

Pipelines and Terminals CTEMS Document		
	<b><i>ELEMENT FOUR</i></b>	<b>CTEMS SWP 01</b>
	<b><i>Operations Reliability &amp; Mechanical Integrity</i></b>	<b>Rev Date: July 20</b>
	<b><i>4.1 RISK ASSESSMENT STANDARD</i></b>	<b>Revision v3</b>

## 1 PURPOSE

To define the process by which hazards shall be assessed for health, safety and environmental risks and appropriate controls identified.

## 2 SCOPE

Pipelines and Terminals European operations.

## 3 ROLES AND RESPONSIBILITIES

The Facility Manager shall be responsible for ensuring suitable and sufficient risk assessments are in place for activities performed on site. Information on hazards present on site will also be communicated to contractors to enable them to carry out their assessments

HES specialists shall assist in the preparation of risk assessments for work undertaken by Valero staff or appointed designates. They shall seek input of appropriate persons, Facility Managers, Engineers, Operators or other specialists as necessary to complete the assessment. It is recommended that two or more people are involved in the preparation and review of risk assessments in order to ensure they reflect an appropriate degree of expertise.

Complex risk assessments, e.g. quantitative and semi-quantitative predictive risk assessments or use of specialist software may require external expertise to be engaged.

Contractors shall be responsible for assessing the risks arising from their work and determining the appropriate controls taking into account information provided by the facility. These assessments will be reviewed by the facility for suitability before any work is authorised.

## 4 QUALITATIVE AND SEMI-QUANTITATIVE RISK ASSESSMENT

The tools used for Risk Assessment are not prescriptive and any suitable format may be used providing it is suitable and sufficient for the purpose and provides an adequate identification of hazards and assessment of the risk. Appropriate controls must be specified to reduce the risk so far as is reasonably practicable.

For normal routine task risk assessments including COSHH assessments a simple qualitative assessment using a 3 x 3 matrix indicating Low, Medium and High (L, M & H) categorisations of severity and probability shall be considered to be sufficient. **FHES SWP 01.1** provides a qualitative template that can be used.

Risk values of L X L or L x M shall be considered low or acceptable, M X M or L X H should be considered to be a medium risk and further control measures may need to be considered. M X H or H X H shall be considered to be High Risk and unacceptable to proceed. Additional controls will be required to reduce either the probability or severity of harm occurring.

Tasks requiring a more detailed study of probability and consequence but not part of a COMAH MAH assessment may use **FHES SWP 01.2** template. This provides 4 levels of probability and 5 potential levels of harm. The format enables the assessor to determine the risk levels with no or just existing controls in place and then select additional measures to reduce either the probability or the severity of the event. These should be clearly recorded such that a narrative is formed showing how the risk has been mitigated and the impact of the additional controls. A sign off process is provided with higher levels of management approval required proportionate to the escalation of risk.

Quantitative or semi-quantitative assessments are typically required where a formal external evaluation by a predictive specialist is required. E.g. under COMAH regulations. Typically harm categorisations will be as determined by the applicable guidance and frequency in orders of magnitude of the likelihood of the event occurring in a given time period. E.g. one year, ten years etc. Data will normally be taken from acknowledged published sources such as mechanical equipment failure rates and applied to the sites operation e.g. number of loading operations or length of site pipework to calculate event frequency. The risk matrices given in Appendix 1 shall be used.

Consideration shall be given to Management of Change when performing risk assessments. New or substantially revised controls or engineered solutions may require a management of change process to be followed.

## 5 PROCEDURE

Qualitative risk assessments shall be conducted on all tasks and activities where there is a statutory duty to do so or where there is a foreseeable risk of harm occurring. Risk assessments shall include as a minimum;

- A description of the task, location, tools and materials involved.
- Date of the assessment and name of the person/s completing it.

- Identification of persons at risk. This includes the persons performing the task and others who may be affected. This may include other employees and contractors but also person's offsite including the general public if the consequences are of such a magnitude.
- Identification of natural or built environment at risk including sensitive receptors.
- Consideration as to whether an alternative process could practicably be utilised that would reduce either the potential harm or probability following the principles of the hierarchy of control.
- The task should be broken down into logical steps or aspects and an assessment made of the;
  - Hazards present or arising from the task.
  - Potential for harm and an assessment of the likely severity of that harm according to the criteria used with the existing control measures in place.
  - Probability that the harm could occur according to the criteria used with the control measures in place.
  - Existing control measures in place, engineered, procedural, protective equipment.
  - Overall risk rating of each step/aspect shall be determined as a product of the severity and likelihood and categorised according to the appropriate matrix.

Where appropriate additional control measures or changes to the task may be applied and the risks reassessed. The final version shall reflect the residual risk with the specified controls in place. There is not an expectation that all risk assessments will indicate low risk. The risk ranking should be a valid proportionate reflection of the risk associated with the task.

***Note on Safety Critical Steps:*** *Where there is potential for a failure to result in significant harm such as a Major Accident Hazard (MAH) event, or to limit the effectiveness of a mitigation measure to an MAH then it should be highlighted as a Safety Critical Step.*

Where quantitative or semi-quantitative assessments are undertaken, then sufficient expertise in both the task/operation to be assessed and the assessment process must be involved to ensure the assessments are conducted consistently and with sufficient rigor.

Results will typically be plotted on a matrix according to the predicted severity and frequency. It is common practice to classify the events as being tolerable, tolerable if as low as reasonable practicable

(TifALARP) or intolerable. The Establishment Risk is the sum of all the representative set of MAH for the facility.

## 6 RISK ASSESSMENT REVIEW

All risk assessments shall be reviewed if there are any significant changes to the task or the way it is performed or in response to any incident call could affect the validity of the assessment.

Risk assessments should be reviewed periodically to ensure they remain suitable and sufficient.

## 7 DOCUMENT REVIEW

This document should be reviewed following but not limited to:

- Incidents where the risk rating was believed to be a factor
- The identification of procedural gaps following Internal and / or external audits
- Updates according to the needs of management or organisational reviews

## 8 REVISION HISTORY

Description	Reference
Document:	SWP 01 – Risk Assessment Standard
Date Created:	June 2012
Owner:	HES Manager
Author:	Eddie Watts
Date Reviewed/Amended:	July 2020
Revision No.	3

Amendment details:

Date	Amended By	Description	AR No
June 2016	E Watts	Rewrite and clarification of matrix use	AR 141
Sept 2016	E Watts	Addition of detailed risk assessment methodology	AR 141
July 2020	J Daniels	Removed RA forms as published separately, updated references to such forms, a adjusted formatting and human harm risk matrix.	AR 421

## APPENDIX 1

Figure 1 Risk matrix for human harm

Frequency / year	Consequence / Severity			
Likely >10 <sup>-2</sup>				
Occasional 10 <sup>-3</sup> -10 <sup>-2</sup> y <sup>-1</sup>				
Seldom 10 <sup>-4</sup> -10 <sup>-3</sup> y <sup>-1</sup>				
Unlikely 10 <sup>-5</sup> -10 <sup>-4</sup> y <sup>-1</sup>				
Remote 10 <sup>-6</sup> -10 <sup>-5</sup> y <sup>-1</sup>				
Rare <10 <sup>-6</sup> y <sup>-1</sup>				
People at risk of fatality	<b>NONE</b> major injuries only	<b>MAJOR</b> 1 - 4	<b>SEVERE</b> 5 - 50	<b>CATASTROPHIC</b> >50

Broadly Acceptable Region	Demonstrable ALARP (Tolerable Region)	Intolerable Region
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**MAJOR:** 1-4 onsite fatalities or serious injury to public  
**SEVERE:** 5-50 onsite fatalities or multiple offsite fatalities  
**CATASTROPHIC:** >50 fatalities

Figure 2 Risk matrix for environmental harm (CDOIF)

Frequency	Consequence / Severity				
Fairly Probable >10 <sup>-3</sup>					
Quite Unlikely 10 <sup>-4</sup> – 10 <sup>-3</sup>					
Unlikely 10 <sup>-5</sup> – 10 <sup>-4</sup>					
Very Unlikely 10 <sup>-6</sup> – 10 <sup>-5</sup>					
Extremely Unlikely 10 <sup>-7</sup> – 10 <sup>-6</sup>					
Remote < 10 <sup>-7</sup>					
Environmental harm potential	Sub-MATTE (short term)	MATTE Category A	MATTE Category B	MATTE Category C	MATTE Category D

