

SUMMARY REPORT
ARTHIT PLATFORM
2014 ART Shutdown Valve Repair and Replacement

EMI/M
Date: 09/12/14
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SUBJECT: Fix leak P-4635 (Sea Water Lift Pump)

REPORT NO: 20141217-ART-MAINT-00074



Prepared by: Siripong Limprachaya Endorsed by: Suthep Ngamlertlee
Date: 10 December 2014 Date: _____

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1. EXECUTIVE SUMMARY

Background Information

There are 3 sea water lift pump unit in Arhit production platform which supply sea water for process cooling. P-4630 has been selected to perform PM 5Y in 2014 due to the pump reached 5 year of operation.

Work summary

The work was started on Sep 08, 14 and finished on Dec 18, 14. The pump was removed at offshore platform then was sent for refurbishment at vendor workshop in Singapore. Main pump parts have been replaced such as bearing, impeller and shaft. ...etc. The pump body has been repaired by welding and belzona coating. The refurbished pump was returned to offshore platform to be installed with new motor with new power cable. No any issue after performing pump test run.

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3. BUDGET AND COST

Approved budget: 9,890,000 THB

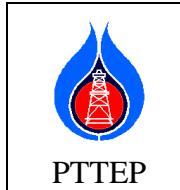
Total cost: 12,065,473.07 THB

Cost summary

Reference work order: 500009215

Stock cost	10,065,473.07 THB	Ref SIR	17606
Service cost	500,000.00 THB		3200013272 Contract (CRAT) LGC13-1984
	1,500,000.00 THB		3450008247 Non Contract (SPX)
TOTAL COST	12,065,473.07 THB		

Note: Cost is based on SIR/PO. The actual cost will be as per invoices.



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4. ACTIVITY SUMMARY

- a) Personnel

Total – 6 people	
PTTEP - 1 person Electrical: Instrument: Mechanical: Siripong L.	Contractor - 5 people Electrical: Instrument: Mechanical: 4 CRAT/ 1 SPX

- b) Work preparation

- Elect scaffolding
- Set up equipment, tool and spare parts at site
- Perform process isolation
- Perform electrical isolation
- Start main activities

- c) Main activities

Date	Activities	Status
18-Sep-14	<u>Task</u> ➢ Disconnect power cable <i>Found that cable cannot removed, need to cut the cable</i> ➢ Perform mechanical isolation +remove elbow <i>The internal surface of elbow is still in good condition</i> <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>	Completed Completed

Fig.1-4: Disconnect power cable



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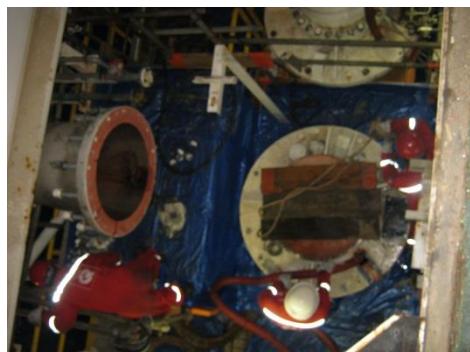


Fig.5-8: Perform mechanical isolation +remove elbow



Fig.9-10: The condition for internal surface of elbow

19-Sep-14

Task

- Remove pump package
 - Remove pump head
 - Remove 1st- 8th riser pipes

StatusCompleted
Completed

Fig.1-2: Remove pump head



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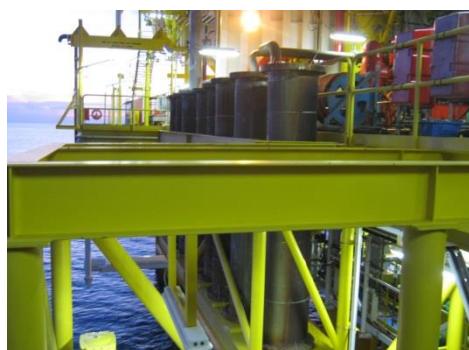
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Fig.3-8: Remove 1st- 8th riser pipes

	<u>Task</u>	<u>Status</u>
20-Sep-14	<ul style="list-style-type: none">- Remove pump package<ul style="list-style-type: none">➤ Remove compacted set of short piece, check valve and pump➤ Dismantle compacted set of short piece, check valve and pump<ul style="list-style-type: none">• Short piece: in good condition• Check valve: spring broken, need to replace by repair kit• Pump: in good condition➤ Remove motor and laydown motor with motor support	Completed Completed Completed



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Fig.1-4: Remove compacted set of short piece, check valve and pump





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Fig.5-10: Dismantle compacted set of short piece, check valve and pump



Fig.11-15: Remove motor and laydown motor with motor support

21-Sep-14

Task

- Re-arrange the layout for pump, motor, and all accessories
- Remove pump to laydown area and box up with wooden box
- Perform final housekeeping

StatusCompleted
Completed
Completed



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Fig.1-4: Re-arrange the layout for pump, motor, and all accessories and perform housekeeping



Fig.5-10: Remove pump to laydown area and box up with wooden box

09-Dec-14	<u>Task</u>	<u>Status</u>
	<ul style="list-style-type: none">- Transfer new pump and motor to working area Found that power cable was incorrectly installed at the roller, need to be re-installed	In Progress



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Fig.1-2: Wrong power cable installation at the roller



Fig.3-4: Transfer motor to working area by trolley



Fig.5-7: Transfer pump and set up some scaffolding

10-Dec-14

Task

- Transfer new pump and motor to working area

Status

Completed

- Perform motor pressure test/ megger test **In Progress**
- Waiting for motor hoses arrived at 08:00PM***



Fig.1-4: Move new motor to working area and old motor to temporary laydown area



Fig.5-7: Install motor at caisson preparing for performing motor pressure test



Fig.8-9: Overhaul discharge check valve



Fig.10-11: motor hoses arrived at ART

11-Dec-14	<u>Task</u>	<u>Status</u>
	<ul style="list-style-type: none"> - Perform motor pressure test/ megger test <ul style="list-style-type: none"> ➢ Perform insulation check at all phases with dry condition → Acceptable ➢ Perform megger test at U phase with wet condition → Acceptable ➢ Perform megger test at V phase under pressure 30 psig → Acceptable ➢ Perform megger test at V phase under pressure 65 psig → Acceptable - Check motor bearing torque inspection <ul style="list-style-type: none"> ➢ At holding pressure 65psig → The bearing torque is 407 N·m (Acceptable) - Install pump package 	Completed Completed In Progress





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Fig.1-4: Perform motor pressure test/ megger test



Fig.5-7: Check motor shaft torque under pressure at 65 psig

12-Dec-14	<u>Task</u>	<u>Status</u>
	<ul style="list-style-type: none">- Install pump package<ul style="list-style-type: none">➢ Check and adjust pump axial displacement → Acceptable➢ Install compacted set of short piece, check valve and pump➢ Install RTD cable➢ Connect pump and motor<ul style="list-style-type: none">• Found the pump shaft stuck inside the motor coupling After we removed the pump shaft, found the shaft was rubbed	In Progress



Fig.1: machine thrust nut at mechanic workshop to adjust axial displacement



Fig.2-3: Install compacted set of short piece, check valve and pump



Fig.4: Install RTD cable



Fig.5: The rubbing at pump shaft

13-Dec-14	Task	Status
	<ul style="list-style-type: none"> - Install pump package <ul style="list-style-type: none"> ➢ Machine pump shaft → Completed ➢ Re-check dimension of pump shaft, shaft key, motor coupling → Completed ➢ Re-perform pressure test at 65 psig → Completed ➢ Re-connect coupling between pump and motor → Completed ➢ Re-check axial displacement → Acceptable ➢ Install check valve and short piece → Completed 	In-Progress



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Fig.1-2: Shaft condition before machining (Left)
Shaft condition after machining (Right)



Fig.3-4: Re-perform pressure test at 65 psig



Fig.5: RE-connect coupling between pump and motor



Fig.6-7: Re-check axial displacement

14-Dec-14

Task

- Install pump package
- Install 8 pieces of rising pipes → **Completed 4 pieces**

Status

In-Progress



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Fig.1-2: Install rising pipes

15-Dec-14

Task

- Install pump package
 - Install 8 pieces of rising pipes → **Completed**
 - Install pump head → **Completed**
- Install power cable connection

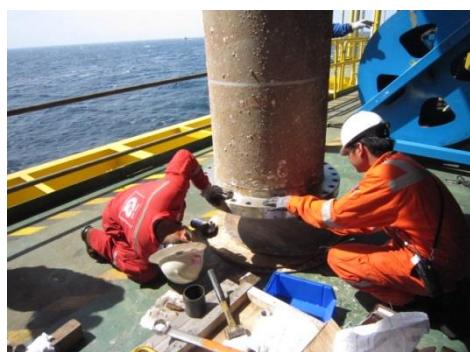
Status**Completed****In Progress**

Fig.1-4: Install rising pipes





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Fig.5-7: Install pump head

16-Dec-14

Task

- Install power cable connection
- Perform mechanical de-isolation
- Perform housekeeping

Status

Completed
Completed
Completed



Fig.1-2: Install power cable connection

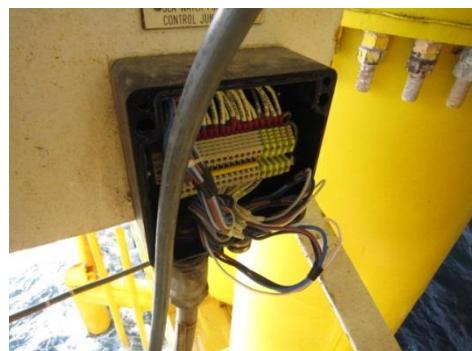


Fig.3-4: Install RTD cable connection





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Fig.5-7: Perform mechanical de-isolation

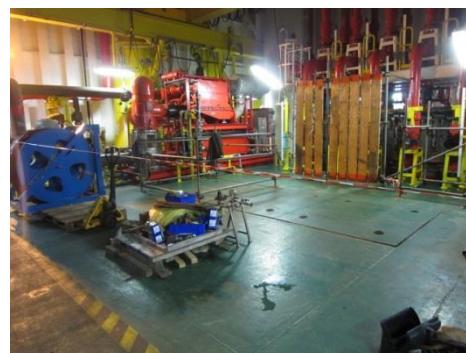


Fig.5-8: Perform housekeeping

17-Dec-14

Task

- Perform process de-isolation
- Perform mechanical/ performance test run pump

StatusCompleted
Completed***The power consumption of P-4630 is less than P-4635, it is in good condition***

Running Time (Minutes)	Motor Power (kW)	Motor Current (Amps)			RTD Temp (°C)	Disch Pressure (Barg)	Disch Flow (m³/h)	Note
		U	V	W				
15	1220.	140	140	140	55.	3.4	4984	PF=0.76
30	1220.	140	140	140	55.	3.4	5250	PF 0.76
45	1220	140	140	140	55	3.4	5273	PF 0.76
60	1220	140	140	140	56	3.4	5174	PF 0.76
90	1220	140	140	140	56	3.4	5200	PF=0.76
120	1220	140	140	140	56	3.4	5073	PF 0.76

Fig.1-2: The record of pump test run

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5. WORK PROCEDURE

Job Safety Analysis Refer to job safety analysis: Remove && Re-install Sea water pumps (P -4630/ 35/ 40) No.: ART-MECH-086 Rev.02 (Attachment-1)

6. PUNCH LIST

- N/A

7. AREA OF CONCERN/LESSON LEARN

- N/A

8. ATTACHMENT

- Attachment-1: JSA: ART-MECH-045 Rev02
- Attachment-2: Pump overhaul report by SPX
- Attachment-3: Service report(re-install pump package) by SPX
- Attachment-4: Service report(power cable connecting) for by CBA