

COMAH Competent Authorities

Operational Guidance

Classification of Inherent Hazard (Safety and Environment) for COMAH Establishments

(This Guidance replaces “Site Prioritisation Methodology - Intrinsic Hazard (Safety and Environment) and Performance”)



Environment
Agency



Cyfoeth Naturiol Cymru
Natural Resources Wales



Office for
Nuclear Regulation

Purpose

1. The COMAH 2015 Regulations place duties on regulators to organise an adequate system of inspection. There is a specific duty on the COMAH Competent Authorities (CAs) to draw up plans for routine inspections of all COMAH establishments. This must be done on a regular basis. The CAs fulfil this responsibility by developing annually reviewed and revised COMAH Intervention Plans.
2. The COMAH Intervention Plans take account of a COMAH Operator's performance in managing the major hazard risks on their establishment as well as the inherent hazard presented by the establishment.
3. This document describes the methodology used by the CA to determine the inherent hazard classification of a COMAH establishment.
4. The COMAH CAs "Performance and Recognition Framework" <http://www.hse.gov.uk/comah/guidance/performance-recognition-framework.pdf> describes how the CAs take account of businesses' performance in controlling major accident risks when planning inspections.

Background

5. Regulation 25 to the COMAH Regulations 2015 requires the CAs to "*organise a system of inspections of establishments appropriate to the type of establishment concerned*", and the system "*must ensure all establishments are covered by an inspection plan that includes a general assessment of relevant safety issues*". The prioritisation of establishments for inspection and the annual intervention plan for each establishment enables the CAs to comply with this requirement.
6. The Hampton Principles, formulated by Sir Philip Hampton in his 2005 review, place an emphasis on a risk-assessed approach to regulation, with inspections taking place only where necessary.
7. A system that differentiates between COMAH establishments according to the threat they pose to safety and the environment is clearly an essential component of any sensible approach to informing decisions on appropriate intervention levels.
8. This inherent hazard methodology enables the CAs to differentiate between COMAH establishments according to the inherent hazard they pose.
9. In developing this methodology we have considered similar systems already in use within the CAs. Therefore the approach taken to developing the prioritisation scheme was to:
 - Build upon the strengths of the existing schemes;
 - collect data to obtain inherent hazard classifications for all COMAH establishments;
 - calibrate the method to differentiate between inherent hazard classifications of COMAH establishments relative to each other and also relative to the safety and environment inherent hazard classifications for each establishment;
 - use the inherent hazard methodology to derive inherent hazard groupings which can then be used in the COMAH Intervention Planning process to help deliver the best use of CA resources.
10. The methodology was originally developed in 2010 by the CA and took account of the perspectives of all the constituent sectors of the CA. In 2015, feedback following

use of the methodology confirmed that whilst it was substantially fit for purpose, in a limited number of cases the method did not adequately characterise the environmental inherent hazard. A CA working group made amendments which have been added into the environmental hazard as [Annex 3](#).

How it works

11. The inherent hazard classification is based upon:
 - the hazard type present at an establishment whether 'Safety' or 'Environmental';
 - The establishment and surrounding populations
 - Societal risk modifier

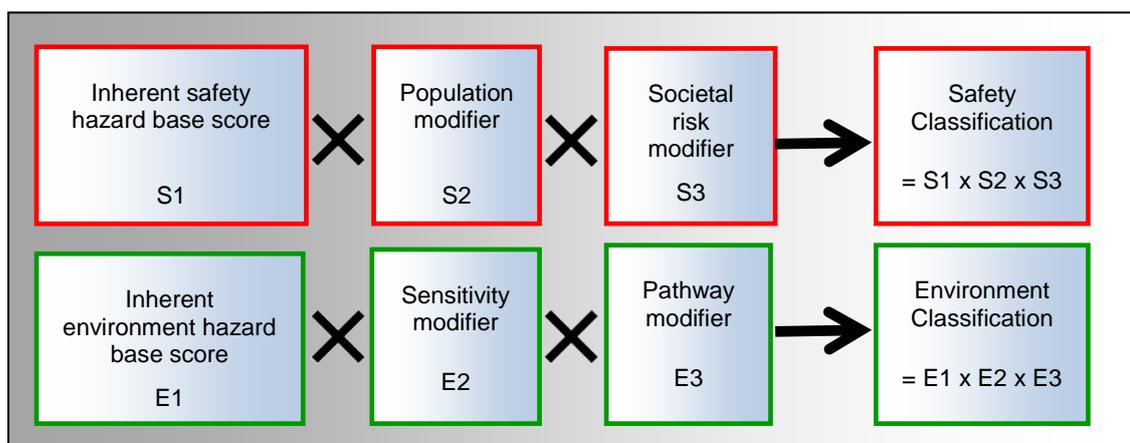
Inherent establishment hazards

12. The CA characterises COMAH establishments based on the type of hazardous substances present, the installation/activity type and the number of people potentially impacted by a major accident. The approach also takes into account the sensitivity of the local natural environment or the presence of any pathways to other sensitive environmental receptors. The establishment is given a base score that describes the main activity and this is multiplied by a factor that reflects the density of the local population. Where the establishment presents a high societal risk another multiplying factor is introduced.
13. The population modifier (S2) (for populations both onsite and offsite) is:
 - Large population (>1000) - Score 16;
 - Medium population (>50 to 1000) - Score 8;
 - Low population (<50) - Score 4;
14. Societal risk modifier (S3) is:
 - Establishments of high societal risk concern - Score 2.
15. The environmental inherent hazard classification works in a very similar way. Numbers are attached to establishment type and multiplied by 'pathway' and 'sensitivity' factors to give the 'environmental' inherent hazard classification.
16. Sensitivity modifier (E2) is:
 - No sensitivity - Score 1;
 - Sensitive receptor (local environment not designated) - Score 2;
 - Sensitive receptor (designated, such as SSSI) - Score 3;
 - Highly vulnerable receptor (eg. SAC) - Score 4.
17. Pathway modifier (E3) is:
 - No clear pathways identified - Score 1;
 - Clear pathways, both direct and indirect - Score 2.
18. Where, in the opinion of the CA, the inherent hazard classification methodology does not adequately characterise environmental hazard (e.g. the environmental grouping, A-D, is either too high or too low) then the CA will consider whether the additional guidance given in [Annex 3](#) for derivation of environmental base score provides a more appropriate environmental inherent hazard classification.

Inherent Hazard Classification incorporating safety and environmental hazards

19. COMAH Operators are assigned safety and environmental inherent hazard classifications as follows:
 - a) assign the appropriate base score for the inherent hazard for that industry sector, dangerous substance group or activity;
 - b) assign the appropriate population and societal risk modifiers;
 - c) multiply the base score by the population and societal risk modifiers to provide safety hazard classification;
 - d) assign the appropriate environmental sensitivity and pathway modifiers; and
 - e) multiply the base score by the sensitivity and pathway modifiers to provide environmental hazard classification.

Figure 1: Calculation of the safety and environmental classifications



20. The safety and environmental inherent hazard classifications are expected to remain relatively static as it depends on the establishment's activities and location; changing only when there are significant changes at the establishment e.g. amendments to inventories and processes, or if the surrounding population / environment changes substantially.
21. A 'common sense check' on the establishment inherent hazard classifications is undertaken by local regulatory inspectors and authorised persons from the appropriate agencies.
22. Where an assessment of the potential for a MATTE has been undertaken and has been agreed by the CA to demonstrate there are no possible MATTE scenarios, the environmental base score, sensitivity and pathway modifiers should each be 1 (i.e. when using the CDOIF guideline, unmitigated worst case consequence is predicted to be sub-MATTE). This leads to an environment inherent hazard grouping of D if there is no MATTE risk from the establishment. (see Table 1 below).
23. Numerical base scores for the range of inherent hazards are shown in [Annex 1](#).
24. Guidance on scoring environmental sensitivity and pathway modifiers is given in [Annex 2](#).

Allocating establishments to inherent hazard groupings

25. Each COMAH establishment is assigned an inherent hazard classification for safety and environment, applying this COMAH establishment methodology.
26. Using the safety and environmental inherent hazard classifications, establishments are assigned to one of four hazard groups. Safety and environmental hazards are ranked separately and each score is assigned to a hazard band (see Table 1 below). The CA uses these hazard bandings to support their inspection planning work.

Table 1: Hazard grouping scores

Safety hazard grouping	Environment hazard grouping
A ≥ 50	A ≥ 64
B 30-49	B 40-63
C 20-29	C 10-39
D < 20	D < 10

Annex 1 – Table for deriving inherent hazard base score

Hazard type	Establishment type	Safety hazard score				Environmental hazard score			
		Base score (S1)	Population modifier [onsite and offsite] (S2)	Societal risk modifier (S3)	Total = S1 x S2 x S3	Base score (E1)	Sensitivity modifier (E2)	Pathway modifier (E3)	Total = E1 x E2 x E3
Toxic	Manufacture of liquefied toxic gases	10	Large population (>1000) Score 16	Sites of high societal risk concern Score 2		9	No sensitivity Score 1	No clear pathways identified Score 1	
	Chemical manufacturing sites with bulk storage of liquefied toxic gases	8				8			
	Water treatment – bulk chlorine	6				Medium population (>50 to 1000) Score 8	5	Sensitive receptor (local environment not designated) Score 2	
	Water treatment – drummed chlorine	4	3						
	Bulk storage of toxic chemicals	5	Low population (<50) Score 4			9	Sensitive receptor (designated, such as SSSI) Score 3		
	Use of toxics in drums	3				9			
	Packaged goods dangerous substances warehouse – no aerosols	3				8	Highly vulnerable receptor (eg. SAC) Score 4		
	Packaged goods dangerous substances warehouse – aerosols	3				3			
Explosive	HT 1/2 processing – medium/high risk	16				1			

Hazard type	Establishment type	Safety hazard score				Environmental hazard score			
		Base score (S1)	Population modifier [onsite and offsite] (S2)	Societal risk modifier (S3)	Total = S1 x S2 x S3	Base score (E1)	Sensitivity modifier (E2)	Pathway modifier (E3)	Total = E1 x E2 x E3
	HT 1/2 processing – low risk	12				1			
	HT 3 processing – medium/high risk	13				1			
	HT 3 processing – low risk	8				1			
	HT 4 processing – medium/high risk	10				1			
	HT 4 processing – low risk	5				1			
	AN blending / processing (CEMHD7 sites) – medium/high risk	8				5			
	AN blending / processing (CEMHD7 sites) – low risk	3				5			
	AN manufacture (CEMHD 1-3 sites)	7				5			
	HT 1/2 storage – medium / high risk	9				1			
	HT 1/2 storage – low risk	4				1			
	HT 3 storage – medium / high risk	8				1			
	HT 3 storage – low risk	3				1			

Hazard type	Establishment type	Safety hazard score				Environmental hazard score			
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	HT 4 storage – medium / high risk	7				1			
	HT 4 storage – low risk	2				1			
	AN storage – medium / high risk	8				5			
	AN storage – low risk	2				5			
Flammable	Petrochemical processing, including refining	8				9			
	Gas terminals, including beach terminals with sour gas	6				7			
	LOX manufacture	6				2			
	Underground LNG storage	5				3			
	LNG storage / revapourisation	5				1			
	HP gas storage	4				1			
	Chemical manufacturing sites with flammable liquids in process	4				6			

Hazard type	Establishment type	Safety hazard score				Environmental hazard score			
		Base score (S1)	Population modifier [onsite and offsite] (S2)	Societal risk modifier (S3)	Total = S1 x S2 x S3	Base score (E1)	Sensitivity modifier (E2)	Pathway modifier (E3)	Total = E1 x E2 x E3
	Chemical manufacturing sites with bulk storage of flammable liquids	3				8			
	Bulk fuel storage	3				7			
	Peroxide manufacture	3				4			
	Gas storage in salt cavities / depleted reservoirs	4				1			
	LPG bottling	4				1			
	LPG bulk storage and distribution	3				1			
	Simple gas holder	3				1			
	LPG cylinder storage	1				1			
	Spirit maturation only	1				3			
	Other	Power stations	2				2		
Steelmaking		2				5			
Aluminium smelting		2				5			
SO ₃ sites		3				2			
Biofuels manufacture (large scale)		3				8			
Others		2				2			

Annex 2 – Guidance on scoring for environmental sensitivity and pathway modifiers

Environmental sensitivity modifier - guidance			
No environmental sensitivity	Sensitive receptor, non-designated	Sensitive receptor, designated	Highly vulnerable receptor
<p>No environmental receptor within area of influence <i>Default of 10km unless operators extent and severity analysis suggests that area of influence is greater</i></p>	<p>Local Non-designated environmental receptors including agricultural land</p>	<p>Habitat SSSI, AONB, LNR, National Park</p> <p>Groundwater Principle / Secondary Aquifers</p> <p>Surface Water Good Ecological Status water body</p> <p>Surface Water Abstraction Private abstraction</p>	<p>International Designation – Ramsar, SAC or SPA Highly sensitive / rare species</p> <p>Groundwater Drinking Water Abstractions Total Catchment – SPZ 1, 2 or 3</p> <p>Surface Water High Ecological Status water body</p> <p>Surface Water Abstractions Public Water Supply</p>

Note: Habitat. Sensitivities of habitats and species must relate to both the dangerous substances stored and potential major accident hazards.

SSSI – Site of Special Scientific Interest. AONB – Area of Outstanding Natural Beauty. LNR – Local Nature Reserve.

Surface Water. Water Framework Directive Classifications – a new European classification scheme for surface waters.

Groundwater. SPZ – Source Protection Zone. Zones surrounding abstraction boreholes – defined by groundwater travel time.

Pathways to consider	Definition
Direct Pathway	Direct discharge via surface water drainage systems to controlled waters. Direct discharge to ground waters. Direct conveyance of releases of gasses, dusts and smoke plumes.
Indirect Pathway	Discharge of off-site sewerage and sewage treatment systems. Discharge to ground

Note: Do not consider the benefit of control measures i.e. A penstock on a drainage system when assessing the existence of pathways to environmentally sensitive areas.

Annex 3 – Additional Environmental scoring table for deriving intrinsic hazard score (See Para 18 Above)

Hazard Type	Establishment Type	Environmental Hazard Score (Base Score – E1)
Environment (where not captured appropriately by other entries in Annex 1)	Aggregated presence of E1 & E2 ¹ over UT thresholds	8
	Aggregated presence of E1 & E2 over LT thresholds	7
	Other sites where MATTE is possible (incl substances not with E1 or E2 hazards)	6
	Sites where MATTE is not possible	1

¹ As detailed in Part 1 to Schedule 1 of the COMAH 2015 Regulations