



Near Miss: Incorrect Use of Combination Spreader/Lifting Bar

Upstream PS Controlled Document

No. 4900-HS-H0105

Revision 0

Issue date: 5/07/2017

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Revision history

		s 22 irrelevant material			
0	05/07/2017	Issued for information			
Rev.	Issue date	Revision summary	Originator	Reviewer	Approver

Approvals

This Near Miss: Incorrect Use of Combination Spreader/Lifting Bar has been reviewed by Upstream Production Solutions Pty Ltd and Northern Oil & Gas Australia Pty Ltd and is approved for the Northern Endeavour Project.

Approval: Northern Oil & Gas Australia Pty Ltd

Name	Signature	Date
s 22 irrelevant material Northern Oil & Gas Australia Pty Ltd	s 22 irrelevant material	6/7/2017

Approval: Upstream Production Solutions Pty Ltd

Name	Signature	Date
s 22 irrelevant material Upstream Production Solutions Pty Ltd	s 22 irrelevant material	5/7/2017

A559920

Table of Contents

Revision history	2
Approvals	2
Table of Contents	3
1 References.....	4
2 Term definitions and abbreviations	4
3 Introduction	5
4 Incident Description	5
5 Summary of Causal Factors	6
6 Investigation Team Members	6
7 Incident SnapCharT™	7
8 Human Factors.....	14
9 Recommendations.....	14
9.1 Causal Factor Recommendations.....	14
9.2 Barrier Failures	15
9.3 Opportunity for Improvement (OFI) Recommendations (Observations)	15
10 Corrective Action	16
11 Upstream PS Safety Non-Negotiables	17
12 Conclusion	17
Appendix A Photographs	18
Appendix B High Risk Licence	19
Appendix C Continuous Training Crane Operator	20
Appendix D Permit to Work	21
Appendix E Hazard Identification Risk Assessment (HIRA).....	25
Appendix F 15T Spreader/Lifting Bar Test Certificate	29
Appendix G Certificate of Inspection.....	30
Appendix H Lifting Equipment Configuration	31
Appendix I Lifting Plan.....	32
Appendix J Extract of NE Rigging and Lifting Register	38
Appendix K X1401 Revised Crane Load Chart.....	39
Appendix L Crane Boom Pathway.....	40

A559920

1 References

Document code	Title
00/HSEQ/GEN/PC41	Lifting Operations and Lifting Equipment
00/HSEQ/GEN/PC66	Upstream PS Safety Non-Negotiables
00/SP/DOC/PC01	Document Control
26/HSEQ/GEN/MN01	Integrated Safety System of Work
26/OP/GO/MN/AM9022620	NE Lifting Management Plan (draft)
26/OP/INT/PS38	P20 Lifting Equipment

2 Term definitions and abbreviations

Term or abbreviation	Definition
Barrier Failure	A barrier that has failed or is non-existent, but was not a direct causal factor.
BF	Barrier Failure
Causal Factor	A problem or issue that, if corrected, could have prevented the incident from occurring or significantly reduced the incident's consequences (displayed in a SnapCharT™ as a triangle marked with CF).
CF	Causal Factor
Condition	Information included in a SnapCharT™ (displayed in a SnapCharT™ as an oval shape) that provides additional information relating to an event.
Event	Time based action steps (who did what or what equipment did what) included in a SnapCharT™ (displayed in a SnapCharT™ as a rectangle).
HFAT	Human Factors Analysis Tools
HIRA	Hazard Identification Risk Assessment
HSEQ	Health, Safety, Environment, Quality
ISSoW	Integrated Safety System of Work
NE	Northern Endeavour
OFI	Opportunity for Improvement
Opportunity for Improvement/Observation	A problem or issue that was identified during the investigation that was not a causal factor but should still be corrected (displayed in a SnapCharT™ as a red coloured oval shape).
PTW	Permit to Work
Root Cause	The most basic cause (or causes) that can reasonably be identified that management has control to fix and, when fixed, will prevent (or significantly reduce the likelihood or consequences of) the problem's recurrence.
SnapCharT™	Root Cause Analysis Tool
SW/FW	Seawater/Fire Water
SWL	Safe Working Load
SWLs	Safe Working Load
TapRoot®	Incident Investigation System
s 47G business information	

3 Introduction

On Saturday 29 May 2017, a 9-tonne alternator was delivered to the Northern Endeavour (NE) facility along with a combination spreader/lifting bar. Used as a lifting bar the tool has a Safe Working Load (SWL) Limit of 4.05 tonnes, whereas when used as a spreader bar it has a SWL of 15 tonne. Subsequently, on 10 June 2017, the alternator was lifted using a rigging configuration where the combination spreader/lifting bar was used as a lifting bar, resulting in the bar being overloaded. When the situation was discovered the spreader/lifting bar was taken out of service and an investigation was commenced.

A TapRooT® investigation of the incident was requested by the Operations Manager Northern Endeavour in order to determine what occurred, why it occurred, including the systemic root causes and to make recommendations in order to prevent a recurrence.

This report details the results of the investigation including:

- The incident SnapCharT™;
- The causal factor and root cause;
- Opportunities for improvement; and
- Action recommendations to address the weaknesses identified.

4 Incident Description

On Saturday 10 June 2017, a 9-tonne alternator was being reinstalled to the sea water/fire water generator utilising a combination spreader/lifting bar. The combination spreader/lifting bar was provided by an onshore supplier to assist with the lift and reinstallation of the alternator. The objective was to utilise the combination spreader/lifting bar in a spreader configuration, thus providing a Safe Working Load (SWL) of 15 tonne.

Fifteen days prior to the planned 9 tonne lift, a Permit to Work (PTW) was requested and drafted in ISSoW. The alternator, encased in a protective wooden crate and within a 20' offshore container arrived on board the Northern Endeavour on 29 May 2017. On 09 June 2017, plans were advanced to lift and installing the alternator from the starboard laydown area into the sea water/fire water compartment. The crane operator and rigger reviewed the rigging equipment available on board and commenced rigging the lift configuration.

The rigging configuration employed the "lift bar" arrangement and not the spreader bar arrangement. The lift bar arrangement had a SWL of 4.05 tonne. On completion of constructing the rigging configuration, the rigging team reviewed and amended the PTW.

On 10 June 2017, a preliminary lift was conducted to remove the alternator from the transport wooden crate on the starboard laydown area. The principal lift was to install the alternator in the sea water/fire water compartment. The lift movement commenced from the starboard laydown area and traversed various process pipework, structures and ceased movement suspended at midships. Whilst the alternator was in the stationary midships position, the load was suspended near the LP knock out drum. When the load was stable, the alternator was lowered into the sea water/fire water compartment without incident.

On 11 June 2017, the crane and same rigging configuration was utilised to align the alternator into position without incident. It was not until 12 June 2017, when the rigging configuration was being disassembled, that the inaccurate rigging configuration was detected and accordingly reported to NE management. The event was classified as a serious near miss with the spreader/lift bar immediately tagged out of service.

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5 Summary of Causal Factors

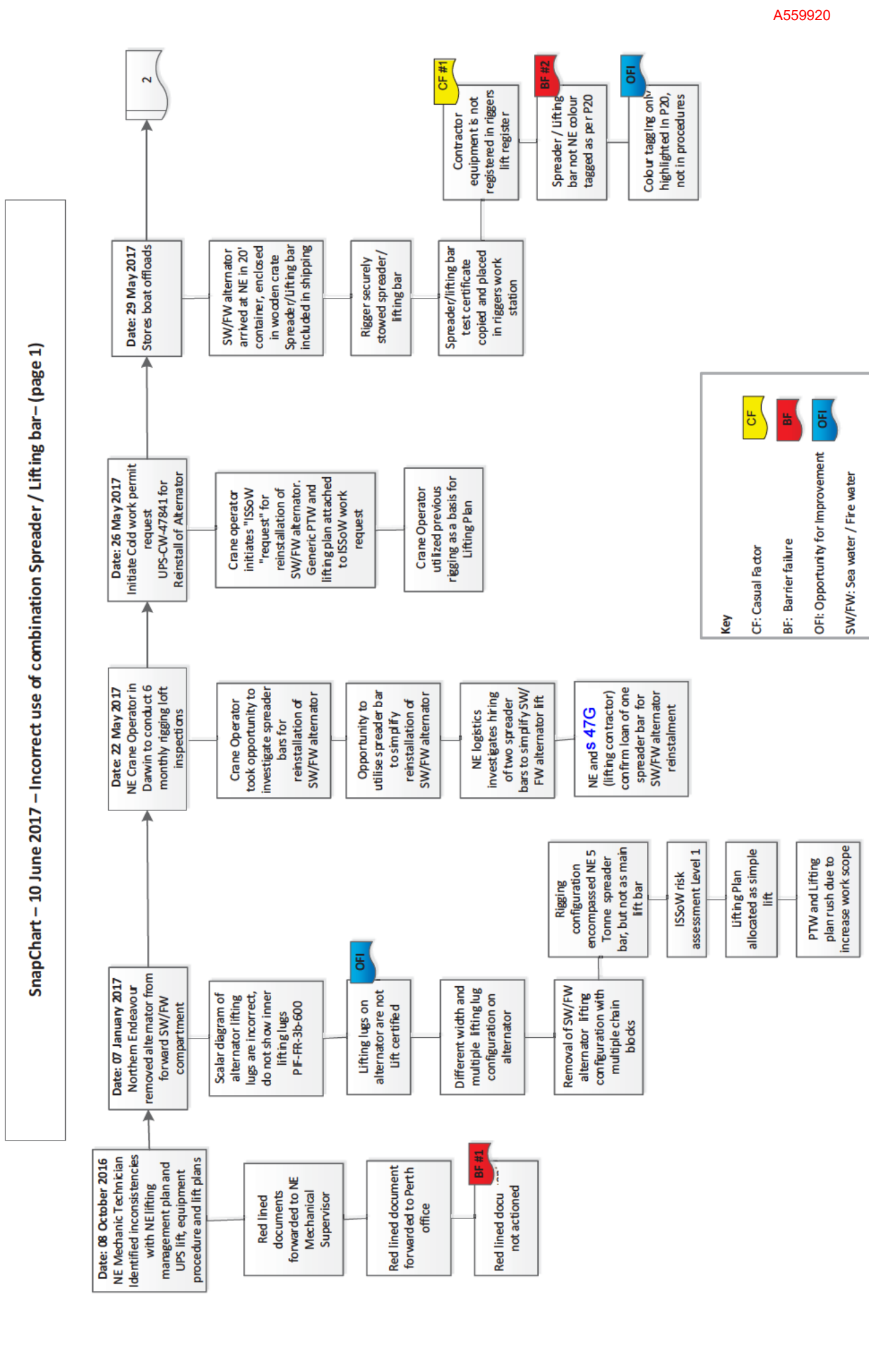
- (1) Contractor equipment is not registered in lift register.
- (2) Crane operator perceived working under time pressure.
- (3) No pre-inspection rigging checks completed for compliance plate for spreader/lifting bar.
- (4) Spreader/lifting bar test certificate was not thoroughly checked.

6 Investigation Team Members

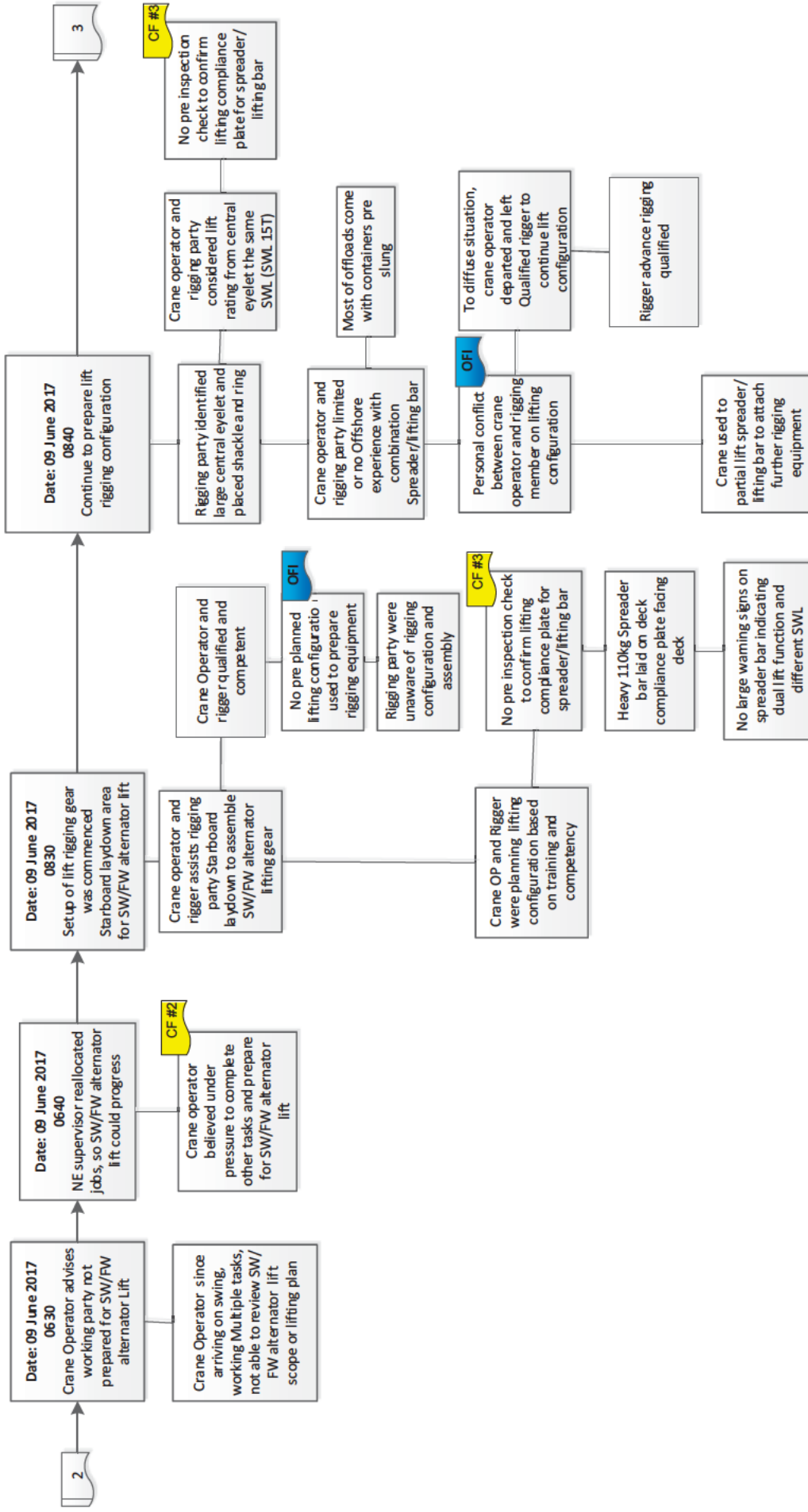
The investigation team consisted of the following personnel:

s 22 irrelevant material -HSEQ Facilitator
Crane Operator
Mechanical Technician
, Production Supervisor

7 Incident SnapChart™

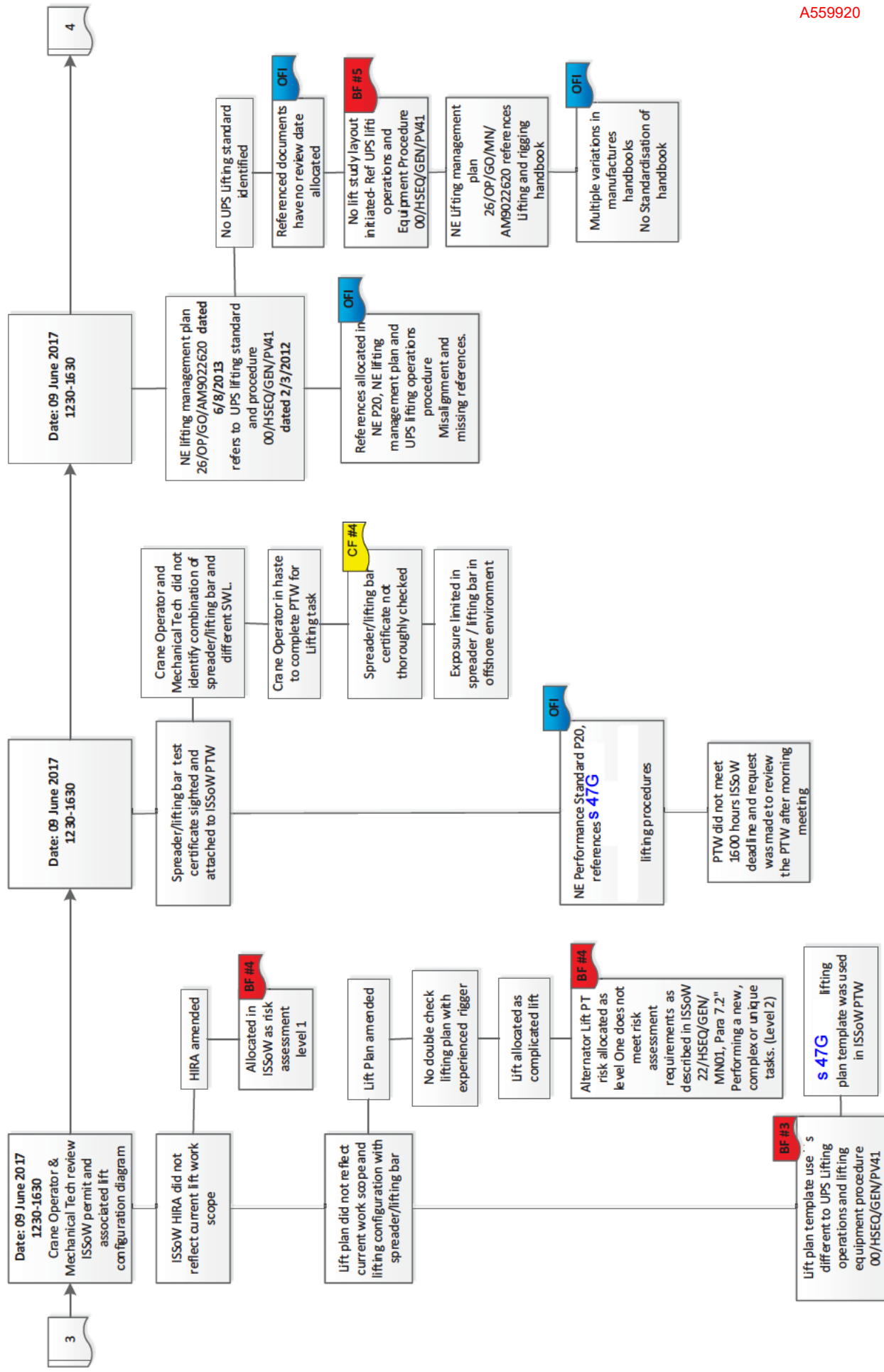


SnapChart – 10 June 2017 – Incorrect use of combination Spreader / Lifting bar – (page 2)



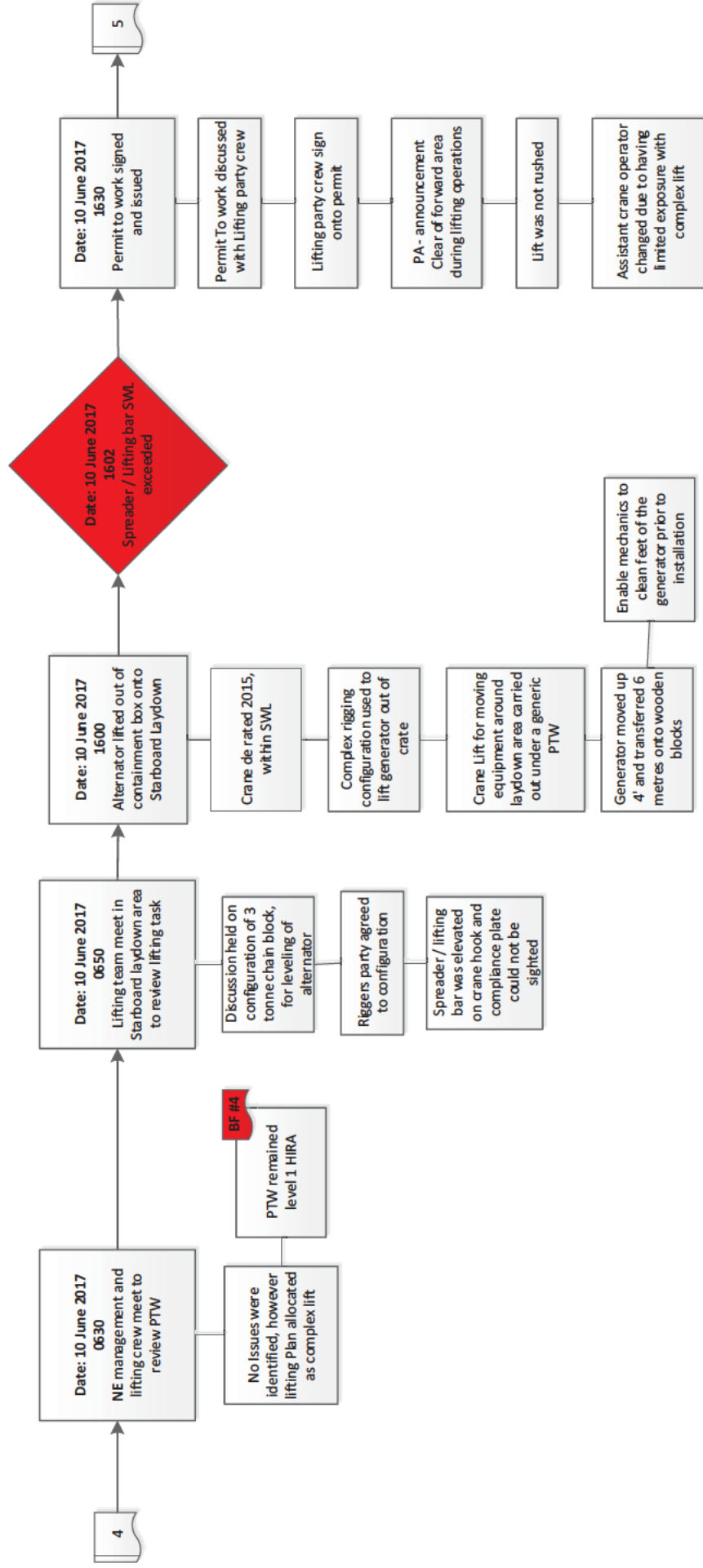
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SnapChart – 10 June 2017 – Incorrect use of combination Spreader / Lifting bar-- (page 3)



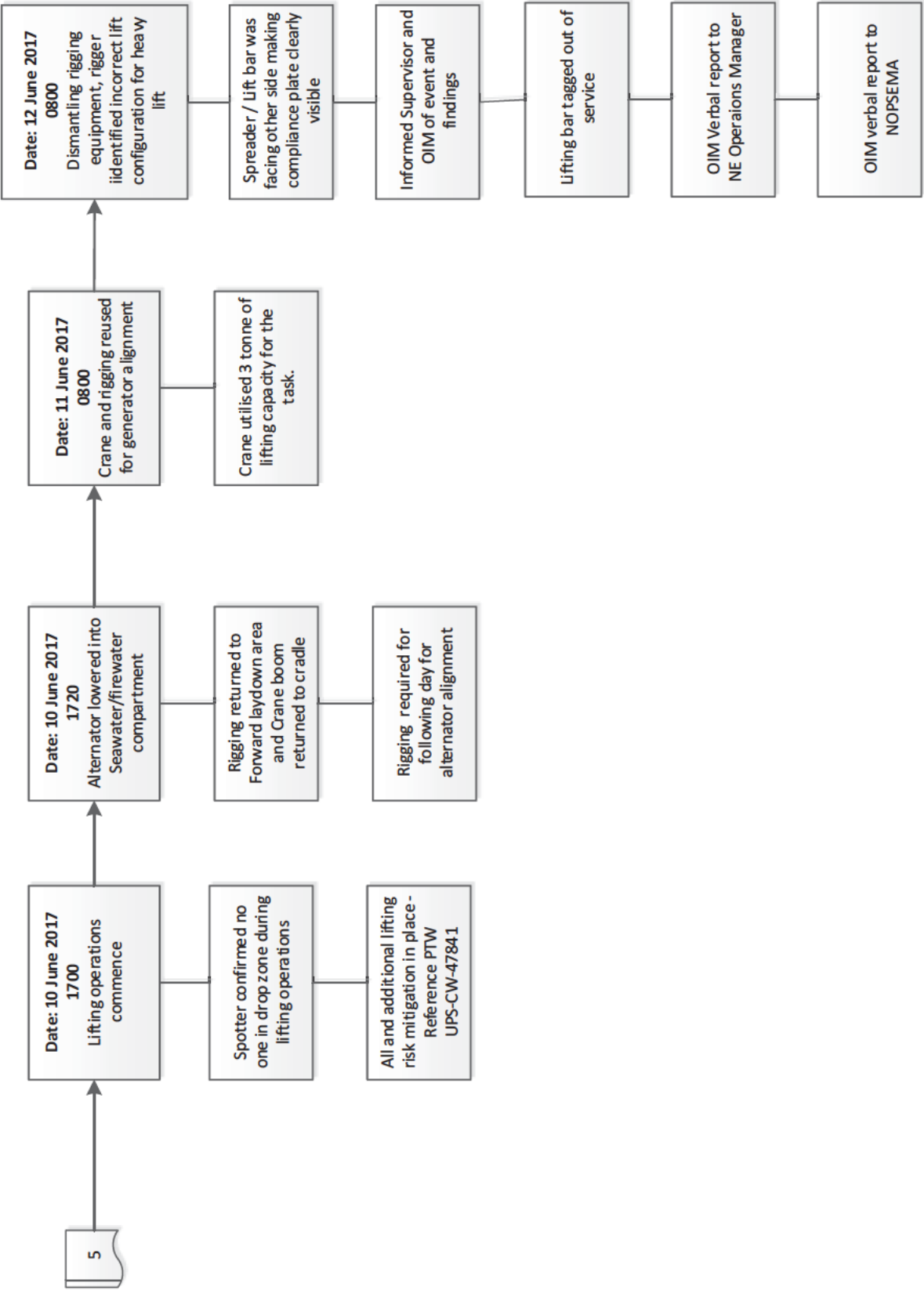
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SnapChart – 10 June 2017 – Incorrect use of combination Spreader / Lifting bar– (page 4)

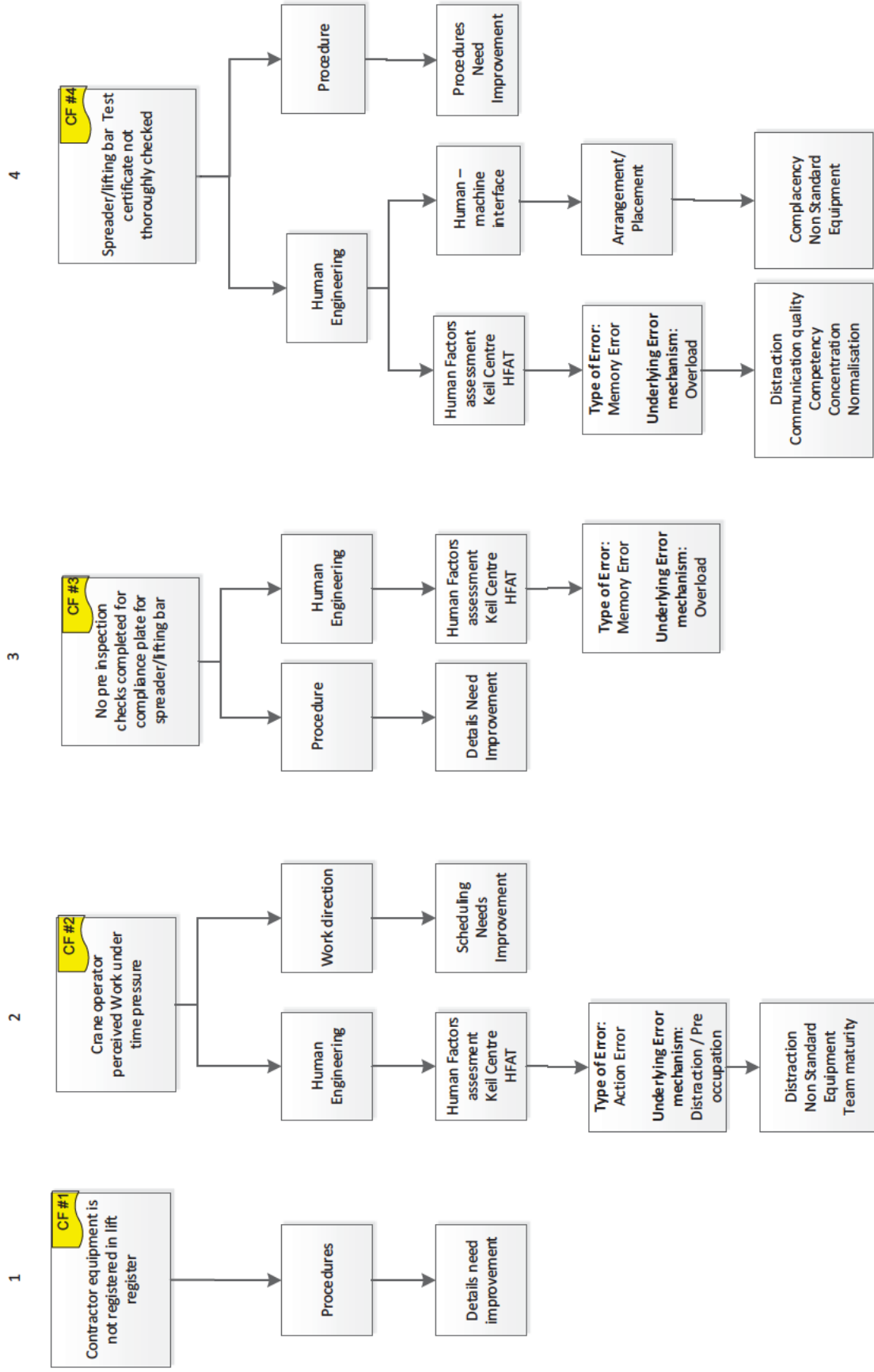


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SnapChart – 10 June 2017 – Incorrect use of combination Spreader / Lifting bar– (page 5)



SnapChart – 10 June 2017 – Incorrect use of combination Spreader / Lifting bar – Causal Factors



A559920

SnapChart – 10 June 2017 – Incorrect use of combination Spreader / Lifting bar– Barrier Failures

BF #1
Red lined document not
actioned

BF #2
Spreader / Lifting bar not
NE colour tagged as per
P20

BF #3
Lift plan template used is
different to UPS Lifting
operations and lifting
equipment procedure
00/HSEQ/GEN/PV41

BF #4
Alternator Lift PTW risk
allocated as level One
did not meet risk
assessments as
requirements as
described in ISSoW
22/HSEQ/GEN/MN01,
Para 7.2" Performing a
new, complex or unique
tasks. (Level 2)

BF #5
No lift study layout
initiated- Ref UPS lifting
operations and
Equipment Procedure
00/HSEQ/GEN/PV41

A559920

8 Human Factors

In any investigation, human factors are allocated as an interconnected contributor. The investigation utilised the Kiel Centre Human Factors Analysis Tools (HFAT). The HFAT tool assists in analysing and understand any human behaviour relevant to the incident. Errors will be analysed using a Human Error Analysis method. Intentional behaviour will be analysed using the ABC analysis method.

The investigation identified three occasions where human factors may have been a contributing factor to the incident. These were assessed with the following human error allocated:

- Type of error: Action error
 - Underlying error mechanism: Distraction/pre-occupation
- Type of error: Memory error
 - Underlying error mechanism: Overload

9 Recommendations

A series of recommendations have been developed to address:

- The root cause of the causal factor as identified in the Incident SnapCharT™; and
- Opportunities for improvement as identified in the Incident SnapCharT™.

9.1 Causal Factor Recommendations

CF1	Causal Factor Contractor equipment is not registered in NE lift register
RC1	Root Cause
	Procedures; Details Need Improvement, ambiguous instructions
CF2	Causal Factor Crane Operator perceived to work under pressure
RC2	Root Cause
	Human Engineering and work direction; Knowledge based decision required. No preparation, scheduling needs improvement, work package needs improvement Human Error analysis
CF3	Causal Factor No Pre-inspection check for compliance plate spreader / lifting bar
RC3	Root Cause
	Procedure and Human Engineering; Procedures – Details Need Improvement No Checkoff list Knowledge based decision required Human Error analysis Non-Standard Equipment Communication quality
CF4	Causal Factor Spreader / lift bar test certificate not thoroughly checked

A559920

RC4	Root Cause Human Engineering and Procedure; Complacency Distraction, Normalisation Procedures need improvement and alignment
-----	---

9.2 Barrier Failures

BF1	Red lined NE Lift management plan document not actioned.
BF2	Spreader/lifting bar not NE colour tagged as per Performance Standard P20 Lifting Equipment [26/OP/INT/PS38].
BF3	Lift plan template used is different to Lifting Operations and Lifting Equipment procedure [00/HSEQ/GEN/PC41].
BF4	Alternator Lift PTW risk allocated as Level One did not meet risk assessment requirements as described in Integrated Safety System of Work (ISSoW) [26/HSEQ/GEN/MN01], Section 7.2 Level 2 Risk Assessment "Performing a new, complex or unique tasks".
BF5	Lift study layout not initiated (refer to Lifting Operations and Lifting Equipment procedure [00/HSEQ/GEN/PC41], Section 11.5 and 11.6.

9.3 Opportunity for Improvement (OFI) Recommendations (Observations)

OFI1	Observation (OFI) Lifting lugs on alternator were not lift certified.
OFI2	Observation (OFI) Colour tagging only highlighted in Performance Standard P20 Lifting Equipment, not in procedures
OFI3	Observation (OFI) No approved pre-planned lifting configuration diagram used during pre-task rigging.
OFI4	Observation (OFI) Personal conflict between crane operator and rigging member on lifting configuration.
OFI5	Observation (OFI) Performance Standard P20 Lifting Equipment references old Woodside Energy Limited (WEL) documents [WM3040SF5154622] and WEL lifting procedures.
OFI6	Observation (OFI) NE Lifting Management Plan [26/OP/GO/MN/AM9022620] (draft) dated 06/08/2013, and Lifting Operations and Lifting Equipment [00/HSEQ/GEN/PC41] dated 02/03/2012 have no review date allocated.
OFI7	Observation (OFI) References allocated in Performance Standard P20 Lifting Equipment, NE Lifting Management Plan [26/OP/GO/MN/AM9022620] (draft) and Lifting Operations and Lifting Equipment procedure [00/HSEQ/GEN/PC41] misaligned and missing references.
OFI8	Observation (OFI) NE Lifting Management Plan [26/OP/GO/MN/AM9022620] (draft) refers to generic rigging handbook, while Lifting Operations and Lifting Equipment [00/HSEQ/GEN/PC41] refers to Nobles rigging handbook; no standardisation of lifting/rigging handbook.

A559920

10 Corrective Action

Actions below have been allocated to address the CF, BF and OFI.

	Action	Response
(1)	<p>Align and update Performance Standard P20 Lifting Equipment [26/OP/INT/PS38], NE Lifting Management Plan [26/OP/GO/MN/AM9022620] (draft), and Lifting Operations and Lifting Equipment [00/HSE/GEN/PC41].</p> <p>Revision shall include:</p> <ul style="list-style-type: none"> Assigned references in all documents are aligned Classification and terminology for lift classifications are aligned Clear definition and requirement of rigging register for NE rigging and contractor rigging equipment Define management of contractor lifting and rigging equipment Clarify requirement for engineering input for offshore complicated/complex lifts and rigging arrangements Define a process for a second qualified checker to review and sign off for: <ul style="list-style-type: none"> Lifting pre-check inspections Complex rigging Lift plan, test certifications for PTW in ISSoW Clarify the requirement for an approved lifting plan and sketch to be completed for complicated/complex lifts during rigging configuration Remove s 47G references Expand on colour tagging details (not just in P20 Lifting Equipment) Pre-checks of rigging equipment must identify associated compliance plates and be recorded Define and standardise riggers handbook Verify a standardised lifting plan, confirming rigging test certificate are included in the lift plan Archive non-procedural lifting plans templates Define process to ensure equipment with non-certified lifting lugs are risk assessed by TA prior to lift Define ISSoW risk assessment requirements for NE complicated/complex lifts in ISSoW (ie level 1 or 2) 	

A559920

	Action	Response
(2)	Promote the workers "Right to Stop the Job".	As a component of the 360 DEGREES safety program, a "Right to Stop the Job" campaign will be initiated in July 2017. This will include SharePoint information, posters, stickers, and presentation by facility 360 DEGREES champions at various facility meetings.
(3)	On completion of lift documentation update, prepare and implement Competency Based Training Assessment (CBTA) to ensure crane operators, riggers, supervisors and personnel working with lifts are aware of the lifting procedures requirements.	
(4)	Communicate at facility HSE meetings, the document control process, relating to "red line mark ups".	Document Control procedure [00/SP/DOC/PC01]
(5)	On completion of lift documentation update, create and implement information training sessions on changes and specific requirements and contents of the lift documents for general awareness.	
(6)	Create and present findings of spreader/lifting bar near miss to onshore and offshore crews.	

11 Upstream PS Safety Non-Negotiables

The investigation reviewed the Upstream PS Safety Non-Negotiables [00/HSEQ/GEN/PC66] and identified that the element "Conduct lifting operations appropriately" were breached. The specific contravened element identified were:

- Ensure equipment is appropriately rated and comply with it, and
- Ensure that all lifting equipment used on site is inspected and registered.

However, on reviewing the evidence and circumstances of the near miss event, it is the opinion of the investigation team leader that the Safety Non-Negotiables breaches were not wilful. Various causal factors, barriers failures and human factors were involved in this event. It was evident during interviews that involved employees recognised the error. This is supported by the near miss being reported days following the actual occurrence, thus advocating that a positive safety culture exists and employees are seeking continuous improvement.

12 Conclusion

Several main contributing factors were identified in this investigation. One contributing factor was lifting documentation and the general misalignment found between documentation. The second contributing factor was the contractor's combination spreader/lifting bar was not a piece of equipment regularly utilised in an offshore environment, and the signage apportioned to the spreader/lifting bar was not intuitive to understand the two different SWLs. Attentiveness and attention to detail was required to inspect the compliance plate, however this was not done.

To conclude, human factors were an important contributor to this near miss. The employees involved were all qualified, however the aptitude to follow known procedures were inhibited due to misalignment of procedures, attention to detail, assumptions, complacency and personal differences between employees.

On a positive comment, the near miss would not have been reported, if it was not for the safety culture of the personnel involved, and these employees should be commended.

Appendix A Photographs



Figure 1 - Spreader/Lift Bar SWL Tag



Figure 2 - Lifting Gear



Figure 3 - Spreader/Lift Bar Compliance Plate



Figure 4 - Lift into SW/FW Space



Figure 5 - Lift into SW/FW space 2

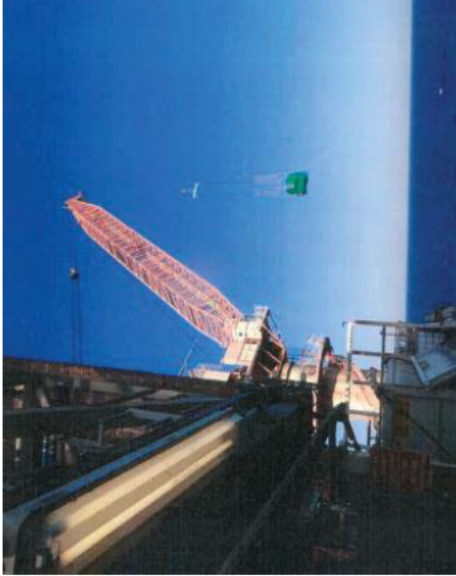


Figure 6 - Lift Over Sea Water

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Appendix B High Risk Licence

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Appendix C Continuous Training Crane Operator



Certificate of Assessment

This is to certify that
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has successfully completed the:

OFFSHORE CRANE SIMULATOR TRAINING

in accordance with the principals of

PMASUP305A

Operate Offshore Cranes

s 22 irrelevant material

s 22 irrelevant material

13/11/2015, Perth

Date, Place

s 22 irrelevant material

Assessor

General Manager

No.: 0008

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CCOA 5-2015

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Appendix D Permit to Work



Upstream Production Solutions		RE-PRINT		Permit No: UPS-CW-47841	
COLD WORK PERMIT					
1. Permit Request					
Date Valid From: 10/06/2017 16:27		Date Valid To: 22/06/2017 18:00		Requested By: s 22 irrelevant material	
Work Location: Zone G / F-FWD Fore Castle / STBD		Equipment to be Worked On: AU06.A6001B - PKG EQ,FIREWATR/EMERG DIESEL GENSET B			
Work Description: Replacement of FWD SWFW Generator - Replacement of A6001B Generator onto package skid. Erect, modify and dismantle Scaffold to facilitate the installation.		Work Order No.:		Own Isolations: No	
Notes: 					
Tools and Equipment: Hand tools, scaffold tools, working at heights equipment, rigging equipment, slings, chains, chain blocks, shackles, spreader beam, tag lines, forward favco crane.					
HIRA Reference No: UPS-WR-47841		Level 2 Risk Assessment Ref. No:			
2. Work Control					
Process / Mechanical Isolation Certificate		Certificate No. UPS-PMIC-44372 rev 1		Electrical Isolation Certificate	
Safety System Inhibit Certificate		Certificate No. UPS-SSIC-43799 rev 2		Certificate No. UPS-EIC-43801 rev 3	
3. Permit Authorisation					
I confirm that precautions specified on this permit (and the references attached) are sufficient and that I have reviewed the work as specified on this permit and authorise it to proceed with a residual risk rating of Medium.					
Issuing Authority: s 22 irrelevant material		Date: 9/06/2017		Time: 18:44 hrs	
4. Permit Issue					
I confirm that precautions specified on this permit (and the references attached) are sufficient for the proposed work and the necessary controls as specified are in place. I declare that I have considered potential work conflicts and it is safe to proceed after Shift Endorsement:					
Issuing Authority (Print): s 22 irrelevant material		Date: 6/10/2017		Time: 16:27 hrs	
5. Acceptance of Responsibility					
I understand the work and controls specified in this permit (and references attached). I accept responsibility for carrying out only the work as detailed, complying with all listed controls and informing the work party of them.					
Rev	Performing Authority (Print):		Date:	Time:	
0	s 22 irrelevant material		10/06/2017	16:27	

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6a. Shift Endorsement

[illegible][illegible]

Area Authority (Print): s 22 irrelevant material Sign: s 22 irrelevant material Date: 15/6/17 Time: 1760



RE-PRINT COPY

Certificate No: UPS-PMIC-44372 rev 1

PROCESS / MECHANICAL ISOLATION CERTIFICATE

A - Details of Equipment to be Isolated

Equipment to be isolated: AU06.A6001B - PKG EQ FIREWATREMERG DIESEL GENSET B

Location: Zone G / Process Deck / MID SHIP

Job Description: ROMOVAL OF ALTERNATOR A6001B SW/FW Gen - Isolate the Inergen system while personnel are working inside the enclosure.

Notes:

Warnings & Instructions:

Drawing No's:

Depressured: N

Flushed: N

Vented: N

Drained: N

Purged: N

B - Details of Process/Mechanical Isolation Points

Lock Box Number: 3-924

Prepared By: s 22 irrelevant material

Date: 31/05/2017 13:07

Ref.	Isolation Point	Spade Line Size	Rating	Isolated Status	Isolation Verified By	Hazard Factor	Bleed Frequency
1	AU06.60HV618 - VALVE A6001B SW/FW GEN INERGEN ISOLATI			CLOSED	s 22 irrelevant material	24	
	- KEY SAFE 2			LOCKED			
	- 3-924			LOCKED			

C - Approval

I confirm this isolation scheme along with all other parent/associated isolation schemes will, if implemented properly, provide suitable protection for all currently known dependent work permits. It removes all potential for harm from sources of energy or from harmful substances by means of appropriate isolations.

I agree this isolation scheme along with all other parent/associated isolation schemes will, if implemented properly, provide suitable protection for all currently known dependent work permits. It removes all potential for harm from sources of energy or from harmful substances by means of appropriate isolations. The isolation does not conflict with any other known activities and is authorised to proceed.

I confirm that this, and all associated equipment is offline, and isolation may now proceed.

Prepared By (Sign): s 22 irrelevant material

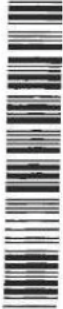
Date: 31/05/2017 13:07


Process Mechanical Isolation Authority (Sign):

Date: 31/05/2017 13:07

Issuing Authority Rep (Sign):

Date: 31/05/2017 13:08



		RE-PRINT COPY	
Certificate No:		UPS-PMIC-44372 rev 1	
PROCESS / MECHANICAL ISOLATION CERTIFICATE			
D - Isolation			
I declare that I have verified and confirmed the isolation scheme has been implemented as specified.		Process Mechanical Isolation Verifier (Sign):	
I confirm that the isolation has been applied as per design inclusive of draining, flushing, purging and venting requirements, and will provide a safe boundary within which work may be carried out.		Process Mechanical Isolation Authority (Sign):	
		Date:	31/05/2017 13:14
		Date:	31/05/2017 13:13

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Appendix E Hazard Identification Risk Assessment (HIRA)



RE-PRINT

Permit No: UPS-CW-47841

Hazard Identification Risk Assessment (HIRA)

1. Work Description

Prepared By: s 22 irrelevant material

Work Location:

Zone G / F-FWD Fore Castle / STBD

Equipment to be Worked On:

AU06.A6001B - PKG EQ,FIREWATR/EMERG DIESEL GENSET B

Work Description:

Replacement of FWD SWFW Generator - Replacement of A6001B Generator onto package skid.
Erect, modify and dismantle Scaffold to facilitate the reinstallation..

2. Residual Risk Rating

Risk Consequence:

Moderate

Risk Likelihood:

Unlikely

Residual Risk Rating:

Medium

3. Hazard Assessment

The following hazards may be encountered during work:

313 Erection/Dismantling of Scaffolding

GH General Hazards

H Height

DO Dropped Object

WIE Working on Incorrect Equipment

110 General work

GH General Hazards

WIE Working on Incorrect Equipment

147 Lifting Operations For Complicated Lifts

FC Failure of Communications

GH General Hazards

H Height

HAO Heavy or Awkward Object

PRO Projectiles

RE Release of Stored Energy (Spring / Pressure/Tension)

TRH Trapping Hazards

UO Unguarded Opening

DO Dropped Object

44 Working at Height

GH General Hazards

H Height

SAW Severe / Adverse Weather

DO Dropped Object

323 Working Near/Over Open Penetrations,Deck Hatches or Removal of Floor Grating/Plates

GH General Hazards

H Height

UO Unguarded Opening

DO Dropped Object

A559920



Permit No: **UPS-CW-47841**

Hazard Identification Risk Assessment (HIRA)

4. Work Controls

1. Preparation Controls

Tick only when in place

Activity is supported by an approved procedure

WIE



All areas above and below worksite to be inspected before commencing workscope to minimise the probability of objects falling onto or from the worksite, identify/remove potential for dust and wind-borne particles to cause harm, and to ensure potential "line of fire" hazards are removed.

GH

H



Alternative means of communication to be available and tested. Alternative lines of command and control to be agreed beforehand, should these fail.

FC



Area Authority and Performing Authority to jointly confirm the correct equipment to be worked on as part of pre-start check at the specific worksite, prior to AA endorsing the permit. The check should ensure that, where required, the correct equipment has been isolated.

GH

WIE



Identify fire and gas/emergency detection equipment that may be impacted by the work activities, such as line-of-sight and infrared gas detectors, oil mist detectors, smoke and heat detectors, MAC points, ESD buttons.

313

GH



Identify fire and gas/emergency protection equipment that may be impacted by the work activities, such as deluge nozzles, foam skids, watermist systems, access to fire extinguishers and fire blankets, signage.

313

GH



Issuing Authority to check hazardous area boundaries are not affected due to removal hatches

UO



Lifting Plan developed by a competent person, and in place

147



Rescue plan in place, attached to permit, and understood by all persons involved in the work.

H



Use appropriate means of dropped object protection accounting for size and weight of potential dropped objects to encapsulate the work area. Identify all potential apertures and cover to eliminate any risk of objects falling to lower levels. Tools and equipment shall be tethered where practical.

DO

H



Where there is the potential for personnel to fall into, or kick objects into, the opening, it is to be fitted with guard rails and toe boards. Barrier to be installed before flooring/grating is removed.

UO



Work restricted to daylight hours

H



3. Standby Person Duties (Check after every break)

Tick only when in place

Competent and capable standby person to be in place, knowledgeable of duties and emergency procedures.

H



4. PPE Controls

Tick only when in place

Approved fall restraint/ arrest to be worn

H



Approved safety harness appropriate to the task is to be worn - minimal slack, and fixed to strong and approved anchor point. (For Confined Space Entry, an approved CSE harness is to be worn).

H



5. Execution Controls

Tick only when in place

Ensure check couplers are installed on all dropper tubes on installation of dropper tubes, and that visual inspection takes place to ensure couplers are fitted to dropper tubes prior to the tube being used to support a person's weight.

313



No one is positioned under a suspended load or between suspended / lifted load and fixed objects

TRH



Retaining fasteners should not be removed until flanges etc. have been broken and pipe work equipment proved free of residual pressure

RE



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Permit No: **UPS-CW-47841**

Hazard Identification Risk Assessment (HIRA)

4. Work Controls (continued)

5. Execution Controls (continued)

Tick only when in place

Scaffold boards to be lashed only with wire, except when working within electrical switchrooms, in which case rope lashing shall be used.

313



Suitable clearance is to be maintained between the structure being built and adjacent equipment that may be susceptible to movement. (Such equipment may include, wellheads, rotating machinery, or equipment impacted by weather/sea state). Consult local procedures for guidance on suitable clearances.

313



Tools, Materials and equipment shall be tethered where practical and are not to be placed on structural members, pipework, cable trays, instrumentation, vessel skirts/saddles, etc, or any where it may later create a dropped object hazard.

DO

H



Work crew to be in radio contact with the control room

H



Work crew to ensure they position themselves away from the potential 'line of fire'

PRO

RE



Work party exposed to airborne particles to present themselves for an end of shift eye check from the facility medic or approved eye checker

313



Work to be undertaken by a minimum of 2 persons (or 3 persons for overside work activities)

H



6. General Controls

Tick only when in place

Barriers and signs to be erected to ensure safe areas and hazardous areas are clearly segregated, and that all potential access/egress routes to the affected areas are also barriered off (eg. ladders, doorways).

GH

HAO

PRO

RE

UO



Consider noise levels associated with the location of work. Consult the Noise Hazard Register/ noise contour maps

GH



5. Approval

I declare that I have reviewed the HIRA and proposed certificates and confirm they are adequate for the work to be carried out.

Workscope Authoriser (Print):

s 22 irrelevant material

Date:

6/9/2017

Time:

18:43

6. Site Risk Assessment (Additional Hazards/Controls to those in Checklist)

HAZARD (List Hazards)	CONSEQUENCE (What could go wrong - its effects?)	CONTROLS (How can the hazard be prevented?)	RESPONSIBILITY (Who is going to take action to prevent escalation?)

A559920

Permit No: **UPS-CW-47841**

7. Work Party Sign On

Work party members to initial at start of work each day to acknowledge participation in a toolbox talk and agree to abide by the conditions of the permit.

[illegible]

Page 4 of 5

A559920

Appendix F 15T Spreader/Lifting Bar Test Certificate

s 47G business information

15T SPREADER/LIFTING BAR TEST CERTIFICATE

The spreader/lifting bar meets requirements of AS4991:2004

Manufacturer	:	TRT, Hamilton, New Zealand
Assembly #	:	PC22-559
Tare weight	:	110kg
Crane classification	:	C3
Rating SWL/WLL	:	As per chart below
Cert #	:	PC-D26
Date	:	10/10/14
Serial #	:	SB-1019

15T Spreader/Lifting Bar Test Certificate

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15T SPREADER BAR

90° MAX

3.70M TO 2.25M - SWL / WLL 15T

RATED CAPACITY CHART

DESIGNED TO AS 4991:2004

CRANE CLASSIFICATION C3

TARE WEIGHT 110KG

CERT #PC-D26

LIFTING BAR

2.25M SWL / WLL 4.05T

2.50M SWL / WLL 3.65T

2.90M SWL / WLL 3.00T

3.30M SWL / WLL 2.65T

3.70M SWL / WLL 2.25T

PC22-559-P1

Example of tag

Bennet Gage-Brown

Engineering Design

PC-D26

Title: Rated Capacity Chart
Identifies individual lift rating
capacity for both Spreader
and Lift bar configuration

A559920

Appendix G Certificate of Inspection

s 47G business information

s 47G business information

CERTIFICATE No.: FRVD2319

CERTIFICATE OF VISUAL INSPECTION

Customer: s 47G business information

Address: 1

Inspection Date: 13/02/2017

Order No.: 007008-1

QUANTITY	DESCRIPTION	I.D. No.	W.L.L. (tonnes)	Inspection Specification
1	15 tonne COMBINATION BEAM	SB - 1019	15 tonne AS SPREADER BEAM LIFTING BEAM 4.05 t @ 2.25 m 3.55 t @ 2.5 m 3.0 t @ 2.9 m 2.55 t @ 3.3 m 2.25 t @ 3.7 m	WIWS-007 AS 4991
Remarks	NO SIGNIFICANT VISUAL DEFECTS EVIDENT PREVIOUS CERT: PC-D26			MANUFACTURER: T.R.T SURFACE FINISH: PAINTED WHITE JOB SHEET: 05747
				Inspection Type VISUAL

The above inspection was performed by a competent person in accordance with the information provided.
The items were found to comply to inspection specifications as detailed above.

s 22 irrelevant material



NATA Accredited Inspection Service Number: 14301
Accredited for compliance with ISO/IEC 17020.
This document shall not be reproduced, except in full.

FORM B32 (b) (II) Rev 122

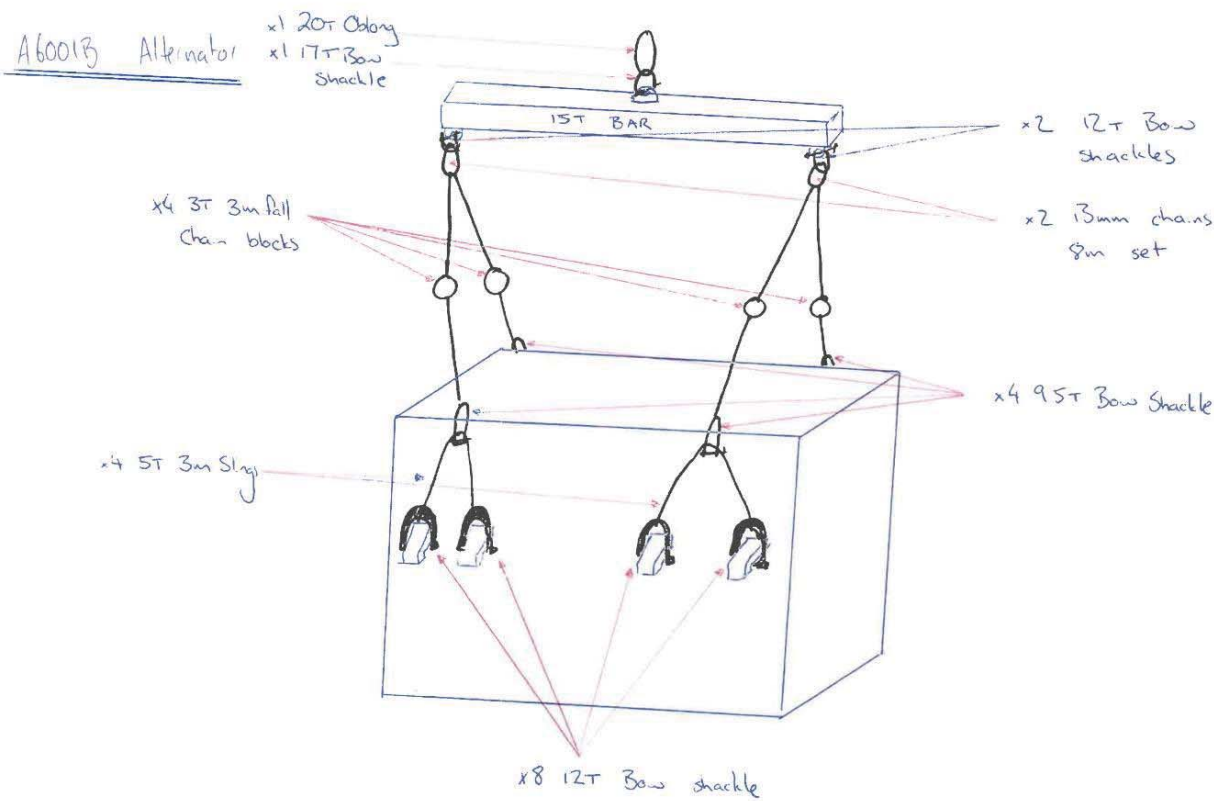
APPROVED
SIGNATORY:

TESTING OFFICER

Date of Issue: 13/02/2017
Page 1 of 1

A559920

Appendix H Lifting Equipment Configuration



Appendix I Lifting Plan

NORTHERN ENDEAVOUR FPSO

OPERATING PROCEDURE – LIFT PLAN



MECHANICAL HANDLING

COMPLICATED LIFT PLAN – Fwd SW/FW Gen B Alternator

CONDITIONS – COMPLICATED LIFT PLAN			
Work Instructions:	Ensure all rigging gear is tagged and tested prior to use. Pre sling the Alternator using the spreader bar, soft slings, shackles and chain blocks. Test lift using Fwd Favco X1401 prior to final lift. Ensure tag lines are attached and a minimum of two dogmen/load handlers are used to guide the load into location. Protect alternator shaft with wooden gluts, ratchet strapped to alternator. Lower alternator inside pre-build scaffold hard barricage inside enclosure.		Permit Number: 47841
Change Management	For information on how to update an existing controlled document or create a new controlled document, refer to Process Map 5.1.6 Manage Change to Production Information		
Description:	This lifting plan is for the Fwd SW/FW Gen B Alternator at the Northern Endeavour FPSO. Prior to every individual lift full details of the lift must be identified and discussed between the lifting team. A step back 5 x 5 must be conducted to identify, eliminate (where possible) and control the hazards. PIC (PERSON IN CHARGE) OF LIFT TO BE IDENTIFIED BEFORE COMMENCEMENT OF WORK, AND AGREED AND ACKNOWLEDGED BY ALL MEMBERS OF THE LIFT TEAM.		
Site Conditions:	Maximum allowable wind speed: (if no other guidance assume 20 knots)	20	Maximum allowable significant wave height or vessel roll if more stringent than normal operating: (if applicable) 1.5m
	Equipment Required:	Fwd Favco X1401, 15T spreader bar, 2 x 13mm 2 legged chains, 4 x 3.2T Chain Blocks, 4 x 5T/3M soft slings, a variety of 12T and 9.5T shackles.	
	Communication methods used:	Radio and Hand Signals	
	Barricading required:	All areas below and around Fwd Gen B Enclosure. PA call – No access fwd of the Aft crane laydown/Chem Inj Area.	

CONDITIONS – COMPLICATED LIFT PLAN	
Other	

OPERATING PROCEDURE – PROCEDURE TITLE			
Settings/ Parameters	Step	Action	Step Notes Initial
	1.	Attach 15T spreader bar and associated lifting equipment to the crane.	
	2.	Complete a test run over the alternator, making sure there is enough height from the spreader bar to the alternator lifting lugs to prevent side pressure being applied to the cooler.	
	3.	Test lift load and make any adjustments required via the chain blocks.	
	4.	Ensure load is secure and level prior to final lift and attach tag lines.	
	5.	Lift load and keep all movements slow and controlled, slew into position over Fwd Gen B enclosure. Dogmen/load handlers to maintain clear comms, spotter to keep any personnel from walking under the load	
	6.	Slowly lower alternator inside scaffold hard barricading, once load is 500mm off the base. Clear for personnel to enter enclosure to assist landing of the load.	
	7.	Strip scaffolding hard barricade down, adjust to make 300mm high hard barricading around alternator to protect personnel when re-lifting for generator alignment.	

Controlled Ref. No.:	Uncontrolled when printed 3 of 9	Rev 0 Date of issue: 17/12/2016
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RISK ASSESSMENT A non-exhaustive list of risks is given below. Blank boxes are provided for additional risks. Items marked X must be addressed by a mitigation.					
<input checked="" type="checkbox"/>	The centre of gravity of the load is not midway between the lifting attachment points.	N/A <input type="checkbox"/>	Inadequate lighting in the pick up or lay down areas or along the route.	<input checked="" type="checkbox"/>	Have aids to limit frequently repeated tasks/lifts been considered? e.g. powered hoist in place of manual hoist or basket in place of frequent small lifts.
<input checked="" type="checkbox"/>	Part of the load or items within it may move during handling or transport. Eg Moving parts, loose items or liquids.	<input checked="" type="checkbox"/>	Additional methods required to prevent working between suspended load and fixed objects. e.g. bumpers		
<input checked="" type="checkbox"/>	The centre of gravity of the load is at or above the level of the lifting attachment points.	<input checked="" type="checkbox"/>	Standard barricades may not adequately prevent unauthorised access to the lifting area.	N/A <input type="checkbox"/>	The load does not have approved lifting points and there is a concern that wrapped slings may damage the load, may be damaged by the load or may slip.
<input checked="" type="checkbox"/>	Large wind area, tight clearances or blind lifts requiring environmental limits or other controls.	N/A <input type="checkbox"/>	Long duration lift that requires consideration of shift changes or impact on other activities.	<input type="checkbox"/>	
N/A <input type="checkbox"/>	Lifts with threaded lifting points, such as eyebolts, without securing nut.	N/A <input type="checkbox"/>	Long duration lift that requires consideration of shift changes or impact on other activities.	<input type="checkbox"/>	
<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	

LIFTING APPLIANCE/LOAD PATH INFORMATION

List all lifting appliances including cranes and hoists and complete the table below. Attach specific rated capacity information where applicable, eg crane RCi software printout or load chart.

Type of appliance:	Favco X1401	Maximum radius required: (if applicable)	37m
Manufacturer: (if known)	Favell Favco	Max allowable radius for weight below hook: (if applicable)	45M
Max capacity:	15T	% of appliance rated capacity at most critical part of proposed lift:	75%
Total weight below hook: (load + container tare + lifting gear)	10T		

Sketch:

As per attached doc

LIFTING GEAR INFORMATION		
Lifting Gear List:		Lifting Gear Sketch:
List the lifting gear to be used and give each an item number. For all items include rated capacity and number required. For slings include length. Include lifting aids such as spreaders.		
Item #	Qty	Description
		15T Spreader Bar
		20T Oblong
		17T Bow Shackle
		12T Bow Shackles
		13mm 8m Chain set
		3T 3M fall chain blocks
		9.5T Bow Shackles
		5T 3M slings
Est. Lifting Gear Weight:		350Kg

Sketch:

LIFT PLAN APPROVAL It is a Lifting Operations requirement that a lift plan specific to the operation be developed by a trained and competent person.					
Lift plan prepared by:		Name s 22 irrelevant material		Signature	Date
Lift plan approved by: (Responsible Engineer or Lifting Focal Point or Lifting Supervisor)					10/9/17
Pre Lift Sign On: All personnel below have read and understood {Insert Specific Lift Plan} prior to lifting operations and acknowledge any lifts not highlighted within the lifted item section or lifts requiring deviation from the lift plan require an individual lift plan to be raised prior to proceeding with the lifting operating.					
Name	Signature	Date	Name	Signature	Date
s 22 irrelevant material					
		0-6-17			
		0/6/17			
		0-6-17			
		1/17			
		0/6-17			
LESSONS LEARNED List any clearance issues, COG information, weight confirmation or other information that may be of use when the same task is repeated. Any lessons learned that are also applicable to different tasks are to be emailed to your supervisor using the subject heading "Lift Plan Lessons Learned" for placement onto a lifting lessons learned register.					
x4 load handlers on roof would have assisted lead rigger to have good survival.					

Appendix J Extract of NE Rigging and Lifting Register

Northern Endeavour Rigging & Lifting Register														
Tag Number	Serial Number	Batch number of item (if applicable)	Reinspection Interval	Item Description	Equipment Type	Working Load	Passed (P)	Destroy	Quarantined	Last Inspection	Next Inspection Due	Date of Manufacture	Comments or material number	Location
OW803			1 Yrly	Offshore Lifting Container - Onboard Lift Only Baskets	Baskets	1,000	##						Quarantined - Needs Repairs	Process - Scaffold
OW802			1 Yrly	Offshore Lifting Container - Onboard Lift Only Baskets	Baskets	1,000	##						Quarantined - Needs Repairs	Process Aft of GT's - Breezeway
EPT0-36	TL 0067240190		6 Monthly	Spanset twin elastic lanyard	Lanyard	0.1				Apr-17	Jun-17		For Fwd Crane Inspections	Rigging Loft A
NAAA5819	NAAA5819		6 Monthly	X1452 Provisions Crane 10T swivel hook	Hooks	10				Jan-18	Jan-18		5 Yrly Re-Cert - Inspected by Emermech	Provisions Crane
ECWR810	N010932		1 Yrly	X1452 Provisions crane hoist rope	Crane Wire Rop	8.5				Jan-17	Jan-18		Installed 17/05/15 - Inspected by Emermech	Provisions Crane
N031856	N031856		6 Monthly	5T 4M 24mm Provisions Crane Stinger	Stingers	5,000				Apr-17	Jun-17	Aug-16	Provisions Crane Stinger	Provisions Crane
NEPT05			6 Monthly	5T Water bag	Other loose lifting gear					Jan-17	Jun-17		on laydown under Provisions Crane Boomr	Provisions Crane
NEW010			6 Monthly	10T Water bag	Pedestal Cranes					Jan-17	Jan-18		Inspected by Emermech	Provisions Crane
X-1452	LT-068		1 Yrly	Northern Endeavour Aft Crane	Wire Rope Sling	5.5				Apr-17	Jun-17		Provisions Crane 1452	Provisions Crane 1452
N002834	N002834		6 Monthly	Diesel Bunkering Hose Lifting Sling	Sheave & Snatch	4.5				Jan-17	1/06/2017		Quarantined	Quarantined
EN4-09	3607.8		6 Monthly	4.5T Snatch Block w/shackle	Harness					1/04/2017	Jun-17	9/09/2014	Safety Harness for Crane Inspections	Rigging Loft A
EHO-39	TL 0067240121		6 Monthly	Span Set Safety Harness	Lanyard	0.1				1/04/2017	Jun-17		Used only for Crane Inspections	Rigging Loft A
EPT0-31	PLR1P637		6 Monthly	Twin elastic lanyard	Soft Slings	1				Apr-17	Jun-17		Destroyed - 06.06.17	Rigging Loft A
ER12-96			6 Monthly	1T 2M Round Sling	Harness					1/04/2017	Jun-17		Missing	Rigging Loft A
EHO-29			6 Monthly	Span Set Safety Harness	Beam Trolleys	1,000				Apr-17	1/06/2017			Rigging Loft A
X-1452	1305061		6 Monthly	1T Girder trolley	Beam Trolleys	2,000				Apr-17	1/06/2017			Rigging Loft A
EY1-02	1309034		6 Monthly	2T Girder trolley	Beam Trolleys	2,000				Apr-17	1/06/2017			Rigging Loft A
EY2-02	1309035		6 Monthly	2T Girder trolley	Beam Trolleys	#####				Apr-17	1/06/2017			Rigging Loft A
NOV6227	S11217/7/12		6 Monthly	10T Beam trolley	Beam Trolleys	3,000				Apr-17	1/06/2017			Rigging Loft A
EY3-01	1204546		6 Monthly	3T Beam Trolley	Chain Blocks	0.5				Apr-17	1/06/2017			Rigging Loft A
EBO3-01	5670		6 Monthly	0.5T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-01	25978		6 Monthly	1T 20M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-01	26799		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-02	27985		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-03	27988		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-04	27990		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-05	27991		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-06	28313		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-07	27993		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-09	27997		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-10	27998		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-11	28310		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-12	28314		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-13	28315		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-14	28316		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-15	28319		6 Monthly	1T 3M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-16	28453		6 Monthly	1T 6M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-17	28455		6 Monthly	1T 6M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-18	28456		6 Monthly	1T 6M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-19	28457		6 Monthly	1T 6M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A
EBO3-20	28458		6 Monthly	1T 6M Chain block	Chain Blocks					Apr-17	1/06/2017			Rigging Loft A

A559920

Appendix K X1401 Revised Crane Load Chart

X1401 Revised Load Chart

s 47G business information

Job: NE FWD FAVCO CRANE BOOM ASSESSMENT Job No: AEC2018-078
Subject: CRANE DE-RATING CHARTS DUE TO 2015 CORROSION INSPECTION
Reference:
Prep By: s 22 Date: 23-Jul-18
i i

Amended Load Charts for NE X1401 FWD Favco 28/10K Crane due to boom corrosion:

AMENDED LOAD CHART - 2 FALLS - CURRENT BOOM CONDITION										
Radius (m)	Safe Working Load (SWL)									
	On-vessel Lift (Te)		Hs = 1m (Te)		Hs = 2m (Te)		Hs = 3m (Te)		Hs = 4m (Te)	
	As-Built	Amended	As-Built	Amended	As-Built	Amended	As-Built	Amended	As-Built	Amended
8	30.0	27.5	30.0	27.5	30.0	27.5	30.0	24.4	30.0	18.3
10	30.0	27.5	30.0	27.5	30.0	27.5	30.0	24.4	30.0	18.3
15	30.0	27.5	30.0	27.5	30.0	27.5	30.0	24.4	30.0	18.3
20	30.0	27.5	30.0	27.5	30.0	24.8	30.0	18.8	30.0	15.6
25	30.0	26.7	30.0	25.7	30.0	19.6	28.9	15.6	24.0	12.5
30	30.0	21.4	30.0	21.4	29.3	18.2	24.1	12.9	19.9	10.3
35	30.0	20.3	30.0	18.5	24.9	13.9	20.5	11.2	16.8	8.0
40	30.0	17.3	27.8	16.3	21.7	12.4	18.0	10.0	14.9	6.2
45*	30.0	15.0	25.0	14.9	19.9	11.6	16.0	9.6	13.8	7.9

Note: - GREEN values = no change to the as-built load chart, RED values = reduced capacity to the as-built load chart.
- 3 fall hook configuration not permitted.
* Load chart capacities noted at 45m radius are not valid for radii beyond 45m (ie: do not use these for 45.1m radius)

AMENDED LOAD CHART - 1 FALL - CURRENT BOOM CONDITION										
Radius (m)	Safe Working Load (SWL)									
	On-vessel Lift (Te)		Hs = 1m (Te)		Hs = 2m (Te)		Hs = 3m (Te)		Hs = 4m (Te)	
	As-Built	Amended	As-Built	Amended	As-Built	Amended	As-Built	Amended	As-Built	Amended
8	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
10	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
15	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
20	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
25	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
30	15.0	15.0	15.0	15.0	15.0	15.0	15.0	12.9	15.0	10.3
35	15.0	15.0	15.0	15.0	15.0	13.9	15.0	11.2	15.0	8.0
40	15.0	15.0	15.0	15.0	15.0	12.4	15.0	10.0	15.0	6.2
45*	15.0	15.0	15.0	14.9	15.0	11.6	15.0	9.6	15.0	7.9

Note: - GREEN values = no change to the as-built load chart, RED values = reduced capacity to the as-built load chart.
- 3 fall hook configuration not permitted.
* Load chart capacities noted at 45m radius are not valid for radii beyond 45m (ie: do not use these for 45.1m radius)

PERSONNEL LIFT LOAD CHART - 1 FALL - CURRENT BOOM CONDITION										
Radius (m)	Safe Working Load (SWL)									
	Platform Lift (Te)		Hs = 1m (Te)		Hs = 2m (Te)		Hs = 3m (Te)		Hs = 4m (Te)	
	As-Built	Amended	As-Built	Amended	As-Built	Amended	As-Built	Amended	As-Built	Amended
8										
10										
15										
20										
25										
30										
35										
40										
45										

Note: - GREEN values = no change to the as-built load chart, RED values = reduced capacity to the as-built load chart.

AEC-EM-01-001-T03 Rev 0

Appendix L Crane Boom Pathway

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s 47 commercial value