

LEVEL 4 ASSESSMENT SPECIFICATION

Student name:	James.		Student ID number:	
Programme:	HNC Process Operations Engineering			
Module:	Process Engineering Practice			
Module code:	PCPO4007	Contribution to Overall Module Assessment (%):	50%	
Lecturer:	M. Lewis	Internal Verifier:		
Assignment Title:	Responsibility, operational and maintenance activities.	Word count (or equivalent):	2000	
Submission deadline:	12/01/23	Return date of provisional marks and feedback:	02/03/23	
Submission method:	All written assessments, where practical and possible, must be submitted via Turnitin unless otherwise instructed by the Lecturer. (Please DO NOT put this assessment specification into Turnitin or it will match many similarities with other students' submissions.) Alternative submission method (if applicable): Late submission of the assessment will result in a late penalty mark. Penalties for late submission: Up to one week late, maximum mark of 40%. Over one week late, 0%. Only the Extenuating Circumstances Panel may approve a change to submission dates.			
Academic honesty / referencing:	Academic honesty is required. In the main body of your submission, you must give credit to authors on whose research and ideas your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have used, cited or quoted in order to complete this assessment.			

Disclosure:	I declare that this assignment is all my own work and that I have acknowledged all materials used from the published or unpublished works of other people. All references have been duly cited.		
Student's Signature:	Hardcopy assignments will not be accepted without a signature here	Date:	

Module Learning Outcomes (from module syllabus)

- LO1 - Demonstrate a knowledge and understanding of the operational and maintenance activities within the process engineering environment
- LO2 - Demonstrate a knowledge and understanding of the levels of responsibility within the process industry

For this assignment you are required to **demonstrate** your **knowledge, understanding** and levels of **responsibility in your area** of a process engineering environment.

Both of the tasks below must be presented in a report style format, with different sections for each task.

The report document must be constructed in a formal and professional manner using an appropriate word-processed program. The completed report should contain the following sections:

- A cover page or document title page.
- A table of contents page.
- Sections or paragraph headings related to each aspect of the report.
- Headers on each page with the title of your report.
- Paragraphs should be spaced using '1.5 line spacing'.
- Footers on each page with the author's name on the right-hand side and 'Page ... of ...' on the left.
- A references page and bibliography as appropriate.
- Appendices where appropriate for larger quantities of data.
- Diagrams, charts or tables, suitably incorporated and labelled.
- The text format should be Times New Roman or Ariel with a font size of 12.
- A word count of 2000 words ($\pm 10\%$).

Task 1 (LO1)

For task one you are required to **demonstrate a knowledge and understanding** of the **operational and maintenance activities** within a process engineering environment of your choice.

You should include operational and maintenance principles of key process equipment such as:

- Pumps,
- Compressors,
- Turbines,
- Heat Exchangers,
- Fired Heaters,
- Columns,
- Reactors,
- Tanks and Vessels,
- Valves and Piping,
- Motors.

Please keep in mind the word count limit for the assignment.

Task 2 LO2

In order to demonstrate your **knowledge, understanding and responsibility** within the process industry, you are required to provide the following evidence

- CV, current job description and person specification.
- Your current development action plan.
- Provide evidence to prove your technical competence. Evidence could include:
 - i. Competence framework, copies of company,
 - ii. Appraisals or any assessments,
 - iii. Key certificates and training records,
 - iv. Samples of relevant work undertaken,
 - v. Plans and evidence of work preparation,
 - vi. Evaluation of work outcomes and personal effectiveness.
- Recognition of the results of your work and your achievements.
- Evidence of application of knowledge and skills as well as your **responsibilities and autonomy** when carrying out key work activities.

STUDENT FEEDBACK FORM

This section details the *extent* to which the assessment criteria are demonstrated by you, which in turn determines your mark. The marks available for each category of skill are shown. Lecturers will use the space provided to comment on the achievement of the task(s), including those areas in which you have performed well and areas that would benefit from development/improvement.

Generic Assessment Criteria	Marks available	Marks awarded
1. Engagement with Literature Skills		
Bibliography and references included, demonstrating an engagement in literature.	10	6
2. Knowledge and Understanding Skills		
Report and documents demonstrate you have a sound knowledge of the process selected.	40	28
3. Cognitive and Intellectual Skills		
You have included some evaluation and justification of the process discussed.	10	6
4. Practical Application Skills		
Report, documents, emails and images show that you have the competency and skills in the chosen area	30	25
5. Transferable Skills for Life and Professional Practice		
Report laid out in a logical manner	10	6

Assessment Mark (Assessment marks are subject to ratification at the Exam Board. These comments and marks are to give feedback on module work and are for guidance only until they are confirmed.)

Late Submission Penalties (tick if appropriate)

Up to 1 week late (40% Max)

Over 1 week late (0%)

71 %

Marks agreed 71%
[Signature]

Responsibility, operational and maintenance activities

PROCESS ENGINEERING PRACTICE

MCCARTHY, JAMES

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Task 1

Reciprocating Net Gas Compressors (7-C-302 A/B/C)

CCR/CRU overview (Continuous Catalyst Regeneration/Catalytic Reformation Unit)

The aim of the CCR/CRU is to convert low octane hydrocarbons into high octane hydrocarbons. The conversion takes place in the units three reactors. The reactors are filled with catalyst that promotes the chemical reaction which increases the octane number of the feed. Hydrogen and other light gases are produced as by products of the reaction. Most of the Hydrogen is recycled and added to the naphtha feed before it enters the reactors. The presence of hydrogen in the reactors prevents the hydrocarbon molecules from joining up during the reaction to form coke. The remainder is routed to the Net Gas Compressors and sent to other units on the refinery. Spent catalyst from the reactors is regenerated in the CCR, where the coke is burnt off, reimpregnated with chloride, and returned to the reactors (Valero Energy, 2018).

Purpose

The purpose of the net gas compressors is to take the net gas production feed from the reactor products separator 7-F-305 and by two stages of compression raise the gas pressure to 42 Kg/cm². The first stage increases the gas pressure from 7 Kg/cm² to 17 Kg/cm², and the second stage from 17 Kg/cm² up to 42 Kg/cm². The NGC exports Hydrogen to the header when it is used in other units across the refinery.

Working principle

The compressors are two stage reciprocating compressors with electric motor drivers. The first and second stages share the same driver and rely on the same gas stream. The net gas compressors are four cylinder (two cylinders per stage) reciprocating type and are driven by a low speed electric motor operating at 300 rpm (Learn Mech.com, n.d.).

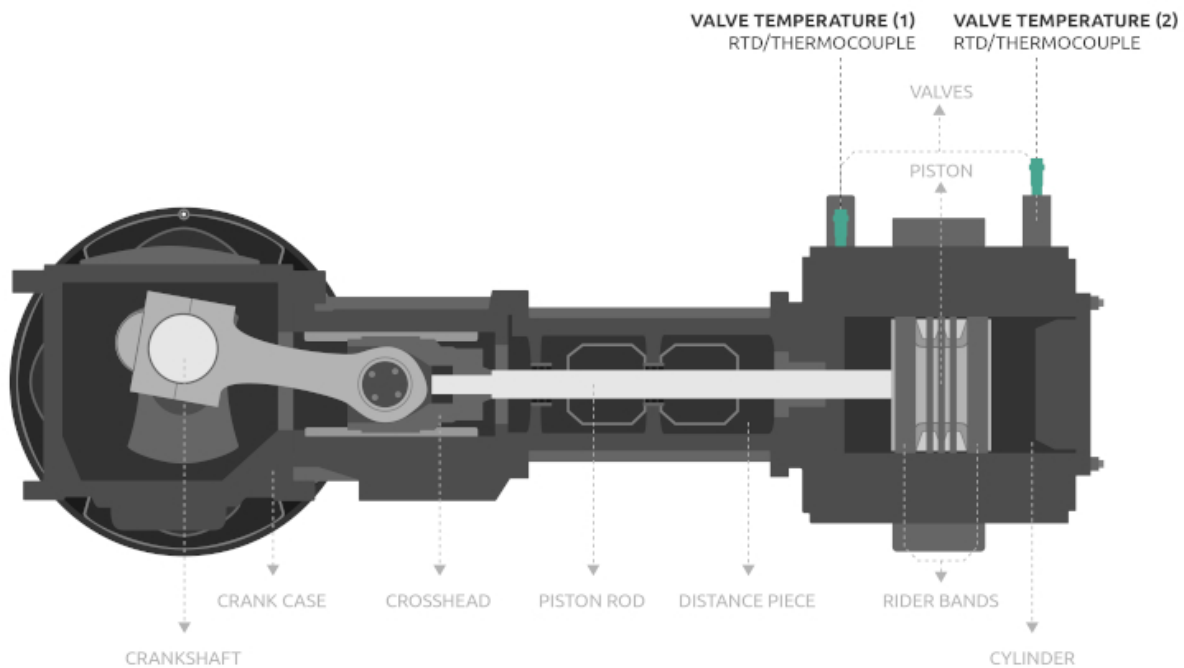


Figure 1 Diagram of reciprocating compressor internals (ISTEC, n.d.)

The drive from the motor shaft is transmitted through a flywheel to the compressor crankshaft. The flywheel, which is part of the motor, smooths out the pulsation caused by the reciprocating motion of the four compressor pistons. The motor has manual start and both automatic and manual stop facility. The motor windings are cooled by air blowers, which have to be started before the main motor driver. There is an air operated barring device that is provided to turn the compressor for maintenance purposes, which has mechanical/electrical interlocks to prevent the compressor starting if the barring gear is engaged (Valero Energy, 2018).

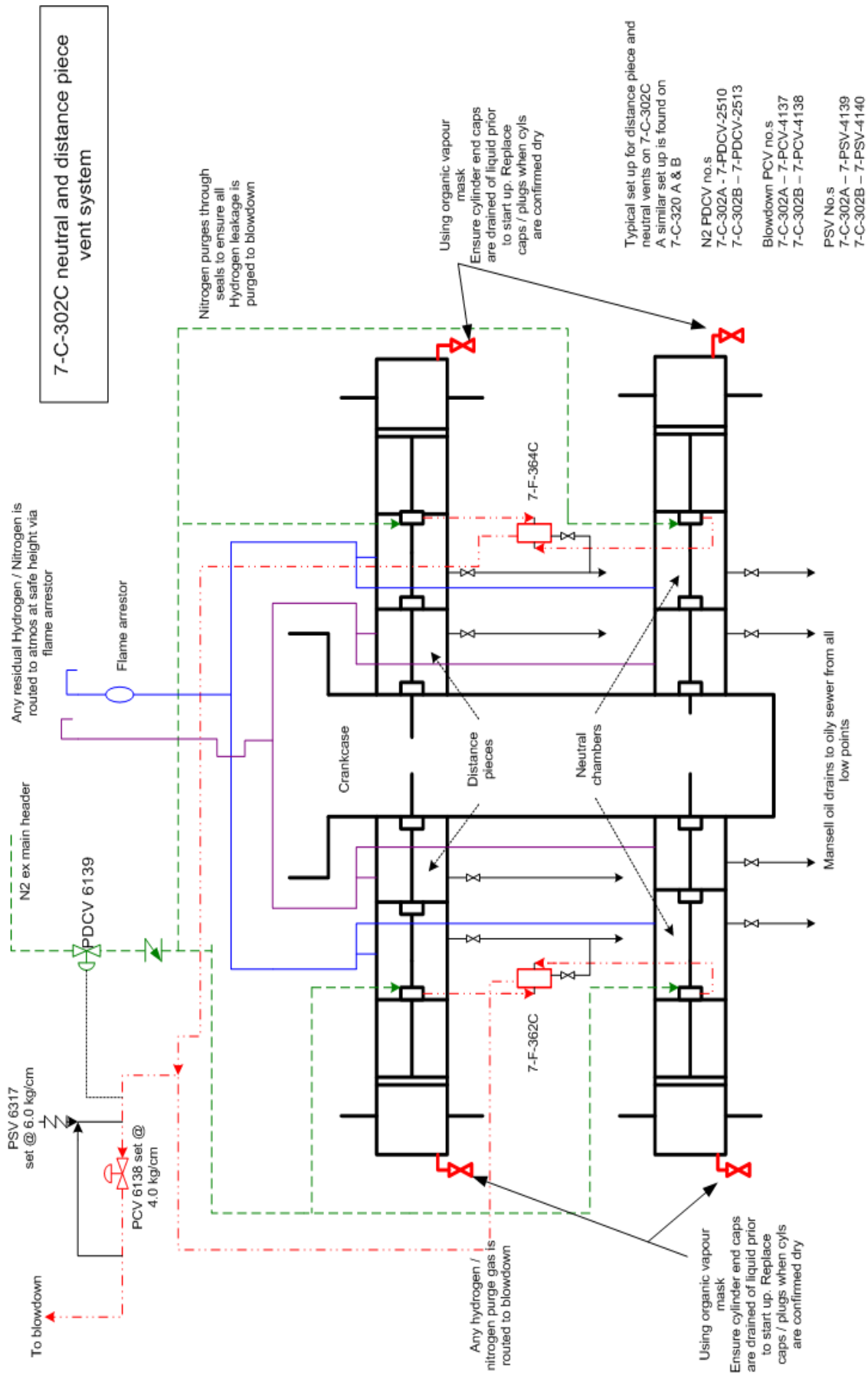


Figure 2 Net Gas Compressor Diagram (Valero Energy, 2018)

Routines

The Net Gas Compressors are an important piece of equipment of the CRU. Routines are to be performed three times per shift in order to maintain optimum operating conditions (Valero Energy). Routine duties:

- Ensure lube oil flow to compressor is evident
- Ensure NGC manzells maintain regular drops of cylinder lube oil, and visible oil pot levels are not too high
- Ensure crack case lube oil level is correct, top up if required
- Drain down online and offline compressors
 - Suction snubbers drained down of fluid to ensure no liquid carry over to the compressor, level visible in sight glass
 - Discharge snubbers are drained to oily sewer
 - Distance pieces are drained to oily sewer
 - Neutral chambers are drained to oily sewer
 - Perform sensory checks on compressor, report any abnormal circumstances.

When conducting draining down of the compressor an organic vapour mask must be worn. This is due to the Benzene content present.

Emergency procedures

There is an emergency procedure in place if all three Net Gas Compressor have been lost and cannot be restarted within 10 minutes (Valero Energy).

1. Inform the Unifiner and all other Hydrogen users, giving as much warning as possible. Shut down the CRU charge pumps 7-P-311's, which provide the feed to the reactors.
2. Block in 7-FCV-219 & 220, to stop feed to the reactors.
3. Charge heaters still online?
 - a. Yes – Continue to recycle gas flow for at least an hour to remove residual hydrocarbons.
 - b. No – Block all charge heater fuel gas control valves. If pilots for heater have been extinguished, block in all pilot gas control valves. Reduce force draft to heaters to minimum to allow minimum cool down rate for heaters tubes and reactors.

4. To preserve Hydrogen within unit, 7-PCV-296C and 7-PCV-310. This keeps the Hydrogen within the unit. The CRU reaction requires Hydrogen to start up, therefore loss of all Hydrogen can cause extended down time.
5. Bypass the Benzene splitter column as per 7-OPS-EMP-0026. Lighter ends will now be present in the Platformate, therefore can cause a process upset if it hits the Benzene splitter.
6. Platformate to be routed to “off spec” tank.
7. Investigate NGC trip, find solution/
8. If unable to start a NGC, then reactor temperatures are to be reduced to 370°C.

Start Net Gas Compressor

To bring up an NGC from cold post maintenance activities I would complete the following these steps completing procedure 7-OPS-SUP-0005 – Start-Up: 7-C-302A Soft Start.

Pre-requisites:

- Drain suction and discharge snubbers#
- Drain distance pieces
- Lube oil crank case level
- Manzel oil level checked
- Check HXV's are open and operational
- Bar the compressor over
- Check cooling water
- Check lube oil pressure
- Manzel pump turned on and heater
- Lube oil sump heater on
- Check loading panel switch is on manual
- Check auto cut in of motor blowers

Start Process

1. Start 7-CM-364S in HAND
2. Place 7-CM-364 in AUTO
3. Stop 7-CM-364S and check that 7-CM-364 cuts in
4. Pull stop button out on 7-CM-364S and place on AUTO
5. Stop 7-CM-364 and check that 7-CM-364S cuts in

6. Pull stop button out on 7-CM-364 and place on AUTO

- Star motor purge
- Request to start button pressed, wait for ready to start to light
- Inform panel man and press start
- Wait for red running light to show before doing anything else
- Take off auxiliary lube oil pump, leave pressure to settle and place plump back into auto
- Call panel man to check that he is ok for 42% loading then flick the switch on the loading panel to manual

The compressor is now under the control of the Control panel for loading and unloading.

Task 2

Curriculum Vitae

Please see Appendix 1 for CV.

Current Job Description

Process Operator at Valero Pembroke Refinery, based on the CCR/CRU unit within Refining.

My responsibilities include:

- Safely maintain and operate the smooth running of the CCR/CRU unit. Provide guidance to the Lead Operator and Control Operator when necessary to troubleshoot any unit problems
- Be able to respond to process emergencies by having comprehensive knowledge and understanding of the emergency procedures
- Prepare equipment for maintenance in a safe manner
- Troubleshoot unit problems as they arise
- Lubricate and monitor field equipment
- Carry out gas testing and electrical isolations as part of equipment preparations
- Provide and receive verbal and written handover at the start and end of every shift
- Ensure high standards of housekeeping are maintained within the unit
- Responsible for all field personnel within and requiring access to the unit
- Perform daily routines throughout unit and on equipment to maintain optimum operating conditions.

Person Specification

Qualifications

Sept 2019 – Present

Pembrokeshire College

- | | |
|---|-------------|
| • HNC Level 4 Process Operations Engineering | In Progress |
| • BTEC Level 3 Diploma in Mechanical Engineering | D*D* |
| • NVQ Level 3 Extended Diploma in Engineering Maintenance (Instrumentation and Control) | Achieved |
| • EAL Level 2 Performing Engineering Operations | Achieved |

Feb 2019 – April 2019

Pembrokeshire College

- Introduction to Welding Achieved

Aug 2016

Stratum Ltd

- MTA Networking Achieved
- MTA Windows Server Administration Achieved

Sept 1999 – Jul 2006

Milford Haven Comprehensive School

A Level Information Communication Technology	B
A Level Mathematics Statistics	C
A Level Business Studies	D
GCSE Information Communication Technology	A
GCSE Mathematics	B
GCSE Double Award Science	BB
GCSE Graphic Design	B
GCSE Geography	B
GCSE English Language	C
GCSE Business Studies	C

Currently employed as a Process Operator at Valero Pembroke Refinery, based on the CCR/CRU and LPGRU units within Refining. Three years on site experience, as part of Operations team and the Instrumentation Maintenance department. Part of the Operations team for the successful 2022 ARU/SRU turnaround. Currently working towards an HNC in Process Operations Engineering at Pembrokeshire College.

During my previous employment at Evens & Co Ltd I became accustomed to working within an accounts team in a time pressured, demanding environment. I have greatly developed as an employee and a person whilst being there, learning to stay on top off deadlines has become second nature to me. As an accountant I was constantly using arithmetic and dealing with figures daily. My main role within the company was overseeing the daily running of all IT systems in our offices, installation of new networks, servers, and computers, also solving any

problems which may occur and ensuring the computer systems run efficiently. I have also taken the tasks of providing support with all computerised accounts software, resolving all problems, errors or data corruption that may on clients' systems and systems within our offices.

I am self-driven, motivated person able to work independently as well as part of a team to achieve goals and accomplish complex tasks. Playing football for many years helped develop and improve my team working skills and given me the understanding of how to work as part of a team to achieve the same goal. (Reed, n.d.)

Development Action Plan

Currently:

- Consolidating a six month period on the CCR/CRU and LPGRU units, which will commence in February.

0 – 6 months:

- Complete consolidation of CCR/CRU and LPGRU
- Train and pass out on second unit, if training position becomes available
- Complete three months consolidation.

6 months – 3 years:

- Complete training and consolidation of all White oil's units
- Have three outside position complete to progress training a Control Panel position.

3 – 5 years:

- Complete first Control Panel position.

Technical Competence

To prove technical competence, I have included various training completed:

- Plant Operator CRU LPG training completion certificate (Appendix 2)
- Recertification test for generic plant operator duties (Appendix 3)
- Recertification test for CRU plant operators (Appendix 4)
- Pembroke VEST training for Ops Brown 1 (Appendix 5)
- Fired heater training (Appendix 6)
- Pembroke HES safety talk – Benzene (Appendix 7)

- Pembroke HES safety talk – Hazard recognition (Appendix 8)
- Pembroke HES safety talk – LOTO (Appendix 9)
- Pembroke HES safety talk – Process safety and process safety management (Appendix 10)
- Pembroke HES safety talk – Respiratory protective equipment (Appendix 11)
- Pembroke HES safety talk – Valero electrical safe working (Appendix 12)
- Worst case failure mechanism (Appendix 13)
- Information security awareness (Appendix 14)

Recognition

On successful completion of the ARU/SRU 2022 turnaround I received recognition from senior members of the turnaround team thanking me for my involvement and assisting the Operations team.

- Ioan Llewellyn, Lead Operator (Appendix 15)
- Paul Burnett, Manager Turnaround Operations (Appendix 16)
- Ben Diment, Complex Manager Cracking and Olefins (Appendix 17)
- Housekeeping conducting during turnaround. Ben Diment, Complex Manager Cracking and Olefins (Appendix 18)

Application of Knowledge Evidence

As part of the Valero apprenticeship, I spent eighteen months in the Instrumentation maintenance department. I conducted numerous Instrument preventative tasks:

- Temperature PM Check 1-TT-0508 (Appendix 20)
- Reconnect Valve 11-LV-375 and Calibrate Smart Positioner (Appendix 21)
- Calibration checks on current to pressure convertor 04-PDY-177 (Appendix 22)

Responsibilities include preparing equipment for maintenance activities, safely maintain and operate the smooth running of the unit, trouble shoot problems on the unit as they occur, carrying out gas testing and isolations, both electrical and mechanical. Also maintain high standards of housekeeping, responsible for field personnel on unit, perform daily Operator routine duties on equipment throughout the shift to maintain optimum conditions, see Appendix 19.

Bibliography

- ISTEC. (n.d.). *Temperature measurements for reciprocating compressors*. Retrieved from <https://www.istec.com/en/temperature-measurements-for-reciprocating-compressors/>
- Learn Mech.com. (n.d.). *Reciprocating Compressor – Diagram , Parts , Working, Advantages*. Retrieved from Learn Mech.com: <https://learnmech.com/reciprocating-compressor-parts-diagram-basic-working/>
- Reed. (n.d.). *Key things to consider for a person specification*. Retrieved from <https://www.reed.com/articles/the-purpose-of-a-person-specification>
- Valero Energy. (2018). Platformer Unit, LPG Recovery, Part 1 - Module 1, Plane and Process Knowledge.
- Valero Energy. (n.d.). Emergency Condition - Loss of all Nett Gas Compressors 7-OPS-EMP-0025.
- Valero Energy. (n.d.). Management of CRU/LPGRU Operator routine duties PP-OPS-GUI-0032.

James McCarthy

Bryn Cwy, Great North Road, Milford Haven, Pembrokeshire SA73 2LE

☎ 07769 340230 · ✉ mccarthy157@hotmail.com

Summary

Process Operator at Valero Pembroke Refinery, based on the CCR/CRU unit within Refining. Three years on site experience, as part of Operations team and the Instrumentation Maintenance department. Part of the Operations team for the successful 2022 ARU/SRU turnaround. Currently working towards an HNC in Process Operations Engineering at Pembrokeshire College.

Experience

Aug 2022 –
Present

Process Operator

Valero Energy Ltd

Responsibilities:

- Safely maintain and operate the smooth running of the CCR/CRU unit. Provide guidance to the Lead Operator and Control Operator when necessary to troubleshoot any unit problems
- Be able to respond to process emergencies by having comprehensive knowledge and understanding of the emergency procedures
- Prepare equipment for maintenance in a safe manner
- Troubleshoot unit problems as they arise
- Lubricate and monitor field equipment
- Carry out gas testing and electrical isolations as part of equipment preparations
- Provide and receive verbal and written handover at the start and end of every shift
- Ensure high standards of housekeeping are maintained within the unit
- Responsible for all field personnel within and requiring access to the unit.

Experience:

- Making decisions to advise Control Operators on all unit aspects to maintain a safe, reliable unit operation
- Following instructions from Control Operator during abnormal operating conditions, providing field conditions feedback to Control Operator.

Sept 2020 –
Aug 2022

Process Operations Apprentice

RSD Technology Ltd

Responsibilities:

- Assist Instrumentation Technicians in the completion of preventative and corrective maintenance tasks, following procedures as stated, to safely and effectively complete tasks, whilst maintaining continuous radio contact with Control and Field Operators
- Assist with fault finding, calibration and replacement of instruments where required
- Conducting safe self-isolation of equipment as per procedures to conduct instrument maintenance tasks
- Completing daily LPSA, understanding hazards and assessing risk, taking necessary steps to minimise risk
- Conducting LPOs, providing constructive feedback to colleagues on their safety behaviours
- Adhering to all Valero safety protocols to ensure a safe working environment for myself and co-workers.

Experience:

- Working 12-hour shifts, on 13 shifts on 1 shift off rotation (8 weeks on days and 4 weeks on nights) during the 2021 TAR on both Alkylation unit, FCCU and running plant
- Assisting Instrument Supervisor with testing of FCCU ESD Triconex systems during TAR
- Assisting with the disinvestment and safe removal of instrumentation equipment, and installation and calibration of new instrumentation on the Alkylation unit during TAR, conducted in both A class and C class Alky PPE

- Received training for Substation entry, Barrier operation, Confined Space entry, Breathing Apparatus training, Alkylation Unit entry and correct use of Alky PPE.

May 2017 –
Aug 2020

Computerised Accounts & IT Technician

Evens & Co Ltd

Responsibilities:

- Managed the day to day running of all computer systems, solve any issues that may occur with the systems, implementing improvements where required
- Planning, set up and installation of additional networks, servers, and computers for offices
- Oversee clients transition from manual accounts record keeping methods to computerised record keeping complying with changes in legislation, evaluating client's requirements and providing a recommendation, installation, ongoing training, and support with the new accounting software
- Identify and resolve any errors or corruption that may appear in clients' accounts data within a short time frame to minimise client's downtime.

Feb 2017 –
April 2017

Documents Clerk

SGS United Kingdom Ltd based at Valero Pembroke Refinery

Responsibilities:

- To carry out documentation duties to establish accurate quantities of loading of vessels as per client's requirements and/or SGS/International standards
- To deliver the correct documentation as outlined by the client for the loading of vessels
- At all times, adopt a safe behaviour by exercising due regard for the health and safety of yourself, colleagues, and clients, in line with the SGS's and Valero's procedures and protocols
- Work closely with the inspection team to ensure an effective quality and quantity service is provided to the customer.

Jul 2010 –
Jan 2017

Accountant & IT Technician

Evens & Co Ltd

Responsibilities:

- Analysing client data for the submission of VAT returns and annual accounts
- Producing sole trade and company accounts, regularly working to client and Companies House filing deadlines
- Overseeing the day to day running of all computer systems in the office, solving any issues that may occur with the systems.

Education

Sept 2019 –
Present

Pembrokeshire College

Qualifications:	HNC Level 4 Process Operations Engineering	In Progress
	BTEC Level 3 Diploma in Mechanical Engineering	D*D*
	NVQ Level 3 Extended Diploma in Engineering	
	Maintenance (Instrumentation and Control)	Achieved
	EAL Level 2 Performing Engineering Operations	Achieved

Feb 2019 –
Apr 2019

Pembrokeshire College

Qualification:	Introduction to Welding	Achieved
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Aug 2016

Stratum Ltd

Qualifications:	MTA Networking	Achieved
	MTA Windows Server Administration	Achieved

Sept 1999 –
Jul 2006

Milford Haven Comprehensive School

Qualifications:	A Level Information Communication Technology	B
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A Level Mathematics Statistics	C
A Level Business Studies	D
GCSE Information Communication Technology	A
GCSE Mathematics	B
GCSE Double Award Science	BB
GCSE Graphic Design	B
GCSE Geography	B
GCSE English Language	C
GCSE Business Studies	C

- Interests** My personal interests primarily revolve around spending time with my family, my wife Andrea and children Ella, Jacob, and Mali. I also enjoy keeping myself physically fit and healthy, I enjoy attending the gym, I have also played for Milford Haven United football club. I feel that playing for a football team has helped me to develop and improve communication and team working skills, also giving me the understanding of how to work as part of a team to achieve the same goal.
- References** Available on request.



Hereby certifies that

James McCarthy

Has satisfactorily completed the training and testing requirements for compliance.

Plant operator - CRU / LPRGU

Class Title

Instructor

PM-PLT-Q-000-08O

Course Code

1.00

Duration (Hours)

08/30/2022 10:12

Training Date

Training Location



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Recertification test for generic plant operator duties (PM-ART-Q-000-05T)

10/28/2022 16:36

Training Date



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Recertification test for CRU plant operators (Site Specific) (PM-ART-Q-000-21T)

08/16/2022 00:00

Training Date



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Pembroke VEST training for Ops Brown 1 (Site Specific) (PM-ELE-S-100-01B)

10/24/2022 21:29

Training Date



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Fired Heaters CBT Exercises - not FIT (PM-PLT-P-100-02B)

08/03/2022 01:46

Training Date



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Pembroke HES Safety Talk - Benzene (Site Specific) (PM-PLT-S-000-62B)

11/16/2021 04:25

Training Date



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Pembroke HES Safety Talk - Hazard Recognition (PM-PLT-S-122-01B)

07/05/2022 03:47

Training Date



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Pembroke HES Safety Talk - LOTO (Site Specific) (PM-PLT-S-000-68B)

03/18/2022 08:12

Training Date



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Pembroke HES Safety Talk - Process Safety and Process Safety Management (Site Specific) (PM-PLT-S-000-31B)

11/15/2021 08:02

Training Date



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Pembroke HES Safety Talk - Respiratory Protective Equipment (Site Specific) (PM-PLT-S-000-48B)

07/05/2022 03:56

Training Date



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Pembroke HES Safety Talk - Valero Electrical Safe Working Practice (Site Specific) (PM-PLT-S-000-02B)

07/05/2022 04:02

Training Date



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Worst Case Failure Mechanism (Site Specific) (PM-PLT-R-000-03B)

08/28/2022 16:18

Training Date



Hereby certifies that

James McCarthy

**Has satisfactorily completed the training and testing requirements for
compliance with the**

Information Security Awareness (SA-SEC-O-020-01B)

10/24/2022 21:00

Training Date

McCarthy, James

From: Rawlings, Dean
Sent: 19 April 2022 07:48
To: Merry, Jake (Contractor); McCarthy, James (Contractor); Franklin, Jack (Contractor)
Subject: FW: Apprentice feedback Surv monkey links.

Some nice feedback from Ioan, well done.

From: Llewellyn, Ioan <Ioan.Llewellyn@valero.com>
Sent: 17 April 2022 21:20
To: Rawlings, Dean <Dean.Rawlings@valero.com>
Subject: RE: Apprentice feedback Surv monkey links.

Sorry I've only just completed the surveys.

Must say the 3 lads on days, James, Jake and Jack all performed very well. They were a pleasure to work with and could be trusted to complete tasks to a high standard and in good time. They worked at a level far higher than their experience would expect. They were also very good characters and brilliant team players, whether it was working with each other or with other ops. I would happily have any of them on shift with me.

I've not seen them since the turnaround finished, please pass on my thanks. They were a great asset during the turnaround and made life a lot easier as we were very short manned on days.

Thanks

Ioan Llewellyn

From: Rawlings, Dean <Dean.Rawlings@valero.com>
Sent: 21 March 2022 08:33
To: Smith, Robert <Robert.Smith@valero.com>; Richards, Chris <Chris.Richards@valero.com>; Wilson, Adam <Adam.Wilson@valero.com>; Burnett, Paul <Paul.Burnett@valero.com>; Rickard, Brett <Brett.Rickard@valero.com>; Charlton, Alex <Alex.Charlton@valero.com>; Llewellyn, Ioan <Ioan.Llewellyn@valero.com>
Cc: Blair, Marcus <Marcus.Blair@valero.com>; Diment, Ben <Ben.Diment@valero.com>
Subject: Apprentice feedback Surv monkey links.

Morning all, attached are the Survey Monkey links for the apprentices assisting on days or nights.

Click on the individual link (or copy to browser).

Fill in survey for the apprentice you wish to give feedback for (good and not so good) and submit.

The details go on to their database where Marcus collates them.

If I have missed anyone else that wishes to give feedback, please let me know.

Thanks, Dean.

Dean Rawlings
Superintendent Training

Global Refining.
Valero Limited
Valero Pembroke Refinery

Tel +44 01646649921

McCarthy, James

From: Burnett, Paul
Sent: 05 April 2022 08:19
To: Wilson, Adam; Smith, Robert; Llewellyn, Ioan; Richards, Chris; Preece, Thomas; Davies, Stephen; Davis, Sean; Franklin, Jack (Contractor); Roach, Paul; Thomas, Marcus; Harding, Callum (Contractor); Haughey, Christopher (Contractor); Williams, Tristan (Contractor); McCarthy, James (Contractor); Merry, Jake (Contractor); Lloyd, Joshua; Kavanagh, Simon; Doyle, Simon; Oliver, Harry (Contractor)
Cc: GMfg - PEM C & O STLs; Diment, Ben; Charlton, Alex; Fenneberg, John; Roberts, Jamie; Kelly, Marcus; Allan, William
Subject: ARU/SRU TAR completion

24th Jan to the 5th April!

72 days & an excellent effort by all involved (they said it was a small event!)

Thank you to you all for your teamwork & valuable input throughout the event.

We had a slow start & few hiccups along the way but have come out the other end with No injuries or leaks, On time, On budget & hopefully wiser 😊

Well done

Regards

Paul Burnett

Manager Turnaround Operations Ext 2403

Room 66 PCC Admin
Valero Energy Ltd
Pembroke Refinery
Pembroke
Pembrokeshire SA71 5SJ
Tel +44 (0) 1646 649403
Fax +44(0) 1646 641038
Paul.Burnett@valero.com

27th Floor, 1 Canada Square, London EC14 5AA.. Place of Registration : England and Wales. Company No. 8566216

From: Charlton, Alex
Sent: 04 April 2022 16:47
To: Wilson, Adam <Adam.Wilson@valero.com>; Burnett, Paul <Paul.Burnett@valero.com>
Cc: Smith, Robert <Robert.Smith@valero.com>; Llewellyn, Ioan <Ioan.Llewellyn@valero.com>; Richards, Chris <Chris.Richards@valero.com>; Rickard, Brett <Brett.Rickard@valero.com>; Diment, Ben <Ben.Diment@valero.com>; Griffiths, Karl <Karl.Griffiths@valero.com>; Preece, Thomas <Thomas.Preece@valero.com>
Subject: OS turnover Days 04-04-22

Hopefully the last handover required.

Alex Charlton
Superintendent Operations
Butamer, ARU/SRU & ULSG

Valero Energy Ltd
Pembroke Refinery
Pembroke
Pembrokeshire SA71 5SJ
Tel +44 16 4664 9757
Alex.Charlton@valero.com

Registered office 27th Floor, 1 Canada Square, London E14 5AA
Place of Registration : England and Wales. Company No. 8589245

McCarthy, James

From: Diment, Ben
Sent: 05 April 2022 08:30
To: Williams, Tristan (Contractor); Haughey, Christopher (Contractor); Harding, Callum (Contractor); McCarthy, James (Contractor); Franklin, Jack (Contractor); Merry, Jake (Contractor); Oliver, Harry (Contractor)
Subject: ARU/SRU support

All, just wanted to drop a quick note to say a personal thanks for your efforts through this TAR

I'm aware we dropped you in the deep end, but as you quickly found out it was critical to have your support for the ops to make the TAR a successful one.

The feedback I have had from both the day and night teams has been extremely positive and this has gone back to the leaders as they finalise your next steps forward.

Having your energy and enthusiasm around the ops has helped both them and yourselves progress, great to see the amount of level 1 and OEIP really ramp up as you got on top of the job, hopefully you can see what it means to have the kit put back into a better condition makes it a far easier to troubleshoot issues and keep on top of the housekeeping.

Well done all and enjoy the next steps in your career

Many thanks

Ben

Ben Diment,
Complex Manager Cracking and Olefins

Valero
Pembroke Plant,
Pembrokeshire.
SA71 5SJ
Tel: (+44)1646 649 710
Ben.diment@valero.com

Registered office: 27th Floor, 1 Canada Square, London EC14 5AA.. Place of Registration : England and Wales. Company No. 8566216

McCarthy, James

From: McCarthy, James (Contractor)
Sent: 29 March 2022 16:51
To: Diment, Ben
Cc: Franklin, Jack (Contractor); Merry, Jake (Contractor); Rawlings, Dean
Subject: FW: Some minor housekeeping

Hi Ben,

Please see below photos of completed housekeeping tasks.

Operations storage: Obstructions removed, area organised.



Hose and drain cover storage: Drain covers relocated to drain cover hanger



Operations housekeeping cabinet: Cabinet door replaced and restocked with spades, brush, drip pans, absorbent granules, spill pads, bucket.



Valve stem covers: Covers reinstated throughout ARU/SRU where required

Chickets missing from chain valve: None available. Order of chickets has been requested from Safety.

Additionally we have replaced all old unsafe whip checks on the unit utility points with new.



Kind regards

James, Jack and Jake

ARU/SRU Turnaround Operations Apprentices

From: Smith, Robert

Sent: 24 March 2022 17:16

To: McCarthy, James (Contractor) <James.McCarthy@contractor.valero.com>; Merry, Jake (Contractor) <Jake.Merry2@contractor.valero.com>; Franklin, Jack (Contractor) <Jack.Franklin@contractor.valero.com>

Subject: FW: Some minor housekeeping

From: Diment, Ben

Sent: 24 March 2022 15:10

To: Smith, Robert <Robert.Smith@valero.com>; Richards, Chris <Chris.Richards@valero.com>

Subject: Some minor housekeeping

Can you let me know when complete, the apprentices should lap this list up, ta (this is old, so most maybe able to close now)

FCCU & Butamer	Housekeeping	Aled Thomas	ARU/SRU - access to cabin wooden pallet -potential S
FCCU & Butamer	Housekeeping	Aled Thomas	ARU/SRU - hoses and drain correctly
FCCU & Butamer	Housekeeping	Aled Thomas	ARU/SRU - operations hou mess, no equipment
FCCU & Butamer	Housekeeping	Aled Thomas	ARU/SRU - stem shield mis
FCCU & Butamer	Housekeeping	Aled Thomas	ARU/SRU - chickens missing chains (17-P-202/S)
FCCU & Butamer	Housekeeping	Aled Thomas	ARU/SRU - Waste bins ove





Ben Diment,
Complex Manager Cracking and Olefins

Valero
Pembroke Plant,
Pembrokeshire.
SA71 5SJ
Tel: (+44)1646 649 710
Ben.diment@valero.com

Registered office: 27th Floor, 1 Canada Square, London EC14 5AA.. Place of Registration : England and Wales. Company No. 8566216

	Doc Type/Category/Sub Category (if required): Instruction/Routine Duties Title: MANAGEMENT OF CRU / LPGRU OPERATOR ROUTINE DUTIES	Department/Sub Group/Discipline (if required): OPS/Refining/Operations
Review frequency : 10 years	Doc No: PP-OPS-GUI-0032	Unit: 7 - CCR/CRU / 10 - LPGRU
Issue/Review date: 24 11 2016	CTEMS Element/Expectation: 4.1.6	Content Contact (by Role) : Engineer - Process Refining - 7 - CCR/CRU
Status: Active Rev: 2.0	MOC No: 7241	Human factored PP-PEM-INS-0016 applied N

Index

Section	Pages	Section Title
	1	Index
1	1	Purpose
2	1	Scope
3	1	Definitions
4	2	Instruction
5	3	Roles and Responsibilities
6	3	References and Child Documents
	4	Revision History

1. Purpose

The following routine duties are to be completed by the Plant Operator on a shiftly basis. These duties are in conjunction with other instructions / tasks as detailed in the HHD's, DOB/DOI and turnovers. Any issues found as a result of the duties detailed below should be recorded in the Plant Operator Turnover and reported to the Lead Operator.

2. Scope

- 4.1.0 The following duties are site wide shift expectations for all Operators and should be completed at least 3 times per shift.
- 4.2.0 The following routine Duties are specific to the **Platformer / LPGRU** and must be completed on a shiftly basis.

3. Definitions / Acronyms

To view definitions of the terms/acronyms see the [PRMS Glossary](#)

Title: MANAGEMENT OF CRU / LPGRU OPERATOR ROUTINE DUTIES				
PP-OPS-GUI-0032	Rev 2.0	Issued: 24 11 2016	Page 2 of 4	Printed on 01/12/2016

4. Instruction

Step	Activity
1.0	Operator Routine Duties – Site Wide (shift expectations for all Operators and should be completed <i>at least</i> 3 times per shift.)
1.1	Compressors: Carry out 4 senses on motor/turbine, gearbox and compressor and associated equipment. Drain down suction / discharge and neutral chambers to remove oil. Note any increase in pressure in neutral chamber. Check lube/Seal oil levels and top up as necessary.
1.2	Pumps: Carry out 4 senses on the pump, gearbox and motor / turbine. Check to include seal, seal flush, seal pot levels and pressures, oil condition and level, temperature, vibration, cooling water, smells and leaks. Check pressure gauges for evidence of gassing up. Check for any slow rolling turbines and rectify to reduce steam usage. Carry out simple drop check to confirm injection pumps are working correctly and with no leaks
1.3	Pumps: Ensure pump discharge NRV bypass/warm-up line on online pump (if fitted) is closed.
1.4	Pumps: Ensure HXV bypass/pressure up line is closed.
1.5	Fin fans: Carry out 4 senses on fin fans. Check belt condition, motor temperature, and motor / fan vibration. Check fin fan bank for leaks.
1.6	Air Pots: Check instrument air pots (where applicable) for water/desiccant and drain down.
1.7	Heaters: Check Internal heater condition for the flame pattern, flame colour, debris on the floor, hot spots on the tubes/walls, heater draft and condition of pilots. Rectify any issues
1.8	Heaters: Check heater external condition for leaks (process and fuel gas/fuel oil), combustion air to online burner open, and combustion air to offline burner closed, hotspots on the heater shell / floor, burner availability for control operator.
1.9	Valves: Visually check valves for leaks and rectify if possible. Check general condition. Exercise and lubricate if required
1.10	Knock Out pots / Dip Legs: Drain as required.
1.11	Tanks / Vessels / Drums / Exchangers and Process Lines: Check visually for leaks, levels and water (as applicable). Check general condition (e.g. lagging etc.) Windsock serviceable and visible (if fitted)
1.12	Housekeeping: Complete general housekeeping duties as follows; • All minor spills / leaks that occurred on shift have been cleaned up. • Work orders raised for all major spills / leaks that occurred on shift. • Drain covers picked up and neatly stored on the hangers / edge of the unit when not in use. • All steam / utility hoses not in use have been neatly coiled on the hangers. • All sample bottles picked up and neatly stored. • All litter and debris picked up and placed in skips / bins provided. Specific duties per housekeeping area are as detailed in the housekeeping check sheets.
1.13	Unit/Stack Lighting checks: Report any defective lights and raise a MWO.
1.14	Heat Tracing: Steam tracing working with no leaks. Electrical tracing working (Lights Lit). MWO any defects
1.15	Sub Stations: check the substation to ensure all available electrical equipment is ready to run (e.g. Stop button out, reset). Ensure all doors are locked at all times

Title: MANAGEMENT OF CRU / LPGRU OPERATOR ROUTINE DUTIES				
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2.0	Operator Routine Duties – Unit Specific (specific to the Platformer / LPGRU and must be completed on a shiftly basis)
2.1	When draining NGC's ensure to stay in attendance
2.2	NGC: Drain down offline compressor.
2.3	NGC: Ensure end pocket loaders are unwound to prevent incorrect loading and high cylinder temps.
2.4	NGC: Ensure lube oil flow to motor is evident
2.5	NGC Manzells: Ensure regular drops of cylinder lube oil are visible and that oil pot levels are not too high.
2.6	7C321: Drain down interstage coolers of any water
2.7	Check CRU air drier skid filters for free water
2.8	7F306 & 308: Compare levels to TDC. Report any defects to Lead Op and raise work order
2.9	CCR: Check valves for signs of leakage – both catalyst and hydrocarbon
2.10	CCR Coalescers: Verify gas is dry and drain lines open to 7-F-305 via restriction orifices
2.11	CCR: If CCR is offline , ensure chloride injection is routed to feed and driers are bypassed and isolated.
2.12	SulfrZol 54 inj, Ensure sufficient stock available
2.13	Debut Water injection points: Check that all in service injection points are hot and flows are equal on all banks. If cold and flow low suspect plugged and possible salt build up and raise work order. If water injection is off, ensure neutraliser injection is also off (South IBC)
2.14	7-F-324: Ensure level is maintained above 75%. Top up as necessary. Inform NALCO if topped up
2.15	7-F-516 (Chloride drum); Ensure pressure is maintained 100mmWg and 800mmWg.
2.16	CCR: Check vent pots for catalyst by tapping. If level present, drain into container and inform OA (Night Shift)
2.17	Carry out drop chloride check and check against DOI. Record exceptions in turnover
2.18	7-C-301: Ensure 7-C-301 lube oil SOV has not tripped.

5. Roles & Responsibilities

6. Related Documents (See [PRMS Glossary](#) for definitions of terms)

- [Parent Document](#)
- [Child Document\(s\)](#)
- [Reference\(s\)](#)
- [Appendices](#)

Title: MANAGEMENT OF CRU / LPGRU OPERATOR ROUTINE DUTIES				
PP-OPS-GUI-0032	Rev 2.0	Issued: 24 11 2016	Page 4 of 4	Printed on 01/12/2016

Issue / Revision / Review	Date	Change	Revision Content Owner	Approver
1.0	26 02 2010	Reviewed & updated	Nigel Evans	Richard Allen
2.0	24 11 2016	Reviewed & Updated	Alan Vickery AFVICKE	Richard Allen ROALLEN
3.0				
4.0				
5.0				

Note: Only the last 5 revisions need to be recorded in the Revision History

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Candidate Site Report

NVQ: City & Guilds 1788-80 Level 3 NVQ Extended Diploma in Engineering Maintenance.		Level: 3.
Candidate: James McCarthy		Date: 21/05/2021
Employer: Valero	Site Mentor: Jordan Gough	
College Assessor: William Bateman	NVQ Unit's Covered: 001, 002, 103, 104, 174, 175, 176, 178	

Equipment Details			
Thermocouple calibration 1-TT-0508. Checks to be performed: thermocouple.			
Category/ Service	Preventative maintenance	Equipment No.	1-TT-0508
Equipment Description	1-TT-0508 - thermocouple.		

Safety

General Safety

The Health and Safety at Work Act 1974 requires employees to play their part in safeguarding themselves and other employees while at work. Employees must also cooperate with their employer and use safety equipment as instructed and only for its intended purpose. At all times I abided by the HSWA and Valero's safety policies. I did this by following Valero's safe working procedures, conducted the task as stated in the job procedure and wore the correct PPE.

While working on site at Valero I must abide by several health and safety legislation, including:

- Health and Safety at Work Act 1974
- Control of Substances Hazardous to Health Regulation 2002
- Personal Protective Equipment at Work Regulations 1992
- The Manual Handling Operations Regulations 1992
- Electricity at Work Regulations 1989
- Noise at Work Regulations 1970.

Permit

A work permit describes what I must do to stay safe. No work is to be undertaken until a work permit is obtained. Permits are issued by Operations personnel and can be obtained from the permit office. It is my responsibility to read, understand, sign, and agree the work permit before commencing any work. Work permits are only valid until the end of the working day. Each permit is given a unique permit number for every job.

The permit states that we can carry out instrument PM checks 1-TT-0508.

Commented [MJ(1)]: 001.1.2.4

Commented [MJ(2)]: 001.1.1
176.1.1
178.1.1

Commented [MJ(3)]: 174.1

Commented [MJ(4)]: 104.1.1

Commented [MJ(5)]: 103.1.1

Commented [MJ(6)]: 175.1

Commented [MJ(7)]: 103.1.3.8

Risk Assessment

Individual risk assessment (first sight) conducted prior to starting job. Before any task is started workers must conducted a first sight, this is to ensure no additional hazards have arisen since the risk assessment was conducted, also to confirm hazards of the job and that none have been overlooked.

All work involving a substance hazardous to health must covered by a COSHH assessment before any work begins. A COSHH assessment is conducted by trained COSHH assessors on site. COSHH assessments and safety data sheets (SDS) are readily accessible and provide all information needed to allow safe handling of a hazardous substance.

Commented [MJ(8)]: 001.1.7.1, 1.7.2, 1.7.3

Commented [MJ(9)]: 175.1.2.3
176.1.2.3
178.1.2.2

Commented [MJ(10)]: 001.1.2.2

Commented [MJ(11)]: 001.1.2.2

Commented [MJ(12)]: 175.1.2.3
176.1.2.3
178.1.2.2

PPE

The job is to be carried out within a red zone, minimal PPE requirements for this zone are:

- Fire retardant overalls
- Hard hat
- Safety Glasses
- Safety boots
- Ear defenders.

Additional PPE to be worn is stated on the work permit. PPE is determined for a job based on the risk assessment conducted. The following additional PPE is required for the job:

- General purpose glove – EN388 cut level C & Impact P
- Personal gas monitor
- Personal H₂S monitor

I checked all PPE before use to ensure it is suitable and fit for purpose.

Commented [MJ(13)]: 175.1.2.3
176.1.2.3

Commented [MJ(14)]: 103.1.3.3

Work Instructions

Procedure

The method statement/procedure for the job is obtained prior to job taking place, it is provided in the job pack. The job pack contains all drawings, P&IDs, job procedure and other job associated documentation. The job pack is kept in a plastic wallet at all times to ensure the documents are kept clean and dry when not in use. The procedure must be read and understood before starting the job. This job required PMs to be conducted on the temperature transmitter 1-TT-0508. All documentation for the procedures are provided in the job pack. I followed all steps in the PM procedures to ensure the task was conducted safely and effectively.

The photographs provided in the job pack aided in locating the temperature transmitter. It also informed us of accessibility, or lack of, if scaffolding or steps were required to access the instrument.

Valero		Maintenance Instrument Request Workscope		SIS Req'd SIL 1	Priority PM
Equipment	1-TT-0508				
Procedure	1-MTC-PRO-INST-0212				
Work Order	6260239				
Workscope	CDU Rundown Temperature PM Check				
Location	Outlet of 1-E-8B - E Side of GDU by 1-G-5				
RAP No.	20204091				
CONTACT	ZOE JOHN	EXT	2127		
Waste Management If Required Tick Box ☒	Waste Generated	IR548 Required	Comments		
Services If Required Tick Box ☒	Scaffold	Lagging	Crane		
Isolation If Required Tick Box ☒	Self	Ops	Ops in Attendance	Elect Isol Lvl	
	☒			B1	B2 B3




Notes

Liaise with Ops prior to starting. Carry out PM as per procedure
1-BPS-508 **MUST** be used.

Comments

BLACK OILS OMC APPROVED 230421 ACH

Commented [MJ(15)]: 103.1.3.5

Commented [MJ(16)]: 002.1.2.2

Commented [JM17]: 002.1.6.2

Title: CDU Rndown Temperature Function Check 1-TT-508
1-MTC-PRO-INST-0212 **Rev: 1.0** **Issued: 24 04 2018** **Page 5 of 8**

3	Sub-Task 3 –Procedure (Calibration of 1-TT-508 Temperature Transmitter)			Role	Tick																																			
Step	Description																																							
3.1	Inform the Control operator that work is to start on 1-TT-508.				✓																																			
3.2	Have Control Operator place bypass switch 1-BPS-508 "ON" Confirm the following:		Control OP		✓																																			
	<table border="1"> <thead> <tr> <th>Delta V Alarm</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>1BPA0508</td> <td>Initiated</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Bypass Panel</th> <th>Lamp</th> </tr> </thead> <tbody> <tr> <td>1-BPSL-508</td> <td>Initiated</td> </tr> </tbody> </table>	Delta V Alarm	Status	1BPA0508	Initiated	Bypass Panel	Lamp	1-BPSL-508	Initiated																															
Delta V Alarm	Status																																							
1BPA0508	Initiated																																							
Bypass Panel	Lamp																																							
1-BPSL-508	Initiated																																							
3.3	Disconnect thermocouple 1-TE-508 from the temperature transmitter 1-TT-508 and connect a "J" type temperature calibrator in its place.		Tech		✓																																			
3.4	Carry out a calibration check on the temperature transmitter 1-TT-508 as per generic procedure MTC/PRC/IE(Gen)/11. Adjust if necessary and note results below.		Tech		✓																																			
3.5	<table border="1"> <thead> <tr> <th>Input (°C)</th> <th>Output (mA)</th> <th>Delta V Indication 1TI0508(°C)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4</td> <td>0</td> </tr> <tr> <td>125</td> <td>12</td> <td>125</td> </tr> <tr> <td>250</td> <td>20</td> <td>250</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Input (°C)</th> <th>Output (mA)</th> <th>Delta V Indication 1TI0508(°C)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4</td> <td>0</td> </tr> <tr> <td>125</td> <td>12</td> <td>125</td> </tr> <tr> <td>250</td> <td>20</td> <td>250</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Input (°C)</th> <th>Output (mA)</th> <th>Delta V Indication 1TI0508(°C)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td></td> <td></td> </tr> <tr> <td>125</td> <td></td> <td></td> </tr> <tr> <td>250</td> <td></td> <td></td> </tr> </tbody> </table>	Input (°C)	Output (mA)	Delta V Indication 1TI0508(°C)	0	4	0	125	12	125	250	20	250	Input (°C)	Output (mA)	Delta V Indication 1TI0508(°C)	0	4	0	125	12	125	250	20	250	Input (°C)	Output (mA)	Delta V Indication 1TI0508(°C)	0			125			250				Tech	
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Input (°C)	Output (mA)	Delta V Indication 1TI0508(°C)																																						
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3.7	Reduce the output of the temperature calibrator to clear all alarms.		Tech		✓																																			

Title: CDU Rndown Temperature Function Check 1-TT-508
1-MTC-PRO-INST-0212 **Rev: 1.0** **Issued: 24 04 2018** **Page 6 of 8**

3	Sub-Task 3 –Procedure (Calibration of 1-TT-508 Temperature Transmitter)			Role	Tick									
Step	Description													
3.8	Have the Control Operator place bypass switch 1-BPS-508 "OFF" and confirm the following:	<table border="1"> <thead> <tr> <th>Delta V Alarm</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>1BPA0508</td> <td>Cleared</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Bypass Panel</th> <th>Lamp</th> </tr> </thead> <tbody> <tr> <td>1-BPSL-508</td> <td>Cleared</td> </tr> </tbody> </table>	Delta V Alarm	Status	1BPA0508	Cleared	Bypass Panel	Lamp	1-BPSL-508	Cleared		Tech	✓	
Delta V Alarm	Status													
1BPA0508	Cleared													
Bypass Panel	Lamp													
1-BPSL-508	Cleared													
3.9	Request the field operator to STOP one or more of the ODD 1-EM-20s fin fan motors either locally at fin fan level or in the sub-station.		Field OP											
Note	The number of ODD 1-EM-20s that can be STOPPED will be at the Control Operators discretion and process temperature permitting.													
3.10	Slowly increase the temperature calibrator output to 78°C. Hold at this point and have Control Operator confirm.	<table border="1"> <thead> <tr> <th>Delta V Alarm</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>1TXH0508 Trip</td> <td>Initiated</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Field Devices</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>1-EM-20-1/3/5/7/9</td> <td>Start</td> </tr> </tbody> </table>	Delta V Alarm	Status	1TXH0508 Trip	Initiated	Field Devices	Status	1-EM-20-1/3/5/7/9	Start		Tech	✓	
Delta V Alarm	Status													
1TXH0508 Trip	Initiated													
Field Devices	Status													
1-EM-20-1/3/5/7/9	Start													
3.11	Continue to increase the output of the temperature calibrator to 80°C and have the Control Operator confirm.	<table border="1"> <thead> <tr> <th>Delta V Alarm</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>1TI0508 PV HI</td> <td>Initiated</td> </tr> </tbody> </table>	Delta V Alarm	Status	1TI0508 PV HI	Initiated		Tech	✓					
Delta V Alarm	Status													
1TI0508 PV HI	Initiated													
3.12	Recommission 1-TT-508 by removing the calibrator and reconnecting the thermocouple.		Tech											
3.13	Have the Control Operator confirm the following:	<table border="1"> <thead> <tr> <th>Delta V Alarm</th> <th>Pre Alarm</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>1TI0508 PV HI</td> <td></td> <td>Clear</td> </tr> <tr> <td>1TXH0508</td> <td>Trip</td> <td>Clear</td> </tr> </tbody> </table>	Delta V Alarm	Pre Alarm	Status	1TI0508 PV HI		Clear	1TXH0508	Trip	Clear		Tech	✓
Delta V Alarm	Pre Alarm	Status												
1TI0508 PV HI		Clear												
1TXH0508	Trip	Clear												
3.14	Check with control Operator that 1-TT-508 has returned 'healthy'.		Tech		✓									
3.15	Request Field Operator to stop the 1-EM-20s as required by operational conditions.		Tech											
3.16	Inform the control operator that the procedure for 1-TT-508 is complete		Tech											
3.17	If no further checks are to be carried out at this time complete section Comments and Deviations.		Tech											
3.18	Sign off the permit.		Tech											

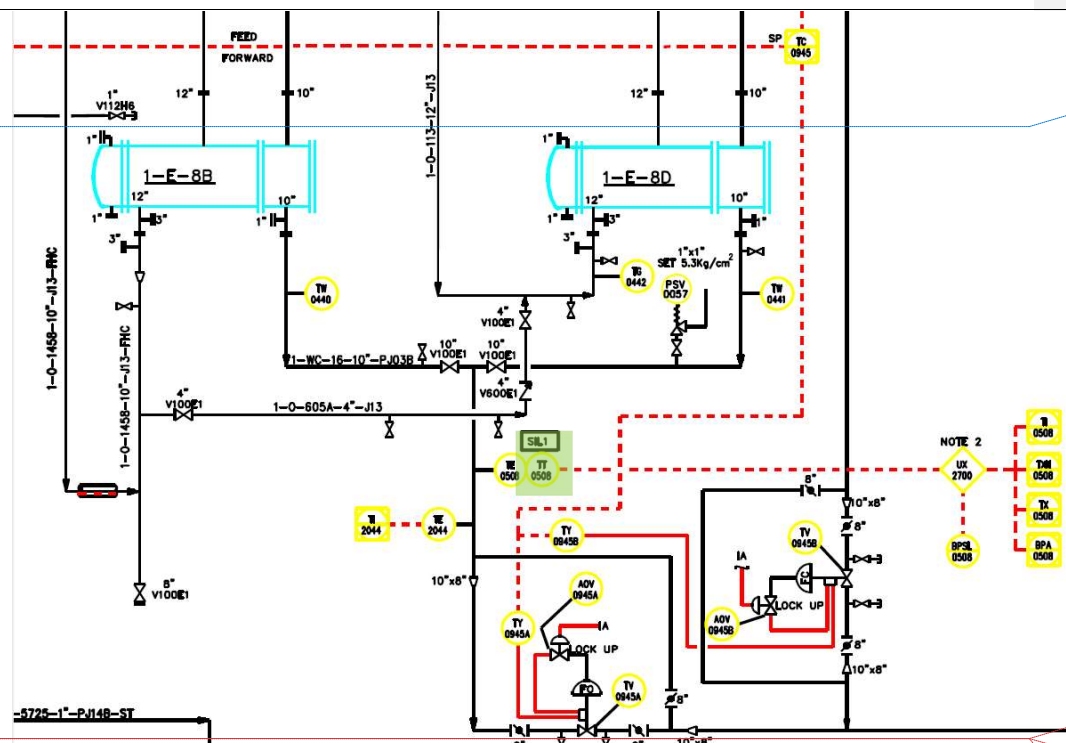
Once printed this document becomes UNCONTROLLED. Do not use a hard copy of this document without first verifying that the Issue Status matches that of the electronic file. Obsolete documents should either be destroyed or suitably marked if they are to be kept for reference purposes.

The maintenance procedure documentation was completed by myself while conducting the calibration.

Commented [JM18]: 002.1.2.8
002.1.4.24
002.1.7.1
002.1.7.2

Piping and instrumentation diagrams (P&IDs) are obtained from Valero's DDMs system before undertaking job. This is to determine where the equipment is located, shows the relationship to other equipment, what purpose the instrument has within process, what other equipment could be affected by maintenance being conducted.

Below is an extract from drawing number 50-AA-626, which illustrates the P&ID required for the job. It displays the instrumentation, control devices, process and piping equipment related to temperature transmitter 1-TT-0508. Highlighted is the instrumentation equipment which I will be carrying out preventative maintenance during this job.



Commented [JM19]: 002.1.1

Commented [MJ(20): 002.1.2.3

Commented [MJ(21)]: 175.1.2.2
176.1.2.2

Commented [MJ(22): 002.1.3

It was found that there was no data sheet within the job pack to confirm the range of the temperature transmitter. I reported this to my supervisor. I then proceeded to obtain the data sheet from the Valero DDMS system. I suggested to my supervisor that in future maintenance tasks it would be helpful to have the data sheets for the instruments provided in the job pack in order to confirm the figures on the procedure to the data sheets. I confirmed the thermocouple calibration certificate was correct to the instrument by checking the instrument tag on the document. I checked the temperature ranges on the document to calibration range checks in the procedure, they were correct.

During the calibration I established that the information obtained from the data sheet met the specifications required, as the temperatures were correct as per the procedure and the process range.



Thermocouple Instruments Ltd

Calibration Certificate

Certificate Number 10507	Calibration Date 11-8-2006	Works Order No 69268	Customer Order No UR20060230311
Customer TEXACO LIMITED PEMBROKE REFINERY PEMBROKE DYFED WALES		Calibration Standard BS EN 60584/2:1993	
		Traceability All standards and devices used have known and traceable values to N.P.L. standards.	
		Uncertainty The uncertainty of any value stated is assessed as being not more than $\pm 1K$ for 0-630K, $\pm 2K$ for 631K to 1000K and $\pm 3K$ over 1001K.	
Description/Part Number/Item Number Calibration of model 644H temperature transmitter..			
Test Procedure This Transmitter was calibrated by comparison with a precision thermocouple simulator. Calibration was carried out in a controlled environment and all standards and devices used have known and traceable values to NPL standard.			
Description	Standard Temperature °C	Test Thermocouple Output mA	Test Thermocouple Deviation mA
1-TE/TI/TT/TW-0508	0.0	3.99	-0.01
RANGE 0-250 C	125.0	12.00	0.00
Input Type (J) thermocouple	250.0	20.00	0.00
1-TE/TI/TT/TW-2133	0.0	4.00	0.00
RANGE 0-300 C	150.0	12.00	0.00
Input Type (J) thermocouple	300.0	20.00	0.00
1-TE/TI/TT/TW-1695	0.0	4.00	0.00
RANGE 0-350 C	175.0	12.01	+0.01
Input Type (K) thermocouple	350.0	20.02	+0.02
1-TE/TI/TT/TW-1709	0.0	4.00	0.00
RANGE 0-700 C	350.0	12.01	+0.01
Input Type (K) thermocouple	700.0	20.01	+0.01
Calibrated By Mark Baldwin	Signature 	Date of Issue 11-8-2006	

Commented [MJ(23)]: 103.1.10

Commented [JM24]: 002.1.2.4
002.1.2.5
002.1.2.6
002.1.3
002.1.4.7
002.1.8
002.1.9
104.1.10

Commented [JM25]: 002.1.5

Material / Tools & Equipment

- Thermocouple simulator – used to simulate type J thermocouple.
- Flat head terminal screwdriver – used to remove terminal connections.
- Adjustable spanner – 0 – 30mm adjustable spanner.
- Radio – to liaise with operations during job.

Commented [MJ(26): 002.1.4.1
178.1.4

The Job

The job requires instrument PM checks to be carried out on a temperature transmitter 1-TT-0508. Before undertaking any task, it is important to ensure the work area is safe and prepared for the maintenance task to be conducted. For example, a gas test is required before any the task is stated, this is done by operations before the permit is issued. Ensuring there is a safe working platform, is there a need for scaffolding, etc. Before conducting any task, I ensured work area was clear and free from obstructions to minimise the risk of a slips, trips or falls.

Calibration of Temperature Transmitter (1-TT-0508)

Locating Equipment

Using the P&ID drawings I located the temperature transmitter 1TT-0508 on the Crude unit. I checked the temperature transmitter and surrounding cabling and pipework for any noticeable damage, there was none, transmitter was in good condition. Before commencing work on the transmitter I contacted Operations via the radio to confirm that the bypass switch 1-BPS-508 has been switched to "ON" and that the status is initiated and lamp is laminated for the bypass, as per the procedure. I followed the maintenance activities step by step throughout the task in order to complete the task safely, correctly and within in the agreed timescale.

Calibration of 1-TT-0508

To calibrate the temperature transmitter I have to first disconnect the thermocouple from the transmitter. I did this by removing the head of the transmitter, loosening the terminal screws which connect the thermocouple to the transmitter. The thermocouple is now disconnected from the system.



Figure 1 Locating instrument

Commented [MJ(27): 175.1.7
178.1.6



Figure 2 Disconnecting thermocouple from transmitter

Commented [MJ(28): 175.1.8.4

I then connected the thermocouple simulator to the transmitter head. Ensuring that I use the same wires as used in the thermocouple. As this is a “J” type thermocouple the wires are a positive iron wire and a negative constantan wire. Once the wires are connected to both the simulator and the transmitter, I am now ready to calibrate the instrument. I noted which wire was the positive by securing some insulation tape to the end of the wire. As I have not used the thermocouple calibrator before, the technician was directing me through the job, training me on the equipment as we followed the procedure through. He observed me throughout the task to ensure that I carried out the maintenance activity using the correct technique and followed the procedure. During the training given by the technician I listened to instructions given, followed them correctly and competently. If I was unsure about an instruction given, I asked for the technician to clarify instructions before continuing. When asking for instructions it is essential to ask in a polite and professional manner.

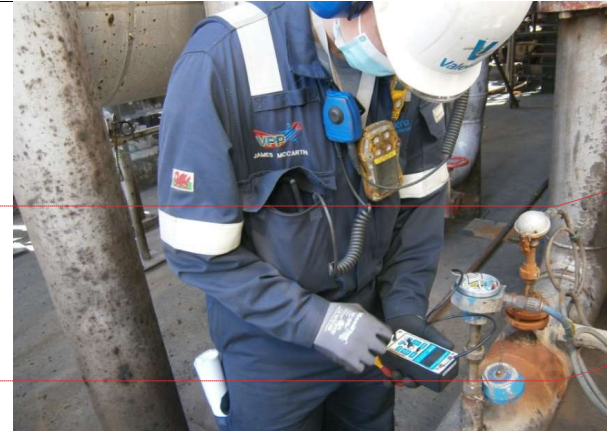


Figure 3 Connecting calibrator

Commented [MJ(29)]: 175.1.8.11

Commented [MJ(30)]: 103.1.14.2
103.1.14.4
176.1.2.7
176.1.2.8
176.1.3.4
178.1.3.4

Commented [MJ(31)]: 103.1.12

The procedure states the calibration values and the corresponding output which should be received on the DCS system.



Figure 4 Calibrator connected, checking procedure

I set the thermocouple calibrator to the required temperature reading. The first temperature input was 0°C. I then contacted Operations to confirm a reading on the DCS system. When contacting Operations via the radio, I maintained a professional manner, politely communicating with the operator, ensuring all communication was clear and professional. By ensuring communication is polite, clear and professional I am maintaining effective working relations with the Valero Operators. The Operator confirmed the first reading was 0°C.

I then increased the temperature on the calibrator to 125°C and requested another reading from the Operator, he confirmed it was 125°C.



Figure 6 Temperature calibrator 0°C



Figure 5 Temperature calibrator 125°C

Commented [MJ32]: 103.1.12.2

Commented [JM33]: 178.1.9.2

The final temperature was 250C, once the calibrator was set I requested the reading from the Operator, the Operator confirmed a reading of 250C.



Figure 7 Temperature calibrator 250C

I noted all readings in the table provided within the procedure documentation. As the results of the calibration testing were as required no further testing or investigation is required.

3.4	Carry out a calibration check on the temperature transmitter 1-TT-508 as per generic procedure MTC/PRC/IE(Gen)/11. Adjust if necessary and note results below.			Tech	✓
3.5	Data Sheet	Input (°C)	Output (mA)	Delta V Indication 1T10508(°C)	Tech
		0	4	0	
		125	12	125	
		250	20	250	
	As Found	Input (°C)	Output (mA)	Delta V Indication 1T10508(°C)	
		0	4	0	
		125	12	125	
		250	20	250	
	As Left	Input (°C)	Output (mA)	Delta V Indication 1T10508(°C)	
		0			
		125			
		250			

Figure 8 Procedure results table

Commented [JM34]: 178.1.10
178.1.11

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For the next step of the procedure 1-BPS-508 bypass must be switched OFF. I requested the Operator perform this task and confirm the DCS alarm for 1-BPA-508 has cleared and the lamp on the bypass panel for 1-BPSL-508 has also cleared. The Operator confirmed this was the case. The procedure then request the Field Operator to stop one of the fin fans. The temperature will then be increased to ensure that correct alarms come in at the set temperatures and the stopped fin fan starts up again at this point. The field Operator stopped one of the fin fans.

I then altered the temperature on the calibrator to 78°C (as per figure 9). The Control Operator confirmed the trip had activated and the fin fan which had been stopped, started at this point.

I continued to increase the temperature on the calibrator to 80°C. I asked the Control Operator to confirm the process high alarm has initiated. He confirmed this has happened. By ensuring the DCS alarms initiate as per the procedure I can confirm that the equipment remains compliant with the safety requirements when in operation, starting the filed device when required and alarming Operations of the issue.

The next step was to reinstate the thermocouple and return the transmitter into service.

Title: CDU Shutdown Temperature Function Check 1-TT-508

1-MTC-PRO-INST-0212

Rev: 1.0

Issued: 24 04 2018

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3 Sub-Task 3 - Procedure (Calibration of 1-TT-508 Temperature Transmitter)

Step	Description	Role	Tick								
3.8	Have the Control Operator place bypass switch 1-BPS-508 "OFF" and confirm the following: <table> <tr> <td><u>Delta V Alarm</u></td> <td><u>Status</u></td> </tr> <tr> <td>1BPA0508</td> <td>Cleared</td> </tr> <tr> <td><u>Bypass Panel</u></td> <td><u>Lamp</u></td> </tr> <tr> <td>1-BPSL-508</td> <td>Cleared</td> </tr> </table>	<u>Delta V Alarm</u>	<u>Status</u>	1BPA0508	Cleared	<u>Bypass Panel</u>	<u>Lamp</u>	1-BPSL-508	Cleared	Tech	✓
<u>Delta V Alarm</u>	<u>Status</u>										
1BPA0508	Cleared										
<u>Bypass Panel</u>	<u>Lamp</u>										
1-BPSL-508	Cleared										
3.9	Request the field operator to STOP one or more of the ODD 1-EM-20s fin fan motors either locally at fin fan level or in the sub-station.	Field OP									
Note	The number of ODD 1-EM-20s that can be STOPPED will be at the Control Operators discretion and process temperature permitting.										
3.10	Slowly increase the temperature calibrator output to 78°C. Hold at this point and have Control Operator confirm. <table> <tr> <td><u>Delta V Alarm</u></td> <td><u>Status</u></td> </tr> <tr> <td>1TXH0508 Trip</td> <td>Initiated</td> </tr> <tr> <td><u>Field Devices</u></td> <td><u>Status</u></td> </tr> <tr> <td>1-EM-20-1/3/5/7/9</td> <td>Start</td> </tr> </table>	<u>Delta V Alarm</u>	<u>Status</u>	1TXH0508 Trip	Initiated	<u>Field Devices</u>	<u>Status</u>	1-EM-20-1/3/5/7/9	Start	Tech	✓
<u>Delta V Alarm</u>	<u>Status</u>										
1TXH0508 Trip	Initiated										
<u>Field Devices</u>	<u>Status</u>										
1-EM-20-1/3/5/7/9	Start										
3.11	Continue to increase the output of the temperature calibrator to 80°C and have the Control Operator confirm: <table> <tr> <td><u>Delta V Alarm</u></td> <td><u>Status</u></td> </tr> <tr> <td>1TI0508 PV HI</td> <td>Initiated</td> </tr> </table>	<u>Delta V Alarm</u>	<u>Status</u>	1TI0508 PV HI	Initiated	Tech	✓				
<u>Delta V Alarm</u>	<u>Status</u>										
1TI0508 PV HI	Initiated										
3.12	Recommission 1-TT-508 by removing the calibrator and reconnecting the thermocouple.	Tech									
3.13	Have the Control Operator confirm the following <table> <tr> <td><u>Delta V Alarm</u></td> <td><u>Status</u></td> </tr> <tr> <td>1TI0508 PV HI</td> <td>Pre Alarm</td> </tr> <tr> <td>1TXH0508</td> <td>Trip</td> </tr> <tr> <td></td> <td>Clear</td> </tr> </table>	<u>Delta V Alarm</u>	<u>Status</u>	1TI0508 PV HI	Pre Alarm	1TXH0508	Trip		Clear	Tech	✓
<u>Delta V Alarm</u>	<u>Status</u>										
1TI0508 PV HI	Pre Alarm										
1TXH0508	Trip										
	Clear										
3.14	Check with control Operator that 1-TT-508 has returned 'healthy'.	Tech	✓								
3.15	Request Field Operator to stop the 1-EM-20s as required by operational conditions.	Tech									
3.16	Inform the control operator that the procedure for 1-TT-508 is complete	Tech									
3.17	if no further checks are to be carried out at this time complete section Comments and Deviations.	Tech									
3.18	Sign off the permit.	Tech									

Figure 9 Extract from procedure

Commented [MJ(35)]: 176.1.9.

I reconnected the thermocouple to the transmitter, ensuring the wires were connected to the correct terminals as per the procedure. The terminal connection screws are required to be tight enough to secure the wire, it is important not to over tighten the fastenings, wires may become damaged if fastenings are too tight. To test if the fastenings secure the wire, a gentle tug of the wire to confirm its security is sufficient.

I contacted Operations to confirm the status of 1-TT-508 had returned to healthy. Operations confirmed the transmitter was reading healthy.

I confirmed to Operations that the PM for 1-TT-508 is completed and if they were happy with the operation of the transmitter that they can resume control.

By following the steps in the procedure I was able to safely, effectively and efficiently complete the maintenance activity to the required standard in the agreed timescale set out in the maintenance schedule of three hours. The frequency of maintenance performed on 1-TT-508 is decided by the Planning and scheduling team. This frequency can vary depending on the instrument, some requiring more frequent maintenance if the instrument is important to plant operation or if there is a known issue with the equipment. We are provided with the job packs of the scheduled maintenance activities at the start of the day by our supervisor.



Figure 10 Reconnect thermocouple to transmitter

Commented [MJ(36)]: 175.1.10.2

Commented [MJ(37)]: 175.1.8.8

Commented [MJ(38)]: 175.1.10.4

Commented [JM39]: 178.1.9.11

Commented [MJ(40)]: 175.1.4
176.1.4
176.1.7

Commented [MJ(41)]: 176.1.9.

Reinstate Work Area

- Work area reinstated.
- Piping and instrumentation checked to ensure no leaks from pipework and no damage had been sustained to instrumentation.
- Tools tidied away and returned to correct storage area.
- Equipment packed in to carry cases, collected and returned to van.
- Walk-ways checked, clear and free from obstruction.

Commented [MJ(42)]: 103.1.6.2

Commented [MJ(43)]: 001.10.2

Commented [MJ(44)]: 103.1.7

Hand-Over

- Operations informed preventative maintenance has been completed.
- Preventative maintenance completion form filled in by technician.
- Preventative maintenance procedure signed off by technician.
- Work permit handed back to Operations
- Job signed off on SAP system.
- Job pack completed and returned to supervisor, including P&IDs, completed job procedure.

Commented [MJ(45)]: 104.1.8.6

Commented [MJ(46)]: 103.1.6.3

Commented [MJ(47)]: 104.1.3.2

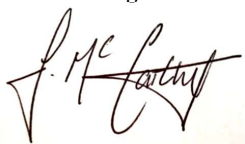
Commented [MJ(48)]: 104.1.9.3

Commented [JM49]: 002.1.2.7

Declaration of authenticity:

I declare this is a true record of my work

Candidate Signature:

A handwritten signature in black ink, appearing to read 'J. Mc Lint', written over a light yellow rectangular background.

Date:.....

Assessor Feedback:



Internal Verifier signature and date (where sampled)

External Verifier signature and date (where sampled)



Candidate Site Report

NVQ: City & Guilds 1788-80 Level 3 NVQ Extended Diploma in Engineering Maintenance.		Level: 3.
Candidate: James McCarthy		Date: 21/05/2021
Employer: Valero	Site Mentor: Jordan Gough	
College Assessor: William Bateman	NVQ Unit's Covered: 001, 002, 103, 104, 174, 175, 176, 178	

Equipment Details			
Reconnect Valve 11-LV-375 and Calibrate Smart Positioner			
Category/ Service	Preventative maintenance	Equipment No.	1-TT-0508
Equipment Description	11-LV-375 valve positioner.		

Safety

General Safety

The Health and Safety at Work Act 1974 requires employees to play their part in safeguarding themselves and other employees while at work. Employees must also cooperate with their employer and use safety equipment as instructed and only for its intended purpose. At all times I abided by the HSWA and Valero's safety policies. I did this by following Valero's safe working procedures, conducted the task as stated in the job procedure and wore the correct PPE.

While working on site at Valero I must abide by several health and safety legislation, including:

- Health and Safety at Work Act 1974
- Control of Substances Hazardous to Health Regulation 2002
- Personal Protective Equipment at Work Regulations 1992
- The Manual Handling Operations Regulations 1992
- Electricity at Work Regulations 1989
- Noise at Work Regulations 1970.

Permit

A work permit describes what I must do to stay safe. No work is to be undertaken until a work permit is obtained. Permits are issued by Operations personnel and can be obtained from the permit office. It is my responsibility to read, understand, sign, and agree the work permit before commencing any work. Work permits are only valid until the end of the working day. Each permit is given a unique permit number for every job.

The permit states that we can carry out disconnect and reinstate instrumentation on 11-LV-375.

Commented [MJ(1)]: 001.1.2.4

Commented [MJ(2)]: 001.1.1
176.1.1
178.1.1

Commented [MJ(3)]: 174.1

Commented [MJ(4)]: 104.1.1

Commented [MJ(5)]: 103.1.1

Commented [MJ(6)]: 175.1

Commented [MJ(7)]: 103.1.3.8

Risk Assessment

Individual risk assessment (first sight) conducted prior to starting job. Before any task is started workers must conducted a first sight, this is to ensure no additional hazards have arisen since the risk assessment was conducted, also to confirm hazards of the job and that none have been overlooked.

All work involving a substance hazardous to health must covered by a COSHH assessment before any work begins. A COSHH assessment is conducted by trained COSHH assessors on site. COSHH assessments and safety data sheets (SDS) are readily accessible and provide all information needed to allow safe handling of a hazardous substance.

Commented [MJ(8)]: 001.1.7.1, 1.7.2, 1.7.3

Commented [MJ(9)]: 175.1.2.3
176.1.2.3
178.1.2.2

Commented [MJ(10)]: 001.1.2.2

Commented [MJ(11)]: 001.1.2.2

Commented [MJ(12)]: 175.1.2.3
176.1.2.3
178.1.2.2

PPE

The job is to be carried out within a red zone, minimal PPE requirements for this zone are:

- Fire retardant overalls
- Hard hat
- Safety Glasses
- Safety boots
- Ear defenders.

Additional PPE to be worn is stated on the work permit. PPE is determined for a job based on the risk assessment conducted. The following additional PPE is required for the job:

- General purpose glove – EN388 cut level C & Impact P
- Personal gas monitor
- Personal H₂S monitor

I checked all PPE before use to ensure it is suitable and fit for purpose.

Commented [MJ(13)]: 175.1.2.3
176.1.2.3

Commented [MJ(14)]: 103.1.3.3

Work Instructions

Job Requirements

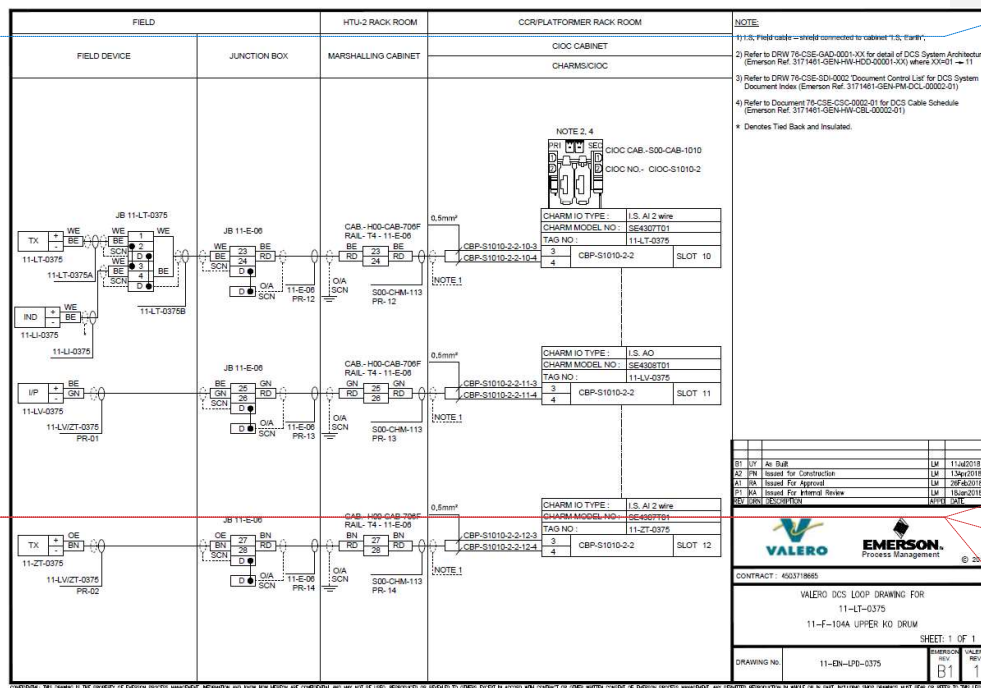
The job is to reconnect the pipework and instrumentation to the valve 11-LV-375 and calibrate the smart positioner for the valve and ensure that all is working correctly.

Loop Diagram

Loop diagrams are obtained from Valero's DDMs system

before undertaking job. This is to determine where the equipment is located, shows the connection to other electrical equipment in the loop.

Below is an extract from the loop diagram for the instrument on 11-LT-375, which illustrates the loop diagram required for the job. It displays the instrumentation, control devices related to the instrument on 11-LT-375. Highlighted is the instrumentation equipment which I will be carrying out preventative maintenance during this job.



Commented [JM15]: 002.1.1

Commented [MJ16]: 002.1.2.3

Commented [MJ17]: 175.1.2.2
176.1.2.2

Commented [MJ18]: 002.1.3

Material / Tools & Equipment

- Multimeter – to check electrical connections
- Phillips head screwdriver – used to secure the cover for the positioner
- Flat head terminal screwdriver – used to remove terminal connections.
- Adjustable spanner – 0 – 30mm adjustable spanner.
- Radio – to liaise with operations during job.

Commented [MJ(19): 002.1.4.1
178.1.4

The Job

The job requires instrument PM checks to be carried out on sphere 20-D-26. Before undertaking any task, it is important to ensure the work area is safe and prepared for the maintenance task to be conducted. For example, a gas test is required before any the task is stated, this is done by operations before the permit is issued. Ensuring there is a safe working platform, is there a need for scaffolding, etc. Ensuring all bypasses are in place if required to confirm maintenance work will not affect the process of the unit. Before conducting any task, I ensured work area was clear and free from obstructions to minimise the risk of a slips, trips or falls.

Calibration of Pressure Transmitter (21-PT-3037)

Locating Equipment

Using the P&ID drawings I located the pressure transmitter 21-PT-3037 at the top of sphere 20-D-26. I checked the pressure indicator and surrounding cabling and pipework for any noticeable damage, there was none, transmitter was in good condition. Before commencing work on the pressure transmitter I contacted Operations via the radio to provide a DCS reading for 21-PT-3037. Operations confirmed a reading of 1.1kg/cm². noted the reading and recorded it in the procedure (below).

Reinstate Work Area

- Work area reinstated.
- Piping and instrumentation checked to ensure no leaks from pipework and no damage had been sustained to instrumentation.
- Tools tidied away and returned to correct storage area.
- Equipment packed in to carry cases, collected and returned to van.
- Walk-ways checked, clear and free from obstruction.

Commented [MJ(20)]: 103.1.6.2

Commented [MJ(21)]: 001.10.2

Commented [MJ(22)]: 103.1.7

Hand-Over

- Operations informed preventative maintenance has been completed.
- Preventative maintenance completion form filled in by technician.
- Preventative maintenance procedure signed off by technician.
- Work permit handed back to Operations

Commented [MJ(23)]: 104.1.8.6

- Job signed off on SAP system.
- Job pack completed and returned to supervisor, including P&IDs, completed job procedure.

Commented [MJ(24)]: 103.1.6.3

Commented [MJ(25)]: 104.1.3.2

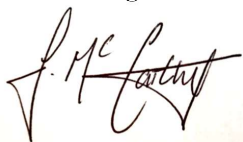
Commented [MJ(26)]: 104.1.9.3

Commented [JM27]: 002.1.2.7

Declaration of authenticity:

I declare this is a true record of my work

Candidate Signature:



Date:.....

Assessor Feedback:



Internal Verifier signature and date (where sampled)

External Verifier signature and date (where sampled)

Candidate Site Report

NVQ: City & Guilds 1788-80 Level 3 NVQ Extended Diploma in Engineering Maintenance.		Level: 3.
Candidate: James McCarthy		Date: 28/03/21
Employer: Valero	Site Mentor: Dan Lee	
College Assessor: William Bateman	NVQ Unit's Covered: 001, 002, 103, 104, 174, 175, 176, 178	

Commented [WB1]: ✓

Equipment Details			
Calibration checks on current to pressure convertor 04-PDY-177.			
Category/ Service	Preventative maintenance	Equipment No.	04-PDY-177
Equipment Description	04-PDY-177 – current to pressure convertor.		

Safety

General Safety

The Health and Safety at Work Act 1974 requires employees to play their part in safeguarding themselves and other employees while at work. Employees must also cooperate with their employer and use safety equipment as instructed and only for its intended purpose. At all times I abided by the HSWA and Valero's safety policies. I did this by following Valero's safe working procedures, conducted the task as stated in the job procedure and wore the correct PPE.

While working on site at Valero I must abide by several health and safety legislation, including:

- Health and Safety at Work Act 1974
- Control of Substances Hazardous to Health Regulation 2002
- Personal Protective Equipment at Work Regulations 1992
- The Manual Handling Operations Regulations 1992
- Electricity at Work Regulations 1989
- Noise at Work Regulations 1970.

Permit

A work permit describes what I must do to stay safe. No work is to be undertaken until a work permit is obtained. Permits are issued by Operations personnel and can be obtained from the permit office. It is my responsibility to read, understand, sign, and agree the work permit before commencing any work. Work permits are only valid until the end of the working day. Each permit is given a unique permit number for every job.

The permit we were issued is shown below. Permit number 215645-51, job number 20198926. The permit states that we can carry out instrument installation/disinvestments for the Alkylolation unit turnaround works.

Commented [MJ(2)]: 001.1.2.4

Commented [MJ(3)]: 001.1.1
176.1.1
178.1.1

Commented [MJ(4)]: 174.1

Commented [MJ(5)]: 104.1.1

Commented [MJ(6)]: 103.1.1

Commented [MJ(7)]: 175.1

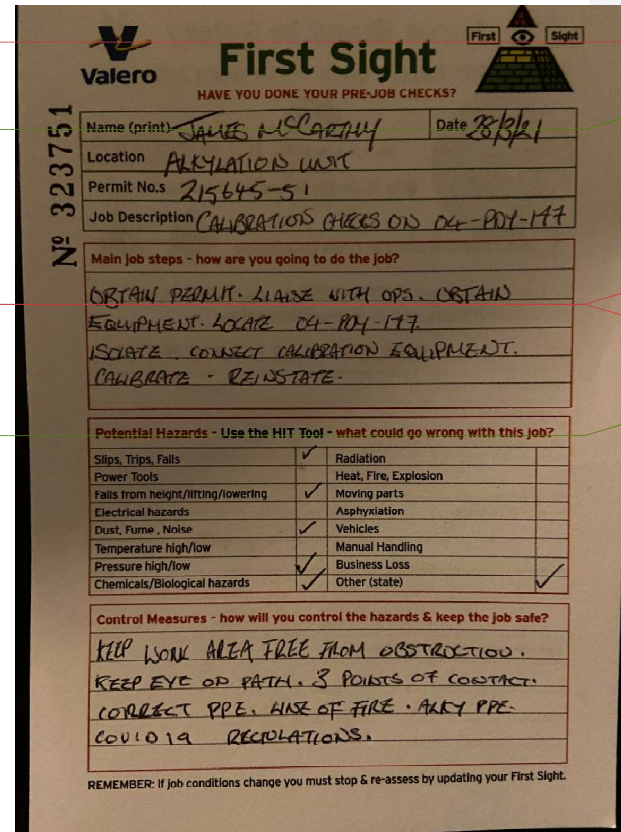
Commented [MJ(8)]: 103.1.3.8

Commented [WB9]: All referenced correctly ✓

Risk Assessment

Individual risk assessment (first sight) conducted prior to starting job. Before any task is started workers must conducted a first sight, this is to ensure no additional hazards have arisen since the risk assessment was conducted, also to confirm hazards of the job and that none have been overlooked. I conducted a first sight before conducting the I to P calibration.

All work involving a substance hazardous to health must covered by a COSHH assessment before any work begins. A COSHH assessment is conducted by trained COSHH assessors on site. COSHH assessments and safety data sheets (SDS) are readily accessible and provide all information needed to allow safe handling of a hazardous substance. The task is being conducted on the Alkylation unit. Hydrofluoric acid is used as a catalyst in the unit's operation. As there is a risk of contact with this hazard additional PPE is required. This includes a neoprene rubber suit, safety gauntlets, safety helmet with neoprene neck flap and safety visor.



Valero First Sight
HAVE YOU DONE YOUR PRE-JOB CHECKS?

No 323751

Name (print) JAMES MCCARTHY Date 28/2/21

Location ALKYLATION UNIT

Permit No.s 215645-51

Job Description CALIBRATION CHECKS ON O4-P04-177

Main job steps - how are you going to do the job?

OBTAIN PERMIT. LIAISE WITH OPS. OBTAIN EQUIPMENT. LOCATE O4-P04-177.
ISOLATE. CONNECT CALIBRATION EQUIPMENT.
CALIBRATE - REINSTATE.

Potential Hazards - Use the HIT Tool - what could go wrong with this job?

Slips, Trips, Falls	☒	Radiation	☐
Power Tools	☐	Heat, Fire, Explosion	☐
Falls from height/lifting/lowering	☒	Moving parts	☐
Electrical hazards	☐	Asphyxiation	☐
Dust, Fume, Noise	☒	Vehicles	☐
Temperature high/low	☐	Manual Handling	☐
Pressure high/low	☒	Business Loss	☐
Chemicals/Biological hazards	☒	Other (state)	☒

Control Measures - how will you control the hazards & keep the job safe?

KEEP WORK AREA FREE FROM OBSTRUCTION.
KEEP EYE ON PATH. 3 POINTS OF CONTACT.
CORRECT PPE. AWARE OF FIRE. AWARE PPE.
COVID 19 REGULATIONS.

REMEMBER: If job conditions change you must stop & re-assess by updating your First Sight.

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176.1.2.3
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176.1.2.3
178.1.2.2

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PPE

The job is to be carried out within a red zone, minimal PPE requirements for this zone are:

- Fire retardant overalls
- Hard hat
- Safety glasses
- Safety boots
- Ear defenders.

Additional PPE to be worn is stated on the work permit. PPE is determined for a job based on the risk assessment conducted. The following additional PPE is required for the job:

- General purpose glove – EN388 cut level C & Impact P
- Personal gas monitor
- Personal H₂S monitor
- Neoprene rubber suit
- Safety gauntlets
- Safety helmet with neoprene neck flap and safety visor.

I checked all PPE before use to ensure it is suitable and fit for purpose.

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176.1.2.3

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Work Instructions

Procedure

The method statement/procedure for the job is obtained prior to job taking place, it is provided in the job pack. The job pack contains all drawings, P&IDs, job procedure and other job associated documentation. The job pack is kept in a plastic wallet at all times to ensure the documents are kept clean and dry when not in use. The procedure must be read and understood before starting the job. This job required calibration of the current o pressure transmitter 04-PDY-177. All documentation for the procedures are provided in the job pack. I followed all steps in the PM procedures to ensure the task was conducted safely and effectively.

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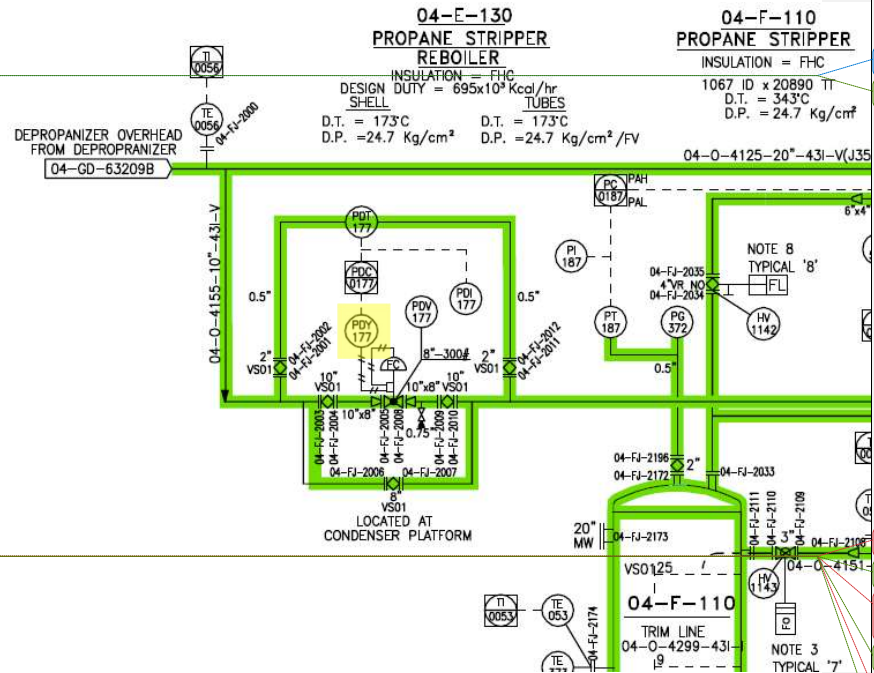
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Piping and instrumentation diagrams (P&IDs) are obtained from Valero's DDMs system before undertaking job. This is to

Below is an extract from drawing number 50-AA-626, which illustrates the P&ID required for the job. It displays the instrumentation, control devices, process and piping equipment related to the current to pressure convertor 04-PDY-177. Highlighted is the instrumentation equipment which I will be carrying out preventative maintenance during this job.



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Material / Tools & Equipment

- Low pressure hand pump calibrator 0 – 18psi – used to observe output reading from pneumatic pressure transmitter of 3 – 15psig. Also used to calibrate pneumatic switch by providing an input of 12psig to trip alarm.
- Multi-meter – used to determine mA reading from transmitter during calibration of DP pressure level transmitter and pressure transmitter.
- Milliamp source – used to generate a milliamp source for use during the I to P calibration.
- Adjustable spanner – 0 – 30mm adjustable spanner.
- Flat head insulated screwdriver.
- Radio – to liaise with operations during job.

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178.1.4

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The Job

The job requires instrument calibration checks on the I to P convertor 04-PDY-177. Before undertaking any task, it is important to ensure the work area is safe and prepared for the maintenance task to be conducted. For example, a gas test is required before any the task is stated, this is done by operations before the permit is issued. Ensuring there is a safe working platform, is there a need for scaffolding, etc. Ensuring all bypasses are in place if required to confirm maintenance work will not affect the process of the unit. Before conducting any task, I ensured work area was clear and free from obstructions to minimise the risk of a slips, trips or falls.

Calibration of Current to Pressure Convertor (04-PDY-177)

Theory

In a current to pressure convertor (I to P) an input current supply of 4-20mA is required. There is a constant supply of 20psi air pressure which is received through a regulator as the Valero site air feed pressure is around 7 bar. The I to P has a flapper nozzle assembly. The flapper has one end connected to a pivot and the other has a magnetic material attached. The flapper is held away from the nozzle using two springs. As the 20psi air pressure travels through the nozzle some escapes through the gap at the top where the flapper is and the remainder travels down to provide the signal pressure. The I to P contains a magnet at the opposite end to the pivot, where the magnetic material is connected to the flapper. As the current is increased the power of the magnet is increased, this draws the flapper closer to the magnet and therefore the nozzle. Now, less pressure will escape through the nozzle and the output signal pressure increases. The output pressure will be proportional to the input current.

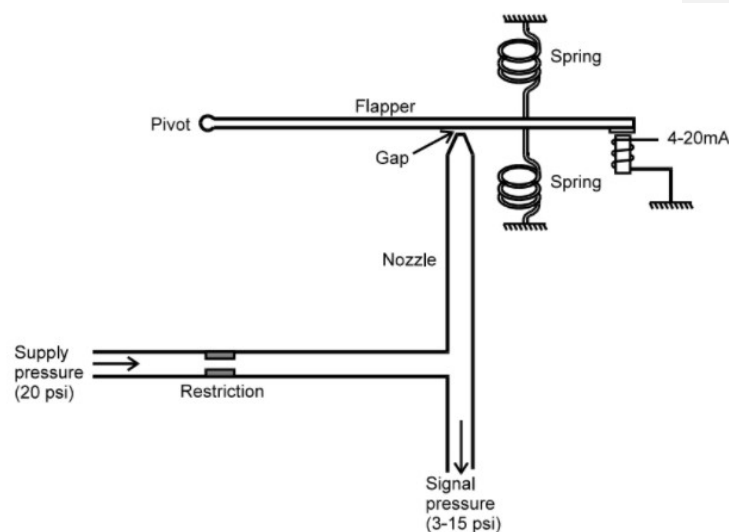


Figure 1 Current to pressure convertor diagram

Locating Equipment

Using the P&ID drawings I located the current to pressure convertor 04-PDY-177 next to the propane stripper vessel 04-F-110, on the fourth level. I checked the current to pressure convertor and surrounding cabling and pipework for any noticeable damage, there was none, transmitter was in

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good condition. Before commencing work on the I to P convertor I contacted Operations via the radio to inform them that I was about to start work on the I to P convertor 04-PDY-177, Operations confirmed I could commence work. The next step was to isolate the I to P from process.

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Firstly, I removed the instruments cover safely. Rotating the head anti-clockwise to open the cover of the instrument. By removing the cover, I will be able to inspect the internals of the instrument and be able to isolate it.

Commented [WB41]: Great performance image.



Figure 2 Removing instrument cover

By removing the cover of the I to P I am able to access the terminals. I inspected my terminal screwdriver to ensure it was free from damage and fit for purpose. Using the terminal screwdriver, I loosened the terminal connectors, allowing removal of the positive and negative cables. These cables provide power to the instruments, they also transfer the 4-20 milliamp signal from the DCS system to the I to P convertor.

I then connected the milliamp source, ensuring the connections were correct from the source to the terminal connections in the I to P (positive to positive and negative to negative). I secured the terminal connections securely within the I to P using the terminal flat head screwdriver.



Figure 3 Isolating instrument



Figure 4 Connecting mA source

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175.1.8.2



Figure 5 Disconnecting air supply

Using the adjustable spanner, I disconnected the airline output from the I to P. This airline is connected to the positioner on the valve. Before using the adjustable spanner, I check that it was free from damage and fit for purpose.

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Figure 6 Connecting hand pump

By the connecting the low pressure hand pump calibrator I can see the air pressure output from the I to P convertor. The pressure calibrator should read from 3 to 15psig depending on the milliamp input of 4-20mA. With 0% being equal to 3psig or 4mA, and 100% being equal to 15psig or 20mA.

Using the milliamp source, I set an input of 4mA, the output reading from the I to P convertor was 4.5psig (ideal reading should be 3psig). I then adjusted the milliamp source to produce an input of 8mA, then 12mA, 16mA and 20mA (table below).

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Input mA	4	8	12	16	20
Output psig	4.5	7	8.5	11.5	14

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Figure 7 Adjusting zero point



Figure 8 Internals of instrument

As the readings from the calibration check were not acceptable adjustment of the I to P convertor was required. There are two adjustments which can be made on the I to P, the zero and the span. The zero screw adjustment is located on the front of the I to P, and the span adjustment is located on the left hand side of the instrument.

The image to the left illustrates adjustment being made to the zero when the input is at 4mA and the pressure gauge output is reading 4psig. The adjust required is to bring the output reading to 3psig while the input remains at 4mA. The five point calibration check is performed again to check the readings. Further adjustment to the zero and span is required.

After repeated adjustment and five point calibration checks it was decided that a new I to P convertor was required as a repeatable I to P reading could not be established on the existing instrument. I reported the defect to my supervisor for actioning. A note was taken of the current instrument and its make and model, so a replacement could be obtained. I removed the current instrument from operation, ensuring all correct isolations had been made. There is a risk that the instrument may have come in contact with HF acid. Therefore, correct storage is required. There is a storage container on the unit specifically for Alky equipment which has been removed. This is to minimise the risk of anyone accidentally coming into contact with HF acid without wearing appropriate PPE. The equipment, if not used again, is then decontaminated and disposed of correctly.

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178.1.9.9

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176.1.10

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103.1.9.2
104.1.6

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104.1.4.3
176.1.12

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103.1.8
178.1.8.7



Figure 9 New I to P calibration setup

New equipment required: I to P convertor, 0 to 30 psi gauge and a regulator. The new equipment is a like for like replacement of the old setup. Stores was checked to see if the correct equipment was in stock, it was, therefore we could obtain the new equipment ready for installation. Before the new I to P can be put into service it first has to be calibrated. I sourced the manufacturers guidelines for the transducer and followed them (figure 11). To calibrate I firstly connected a pressure regulator, to the air in port, which would bring the site air pressure connected from 7bar and regulate it down to 20psi. An air supply providing 7bar was connected to the regulator. I then connected the low pressure calibrator to the air pressure out, this is the 3-15psig output. The milliamp source was then connected via the terminal connectors.

By performing the same five point calibration as in the field, I am able to establish initial current input to air pressure output readings. As the reading taken were not correct, I performed adjusted within the I to P convertor using the zero and span adjustment screws. After performing the necessary adjustments and again a final five point calibration check, the I to P convertor was producing the correct psig output with corresponded with the milliamp input.



Figure 10 Calibrating instrument

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175.1.8.13

Fisher™ 846 Current-to-Pressure Transducer

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Figure 1. Fisher 846 Current-to-Pressure Transducer



Standard Performance: Full Range Input, Direct Action

WARNING

Refer to the **WARNING** at the beginning of the Maintenance section.

Use the following procedure to achieve a standard 0.2 to 1.0 bar (3 to 15 psi) output span for a 4 to 20 mA input signal:

1. Remove the module final assembly from the housing. Refer to Removing the Module Final Assembly in the Maintenance section for an explanation of how to disengage the module final assembly.
2. Confirm that the unit is direct acting. A green electronic circuit board identifies direct-acting units. Refer to Action under the heading Electronic Circuit Board in the Maintenance section for more information on direct acting units.
3. Position the range jumper in the Hi position for High Range. Figure 18 shows the circuit board jumper positions.
4. Replace the module final assembly in the housing. Refer to Replacing the Module Final Assembly in the Maintenance section for an explanation of how to engage the module final assembly.
5. Connect the air supply to the air supply port.
6. Connect a precision output indicator to the output signal port.
7. Make sure that the output gauge port has an output gauge or a threaded plug installed. A threaded plug is provided for units shipped without output gauges.
8. Remove the terminal compartment cover.
9. Connect the current source (or voltage source) positive lead (+) to the terminal block positive (+) and the current source (250-ohm resistor lead) negative lead (-) to the terminal block negative (-). Refer to figure 9.

CAUTION

Excessive current can damage the transducer. Do not connect an input current of more than 100 mA to the transducer.

10. Apply a 4.0 mA ($V_m = 1.0$ V) signal, and adjust the zero screw to achieve a 0.2 bar (3.0 psi) output. The output increases with clockwise rotation of the zero screw.
11. Apply a 20.0 mA ($V_m = 5.0$ V) signal, and adjust the span screw to achieve a 1.0 bar (15.0 psi) output. The output increases with clockwise rotation of the span screw.
12. Repeat steps 10 and 11 to verify and complete the calibration.

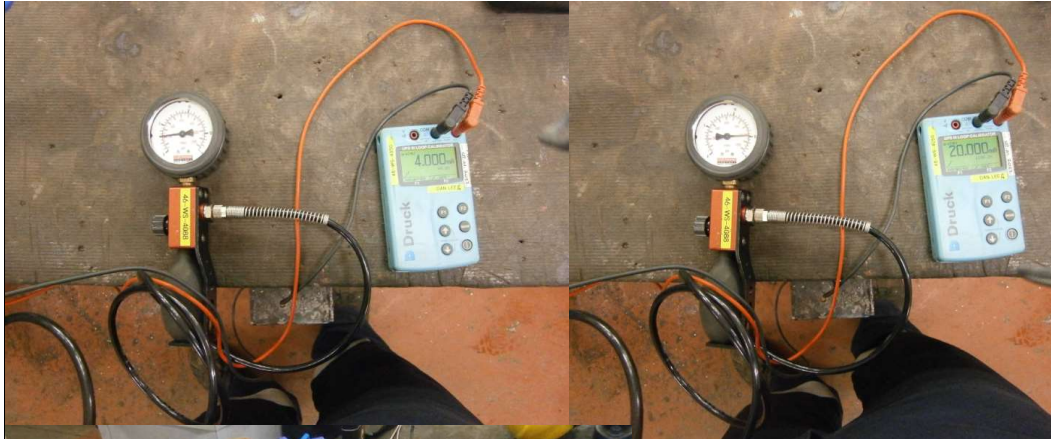
Multirange Performance: Full Range Input, Direct Action

WARNING

Refer to the **WARNING** at the beginning of the Maintenance section.

Note

Consult your [Instrument sales office](#) for calibration of multirange performance units with split range input.



The images to the left illustrate the correct calibration. With a 4mA input producing a 3psig output, and a 20mA input producing a 15psig output.

The I to P new I to P convertor was now ready to be put into service. It is important to store completed products securely while they await being reinstated into operation. I stored the I to P convertor safely and securely in the workshop, until we were ready to reinstate the instrument.

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All waste materials were correctly disposed of on completion of calibration. The cardboard into the correct recycling bin and the general waste into the general waste bin and the work area was cleared and left tidy.

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176.1.12
176.1.2.10
175.1.13

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Commented [JM70]: 175.1.2.9

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To conduct this job, I had to first receive training specific to working on the Alkylation unit this is due to the risk of contact with HF acid. On completion of the training, a card is given to the worker to confirm they are capable of working safely on the Alkylation unit, know the correct PPE to be worn, the Alky unit's safety protocols, and are aware of the hazards and risk.

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Reinstate Work Area

- Work area reinstated.
- Piping and instrumentation checked to ensure no leaks from pipework and no damage had been sustained to instrumentation.
- Tools tidied away and returned to correct storage area.
- Equipment packed in to carry cases, collected and returned to van.
- Walk-ways checked, clear and free from obstruction.

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Hand-Over

- Operations informed preventative maintenance has been completed.
- Preventative maintenance completion form filled in by technician.
- Preventative maintenance procedure signed off by technician.
- Work permit handed back to Operations
- Job signed off on SAP system.
- Job pack completed and returned to supervisor, including P&IDs, completed job procedure.

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104.1.3.4

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Declaration of authenticity:

I declare this is a true record of my work

Candidate Signature:**Date:** 02/05/21**Assessor Feedback:**

13/07/21. James, another detailed report of your performance with excellent and clear images used. A good preventative maintenance write up on calibration checks- well done. Great use of images taken by yourself on site and in the work shop to have the person reading this report informed- a good holistic way of presenting information against criteria.

Actions/Targets-

1. Please can you cross reference the criteria I have agreed you have achieved in green using the cross-referencing template- the cross referencing set up should like this- 732 – 1.16, Job 1, P. 10.
2. Annotate your images- illustrate to the reader what is going on, use arrows to highlight certain parts of the image.
3. Label your images correctly and make direct reference to them. An example is- Figure 1 Risk assessments and then..... As seen in figure 1, the risk assessment sates....

Gwaith ardderchog/Excellent work.

William Bateman.



Internal Verifier signature and date (where sampled)

External Verifier signature and date (where sampled)

