Daily Road Loading Trucks Tons Base oil Base oil 0 0 Bitumen Extract 0 0 Daily Marine Loading Base oil 0 0 Extract Daily Marine Loading Bale level = 1.760 metre // COC Water Ullage level = VGO(T-105A) are sending to TOP. OP is receiving to T-1018. Ming to T-1108 (30 + 117 Vd.), transfering T-1188 to T-1038 and then to product tank T-1190. DRSO with ratio 3:5 as TC advised.	2,600 2,785 LR tank from T-1010, HOT- 368 deg_C. Balance VR 994 Solvent offution 0.50:1/2.3:1 1,650 1,376 Grade 5005N; Feed intake from T-105A, Increase wash rate 1.275 to 1.350. N/A 697 Raff.R/D 900 Reactor temperature has 325 °C HFU R/D 863 Pitration temperature has 325 °C N/A 665 N/A 665 N/A 665 N/A 665 N/A 665 N/A 133 OFFSITE & LOADING & UTILITIES Daily Road Loading Amount Trucks Tons Base oil 0 Base oil 0 0 0 Bitumen 0 Extract 0 Sulfur 0 0 0 Dilt Reed receive 0 0 Itage level = 1.790 metre // COC Water Ullage level = 1.697 VGO(7-105A) are sending to TOP. OP is receiving to T-1018. Not e OP is receiving to T-1018. 630 + 117 Vd.), transfering T-118B to T-1038 and then to product tank T-119D. Not e

Figure 21: Illustrates format of log sheet for Shift Superintendent before implemented

	Logsbeet after l			
ate	02-Sep-08			THAILUBE
hift	A	В	c	D Day Shift Night Shift
afety&	Environm	ent		
te: Plea	se be awared	tahat Hot work	and Confined a	I space activity still carry on at Bitument product tank T-118B
	nance Cor		ren of K did Er	Function tested is ok.
Steam tr	aps around VI	DU have been	checked they ar	are work well.
				SOL and put inservice Fot Oil Surge drum and put on line
3000L T-	108 has calibr	ated temperate	ure indicator it i	t is OK now. (2* C diviated)
700L \$0)	x/Nox at Incine	erator stack ha	s calibrated and	nd put in service.
	nance Inpi			
			the area 200,5 0 will be carried	,500 will be carred on tomorrow
Pipe line	s insulation a	t unit 800 is 20	% progression :	n and will carry on tomorrow.
CCIVun	ider MCB still	under installtic	on and will carry	ry on tomorrow
has	allTechel	cal Dealth		
		cal Proble:		t for shuting down repair.
				t for shuting down repair. due to thermal reactor temperature < 1250 ° C (cannot decomposed NH ₃)
				wn lines are closed for energy conservation purpose
		In contraction in the second		
	iding Rem			
				anial hand for overhaul. <u>Caution! this a hot work</u>
LOW HOW	iavai sereĝusio	nig ayatam ruat	On atorage tanks	te T-202 A/B are in overring (MOS) position to prevent fuel oil pump trip (these tank are now used for storing Extract
-				
			PROCES	SS CORRECTIVE ACTIONS AND OUTSTANDINGS
NIT		PLAN (tpd.)		SS CORRECTIVE ACTIONS AND OUTSTANDINGS
DU feed		2,750	ACTUAL(tpd) 2,764	REMARK Mainatin feed 2750 t/d from T-101A, Inject HCB= 190TPD. Heater out let =367 °C, as planned (WDP)
DU feed		2,750 VR R/D	ACTUAL(tpd) 2,764 995	REMARK Mainatin fised 2750 t/d from T-101A, Inject: HCB= 190TPD. Heater out let: =367 °C, as planned (WOP) Feed rate as vacuum residue product rundown and balance feed tank T-102. Dilution rate: 0.5:1/ 2.4:1 as ins
DU feed DA feed PU feed		2,750	ACTUAL(tpd) 2,764	REMARK Mainatin feed 2750 t/d from T-101A, Inject HCB= 190TPD. Heater out let =367 °C, as planned (WDP)
DU feed DA feed PU feed stract pr FU feed		2,750 VR R/D 1,650+ 631 864	ACTUAL (tpd) 2,764 995 1,371 716 900	REMARK Mainatin feed 2750 t/d from T-101A, Inject HCB= 190TPD. Heater out let =367 °C, as planned (WDP) Feed rate as vacuum residue product rundown and balance feed tank T-102. Dilution rate 0.51/ 2.4:1 as ins Production grade is changing to 150SN aimed at 1650 T/D as planned. Solvent wash rate at 0.9:1 as instruct Feed grade 150 SN from MPU product rundown. Naintain reactor temperature. 295 °C as instructed.
DU feed DA feed PU feed stract pr FU feed DU feed	oduct	2,750 VR R/D 1,650+ 631 864 855	ACTUAL(tpd) 2,764 995 1,371 716 900 867	REMARK Mainatin feed 2750 v/d from T-101A, Inject: HCBm 190TPD, Heater out let: =367 ^a C, as planned (WOP) Feed rates vacuum residue product rundown and balance feed tank T-102. Dilution rate: 0.511/2.4:1 as ins Production grade is changing to: 1505N almed at 1650 T/D as planned. Solvent: wash rate at 0.9:1 as instructed. Feed grade 150 SN from MPU product rundown. Maintain reactor temperature: 295 ^a C as instructed. Feed grade is being changed to: 150 SN from MPU product rundown and max >1250 T/D as instructed.
DU feed DA feed PU feed stract pr FU feed DU feed DU feed	oduct	2,750 VR R/D 1,650+ 631 864	ACTUAL (tpd) 2,764 995 1,371 716 900	REMARK Mainatin feed 2750 t/d from T-101A, Inject HCB= 190TPD. Heater out let =367 °C, as planned (WDP) Feed rate as vacuum residue product rundown and bulance feed tank T-102. Dilution rate 0.51/1 2.4:1 as inst Production grade is changing to 1505N aimed at 1650 T/D as planned. Solvent wash rate at 0.9:1 as instruct Preduction grade is 50 Nhom MPU product rundown. Maintain reactor temperature. 295 °C as instructed. Feed grade 150 SN hom MPU product rundown. Maintain reactor temperature. 295 °C as instructed. Feed grade is being changed to 150 SN from MPU product rundown aimed max >1250 T/D as instructed. DMCL Off mode due to unit is under grade change
DU feed DA feed PU feed tract pr FU feed DU feed DU feed DU prode ax prode BU #1#2	oduct uct product	2,750 VR R/D 1,650+ 631 864 855 745 121 \$/D	ACTUAL(tpd) 2,764 995 1,371 716 900 867 742 133 -3	REMARK Mainatin feed 2750 v/d from T-101A, Inject: HCBm 190TPD, Heater out let: =367 °C, as planned (WOP) Feed rates vacuum residue product rundown and balance feed tank T-102. Dilution rate: 0.5:1/ 2.4:1 as ins Production grade is changing to: 150SN almed at 1550 T/D as planned. Solvent: wash rate at 0.9:1 as instructed. Feed grade 150 SN from MPU product rundown. Maintain reactor temperature: 295 °C as instructed. Feed grade is being changed to: 150 SN from MPU product rundown almed max >1250 T/D as instructed. OMC: Off mode due to: unit is under grade change DMC: Off mode due to: unit is under grade change Process plant/Equipment: are preserved by N ₂ pressure.
DU feed DA feed PU feed tract pr U feed DU feed DU feed DU prode ax prode BU #1#2	oduct uct product	2,750 VR R/D 1,650+ 631 864 855 745 121	ACTUAL(tpd) 2,764 995 1,371 716 900 867 742 133	REMARK Mainatin fised 2750 v/d from T-101A, Inject HCBI 190TPD, Heater out let =367. *C, as planned (WOP) Freed rate as vacuum residue product rundown and balance feed tank T-102. Dilution rate 0.51/ 2.4:1 as ins Production grade is changing to 1509N aimed at 1650 T/D as planned. Solvent wash rate at 0.9:1 as instruct Freed grade 150 SN from MPU product rundown. Maintain reactor temperature. 295. *C as instructed. Freed grade is being changed to 150 SN from MPU product rundown aimed max >1250 T/D as instructed. DMC: Off mode due to unit is under grade change DMC: Off mode due to unit is under grade change DMC: Off mode due to unit is under grade change Blending bitumen feed from T-103A+T-107B rate 1,100+ 148TPD via T-118A into T-119D
DU feed DA feed PU feed tract pr FU feed DU feed DU feed DU prode ax prode BU #1#2	oduci uct product Siending	2,750 VR R/D 1,650+ 631 864 855 745 121 \$70 1,050	ACTUAL (tpd) 2,764 995 1,371 716 900 867 742 133 -3 938	REMARK Mainatin feed 2750 v/d from T-101A, Inject HCBm 190TPD. Heater out let =367.*C, as planned (WDP) Feed rate as vacuum residue product rundown and balance feed tank T-102. Dilution rate 0.51/1 2.4:1 as inst Production grade is changing to 1505N aimed at 1550 T/D as planned. Solvent: wash rate at 0.9:1 as instruct Pred grade 150 SN hom MPU product rundown. Maintain reactor temperature. 295.*C as instructed. Feed grade is being changed to 150 SN from MPU product rundown aimed max >1250 T/D as instructed. DMC: Off mode due to unit is under grade change Process plant/Equipment are preserved by N ₂ pressure. Blending bitumen feed from T-103A+T-107B rate 1,100+148TPD via T-118A into OFFSITE & LOADING & UTILITIES
DU feed DA feed PU feed Atract pr FU feed DU feed DU prode ax prode BU #1#2	oduci uct product Siending	2,750 VR R/D 1,650+ 631 864 855 745 121 \$/D	ACTUAL(tpd) 2,764 995 1,371 716 900 867 742 133 -3	REMARK Mainatin feed 2750 t/d from T-101A. Inject. HCBm 190TPD. Heater out let. =367. *C, as planned (WDP) Feed rate as vacuum residue product rundown and balance feed tank T-102. Dilution rate 0.51/1 2.4:1 as inst Production grade is changing to 1505N aimed at 1550 T/D as planned. Solvent: wash rate at 0.9:1 as instruct Preduction grade is thom MPU product rundown. Maintain reactor temperature. 295. *C as instructed. Feed grade 150 SN from MPU product rundown. Maintain reactor temperature. 295. *C as instructed. Feed grade is being changed to 150 SN from MPU product rundown aimed max >1250 T/D as instructed. DMC: Off mode due to unit is under grade change Process plant/Equipment are preserved by N ₂ pressure. Blending bitumen feed from T-103AF-TDIP are 11,000+148TPD via T-118A into T-1190 OFFSITE & LOADING & UTILITIES
DU feed DA feed PU feed Atract pr FU feed DU feed DU prode ax prode BU #1#2	oduct uct product Blending Daily Rou Base oil	2,750 VR R/D 1,650+ 631 864 855 745 121 \$70 1,050	ACTUAL(tpd) 2,764 905 1,371 716 900 867 742 133 	Bit REMARK Mainatin field 2750 t/d from T-101A, Inject HCBm 190TPD, Heater out let =367 °C, as planned (WDP) Feed rate as vacuum residue product rundown and balance feed tank T-102. Dilution rate 0.51/2.4:1 as inst Production grade is changing to 1505N intered at 1550 T/D as planned. Solvent wash rate at 0.9:1 as instruct Pred grade 150 SN from MPU product rundown. Maintain reactor temperature. 295 °C as instructed. Feed grade 150 SN from MPU product rundown. Maintain reactor temperature. 295 °C as instructed. Feed grade 150 SN from MPU product rundown. Maintain reactor temperature. 295 °C as instructed. DMC: Off mode due to unit is under grade change Process plannet faure preserved by N ₂ pressure. Blending bitumen feed from T-103A+T-1078 rate 1,100+148TPD via T-118A into OFFSITE & LOADING & UTILITIES Out Daily Marine Loading Base oil 0
DU feed DA feed PU feed Atract pr FU feed DU feed DU prode ax prode BU #1#2	oduct uct product Blending Daily Roc Base oil Bitumen	2,750 VR R/D 1,650+ 631 864 855 745 121 \$70 1,050	ACTUAL(tpd) 2,764 905 1,371 718 900 867 742 133 -3 938 Amo Trucks 0 0 0	Bit REMARK Mainatin feed 2750 t/d from T-101A, Inject HCB= 190TPD. Heater out let =367 °C, as planned (WDP) Feed rate as vacuum residue product rundown and balance feed tank T-102. Dilution rate 0.51/1 2.4:1 as inst Production grade is changing to 1505N aimed at 1550 T/D as planned. Solvent wash rate at 0.9:1 as instruct Preduction grade is being changed to 150 SN from HPU product rundown aimed max >1250 T/D as instructed. Feed grade 150 SN from MPU product rundown. Maintain reactor temperature. 295 °C as instructed. Feed grade is being changed to 150 SN from HPU product rundown aimed max >1250 T/D as instructed. DMC: Off mode due to unit is under grade change DMC: Off mode due to unit is under grade change Process plant/Equipment are preserved by N ₂ pressure. Blending bitumen feed from T-103A+T-1078 rate 1,100+ 148TPD via T-118A into OFFSITE & LOADING & UTILITIES Out Dially Marine Loading Base oil 0 0 0
DU feed DA feed PU feed tract pr FU feed DU feed DU feed DU prode ax prode BU #1#2	oduct uct product Bending Daily Ro Base oil Bitumen Extract	2,750 VR R/D 1,650+ 631 864 855 745 121 \$70 1,050	ACTUAL(tpd) 2,764 905 1,371 716 900 867 742 133 	Bit REMARK Mainatin feed 2750 v/d from T-101A, Inject: HCBin 190TPD, Heater out let: =357 *C, as planned (WOP) Feed rate as vacuum residue product rundown and balance feed tank T-102. Dilution rate: 0.51/1/2.4:1 as inst Preduction grade is changing to: 150SN almed at 1650 T/D as planned. Solvent: wash rate at 0.9:1 as instructed. Feed grade 150 SN from MPU product rundown. Maintain reactor temperature: 295 *C as instructed. Feed grade 150 SN from MPU product rundown. Maintain reactor temperature: 295 *C as instructed. Off mode due to unit is under grade change Process plant/Equipment: are preserved by Np pressure. Blending bitumen feed from T-103A+T-107B: rate 1,100+ 148TPD via T-118A into Tons 0 0 0 0 0 0 0 0 0
DU feed DA feed PU feed tract pr FU feed DU feed DU feed DU prode ax prode BU #1#2	oduct uct product Blending Daily Roc Base oil Bitumen	2,750 VR R/D 1,650+ 631 864 855 745 121 \$70 1,050	ACTUAL(tpd) 2,764 905 1,371 716 900 867 742 133 -3 938 Amo Trucks D 0 0	Bit REMARK Mainatin feed 2750 t/d from T-101A, Inject HCB= 190TPD. Heater out let =367 °C, as planned (WDP) Feed rate as vacuum residue product rundown and balance feed tank T-102. Dilution rate 0.51/1 2.4:1 as inst Production grade is changing to 1505N aimed at 1550 T/D as planned. Solvent wash rate at 0.9:1 as instruct Preduction grade is being changed to 150 SN from HPU product rundown aimed max >1250 T/D as instructed. Feed grade 150 SN from MPU product rundown. Maintain reactor temperature. 295 °C as instructed. Feed grade is being changed to 150 SN from HPU product rundown aimed max >1250 T/D as instructed. DMC: Off mode due to unit is under grade change DMC: Off mode due to unit is under grade change Process plant/Equipment are preserved by N ₂ pressure. Blending bitumen feed from T-103A+T-1078 rate 1,100+ 148TPD via T-118A into OFFSITE & LOADING & UTILITIES Out Dially Marine Loading Base oil 0 0 0
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OC Water 300L-M-10 Wild naph Still receit	oduct uct product lending Base oil Bitumen Extract Sulfur r Ullage level of Level r Level of Level of Level of So from wing Mydroace	2,750 VR R/D 1,650+ 631 864 855 745 121 1,050 1,050 1,050 ad Loading	ACTUAL (tpd) 2,764 905 1,371 716 900 867 742 133 	Bit Daily Mainter Construction 10 0<
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Figure 22: Illustrates format of log sheet for Shift Superintendent after implemented

5.4 Improving Communication at Shift Handover

A model of effective shift handover communication was derived from the psychology of effective communication, shift handover communication research in UK and French safety-critical process industries, analysis of industrial accidents and best industry practice. This model was used to assess current practice in a large oil refinery and make measurable improvements. We describe the process and outcomes of the initiative.

Shift handover is regarded as important in many shifts -working occupations. Discontinuity of tasks and personnel give rise to risk of non-transmission or miscommunication of critical information. The importance of shift handover is confirmed by a number of recent industrial accidents where failures of communication or misunderstanding at shift handover have been identified as causal or contributory factors.

Shift handover communication has received little attention in the human factors literature. There is only one known published account of how shift handover is conducted. Shift handover is regarded as problematic under certain conditions. The "UK Health and Safety Executive" state that places particular emphasis on the importance of shift handover during abnormal plant conditions. Handover is also viewed as problematic following a lengthy absence from work.

5.5 Developing guidance on shift handover

Regarding to UK Health and Safety Executive's guidance on human factors in industrial safety recognizes the importance of shift handover and asks managers to consider "what arrangements (e.g. written logs, formal handover procedures) are there for conveying information between shifts on matters such as maintenance in progress, plant out of service, process abnormalities?". Similarly, human factors guidelines for nuclear power generation stations recommend that "proper shift turnover methods" be incorporated to ensure that the next shift has received and understands the current operating status of all plant systems and equipment.

5.5.1 Information, knowledge and understanding: definitions

Information channels have been categorized in terms of their richness. Face-to-face communication is the richest channel for information. It provides immediate feedback thus allowing understanding to be checked and corrected. It is argued that face-to-face communication is most effective for mitigating ambiguity and creating shared understanding. In contrast, written information is lower in richness, lacking the capacity for rapid feedback.

Knowledge can be defined as the body of information possessed by an individual. Two types of knowledge can be distinguished: procedural and declarative Procedural knowledge refers to practical operational knowledge about how to do something. Such knowledge may be implicit and difficult to verbalize. Declarative knowledge consists of facts about the world, which are accessible consciously. The understanding or comprehension via communication relates to the use of information from a dialogue, in combination with existing knowledge, to arrive at a shared meaning. In their attempt to reach shared understanding, dialogue participants must each assess the mental world or mental state of their conversational counterpart to determine what information is required to achieve understanding. Having distinguished between information, knowledge and understanding, we now return to the notion of "effective communication" of information.

5.5.2 Feedback

Shift handover communication is a task-oriented interaction occurring between two or more individuals. Talk of "conveying information" via "procedures" implies a unidirectional flow and neglects the importance of mutual interaction. Interpersonal communication involves a circular rather than linear pattern of interaction. Person A communicates with person B, who in turn communicates with person A, a phenomenon known as feedback.

The role of feedback in accurate communication has also been emphasized in a recent cognitive theory of reliable communication. This theory also provides a possible explanation of why shift handover communication may be problematic under certain conditions.

First, there is the mental model held by those attempting to communicate with each other. When their mental models are largely compatible (e.g. under stable plant conditions, between experienced operators or when both handover participants have been on duty for a number of consecutive shifts) communication is unlikely to be problematic. In other words, shared understanding aids communication.

However, where the respective mental models are not compatible (e.g. under abnormal plant conditions, following a long absence from work or between experienced and inexperienced workers) the role of communication becomes crucial in enabling the differing models to be aligned. The second factor identified as holding the key to effective communication is feedback.

Under normal conditions, with shared mental models or shared understanding, largely one-way transmission of information can prove adequate. Shared models enable assumptions to be made about the meaning of the information conveyed. It is not necessary for the receiver of the information to feed back their understanding, as the sender's meaning is implicit. Under abnormal conditions, where the mental models are not compatible, feedback becomes important for both the sender and receiver. Feedback enables:

- a) The receiver to confirm they have received, correctly interpreted and have understood the message
- b) The sender to confirm that the communication has been successfully transmitted and clarify any misunderstandings.

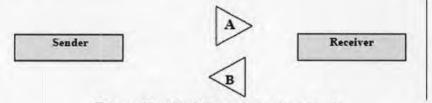


Figure 23. Ideal Communication Cycle

Note that:

A: Receiver registers and understands sent information

B: Sender knows that receiver has registered and understands sent information (Source: <u>http://www.hse.gov.uk/humanfactors/comah/standards.pdf</u>)

5.6 Criteria of communication at shift handover

Shift Handover - Related Accidents and Error Rates

Accidents, incidents, and errors are related to shift handovers in many high-risk domains. Many other shifts - related accidents have to accumulate in oil refinery, errors and accidents occur disproportionately after shift handovers.

Two-way Communication, Preferably Face-to-Face

Face-to-face handover is a best practice that is agreed upon in all guidelines and reviews of the literature and is aimed for in most domains studied. The reason is that handover errors are due to differences in the mental models of the outgoing worker and the incoming worker. Two-way communication enables the incoming worker to ask questions and rephrase the material to be handed over, so as to expose these differences. Face-to-face handovers enable gestures, eye contact, tones of voice, degrees of confidence, and other redundant and rich aspects of personal communication to be utilized in conveying possible different mental models.

Face-to-Face Handovers with Written Support

Face-to-face handovers are improved if they are supported by structured written material for instance a checklist of items to convey, and/or a position log to review. Written material introduces redundancy in the verbal handover, which, as Lardner points out, reduces the risk of erroneous communication. It also allows one to specify ahead of time those aspects of the communication that are most important and should not be left out.

Face-to-face handovers with written support have been shown to reduce errors in aviation maintenance Compared to written handovers with verbal communication filtered through a supervisor.

Content of Handover Captures Intent

Handover communication works best if it captures problems, hypotheses, and intent, rather than simply lists what occurred. Recent research indicates that perception and memory are organized by hierarchical goal representations and that these representations in turn drive narrative comprehension, memory and planning.

5.7 Key areas to examine

Safety critical communication situations, which could be examined, include:

- Shift handover
- Communications during emergencies
- Any form of remote communication between control room and outside operators e.g. during shutdowns
- Permit-to-work procedures, particularly if the work continues over a shift change
- · Communication of hazards and risks to contractors
- Use of radios
- Plant labeling and identification
- Communication of changes to procedures.

Problems with communication leading to major accidents/incidents are well known, for example in early chapter.

Effective communication is important in all organizations when a task and its associated responsibilities are handed over to another person or work team. Critical times when good communication must be assured include: at shift changeover, between shift and day workers, between different functions of an organization within a shift (e.g. operations and maintenance) and during process upsets and emergencies. Although the importance of reliable communication may be recognized, guidance for personnel on how to communicate effectively may be lacking.

5.8 Items might go wrong during shift handover

Unreliable communications can result from a variety of problems including:

- Missing information,
- Unnecessary information,
- Inaccurate information,
- Poor or variable quality of information,
- Misunderstandings,
- Failing to carry forward information over successive shifts.

Miscommunications and misunderstandings are most likely to occur when the parties communicating have a different understanding of the current state of the process. More time will be needed to communicate when such differing 'mental pictures' exist.

5.9 Improving communications during shift change

From the previous section that have mention on the effectiveness of safe communication it can then be summarize as the list below.

A number of simple steps can improve communications during the shift change are:

- · Carefully specify what key information needs to be communicated
- Aim to cut out the transmission of unnecessary information
- Use aids (such as logs, computer displays) based on the key information needs to help accurate communication
- Aim to repeat the key information using different mediums, e.g. use both written and verbal communication
- Allow sufficient time for communication, particularly at shift handover
- Encourage two-way communication with both the giver and recipient of the information taking responsibility for accurate communication
- Encourage the asking of confirmation, clarification and repetition;
- Encourage face-to-face communication wherever feasible
- Try to develop the communication skills of all employees
- Aim to set standards for effective and safe communication.

Also, once the condition of the plant has become too abnormal. There will be some awareness for operator to be alert and concerned to their role on the time. So whenever, there is a situation of awareness has come then some action need to be taken and response it quickly.

5.10 Situation Awareness

Situation Awareness as the name implies is the ability of the operator to be aware of the systems in their operating environment. They consist of the Control and Instrumentation system that provides feedback to the console operator on the plant equipment, the process variables, and the instrumentation system.

The interface is usually via DCS graphics so the design of the User Interface is critical to successful awareness. The second system is communication with the unit field operators who are the eyes, ears and hands of the console operator.

Communication is usually via radio, phone and face-to-face. It is important that the tools used are reliable; free from distortion and that the operators are trained on radio protocols and team building techniques so as to be aware of the needs of the team and not just personal goals.

The third system involves understanding what is happening on connected units or utility suppliers. This is achieved via monitoring their data through screens or Large Off-Workstations in the control room.

Information is sometimes collected casually through overhearing radio conversations or discussion with supervisors, but ideally one-on-one between the operators.

The fourth system is business information that consists of laboratory results of sampling, management communications through emails describing plant changes, operating targets and potential problems. This is normally delivered electronically through a pc located on the operating console but may be re-in forced by shift supervision.

5.11 Monitoring and evaluation

A detailed evaluation should be carried out. This could include repeating the original survey of staff for their feelings about the new shift system and problems and benefits, including effects on health, wellbeing and their social and family life.

It should also analyze the results of the surveillance of the working environment, with a view to identifying and implementing measures to improve that environment and the health and safety of workers.

This analysis should consider organizational criteria such as accident/injury rates, near misses, and levels of overtime, absenteeism, after introduction of the new system, error rates, productivity measures, journey accidents and other changes in work organization.

5.12 Shift handover meeting

The handover should be formal and consistent; it should be held at specific times. Most of all, it must be valued by those in attendance, not considered a waste of time or a ritual. The interview should be a brief exchange of information encompassing not just immediate problems but identifying threats to production and quality. Side issues such as potential environmental excursions and safety issues should be included, or may be handled in separate meetings.

5.13 Shift team meeting

This meeting usually takes longer that the handover meeting and requires participation at the tactical and strategic level. It should take place early in the shift. The purpose of the shift team meeting is sharing information between line supervisors, upper managers and staff functions.

Sometimes, operators or technicians are included for discussing particular problems. Sometimes, consultants, sales, public relations, or other corporate staff should take part. If the people are located in separate buildings, or travel time is too great for a single meeting, consider networked electronic white boards to allow sharing information and video conferencing.

The meeting will have to be adapted for days with managers and engineers and nights for just supervisors. The meeting should begin with a review of the previous shift for each product, or department.

This is the tactical section of the meeting. It is best to follow the same outline for each meeting. Begin this segment with a summary of each product or department, with topics in order of importance: safety, environment, quality, production, and reliability. Unlike the handover meeting, the shift meeting should address more details of a strategic nature.

The tactical section should cover the threats, limitations and potential opportunities. The meeting should address staffing issues, ongoing maintenance repair, and preparation for maintenance, lockout and tag out, test results, special permit preparation and implementation.

Shipping and material movement plans may be presented. Shift monitoring requirements should be periodically reviewed for operator coverage.

The strategic element, which follows, should address complex issues. These include: training and education needs, planning and preparation for future work, updating and reviewing procedures, safety and environmental education, research and development, process testing, changes in sampling, vibration monitoring testing, product inventories, interactions within the corporate venue, planned outages, and long-term goals.

Work instruction procedure can be seen in APPENDIX 3

Workflow structure of Shift Handover System before implemented Shift handover workflow can be described as figure below:

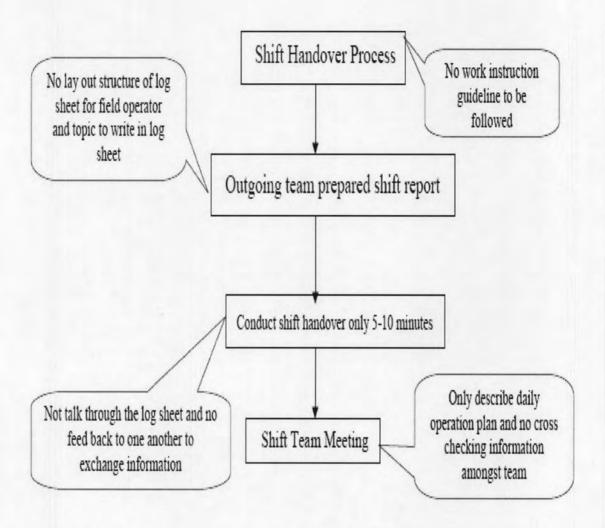
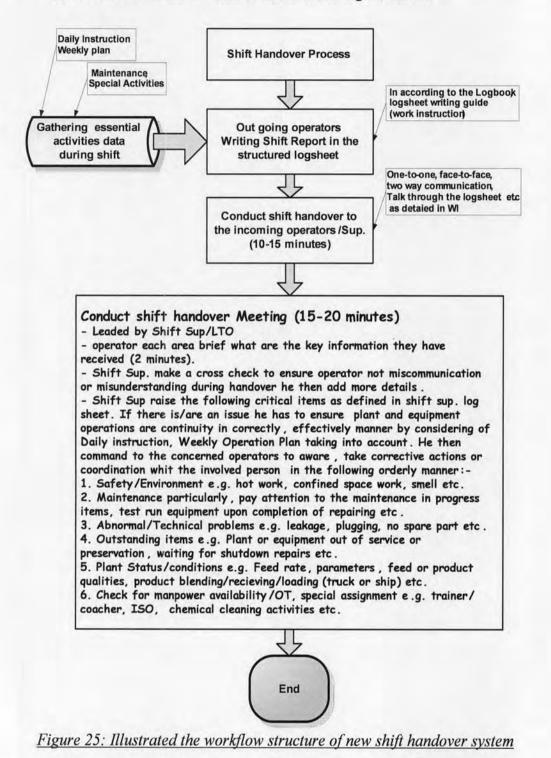


Figure 24: Illustrated the workflow structure of shift handover system before implemented

Workflow structure of Shift Handover System after implemented

Shift handover workflow can be described as figure below:

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From the workflow structure, it can be seen that out going operator must prepared essential data such as:

- Non-routine works such as collect special sample
- Isolate system in prior to prepare to handover to Maintenance
- · Test running performance on equipment for each unit
- Tank calibration
- Special cleaning on site, for instant Column chemical cleaning, High pressure jet cleaning
- Daily instruction
- Operation plan
- Maintenance activity

Moreover, he then must follow the step of writing a logbook as per working instruction provided.

Therefore, conduct shift handover to incoming operator must be using the method as per working instruction provided. Such as;

- Face-to-face communication
- Two-way communication
- Use aid of visual to support shift handover
- Talk though the log book as priority has been set up

First thing for incoming shift superintendent must receive are:

- 1. Daily operation plan
- 2. Weekly operation plan

Then follow through the logbook as priority.

- 1. Safety and Environment issue
- 2. Maintenance activities
- 3. Technical problem such as; leakage, fouling condition and plugging etc.
- 4. Outstanding items such as maintenance progressing or equipment out of service
- 5. Plant status condition such as feed rate, product quantities and product loading and receiving.

Once outgoing team have conduct shift handover to incoming team finish. Shift superintendent will conduct a shift handover meeting or all incoming team.

- Shift superintendent would call operator each area to brief what is the key information they have received from out going operators.
- Shift superintendent make a crosscheck to ensure operator not miscommunication or misunderstanding during handover he then add more details.
- Shift superintendent raise the following critical items as defined in shift superintendent's log sheet. If there is/are an issue he has to ensure plant and equipment operations are continuity in correctly, effectively manner by considering of Daily instruction, Weekly Operation Plan taking into account. He then commands to the concerned operators to aware; take corrective actions or coordination whit the involved person in the following orderly manner:
 - 1. Safety/Environment e.g. hot work, confined space work, smells etc.
 - 2. Maintenance particularly, pays attention to the maintenance in progress items, test run equipment upon completion of repairing etc.
 - 3. Abnormal/Technical problems e.g. leakage, plugging, no spare part etc.
 - 4. Outstanding items e.g. Plant or equipment out of service or preservation, waiting for shutdown repairs etc.
 - 5. Plant Status/conditions e.g. feed rate, parameters, feed or product qualities, product blending/receiving/loading (truck or ship) etc.
 - 6. Check for manpower availability and over time request, special assignment e.g. trainer/coacher, ISO, chemical-cleaning activities etc.

Pont of view	Additional item need to be improved
 Observation of shift sup During handover 	None of handovers observed had all of the safe communication e.g. face-to-face, feedback, but still some 5 % there was no evidence of collation of information or making note in preparation for handover. Most of them talk through the log items. Following the handover, all incoming operators read back
2. Handover Guideline80% had express(20% Not given opinion)	of handover previous logs to check their understanding. Work instruction are well constructed and understandable and also suggested that this procedure working instruction need to put in ISO 9000:2000 to keep the system surveillance and maintain set of standard of shift handover by Auditing from internal auditors of ISO system
 Effectiveness of the new logs 90 % of shift sup and LTO 	Their opinion foreseen this must be surely improved because the key information had included, mandatory categories e.g. safety, maintenance, technical problems, outstanding work are now included very logs discretionary categories e.g. environment, plant status/conditions, product & qualities, action taken, and routine duties are included
	Suggested that Log sheet of LTO /Shift Sup. Should be linked the key Plant Conditions/parameters from the PI program into the log sheet . This provided the reader option to selected the real time or the process plant conditions at the report time.
80% Field operators	Structure logs were generally though of as useful memory aids on information to be included in handover. They were deemed useful for cutting down unnecessary details and only relevant information was passed between shifts.
Logs improvement from field operators 70%	They had claimed that activities were not cleared regarding the routine and non-routine activities and suggested that this should be listed for the routine activities so that they can record the non-routine activities in the log sheet. To this matter a working team was set up and generated the routine checklist for each working area.
During training	The participants had expressed their opinion that this training very useful on the way to conduct the shift handover and the effective way of writing log sheet
Operation Manager	Had advised that the training program for new operator this subject should be included and also develop competency criteria for assessment of this matter.
60% of personnel involved	New structured log sheet is quite good to made them up to date the process plant conditions by using the PI program There is more information for the person coming in What happen now is that major problems are pointed out- it is high light more Safety issues are now being recorded discussed

Table 6.1: Result from feedback after impl	lemented	
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