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NUSTAR ENERGY LTD

FUNCTIONAL SAFETY COMMITTEE

MINUTES OF MEETING

NOVEMBER 2016

Rev	Date	By	Checked	Approved	Description	Client Ref.
A	23.11.16	D. R. Ransome		DRR	Issued as Pro-Forma for Meeting	Document No. NU001115_MIN
B	01.12.16	D. R. Ransome	<i>D. Ransome</i>	NuStar Safety Committee	Issued following meeting	

IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED

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Appendices

E/550 Reports

These reports are now contained within a section of NuStar ASANA Faults and Activations



Meeting Date
30th November 2016

1 REVISION HISTORY

Rev	Description
A	Issued as Pro-Forma for meeting.
B	Issued following meeting.



2 ACTION STATUS

2.1 Actions outstanding from Safety Committee Meetings

2.1.1 Actions outstanding from Safety Committee meeting October 2015.

The screenshot shows a task management interface. At the top, it displays the user 'David F', the date 'Yesterday', and several icons (heart, tag, list, link, and more). Below this is a header for the task: 'NuStar Safety Committee Meeting ...' with a date '7th October ...'. The main title of the task is '2015 - 05 - NuStar On-line documentation system to include all third party documentation'. Underneath the title is a 'Description' field. Below the description, there is a link for '4 more comments'. The task has four comments from 'David Ransome':

- 30 Mar at 09:36: 'This action is ongoing and should be completed by the end of April 2016'
- 7 Nov at 15:33: 'Belfast Manual to be completed for November Safety Panel meeting'
- 7 Nov: 'David Ransome changed the due date to Yesterday.'
- Just Posted: 'DRR demonstrated the on-line documentation system and advised the committee that it was now up and running but a few updates would be necessary due to ensuring the correct third party documentation was current.'

At the bottom, a green checkmark indicates that 'David Ransome completed this task.' on 'Today at 09:29'.



2.1.2 Actions outstanding from Safety Committee meeting 5th April 2016.

dp darren.peck... Yesterday

NuStar Safety Committee Meeting Ac... 5th April 2...

✓ **2016 - 01 - E&H Liquiphant's at Belfast - Preventative Maintenance**

Following several failures from Liquiphants lately, due to corrosion and possible water ingress. E&H attended the Safety Committee meeting

✓

FW Nustar Belfast - contract update.msg

3 more comments

David Ransome 7 Apr at 09:40
NuStar to consider SS replacement and decide how to implement seal replacement on aluminum units

dp darren.peck@nustarenergy.com attached 5 Aug at 09:12
FW Nustar Belfast - contract update.msg

dp darren.peck@nustarenergy.com 5 Aug at 09:13
See the attached NuStar contract update from E&H

I have recommended to Paul that he takes the offer up with E&H on preventative maintenance.

David Ransome changed the due date to Yesterday. 7 Nov

David Ransome Yesterday at 09:36
Endress & Hauser are to provide inspection and compex survey during their maintenance visit.

✓ **David Ransome completed this task.** Yesterday at 09:37




sh simon.hunt... 12 May, 20

NuStar Safety Committee Meeting Ac... 5th April 2...


✓ **2016 - 03 - Eastham Tank 247**
Liquiphant probe length to be re-checked


Following E/550 report UKEH013 - 08.02.16 following an early IHLA activation at 11.010m as opposed to 11.200m

[2 more comments](#)

 **David Faulkner** 7 Apr at 13:21
Tank 247 is on site 2. Not part of EH-SIS1 as tested by P&I

David Ransome assigned to darren.peck@nustarenergy.com. 7 Nov
David Ransome changed the due date to Yesterday. 7 Nov

 **darren.peck@nustarenergy.com** 8 Nov at 08:55
Eastham Site 2
Tank 247.
This is a radar and not a Liquiphant?????????

 **David Ransome** Yesterday at 09:41
Confirmed as a RADAR and on site 2 not SIS.
System is to be retested to ensure correct calibration

David Ransome changed the due date to 12 May, 2017. Yesterday
David Ransome assigned to simon.hunter@nustarenergy.com.
Yesterday





David R



30 Nov



NuStar Safety Com...

5th April 2016 ▾



2016 - 07 - Awareness Training for Operators at Eastham

Another course is to be presented at Eastham

David Ransome created task. 5 Apr



David Ransome 8 Apr at 09:58



Arrange a date for Eastham training



dp darren.peck... 30 Dec

NuStar Safety Committee Meeting Ac... 5th April 2...

✓ **2016 - 08 - A working group of the Safety Committee to produce a risk assessment for Cyber Security with respect to the SIS.**

Description

Cyber Security Risk Assessment.pdf
OG - Cyber security at hazardous installations V16 for ex consultation clean copy.pdf

4 more comments

MM Martin Morgan 22 Nov at 10:28
I will prepare a proposed scope of work and methodology for consideration at the safety committee meeting on 30th Nov. Further clarification recently received on expectations and timescale for COMAH sites from HSE at 2016 international functional safety conference in London.

Martin Morgan changed the due date to 28 Nov. 22 Nov
David Ransome changed the name to "2016 - 08 - A working group of the Safety Committee to produce a risk assessment for Cyber Security with respect to the SIS.", [Show Original](#) 22 Nov

David Ransome changed the due date to 30 Dec. Yesterday

MM Martin Morgan Yesterday at 12:52
Proposal issued to DRR for discussion with Nustar

Martin Morgan assigned to you. Yesterday
David Ransome assigned to darren.peck@nustarenergy.com. 09:32

David Ransome Just Posted. [Undo](#)
The proposal was discussed at the meeting and forwarded to Yvette and Darren for consideration.



2.2 Actions outstanding from Functional Safety Assessments

The following list details all the FSA's which have been conducted – the greyed out and ticked FSA's indicate all actions have been completed and the FSA is closed.

The screenshot displays the 'FSA Status' application interface. At the top right, there is a star icon followed by the text 'FSA Status' and a dropdown arrow. Below this, a navigation bar contains the following tabs: 'List' (which is underlined and has a red bar underneath), 'Conversations', 'Calendar', 'Progress', and 'Files'. On the left side of the main content area, there is a blue button labeled 'Add Task'. On the right side, there is a dropdown menu labeled 'View: All Tasks'. The main content area contains a list of 20 FSA entries. Each entry consists of a circular icon on the left, followed by the FSA title, and a date on the right. The icons are either a grey checkmark (indicating a completed FSA) or a green checkmark (indicating an ongoing FSA). The dates are '31 Mar, 2015' for the completed FSAs. The list of FSAs is as follows:

Icon	FSA Title	Date
Grey checkmark	Amsterdam FSA 1 - Tank Overfill SIS	
Grey checkmark	Belfast FSA 4	31 Mar, 2015
Green checkmark	Belfast FSA 5 - Magnetrol Tanks 46 & 47	
Grey checkmark	Belfast FSA 5 - Magnetrol Tanks 4, 5 & 12	
Green checkmark	Clydebank FSA 4	
Green checkmark	Clydebank FSA 5 - Magnetrol Tanks 7 & 9	
Grey checkmark	Clydebank FSA 5 - Tank 4 LoC	
Grey checkmark	Eastham FSA 4	31 Mar, 2015
Green checkmark	Eastham FSA 5 - Dockline 05 H & J Slab	
Green checkmark	Eastham FSA 5 - Dockline 05 D Slab	
Grey checkmark	Eastham FSA 5 - Shell Modifications	
Grey checkmark	Eastham FSA 5 - Chloroform	
Grey checkmark	Eastham FSA 5 - Radar Ranging	
Green checkmark	Grangemouth FSA 3	
Green checkmark	Grangemouth FSA 4	
Green checkmark	Grangemouth FSA 5 - Tanks 101, 102 & 103	
Grey checkmark	Grangemouth FSA 5 - In-Scope Tank Modifications	
Green checkmark	Grays FSA 4	
Green checkmark	Grays FSA 5 - New Red Dockline	



2.2.1 Actions outstanding from Belfast FSA 4

David F 30 Dec

Belfast FSA 4

✓ **15 - SIS Instrumentation and Documentation to reflect tag numbering of P & I Drawings also Instrument Tagging should be consistent with P & I Drawings**

Description

David Ransome created task. 5 Mar, 2015
David Ransome added to Belfast FSA 4. 5 Mar, 2015

David Ransome 5 Mar, 2015 at 17:05
David Ransome on Thursday Mar 05, 2015 01:30 PM:
added to NU271 - Belfast FSA 4

David Ransome changed the due date to 31 May, 2015. 25 Mar, 2015
David Ransome assigned to darren.peck@nustarenergy.com. 25 Mar, 2015

David Ransome changed the due date to 31 Aug, 2015. 3 Aug, 2015

David Ransome 6 Oct, 2015 at 09:12
Dependant on action 14

David Ransome changed the due date to 22 Sep. 4 Aug

David Ransome changed the due date to 17 Nov. 7 Nov

David Ransome 7 Nov at 14:38
P & I Design Ltd have visited site and a meeting with PILZ documents to be revised and update manual.

David Ransome assigned to David Faulkner. 7 Nov

David Ransome Yesterday at 09:51
All documentation updated with the exception of Ethanol Tanks 6 & 11.








David Ransome changed the due date to 30 Dec. Yesterday




The screenshot shows a task management interface. At the top, there is a header with a profile icon 'dp', the name 'darren.peck...', a calendar icon, the date '30 Dec', and several utility icons (heart, eye, trash, edit, and a menu). Below the header, a pink pill-shaped label reads 'Belfast FSA 4'. The main task is displayed with a checkmark icon and the text: '16 - All SIS documentation to be reviewed and ensure that it reflects P& I Drawings and installed system.' Below the task title is a 'Description' section. The task history shows: 'David Ransome created task. 5 Mar, 2015'. A comment by 'David Ransome' dated '5 Mar, 2015 at 17:05' states: 'David Ransome on Thursday Mar 05, 2015 01:31 PM: added to NU271 - Belfast FSA 4'. Further updates include: 'David Ransome assigned to darren.peck@nustarenergy.com. 25 Mar, 2015', 'David Ransome changed the due date to 31 May, 2015. 25 Mar, 2015', and 'David Ransome changed the due date to 31 Aug, 2015. 3 Aug, 2015'. A final comment by 'David Ransome' dated '6 Oct, 2015 at 09:13' says: 'Dependant on Action 14 & 15'.





2.2.2 Actions outstanding from Belfast FSA 5 – Magnetrol Tanks 4, 5 & 12




 David R  30 Dec     




Belfast FSA 5 - Tanks 4, 5 & 12 Magnetrol




 **8 - On completion of testing, completed testing documentation to be issued for review by the FSA.**



 **David Ransome** 11 Nov at 14:10 
The calculations and sketches need a document number assigning and should have revision, author and checker to provide an audit trail.

David Ransome assigned to David Faulkner. 11 Nov



 **David Faulkner**  attached Sunday at 09:28 
[NU271012_CAL_A - IHLA-TK04 Tank 4 Magnetrol Calculation.pdf](#)

 **David Faulkner**  attached Sunday at 09:28 
[NU271013_CAL_A - IHLA-TK05 Tank 5 Magnetrol Calculation.pdf](#)

 **David Faulkner**  attached Sunday at 09:28 
[NU271014_CAL_A - IHLA-TK12 Tank 12 Magnetrol Calculation.pdf](#)








 **David Faulkner** Sunday at 09:29 
Calculations and sketches converted into attached calcs
NU271012/13/14

David Faulkner assigned to you. Sunday
David Faulkner changed the due date to 28 Nov. Sunday
David Faulkner marked today. Sunday
David Ransome changed the due date to Yesterday. Monday
David Ransome changed the due date to 30 Dec. Yesterday

 **David Ransome** Yesterday at 09:54 
Document received, FSA to be completed

2.2.3 Actions outstanding from Eastham FSA 4

The following outstanding actions were reviewed and updated at the October 2015 Safety Committee Meeting.



 David F  16 Dec     



Eastham FSA 4

14 - SIS Instrumentation and Documentation to reflect tag numbering of P & I Drawings also Instrument Tagging should be consistent with P & I Drawings

Description



[2 more comments](#)

 **David Ransome** 25 Mar, 2015 at 11:35 
Once tags received P& I Design to fit during July proof test

 **David Ransome** 6 Oct, 2015 at 09:50 
NuStar to complete tagging of SIS instrumentation

David Ransome assigned to simon.hunter@nustarenergy.com, 6 Oct, 2015
David Ransome changed the due date to 30 Nov, 2015. 6 Oct, 2015

David Ransome changed the due date to 18 Nov. 7 Nov

 **David Ransome** Yesterday at 09:56 
P & I Design to issue instrument schedule to Eastham in order to complete tagging. Once completed Eastham to provide copies of P&I in order for FSA action to be closed.





David R



30 Dec



Eastham FSA 4



15 - All SIS documentation to be reviewed and ensure that it reflects P& I Drawings and installed system.

Description

David Ransome created task. 5 Mar, 2015



David Ransome 5 Mar, 2015 at 16:57



David Ransome on Thursday Mar 05, 2015 02:15 PM:
added to NU231 - Eastham FSA 4

David Ransome assigned to you. 18 Mar, 2015








David Ransome changed the due date to 25 Mar, 2015. 18 Mar, 2015

David Ransome changed the due date to 24 Nov, 2017. 7 Nov

David Ransome changed the due date to 30 Dec. Yesterday



2.2.4 Actions outstanding from Eastham FSA 5 – Shell Modifications



 David F  Monday     

Eastham FSA 5 Shell Modifications



4 - SRS to be re-written to reflect changes

Description

[2 more comments](#)

 **David Ransome** 16 Feb at 11:26 

I have an FSA 5 review on 25th February. I have checked and this action has not been progressed, is it possible to have it updated before the FSA meeting.

 **darren.peck@nustarenergy.com** 16 Feb at 11:32 

Dave



Sorry, is this a request that you are asking of me, or are you requesting from Simon??

Sorry??

Regards

Darren

Darren Peck
NuStar Terminals Ltd
EC&I Manager
Mobile: 07831 130008
Telephone: 01953 453338

 **David Ransome** Yesterday at 09:59 

SRS to be re-issued for review

David Ransome changed the due date to Monday. Yesterday



2.2.5 Actions outstanding from Eastham FSA 5 – Chloroform

sh simon.hunte... Tomorrow

Eastham FSA 5 - Chloroform

1 - Calculation for safe height at SG 1.47

Storage tank damage or rupture as a result of high SG product in non pressure rated tanks. Tank height is 18.2 metres and the maximum safe fill level at SG 1.47 is 10.4 metres. Calculation is based upon SG 1 and tank space at 1700 cubes.

David Ransome created task. 25 Feb
David Ransome added to Eastham FSA 5 - Chloroform. 25 Feb

David Ransome 25 Feb at 09:37
NuStar to confirm with a documented calculation

David Ransome assigned to simon.hunter@nustarenergy.com. 25 Feb
David Ransome changed the due date to 4 Mar. 25 Feb

David Ransome changed the due date to 17 Nov, 2017. 7 Nov

David Ransome changed the due date to Tomorrow. Yesterdav



sh simon.hunte...  Tomorrow     

Eastham FSA 5 - Chloroform

2 - MoC for this modification to be completed.

Description

David Ransome created task. 25 Feb
David Ransome added to Eastham FSA 5 - Chloroform. 25 Feb
David Ransome assigned to simon.hunter@nustarenergy.com. 25 Feb
David Ransome changed the due date to 4 Mar. 25 Feb

David Ransome changed the due date to 17 Nov, 2017. 7 Nov

David Ransome changed the due date to Tomorrow. Yesterday










David Ransome Yesterday at 10:15




There is a difficulty with this modification in that the logic solver cannot handle the analog inputs. It is intended to complete this FSA based on determination of LoC as progress will be as and when the logic solver is updated, and this will require a further FSA 5.



2.2.6 Actions outstanding from Eastham FSA 5 – Radar Ranging

 **simon.hunter...**  **9 Dec**     

Eastham FSA 5 - Radar Ranging

 **1 - MoC for this modification to be completed.**

Description








David Ransome created task. 26 Feb
David Ransome added to Eastham FSA 5 - Radar Ranging. 26 Feb
David Ransome assigned to simon.hunter@nustarenergy.com. 26 Feb
David Ransome changed the due date to 4 Mar. 26 Feb

David Ransome changed the due date to 17 Nov, 2017. 7 Nov


David Ransome changed the due date to 9 Dec. Yesterday



2.2.7 Actions outstanding from Amsterdam FSA 1



 **David R**  **30 Jun**     

Amsterdam FSA 1 FSA Actions ▾



 **5 - Safety Instrumented System Procedures To be developed**

Description

David Ransome created task. 19 May
David Ransome added to Amsterdam FSA 1. 19 May
David Ransome assigned to David Faulkner. 19 May
David Ransome changed the due date to 30 Jun. 19 May








 **David Ransome** Yesterday at 10:31 
Policy & Lifecycle document updated to reflect UK & EU terminals.

David Ransome assigned to you. Yesterday


 **David Ransome completed this task.** Yesterday at 10:31 



2.2.8 Actions outstanding from Clydebank FSA 5 – Tank 4 LoC

 David F  Tomorrow     



Clydebank FSA5 - Tank 4 LoC








 **FSA 5 Action 1**

The current SRS NU221003_RPT details the SIS for all of the terminal's storage tank SIF's. It will be necessary to revise and update this in line with the modification.


Dave Regan created task. 23 Nov
Dave Regan added to Clydebank FSA5 - Tank 4 LoC. 23 Nov
Dave Regan assigned to Dave Regan. 23 Nov

David Ransome assigned to David Faulkner. Yesterday
David Ransome assigned to Dave Regan. Yesterday
David Ransome changed the due date to 9 Dec. Yesterday
David Ransome assigned to David Faulkner. Yesterday
David Ransome changed the due date to Tomorrow. Yesterday

 **David Ransome** Yesterday at 10:36 
Append revised SRS for FSA review



 darren.peck...  Due ...     



Clydebank FSA5 - Tank 4 LoC

 **FSA 5 Action 2**

Pliz are to attend site to amend the activation pointin the PSS software.

Dave Regan created task. 23 Nov
Dave Regan added to Clydebank FSA5 - Tank 4 LoC. 23 Nov
Dave Regan assigned to darren.peck@nustarenergy.com. 23 Nov

 **darren.peck@nustarenergy.com** 23 Nov at 19:46 
Completed and witnessed by DF P&I Design

 **darren.peck@nustarenergy.com completed this task.** 23 Nov at 19:46 

 **darren.peck...**  **Tomorrow**     


Clydebank FSA5 - Tank 4 LoC

✓ FSA 5 Action 3

Ensure the P&I D's are in accordance with the proposed installed system.

Dave Regan created task. 23 Nov
Dave Regan added to Clydebank FSA5 - Tank 4 LoC. 23 Nov
Dave Regan assigned to you. 23 Nov
Dave Regan assigned to darren.peck@nustarenergy.com. 23 Nov

David Ransome changed the due date to Tomorrow. Yesterday

 **David Ransome** Yesterday at 10:45 
P&I to be uploaded

 **Dave R**  **9 Dec**     

Clydebank FSA5 - Tank 4 LoC

✓ FSA 5 Action 4

The schematic overview drawing NU211003_DWG to be updated as part of the SRS.

 [NU211003_DWG_B - CL-SIS1 Schematic Overview.pdf](#)

Dave Regan created task. 23 Nov
Dave Regan added to Clydebank FSA5 - Tank 4 LoC. 23 Nov
Dave Regan assigned to David Faulkner. 23 Nov

 **David Faulkner**  **attached** Sunday at 10:21 
[NU211003_DWG_B - CL-SIS1 Schematic Overview.pdf](#)

David Faulkner assigned to Dave Regan. Sunday
David Faulkner changed the due date to 28 Nov. Sunday

 **David Faulkner** Sunday at 10:22 
Drawing attached for FSA5 Approval

David Ransome changed the due date to 9 Dec. Yesterday



David F Due Date

Clydebank FSA5 - Tank 4 LoC

✓ FSA 5 Action 5

Full test to be carried out following removal of tank floating deck and modification to gauge IHLA setting.

- NU211103_RPT_C_CC20161021 - CL-SIS1 Shutdown Conditions SIF Proof Testing.pdf
- NU211102_RPT_C_CC20161021 - CL-SIS1 Documentation Verification.pdf
- NU211102_SCH_C_CC20161021 - CL-SIS1 SIF Testing Matrix.pdf

Dave Regan created task. 23 Nov
Dave Regan added to Clydebank FSA5 - Tank 4 LoC. 23 Nov
Dave Regan assigned to you. 23 Nov
Dave Regan assigned to David Faulkner. 23 Nov

David Faulkner attached Sunday at 10:13
NU211103_RPT_C_CC20161021 - CL-SIS1 Shutdown Conditions SIF Proof Testing.pdf

David Faulkner attached Sunday at 10:13
NU211102_RPT_C_CC20161021 - CL-SIS1 Documentation Verification.pdf

David Faulkner attached Sunday at 10:13
NU211102_SCH_C_CC20161021 - CL-SIS1 SIF Testing Matrix.pdf


✓ David Faulkner completed this task. Sunday at 10:13



2.2.9 Actions outstanding from Grangemouth FSA 5 – In Scope Tank Modifications

 yvette.davis...  9 Dec     


Grangemouth FSA 5 - In Scope ... ACTIONS FROM ... ▾

 **1 - Conduct an assessment to ensure the protection proposed is suitable for all stored products**


Some products, although not in-scope as far as PSLG is concerned may require assessment with regards to the companies responsibility in complying with COMAH.

David Ransome created task. 13 Apr
David Ransome added to Grangemouth FSA 5 - In Scope Tanks .
13 Apr
David Ransome assigned to yvette.davis@nustarenergy.com. 13 Apr

David Ransome unassigned from yvette.davis@nustarenergy.com.
11 Nov
David Ransome assigned to you. 11 Nov
David Ransome changed the due date to Yesterday. 11 Nov

 **David Ransome** 11 Nov at 15:20 
Following the initial project conception and following the initial meeting of the FSA 5. NuStar have been in discussions with the HSE regarding this project. Status to be updated at the November 2016 Safety Panel Meeting.

David Ransome changed the due date to 9 Dec. Yesterday
David Ransome assigned to yvette.davis@nustarenergy.com.
Yesterday

 **David Ransome** Yesterday at 10:39 
NuStar have conducted a LOPA and are awaiting a response from HSE.

2.3 HSE Visits

No SIS related HSE visits since last safety meeting.



3 SAFETY COMMITTEE MEETINGS

The object of this committee is for NuStar Energy Ltd to organise and control the Safety Instrumented Systems throughout their UK facility to ensure satisfactory operation, functional safety and compliance with the international standard BS EN 61511.

Date of Meeting	30/11/2016	
Location	NuStar Belfast Terminal	
Present		
Name	Company & Position	Competence
Simon Hunter	NuStar Eastham – Terminal Engineering Manager	Mechanical Engineering BEng (Hons) with over 15 years' experience as an Engineer on Oil Storage Terminals. Five years at NuStar managing the Engineering Maintenance, Inspection and Testing.
Darren Peck	NuStar UK - EC&I Engineering Manager	Over 20 years' experience in the petrochemical process industry ranging from design through to installation and commissioning.
Yvette Davis	NuStar UK - Senior Manager for HSE	Over 17 years' experience in managing HSE in TT COMAH sites, 8 years' experience in Fuel Storage Terminals, managing both Process and occupational safety aspects.
David Ransome Chair	P & I Design Ltd – Consultant	Chartered Engineer and a Fellow of the Institute of Measurement and Control with over 40 years' experience in the Chemical and Process Industry, specialising in High Integrity Protection Systems and Safety Instrumented Systems. Registered Functional Safety Engineer.
David Faulkner	P & I Design Ltd – Engineer	Involved in the maintenance and commissioning of Process Plants, Storage Facilities and Safety Instrumented Systems for over 15 years. Experience includes on-shore systems, including high integrity protection systems. A qualified Functional Safety Specialist.
Paul Price	NuStar Eastham Site Engineer	Mechanical Engineering BEng (Hons) with over 8 years' experience as a mechanical Engineer. Two year's experience on Oil Storage Terminals.
Neil Woodley	Engineering Manager Belfast & Clydebank	Hons degree in Chemical Engineer, over 20 years working for NuStar on various sites. Currently Engineering Manager for Belfast & Clydebank



3.1 Minutes of Previous Meeting

The minutes of the previous meeting NU00114_MIN Revision C were reviewed; some actions remain incomplete. See Section 2 of these minutes.

Actions within an FSA are to be controlled within the relevant FSA. Outstanding actions from FSA's are detailed in Section 2 of these minutes.



4 MANAGEMENT OF FUNCTIONAL SAFETY

4.1 SIS Performance including any maintenance, failures, activations and false alarms.

See ASANA for E/550 reports.

4.1.1 Belfast

Belfast:

UKBF001 - Tank 29 - 07.05.13 - Liquiphant	SD	Comp Fail	
UKBF002 - Tank 27 - 19.08.13 - Liquiphant	SD	Comp Fail	
UKBF003 - Tank 34 - 20.09.13 - Nivotester	SD	Comp Fail	
UKBF004 - Tank 5 - 01.06.14 - Radar		Mainten...	
UKBF005 - Tank 21 - 18.05.15 - Liquiphant	SD	Comp Fail	
UKBF006 - Tank 30 - 01.08.15 - Liquiphant	SD	Comp Fail	
UKBF007 - Tank 6 - 12.08.15	SD	Operations	
UKBF008 - Tank 50 - 15.08.15 - Nivotester	SD	Spurious	
UKBF009 - Tank 50 - 15.08.15 - Liquiphant	SD	Comp Fail	
UKBF010 - Tank 18 - 15.10.15 - Liquiphant	SD	Comp Fail	
UKBF011 - Tank 19 - 10.11.15 - Nivotester	SD	Comp Fail	
UKBF012 - Tank 49 - 21.12.15 - Liquiphant	SD	Comp Fail	
UKBF013 - Tank 14 - 04.01.16 - Liquiphant	SD	Comp Fail	
UKBF014 - IHLA SIS - PSU	SD	Comp Fail	
UKBF015 - Tank 08 - 05.04.16 - Liquiphant	SD	Comp Fail	30 Dec
UKBF016 - Tank 17 - 14.06.16		Demand	9 Dec



4.1.2 Clydebank

Clydebank:		
<input checked="" type="checkbox"/>	UKCL006 - Tank 7 - 27.03.14	SD Spurious
<input checked="" type="checkbox"/>	UKCL007 - Tank 2 - 29.04.14	SD Comp Fail
<input checked="" type="checkbox"/>	UKCL008 - Tank 9 - 06.05.14	SD Spurious
<input checked="" type="checkbox"/>	UKCL009 - Tank 9 - 27.05.14	SD Spurious
<input checked="" type="checkbox"/>	UKCL010 - Tank 9 - 20.06.14	SD Spurious
<input checked="" type="checkbox"/>	UKCL011 - Tank 9 - 30.06.14	SD Spurious
<input checked="" type="checkbox"/>	UKCL012 - Tank 7 - 03.09.14	SD Spurious
<input checked="" type="checkbox"/>	UKCL013 Tank 9 - 24.11.14	SD Spurious
<input checked="" type="checkbox"/>	UKCL014 - Tank 9 - 16.01.15	DD Comp Fail
<input checked="" type="checkbox"/>	UKCL015 - Tank 2 - 28.04.14	DD Comp Fail
<input checked="" type="checkbox"/>	UKCL016 - Tank 2 - 06.05.15	DD Comp Fail
<input checked="" type="checkbox"/>	UKCL017 - Tank 13 - 26.09.15	SD Comp Fail
<input checked="" type="checkbox"/>	UKCL018 - Tank 1 - 11.06.15	SD Operations
<input checked="" type="checkbox"/>	UKCL019 - Tank 1 - 23.06.15	SD Operations
<input checked="" type="checkbox"/>	UKCL020 - Tank 2 - 03.30.15 - Valve Fault	DD Demand
<input checked="" type="checkbox"/>	UKCL021 - Tank 7 - 23.11.15 - Maintenance Activity caused fault	SD Maintena...
<input checked="" type="checkbox"/>	UKCL022 - Tank 1 - 05.04.16	SD Spurious 30 Dec
<input checked="" type="checkbox"/>	UKCL-023 - Tank 7 - 19.04.16	SD Spurious 9 Dec

4.1.3 Eastham

Eastham:		
<input checked="" type="checkbox"/>	UKEH004 - TIC1 - 28.03.14	SD Spurious
<input checked="" type="checkbox"/>	UKEH005 - TK83 - 09.06.14	SD Spurious
<input checked="" type="checkbox"/>	UKEH006 DLO2 - 15.10.14	SD Comp Fail
<input checked="" type="checkbox"/>	UKEH007 DLO3 (Not SIS) - 20.02.15	SD Comp Fail
<input checked="" type="checkbox"/>	UKEH008 PLIZ Fail - 02.03.15	SD Comp Fail
<input checked="" type="checkbox"/>	UKEH009 - Tank 18 - 20.05.15	SD Operations
<input checked="" type="checkbox"/>	UKEH011 - Tank 60 - Radar - Spurious Alarm in empty tank - 26.10.15	SD Spurious
<input checked="" type="checkbox"/>	UKEH012 - DLO2-ESV - Dockline valve closed but no indication was received as control failure 30.10.15	DD Comp Fail
<input checked="" type="checkbox"/>	UKEH013 - Tank 247 - IHLA seems to be set too low in the tank7 - 08.02.16	SD Demand
<input checked="" type="checkbox"/>	UKEH-014 - Tank 42 - 05.05.16	SD Spurious Tomorrow
<input checked="" type="checkbox"/>	UKEH015 - Tank 60 - 10.06.16	SD Spurious 9 Dec
<input checked="" type="checkbox"/>	UKEH016 - Tank 30 - 22.07.16	SD Spurious 9 Dec
<input checked="" type="checkbox"/>	UKEH017 - Tank 30 - 05.08.16	SD Spurious 9 Dec
<input checked="" type="checkbox"/>	UKEH018 - Tank 56 - 26.09.16	SD Spurious 9 Dec
<input checked="" type="checkbox"/>	UKEH019 - Tank 56 - 29.09.16	SD Spurious 9 Dec



4.1.4 Grangemouth

Grangemouth:	
<input checked="" type="checkbox"/> UKGR002 - TK49 - 10.01.14	Demanded Operations
<input checked="" type="checkbox"/> UKGM005 - TK54 - 10.03.14	SD Spurious
<input checked="" type="checkbox"/> UKGM006 - Tank 43 - 20.01.15	SD Systematic
<input checked="" type="checkbox"/> UKGM007 - Tank 81 - 08.06.15	SD Maintenance
<input checked="" type="checkbox"/> UKGM008 - ESV - 12.05.15	SD Operations
<input checked="" type="checkbox"/> UKGM008 (Duplicated No) - Tank 87 - 20.10.15	SD Comp Fail
<input checked="" type="checkbox"/> UKGM009 - Tank 89 - 15.02.16	SD Spurious
<input checked="" type="checkbox"/> UKGM010 - Dens Receipt Line - 20.02.16	SD Operations
<input checked="" type="checkbox"/> UKGM011 - PIDA Import Line	SD Operations
<input checked="" type="checkbox"/> UKGM012 - MCC01	SD Comp Fail
<input checked="" type="checkbox"/> UKGM013 - Tank 88 - 31.03.16	SD Spurious
<input checked="" type="checkbox"/> UKGM014 - Tank 53 - 31.03.16	SD Spurious
<input type="checkbox"/> UKGM-015 - Tank 54 - 11.05.16	SD Spurious Tootonow
<input type="checkbox"/> UKGM016 - PILZ PLC Output module failure	SD Comp Fail

4.1.5 Grays

Grays:	
<input checked="" type="checkbox"/> UKGR003 Tank 18 - 07.10.14	SD Spurious
<input checked="" type="checkbox"/> UKGR004 Tank 18 - 03.10.14	SD Spurious
<input checked="" type="checkbox"/> UKGR005 - Tank 44 - 27.07.16	SD Spurious 9 Dec

Maintenance:



4.2 Lifecycle Documentation

The on-line documentation system controlled by P & I Design Ltd is now fully operational and is currently being populated with all NuStar Energy documentation.

The uploading of documentation has been ongoing over the last few months, but is now well underway. Some difficulties have been encountered in ensuring the correct third party documentation is the current and latest versions.

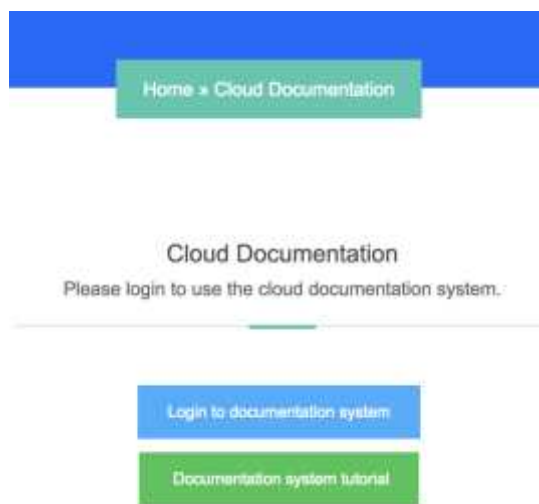
The client interface has also been changed to simplify the method of entering the on-line documentation system. The procedure is now:

Utilising an internet browser go to:

1. www.pidesign.co.uk



2. Click on the top banner – Cloud Documentation



3. Click on – Login to documentation system



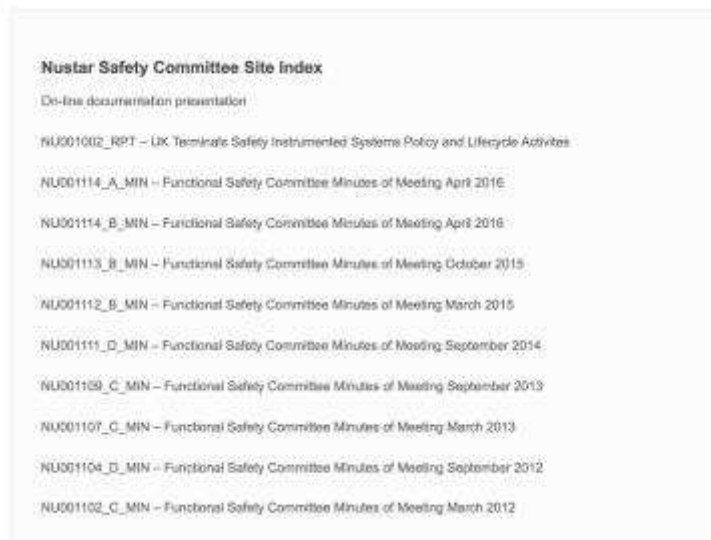


4. Enter Username and Password

Username is:

Safety Committee - The user name and password were issued at the Safety Committee meeting.

Click on Log In



5. Click on required document or manual



4.3 Functional Safety Management System

Dave Ransome outlined that IEC61511: 2016 has strengthened the requirements related to the of management of SIS, and as such the following will need to be modified or created:

4.3.1 Policy & Lifecycle Activities Document

Following the original issue of the Policy and Life-cycle activities document, which has previously been issued, it is now necessary to modify this document in line with IEC61511: 2016.

ACTION 2016 – 09: Update Policy Document in line with changes resulting from IEC61511: 2016 Completed

4.3.2 Functional Safety Management System (FSMS)

The SIS requires a FSM system, which includes auditable procedures and records, for the following:

- Competency management;
- HRA and SIL determination;
- SIS Validation, verification and proof testing;
- Operation and Maintenance activities;
- Management of Change;
- Functional Safety Assessments and audits;
- Monitoring of the SIS performance and corrective actions;
- Configuration Management;
- SIS Security.

The safety committee discussed each of the above, see below:

4.3.2.1 Competency management

The requirements:

Persons, departments or organisations involved in SIS safety lifecycle activities shall be competent to carry out the activities for which they are accountable;

A procedure shall be in place to manage competence of all those involved in the SIS life cycle. Periodic assessments shall be carried out to document the competence of individuals against the activities they are performing.

NuStar employee competence system is managed through the Safety Management System. Where necessary suppliers of SIS related systems are asked to demonstrate their competency systems to NuStar.

4.3.2.2 HRA and SIL determination

Hazard & Risk Assessments have been carried out and are reviewed as necessary in consideration of Functional Safety Assessment 4 & 5. SIL determination is conducted by third party companies during the design phase of the SIS.



4.3.2.3 SIS Validation, verification and proof testing

SIS Validation, verification and proof testing is performed at the required life-cycle phases. Through the safety committee these activities are regularly reviewed and if gaps are identified then improvements are made.

4.3.2.4 Operation and maintenance activities

NuStar have SAP which is utilised for maintenance activities. SIS equipment is uniquely identified within SAP. Operators are aware of their responsibilities through training and when issues arrive, such as faults or activations they utilise the E/550 form to report the problem. Override procedures of the SIS are well defined and require authorisation before being initiated.

4.3.2.5 Management of Change

NuStar Energy have included management of change to the SIS within their company based MoC procedures and the company recognises the need for Functional Safety Assessments when a modification to the SIS is required. The company has to date conducted or have in progress 12 - FSA 5's.



4.3.2.6 Functional Safety Assessments and Audits

4.3.2.6.1 Assessments

Functional Safety Assessments are conducted at the relevant life-cycle phase. To date the SIS have been subjected to:

- FSA 1 – 1 (This is for a new SIS at Amsterdam)
- FSA 3 – 1 (For a completely revised SIS at Grangemouth)
- FSA 4 – 5 (One at each of the UK terminals, planning for future FSA 4 is controlled by the safety committee)
- FSA 5 – 12 off

The company now recognises that FSA are to be conducted at the relevant life-cycle phase.

FSA 4's were conducted in 2011, the company have been pro-active in the monitoring and development of the SIS through the Safety Committee. FSA 4's have not been conducted, as originally intended in 2016, they have been delayed awaiting the issue of IEC61511:2016. It is the intention of NuStar to refine and develop their FSMS and conduct an audit on it. Furthermore, it is intended to perform a FSA 4 at each terminal throughout 2017

4.3.2.6.2 Audits

The purpose of the Functional Safety Audit is to review SIS procedures and records to determine whether the functional safety management system (FSMS) is in place, up to date, and being followed.

Including:

- A review of all the SIS policies and procedures;

- An audit that personnel are following the procedures and that the latest version of the procedures are used.

Audits are typically carried out by an independent person familiar with carrying out audits, such as a quality manager, with obvious reference to IEC61511. Where gaps are identified, improvements should be made.

The Safety Committee felt that it would be appropriate for their QA auditors to audit to audit the FSMS. However, training in IEC61511 would need to be provided to them prior to the audits.

ACTION 2016 – 10: Arrange IEC61511 appreciation training for auditors.



4.3.2.7 Performance Monitoring

Procedures shall be implemented to evaluate the performance of the SIS against its safety requirements to:

- identify and prevent systematic failures;
- assess whether reliability parameters of the SIS are in accordance with those assumed during the design;
- define the necessary corrective action to be taken if the failure rates are greater than what was assumed during design;
- compare the demand rate on the SIF during actual operation with the assumptions made during risk assessment when the SIL requirements were determined.

NuStar Energy have procedures and forms in place for the monitoring of all activations, failures, maintenance activities and modifications to their SIS. The safety committee reviews all activations, spurious trips at their 6-monthly meeting. Further enhancements are in place to provide performance monitoring against the designed pdf, SIL, spurious trip rate and the demand rate.

The proposed database to compare installed SIS reliability parameters is being developed by P & I Design Ltd with a view of not only containing NuStar Energy SIS components, but also other client's data to provide all clients with a greater volume for assessment. Client confidentiality is obviously respected and both individual client installed component data and the wider community data can be provided. Examples of the intended output is shown below:

The screenshot shows a software application window titled 'Components'. It has a tabbed interface with 'Components' selected. The main area contains a form for adding a new component. The fields are as follows:

ComponentID	1	Add a new Component
Element Sub-System	Sensor	
Technology	Vibronics	
Manufacturer	Endress & Hauser	
Model	Liquiphant	
Model Series		
Manufacturers Claimed PFD	1.50E-08	
Manufacturers Claimed SIL	3	Save
Manufacturers SFF	0.95	Save & Close
Proof Test Interval	8760	

Below the form, there is a table titled 'Components added:'. The table has the following columns: Component, Element Sub-System, Technology, Manufacturer, Model, and Manufacturers Claimed PFD.

Component	Element Sub-System	Technology	Manufacturer	Model	Manufacturers Claimed PFD
1	Sensor	Vibronics	Endress & Hauser	Liquiphant	0.0015
2	Sensor	Nivotester	Endress & Hauser	Nivotester	0.0015
3	Logic Solver	Vibronics	Vega	Vegaswing 63	0.00011
4	Final Element	Vibronics	Vega	Vegator 636	0.00047
5	Logic Solver	Radar	Vega	Vegaplus 61	0.00157
6	Final Element	Isolator	Pepperl & Fuchs	KFD2-CRG2-Ex	0.000394
7	Sensor	Radar	Endress & Hauser	Radar	0.00011
8	Logic Solver	Displacer	Magnetrol		

Demonstrating "Prior Use" Data

Printed on: 08 September 2016

ComponentID	Manufacturer	Model	Device Type				
2	Endress & Hauser	Nivotester	Nivotester				
Number in Use:	101						
Hours in Use:	2.91E+06						
Years in Use:	382.5						
<u>Number of Failures:</u>		<u>Failure rates /hr:</u>	<u>Dangerous Undetected Failures:</u>				
Safe Detected:	2	λSD: 6.87E-07	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>FailureDate</th> <th>Report Link</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">22/08/2016</td> <td style="text-align: center;">RPTS/Report 123</td> </tr> </tbody> </table>	FailureDate	Report Link	22/08/2016	RPTS/Report 123
FailureDate	Report Link						
22/08/2016	RPTS/Report 123						
Safe Undetected:	2	λSU: 6.87E-07					
Dangerous Detected:	3	λDD: 1.03E-06					
Dangerous Undetected:	1	λDU: 3.43E-07					
Total Failures:	8	λD: 1.37E-06					
MTTR (Hrs):	3.29						
SFF:	0.875	Manufacturer's Claimed SFF:	0.87				
Proof Test Interval (Hrs):	8760						
tce (Hrs):	1098.3						
PFDF avg:	1.51E-03	Manufacturer's Claimed PFDF:	1.50E-03				
SIL Capability:	2	Manufacturer's Claimed SIL:	2				

Recommended actions:

• The probability of failure on demand has been calculated as higher than is claimed by the manufacturer. You must check all systems which use this component to check they have the appropriate SIL.

InstanceID	Component	Client Sub-System	Manufacturer	Technology	Model	Model Name	Facility	SR	Duty	Client	#	FailureDate	Description	Report Link	Type	MTTR hrs
36	1 Sensor		Endress & Hauser	Vibronics	Liquiphant		Belfast	Overfill	Tank 40	Client2		04/04/2016	Report 3337	RPTS/Report 123	Safe Detected	1
32	1 Sensor		Endress & Hauser	Vibronics	Liquiphant		Belfast	Overfill	Tank 41	Client2		11/04/2016	Report 3363		Safe Detected	5
124	2 Sensor		Endress & Hauser	Nivotester	Nivotester		Belfast	Overfill	Tank 30	Client2		12/05/2016	Report 3343		Safe Undetect	1
37	1 Sensor		Endress & Hauser	Vibronics	Liquiphant		Belfast	Overfill	Tank 48	Client2		15/08/2016	Report 1234		Safe Undetect	0
33	1 Sensor		Endress & Hauser	Vibronics	Liquiphant		Belfast	Overfill	Tank 45	Client2		15/08/2016	Report 1212		Dangerous Det	5
34	1 Sensor		Endress & Hauser	Vibronics	Liquiphant		Belfast	Overfill	Tank 50	Client2		15/08/2016	Report 1234	RPTS/Report 123	Dangerous Undet	1
120	2 Sensor		Endress & Hauser	Nivotester	Nivotester		Belfast	Overfill	Tank 41	Client2		16/08/2016	Report 1342		Dangerous Det	1
182	2 Sensor		Endress & Hauser	Nivotester	Nivotester		Belfast	Overfill	Tank 1	Client2		04/08/2016	Re		Dangerous Det	5
31	1 Sensor		Endress & Hauser	Vibronics	Liquiphant		Belfast	Overfill	Tank 41	Client2		18/08/2011	Report 3363		Safe Detected	1
20	1 Sensor		Endress & Hauser	Vibronics	Liquiphant		Belfast	Overfill	Tank 27	Client2		17/08/2016			Safe Undetect	3
243	5 Logic Solver		Veega	Radar	VeegaPlus II		Belfast	OverTemp	Tank24	Client2		18/08/2016			Safe Detected	1
34	1 Sensor		Endress & Hauser	Vibronics	Liquiphant		Belfast	Overfill	Tank 18	Client2		22/08/2016			Safe Detected	0
18	1 Sensor		Endress & Hauser	Vibronics	Liquiphant		Belfast	Overfill	Tank 22	Client2		22/08/2016			Safe Undetect	1
23	1 Sensor		Endress & Hauser	Vibronics	Liquiphant		Belfast	Overfill	Tank 30	Client2		22/08/2016			Safe Detected	0
36	1 Sensor		Endress & Hauser	Vibronics	Liquiphant		Belfast	Overfill	Tank 33	Client2		22/08/2016	Report 1233	RPTS/Report 123	Dangerous Undet	3
125	2 Sensor		Endress & Hauser	Nivotester	Nivotester		Belfast	Overfill	Tank 31	Client2		22/08/2016			Safe Detected	0
124	2 Sensor		Endress & Hauser	Nivotester	Nivotester		Belfast	Overfill	Tank 30	Client2		18/08/2016			Safe Detected	0
134	2 Sensor		Endress & Hauser	Nivotester	Nivotester		Belfast	Overfill	Tank 45	Client2		22/08/2016	Report 4324		Safe Undetect	0

All Failures1

Client Sub-System	Manufacturer	Model	Facility	SR	Duty	Client	FailureDate	Description	Report Link	Type	MTTR hrs
Sensor	Endress & Hauser	Nivotester	Belfast	Overfill	Tank 31	Client2	22/08/2016			Safe Detected	2
Sensor	Endress & Hauser	Nivotester	Belfast	Overfill	Tank 45	Client2	22/08/2016	Report 4324		Safe Undetected	6
Sensor	Endress & Hauser	Nivotester	Belfast	Overfill	Tank 30	Client2	12/05/2016	Report 3343		Safe Undetected	1
Sensor	Endress & Hauser	Nivotester	Belfast	Overfill	Tank 30	Client2	10/08/2016			Safe Detected	
Sensor	Endress & Hauser	Liquiphant	Belfast	Overfill	Tank 50	Client2	22/08/2016	Report 1233	RPTS/Report 1233	Dangerous Undet	3
Sensor	Endress & Hauser	Nivotester	Belfast	Overfill	Tank 1	Client2	04/08/2016	Re		Dangerous Detect	5
Sensor	Endress & Hauser	Liquiphant	Belfast	Overfill	Tank 18	Client2	22/08/2016			Safe Detected	7
Sensor	Endress & Hauser	Liquiphant	Belfast	Overfill	Tank 22	Client2	22/08/2016			Safe Undetected	1
Sensor	Endress & Hauser	Liquiphant	Belfast	Overfill	Tank 45	Client2	15/08/2016	Report 1212		Dangerous Detect	0
Sensor	Endress & Hauser	Liquiphant	Belfast	Overfill	Tank 48	Client2	15/08/2016	Report 1234		Safe Undetected	2
Sensor	Endress & Hauser	Liquiphant	Belfast	Overfill	Tank 41	Client2	11/04/2016	Report 3363		Safe Detected	1
Sensor	Endress & Hauser	Liquiphant	Belfast	Overfill	Tank 41	Client2	16/08/2011	Report 3363		Safe Detected	1
Sensor	Endress & Hauser	Liquiphant	Belfast	Overfill	Tank 40	Client2	04/04/2016	Report 3337	RPTS/Report 1237	Safe Detected	1
Sensor	Endress & Hauser	Nivotester	Belfast	Overfill	Tank 41	Client2	16/08/2016	Report 1342		Dangerous Detect	1
Sensor	Endress & Hauser	Liquiphant	Belfast	Overfill	Tank 50	Client2	15/08/2016	Report 1234	RPTS/Report 1234	Dangerous Undet	1
Sensor	Endress & Hauser	Liquiphant	Belfast	Overfill	Tank 30	Client2	22/08/2016			Safe Detected	2
Sensor	Endress & Hauser	Liquiphant	Belfast	Overfill	Tank 27	Client2	17/08/2016			Safe Undetected	3



4.3.2.8 Configuration Management

Although configuration management is more specific to manufactures of components and software development of the SIS, there is a requirement for end users to control changes with respect to maintaining continuity of the system by ensuring traceability of any changes throughout the SIS lifecycle.

In the case of NuStar which utilise programmable logic solvers this entails control of updates of the safety plc code – version numbers – traceability and audibility of changes
Sensor change – like for like? – Firmware version – Serial Number

ACTION 2016 – 11 - A letter to be sent to PILZ asking them to provide information on how the control version and Cyber Security of the logic solver software for NuStar.

4.3.2.9 SIS Security

End Users shall develop and conduct a risk assessment;

An example for achieving this could be:

- Identify all threats;
- Assign a risk level to each threat;
- Assess the consequence of each threat;
- Identify where vulnerabilities lie;
- Review adequacy of current protection measures;
- Plan and implement additional protection measures.

NuStar Energy have already recognised the importance of not only SIS security but also that of the BPCS. Action 2016 – 08 is already in place to risk assess the SIS and associated control systems.

See Also ACTION 2016 – 11.



4.4 SIS Testing, planning, results, data collection and analysis.

Testing Schedule:

Terminal	Last Test Done	Scheduled Next Test
Belfast	<p>11th May 2016</p> <p>Valve closure times are shown within the testing document for 90 seconds. This is applied to all valves and may only be required on Dockline valves. During the testing many valves closed quicker.</p> <p>ACTION 2016 – 12: Confirmation of correct valve closure times and update of testing document.</p> <p>Further corrosion identified on liquiphants.</p> <p>Tank 9 was not wet tested due to sticking collar.</p> <p>Tamper proof labels – See 4.4.1</p> <p>Tank 46 & 47 are in-accessible so testing was performed per channel as opposed to in the head of the device</p>	April 2017
Clydebank	<p>24th October 2016</p> <p>It was observed that Tank 6 was on Road off-loading and the SRS shows it as dockline import. This modification was done several years ago.</p> <p>ACTION 2016 - 13: Update SRS to reflect Tank 6 current operation.</p> <p>It was brought to the attention of the safety committee that a pump control system is within the software of the SIS plc and that it is not tested.</p> <p>ACTION 2016 – 14: Update the SRS to reflect the SIS interface with pump 41.</p> <p>ACTION 2016 – 15: Tank 22 Temperature is within the SIS, this is not within the SRS. It is no longer required as no exotherm possible. It was decided to add it to the SRS rather than remove it from the SIS application software.</p>	November 2017
Eastham	<p>8th August 2016</p> <p>Some ESV's have an override facility on top of the valve, following testing it appears that this facility can lock in the air and prevent the valve closing.</p> <p>ACTION 2016 - 16: The override lever to be removed from the ESV's.</p> <p>ACTION 2016 – 17: NuStar to investigate the override on DL3 with a view to removal or locking off.</p>	July 2017
Grangemouth	<p>10th February 2016</p> <p>Sensor heights confirmed. Labels missing.</p>	February 2017
Grays	<p>21st April 2016</p> <p>See 4.8.2</p>	April 2017



4.4.1 Tamper Proof Labels Review



The screenshot shows a meeting agenda item for 'Tamper Proof Labels Review'. At the top, it lists 'David R' with a profile picture, a calendar icon, and the date '30 Nov'. Below this are several circular icons for actions like 'Like', 'Share', 'Comment', 'Edit', and 'More'. The item title is 'Tamper Proof Labels Review' with a checkmark icon. The description reads: 'Attachment method and usage not consistent across all terminals. NuStar wish to retain. Need a procedure to justify why a label may of been tampered will or else proof test will mark down as possible unauthorised modification . Agree attachment method, e.g. label across lid etc:'.

Following discussion this was converted into an action:

ACTION 2016 – 19: Tamper Proof Labels Review

4.5 Training requirements and roles and responsibilities of employees and contractors.

Future training requirements: Eastham require a training for new operators.
Training of Audits as discussed in Section 4.3.2.6.2.

ACTION 2016 - 07: Date to be agreed for Eastham training course.

ACTION 2016 - 10 - Arrange IEC61511 appreciation training for auditors.

4.6 Review of organisation and resources.

There have been no changes to the organisation and resources and NuStar Energy feel that management of the systems is satisfactory.

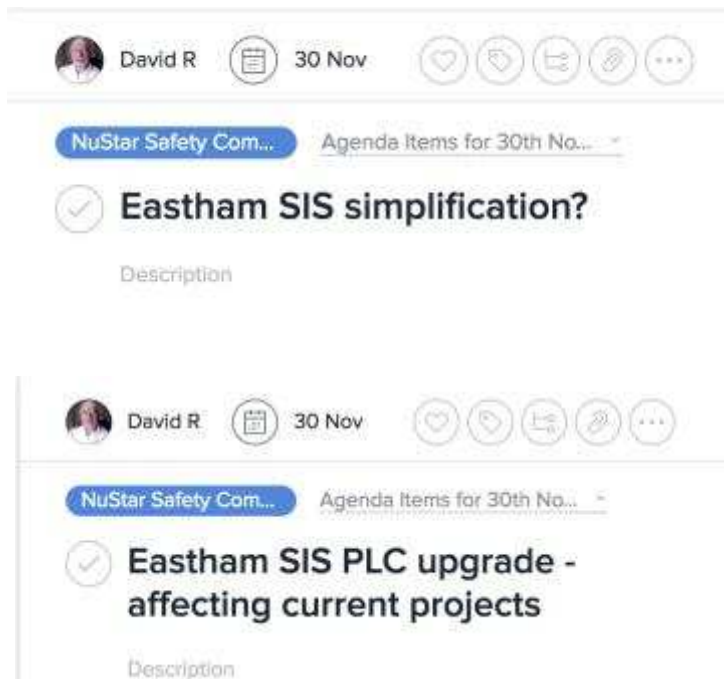


4.7 Outcome of Functional Safety Assessments and Outstanding Action status.

See Section 2 for actions from current functional Safety Assessments.

4.8 Review of any management of change or modifications to the systems.

4.8.1 Eastham SIS



The committee discussed the number of modifications required to the SIS at Eastham, often resulting in one modification impacting on another. It was further established that in order to complete the Chloroform project a new logic solver would be required, as the existing cannot handle the analog inputs.

It was agreed to consider a simplification of the SIS, such that any tank IHLA would close all dockline valves. This should remove a lot of the requirement for modification to the SIS.

ACTION 2016 – 18: Eastham SIS simplification.

4.8.2 Grays SIS



Following discussion and checking with site who confirmed that the tank had been on FAME duty but was now empty.

An action was raised to establish future plans for this tank.

ACTION 2016 – 20: Grays converted water tank reused as product tank SIS?

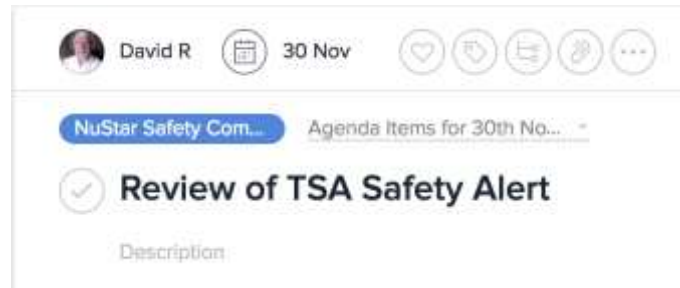


4.9 Review of any HSE or other agency visits.

4.9.1 Competent Authority Visits

No other HSE visits have taken place.

4.9.2 TSA Safety Alert



The Safety Committee reviewed the TSA safety alert, then considered if this event could occur on any of their SIS.

It was confirmed that no NuStar SIS utilise a two-solenoid philosophy.





NAVIGATOR TERMINALS SAFETY FLASH

Incident: Failure of SIS System During Test

Incident Date:	04 th Nov 2016
Time:	15:00
Location:	Navigator Terminals Seal Sands

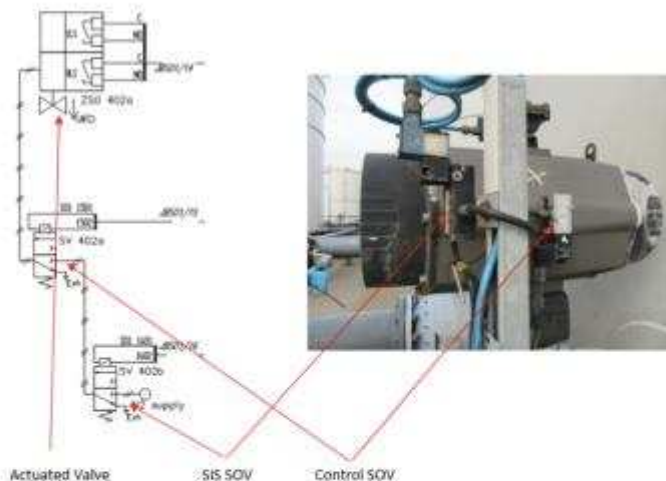
Brief account of the incident:

A SIS tank inlet valve failed to closed when commanded to do so from the SCADA control system. The control room operator requested maintenance to investigate the fault, the maintenance technician who investigated the fault could not close the valve, he isolated the nitrogen supply to the valve and the valve remained open, he then activated the tank high level trip to try and close the valve, the valve still failed to close.

An investigation into the failure was carried out and the fault was identified as a failure of the control solenoid valve. The solenoid valve shuttle had jammed preventing release of the nitrogen through the solenoid valve vent port, this prevented the actuator from closing the valve.

The diagram below shows the design of the SIS valve control and SIS solenoids. The control solenoid is nearest the valve actuator and the SIS solenoid is remote from the actuator. This design caused an indirect failure of the SIS due to the failure of the control solenoid valve.

It is clear that if the SIS solenoid valve was installed nearest the actuator this failure would not have resulted in failure of the SIS.



Actual outcome:	Valve failed to close during test of the tank overfill protection system
Potential outcome:	Valve fail to close on demand leading overfill of tank and loss of containment
What went well:	The technician identified the cause of the failure and highlighted a design flaw
What went wrong:	The designer of the SIS did not identify the common cause failure potential within the design
Immediate Actions:	Faulty control solenoid replaced and overfill SIS proof tested to confirm correct operation
Underlying cause:	The SIS design was not reviewed and validated by Navigator competent person
Lessons learned:	This design is not as reliable as other SIS designs on the terminal, a change to the design of the system is now complete and the solenoids are to be replaced with a different design



4.10 Review of any changes in the standard or competent authority guidelines.

IEC 61511:2016 has now been released in provisional format.

NuStar Energy Safety Committee will now work to the guidelines of IEC 61511:2016.

4.11 Review of competency requirements.

NuStar Energy feel that the competency of those working on the SIS systems is currently acceptable and will be reviewed in line with any additional guidelines or changes in the standard. See also 4.3.2.1.

4.12 Review of independent Instrumented Safety Functions.

NuStar Energy have maintenance agreements in place with manufactures/suppliers of their BPCS.

4.12.1 Clarification of non-SIS functions in SIS Safety PLC




See Action 2016 – 14.



5 ACTIONS ARISING FROM THIS MEETING

 David R  30 Dec      >

NuStar Safety Committee Meetin... 30th November... ▾

 **2016 - 09 -Update Policy Document inline with changes resulting from IEC61511: 2016**

Description

  [NU001002_RPT_D - Policy & Lifecycle Activities.pdf](#)

David Ransome created task. 23 Nov
David Ransome added to NuStar Safety Committee Meeting Actions. 23 Nov
David Ransome assigned to you. 23 Nov
David Ransome changed the due date to 30 Dec. 23 Nov
David Ransome moved into 30th November 2016 (NuStar Safety Committee Meeting Actions). 23 Nov

 **David Ransome**  **attached** Monday at 09:43 
[NU001002_RPT_D - Policy & Lifecycle Activities.pdf](#)

 **David Ransome completed this task.** Monday at 09:45 





yvette.davis...



9 Dec



NuStar Safety Committee Meetin...

30th November... ▾



**2016 - 10 - Arrange IEC61511
appreciation training for auditors.**

Description



David R



30 Dec



NuStar Safety Committee Meetin...

30th November... ▾



**2016 - 11 - A letter to be sent to PILZ
asking them to provide information
on how the control version of the
logic solver software for NuStar.**





 Neil W  9 Dec     

NuStar Safety Committee Meetin... 30th November... ▾

2016 - 12 - Confirmation of correct valve closure times and update of testing document.

Description

David Ransome created task. Yesterday
David Ransome added to NuStar Safety Committee Meeting Actions. Yesterday
David Ransome assigned to darren.peck@nustarenergy.com. Yesterday
David Ransome changed the due date to 9 Dec. Yesterday

 **David Ransome** Yesterday at 12:37 
NuStar to confirm correct closure times, then SRS and test procedures to be updated.

 David F  30 Dec      

NuStar Safety Committee Meetin... 30th November... ▾

2016 -13: Update SRS to reflect Tank 6 current operation.

Description



 David F  30 Dec     

NuStar Safety Committee Meetin... 30th November... ▾

✓ **2016 – 14: Update the SRS to reflect the SIS interface with pump 41.**

Description

 David F  30 Dec     

NuStar Safety Committee Meetin... 30th November... ▾

✓ **2016 – 15: Tank 22 Temperature**

Tank22 Temperature is within the SIS, this is not within the SRS. It is no longer required as no exotherm possible. It was decided to add it to the SRS rather than remove it from the SIS application software.







 simon.hunter...  30 Dec      ✕

NuStar Safety Committee Meetin... 30th November... ▾

✓ **2016 - 16: The override lever to be removed from the ESV's.**

SomeESV's have an override facility on top of the valve, following testing itappears that this facility can lock in the air and prevent the valve closing.











 simon.hunter...  30 Dec      

NuStar Safety Committee Meetin... 30th November... ▾

2016 – 17: NuStar to investigate the override on DL3 with a view to removal or locking off.

Description

 darren.pec...  27 Jan, 20      

NuStar Safety Committee Meetin... 30th November... ▾

2016 - 18 - Eastham SIS simplification

Description

David Ransome created task. 7 Nov
David Ransome added to NuStar Safety Committee Meeting Actions. 7 Nov
David Ransome assigned to you. 7 Nov
David Ransome changed the due date to Yesterday. 7 Nov



David Ransome Yesterday at 14:21 

The safety committee discussed this and a SIS PLC replacement may be required for Eastham and as such NuStar to consider all tanks closing all valves which will eliminate the numerous modifications required on the SIS.



dp darren.peck... 30 Dec

NuStar Safety Committee Meetin... 30th November...

2016 - 19 - Tamper Proof Labels Review

Attachment method and usage not consistent across all terminals. NuStar wish to retain. Need a procedure to justify why a label may of been tampered will or else proof test will mark down as possible unauthorised modification . Agree attachment method, e.g. label across lid etc

David Faulkner created task. 3 Nov
David Faulkner added to NuStar Safety Committee Meeting Actions. 3 Nov
David Faulkner assigned to you. 3 Nov
David Faulkner changed the due date to Yesterday. 3 Nov

David Ransome Yesterday at 14:16

The safety committee feel that tamper proof labels should be used across the seal of the lid and NuStar to ensure that they are replaced if COMPEX work requires access to the instrument. NuStar are to control the tamper proof labels.



The screenshot shows a task management interface. At the top, there is a user profile for 'yvette.davis...' and a date '30 Dec'. Below this is a header for 'NuStar Safety Committee Meetin...' with a dropdown menu showing '30th November...'. The main task is titled '2016 - 20 - Grays converted water tank reused as product tank SIS?' with a checkmark icon. Below the title is a 'Description' field. A history section shows: 'David Ransome created task. 7 Nov', 'David Ransome added to NuStar Safety Committee Meeting Actions. 7 Nov', 'David Ransome assigned to you. 7 Nov', and 'David Ransome changed the due date to Yesterday. 7 Nov'. There are three comments from 'David Ransome': 'NuStar to investigate with site what has been done' (14:26), 'Checking with site the tank was put into FAME but is now empty' (14:33), and 'Check with operations as to future intentions on this tank.' (14:33). Each comment has a heart icon to its right.

6 DATE OF NEXT MEETING

08.00 - 10th May 2017 at Grays Terminal.



Signature Certificate

 Document Reference: V2T4MKI3SJLYMWPUIH7FIP

RightSignature
Easy Online Document Signing



David Ransome
Party ID: 5NJT8JJN33KUT4FGFZREBS
IP Address: 86.14.218.30
VERIFIED EMAIL: drr@pidesign.co.uk

Electronic Signature:

Multi-Factor
Digital Fingerprint Checksum

11bf3a34c02278dec9abd25d4c5da947326ac007



Timestamp

2016-12-01 02:55:26 -0800

2016-12-01 02:55:26 -0800

2016-12-01 02:53:52 -0800
2016-12-01 02:53:35 -0800

Audit

All parties have signed document. Signed copies sent to: David Ransome and P I Design Ltd.
Document signed by David Ransome (drr@pidesign.co.uk) with drawn signature. - 86.14.218.30
Document viewed by David Ransome (drr@pidesign.co.uk). - 86.14.218.30
Document created by P I Design Ltd (signature@pidesign.co.uk). - 86.14.218.30



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