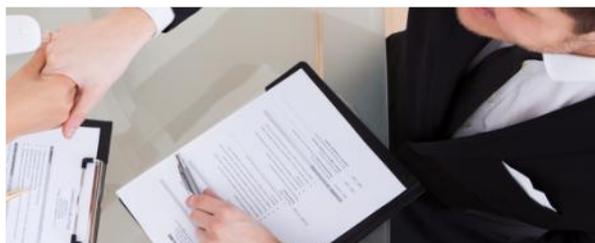


COVID-19 Response:

Managing Process Safety in the Pandemic



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- Professional Process Safety Engineer
- Board Member National Offshore Petroleum Safety and Environmental Management Authority
- 20 years in oil & gas and chemical industries prior to ISC



Process Safety and COVID-19

- A number of incidents have occurred in start up after lock down and changed production
- But some companies are reporting improved safety
- Large scale working from home impacts our normal process safety activities
- Even personal affects can impact process safety
- ISC framework



Paper on Process Safety Impacts

Mental health	Training delivery	Safe ethanol handling
Working from home	Risk assessments & assurance	Supply chains
Virtual meetings	Transportation	Reliability & maintenance
Distraction/stress	Managing teamwork	Emergency response
Board implications	Shift management & handover	Returning to work

Paper available for free download from <https://bit.ly/ISCcovid>



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Mark Hailwood

29 years working in Major Accident Hazards regulation

Member of the OECD Working Group on Chemical Accidents

Many years experience working with Major Hazard Inspectors at national (DE) and international level, particularly with the EU JRC Major Accident Hazards Bureau (MAHB)

Member of the IChemE Loss Prevention Panel



MAHB Lessons Learnt Bulletin: Pandemic Measures & Chemical Process Safety

- Why this Bulletin ...
- Two cases
- Start-up following a pandemic shut-down
- Obtaining the Lessons Learnt Bulletin



Why this Bulletin ...

- The OECD Working Group on Chemical Accidents (WGCA) was approached following the fatal accident in India and asked if a response could be provided.
- The Bureau of the WGCA agreed to write a note addressing this accident and issues related to start-up following lock-down.
- The EU JRC Major Accident Hazards Bureau agreed to publish the content, as this was the fastest way to bring attention to the issue.



Two Cases – (1)

Leak of hazardous gas from a polymer plant, Visakhapatnam, Andhra Pradesh India 7th-8th May 2020

- A leak of hazardous gas led to the death of at least 11 people and injuries to hundreds more. The authorities have reported that a release of gas from styrene tanks occurred in the early hours of the morning (around 3 a.m.) on 7th May 2020.
- The polymer plant was restarting following shutdown due to the Covid-19 pandemic. Media reports have suggested that the styrene had been stored for a long time.



Two Cases – (2)

Explosion at a plastics factory, Ottaviano, Italy, 5th May 2020

- An explosion at a plastics factory near Naples, Italy killed one person and injured two others.
- The explosion occurred in the vicinity of the process ovens, destroying buildings and burying one employee in the rubble. He was freed but died almost immediately of his injuries.
- The local population was recommended to close doors and windows and avoid any unnecessary movement of people. The factory reopened on 4th May after the government eased the lockdown following the coronavirus pandemic.



Start-up following a pandemic shut-down

- Was shutdown carried out in an organised and systematic manner?
- Has everything remained in the same state?
- Were processes identified which required continuous operation (power, cooling, stirring, inhibitor, nitrogen, etc.)?
- Was this maintained?
- Are all staff available for start-up?
- What has changed in working conditions?
- How have changes been assessed with regard to safety?



Obtaining the Lessons Learnt Bulletin

EU-JRC Major Accident Hazards Bureau
Lessons Learned from Major Accidents

https://minerva.jrc.ec.europa.eu/en/shorturl/minerva/lessons_learned_from_major_accidents

Special Issue Covid-19 Pandemic Measures and Chemical Process Safety (en [pdf](#) / [html](#))
[\(疫情应对措施和化工过程安全 \(中文\)\)](#)

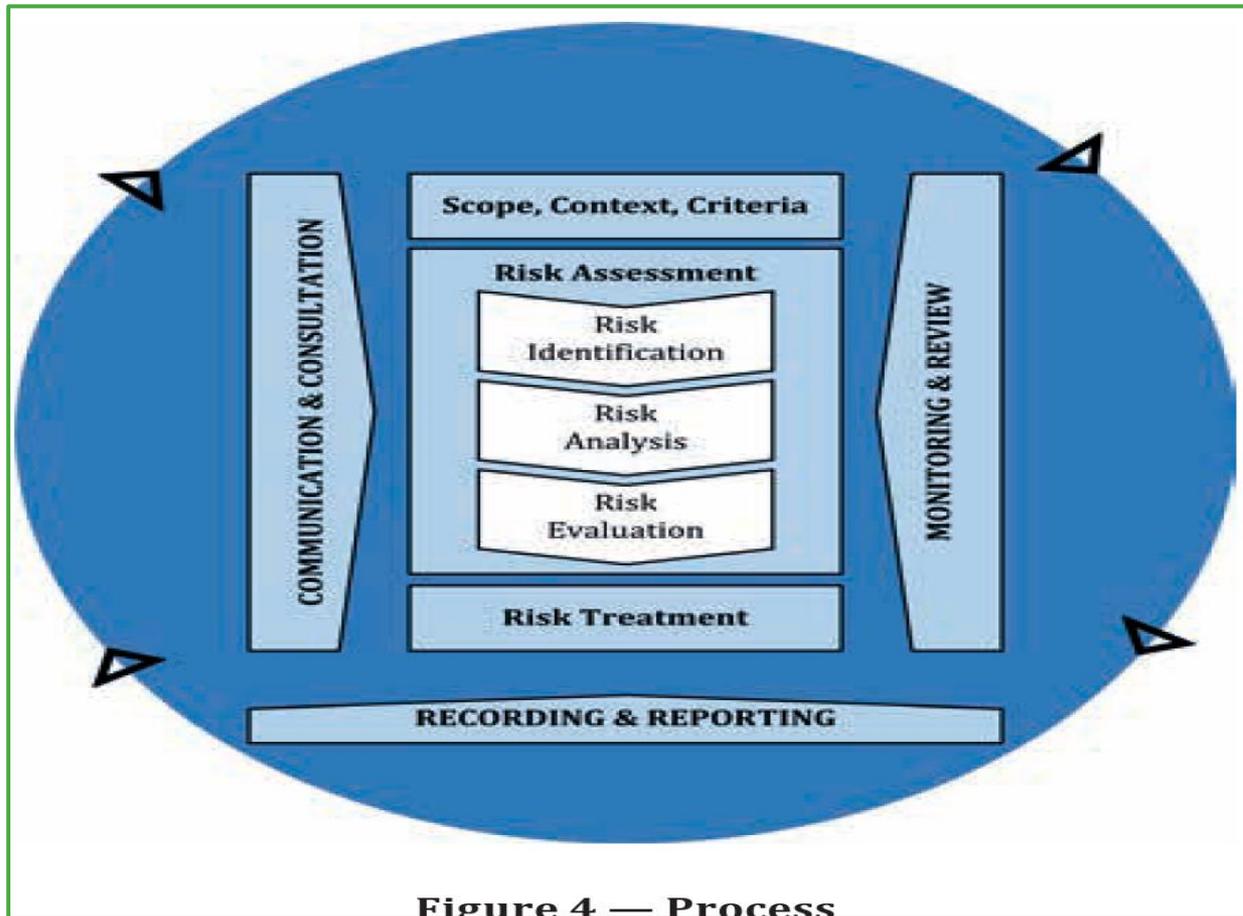


Introduction and Main Points

- Pat Swords BE CEng FIChemE PPSE, Principal Process and EH&S Consultant, PM Group.
- COVID-19 Biohazards - Part of an existing risk based legislative framework. Principles familiar to process safety.
- HAZOP by remote working – Can we maintain the same quality of risk management?



Risk Management - Internationally Recognised Structure



ISO 31000:2018 “Risk management — Guidelines”



'Individual' Directive 2000/54/EC

'Biological Agents at Work'

- Group 1 biological agent means one that is unlikely to cause human disease:
- Group 2 biological agent means one that can cause human disease and might be a hazard to workers; it is unlikely to spread to the community; there is usually effective prophylaxis or treatment available;



COVID-19 is a Group 3

- Group 3 biological agent means one that can cause severe human disease and present a serious hazard to workers; it may present a risk of spreading to the community, but there is usually effective prophylaxis or treatment available;
- Group 4 biological agent means one that causes severe human disease and is a serious hazard to workers; it may present a high risk of spreading to the community; there is usually no effective prophylaxis or treatment available.



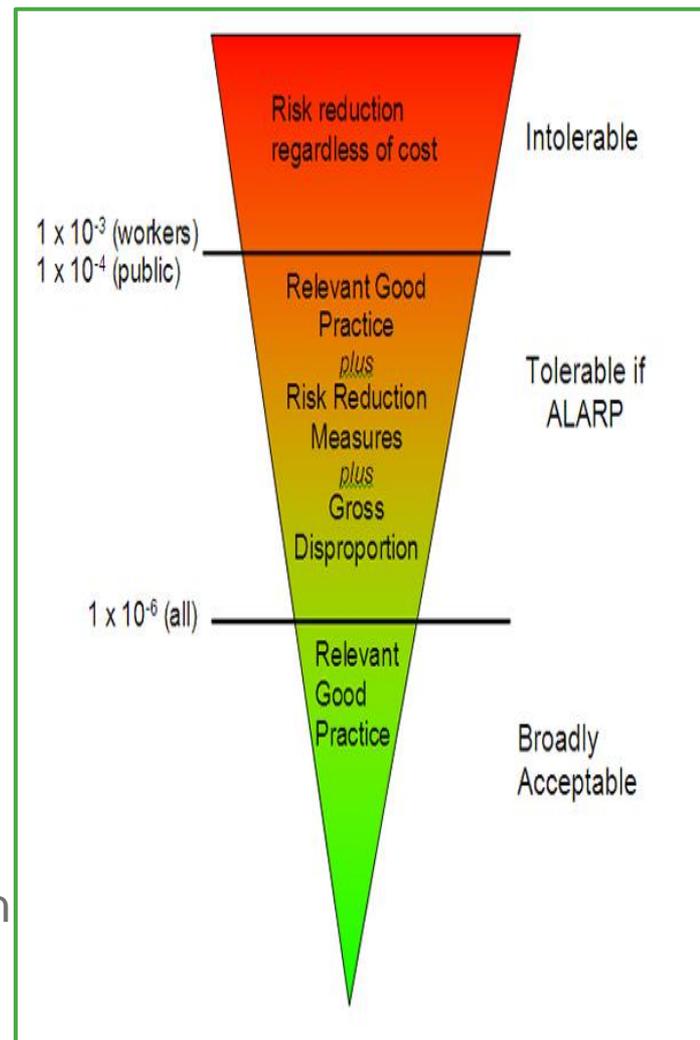
Wider Context

- WHO – Biosafety Levels (BSL) 1 to 4.
 - Same BSL term in USA, Canada calls them Containment Level (CL), Australia Physical Containment Level (PC), UK part of COSHH.
- Legislation differentiates between targeted activities (cell cultures, etc.) versus non-targeted activities (infected person / animal, sample, etc.).
- COVID-19 likely to be down rated to Group 2 when vaccines / therapeutics available.
- Diagnostic laboratories allowed to operate with protection level equivalent to Group 2 (BSL 2).



Such Risks are Not New

- Group 3 agents arise regularly in non-targeted activities, such as slaughtering, veterinary, farming, wastewater, recycling, etc.
- Risk of COVID-19 death as of 1st May 2020 for people <65 years old ranged from 6 (Canada) to 249 per million (New York City):
- Ioannidis et al “Population-level COVID-19 mortality risk for non-elderly individuals overall and for nonelderly individuals without underlying diseases in pandemic epicenters” Medrxiv, 5-5-2020.



HAZOP - Context

- Legislation requires risk assessment, but does not specify technique to be used (IEC 31010):
 - HAZOP not always required, but when it is ...
- IEC 61882:2016 “Hazard and operability studies (HAZOP studies) - Application guide” references IChemE and T Kletz guidance:
 - Assumed HAZOP would be in a room – reference to “adequate room facilities”.
 - Key Feature: “The study should be carried out in an atmosphere of critical thinking in a frank and open atmosphere”.



'Frank and Open' – Room v Remote

- Some considerations and qualitative ranking.

Consideration	Room	Remote
Team already has established relationship	Green	Yellow
Participants do not share a common language	Yellow	Red
Schedule is demanding	Yellow	Red
Complexity – 'New, Unique, Difficult' Technology	Green	Red ?
Complexity – 'Established, Common, Mature' Technology	Green	Yellow

- Remote requires more time and shorter sessions – is it worth it versus getting key individuals in a room?



Christopher G Ross

Currently Deputy Project Manager IChemE
COVID19 Response team

Experience in Process Support, Technical Safety,
Operations Engineering, Projects, Turnarounds,
Demolition, and Modifications Authority in the
Petrochemical industry

Unexpected shutdowns do happen

Understand process during abnormal operations



Unexpected Shutdowns

Differences in the Pandemic:

Are we operating an essential service?

Protect workforce to keep operating, or to come offline safely? COMAH Compliance

How long will we be off for?

Support organisations will be impacted: Term contractors, TAR teams

Customers will be impacted



Example considerations

Mole sieve dessicant beds-enough capacity for restart & preservation dry

Reactors-hydrogenation, methanation-shut down to avoid coking or nickel carbonyl

Cracking furnaces-decoke

Follow normal shutdown procedures and record.
Record forced deviations

Deinventory and/or monitor during period of shutdown



Utilities

Nitrogen for inerting

Boilers and steam for flare

Flare purges

Fire water systems

Cooling water systems

Electrical & DCS systems



Storage

Containment

Contents self reactive?

Can we inhibit and maintain over time?

Reactive to moisture?

Corrosive, water layer?

Are they cryogenic self refrigerating, loss of compressor?



Management of Change

Use for any deviation from normal procedure or temporary modification, eg system blanks

Drives proper design, reduce the chance of unintended consequences

Installation, acceptance and operation to normal standards

Drives removal and reinstatement at the end



Questions?



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