

# Process Safety Responsibility and Accountability

Martin H Goose CEng FIChemE  
Institution of Chemical Engineers  
“ChemEnvoy”

Except where stated otherwise:

This work is licensed under a Creative Commons Attribution-No Derivative Works 2.0 UK: England & Wales License.

To view a copy of this license, visit <http://creativecommons.org/licenses/by-nd/2.0/uk/> or send a letter to Creative Commons, 171 2nd Street, Suite 300, San Francisco, California, 94105, USA



## Synopsis

- One Man's Experience – Brian Harris
  - Joint Managing Director at Company HQ
  - Double Fatality at Explosives Factory
  - Regulatory Investigation
  - Questioned about Personal Responsibility
- His Response
  - Document Experience as Advice to Others
  - Paper in Loss Prevention Bulletin
  - Self Assessment Toolkit
  - Keeping the Issue Alive

# The Company

- Nobels Explosives Company Limited
- Wholly Owned Subsidiary of ICI plc
- Main Site at Ardeer, SW Scotland
  - 2500 employed
- Roburite Works near Wigan, NW England
  - 250 employed
- Cookes Works, at Penrhyndeudraeth, NW Wales
  - 100 employed

# The Company



# Cookes Works

- Making Nitroglycerine Based Explosives
- Three basic processes in separate buildings
  - Nitration of glycerine with mixed acid
  - Mixing of nitroglycerine with kieselguhr, nitrocellulose, aluminium powder and salt to produce gelignite
  - Cartridging of the gelignite in paper wrapped 'sticks'

# Cookes Works



Photo from The Royal Commission on the Ancient and Historical Monuments of Wales  
© Crown Copyright

# Gelignite



# The Accident

- Mid-morning Monday 14th June 1988
- An explosion in one of the two mix houses
- Two process operators missing
- Some fires and secondary explosions
- Second mixing house undamaged and holding nitroglycerine for the next batch



## The Damage



Photo courtesy of Her Majesty's Chief Inspector of Explosives  
© Crown Copyright

# The Damage



Photo courtesy of Her Majesty's Chief Inspector of Explosives  
© Crown Copyright

## The Damage



Photo courtesy of Her Majesty's Chief Inspector of Explosives  
© Crown Copyright

## The Damage



Photo courtesy of Her Majesty's Chief Inspector of Explosives  
© Crown Copyright

# The Investigation

- Regulatory body – Her Majesty's Explosives Inspectorate of the Health and Safety Executive
- Looked at:
  - **People** - inappropriate behaviour due to ignorance, lack of attention or deliberate intent;
  - **Plant** - inadequate design or poor maintenance;
  - **Procedures** - inadequate or poor compliance.
- Considered both individual and corporate culpability

# The Outcome

- The most likely cause of the explosion was a foreign object entering the mixer with the raw materials - a plant deficiency
  - Metal detectors used on raw materials prior to entry into mixing processes
- The men were killed because they were in the wrong place. They were not following the prescribed procedure - a people/procedures deficiency
- During the mixing operation they should have been inside the reinforced control room bunker.

# The Inquisition (1)

- What is your role in the company and what does it entail?
- What are your qualifications for this role?
- Who appointed you? (Is someone else at fault because they might have appointed a person who was not qualified for the role)
- What training have you had for this role particularly with regard to your health and safety responsibilities?
- Explain to me your role in safety management in the company.

# The Inquisition (2)

- How do you discharge your safety accountability?
- What information do you receive?
- What do you do with it?
- How do you know that the information is valid?
- How do you know that company procedures are being followed?
- You have told me about audit processes and their findings. How do you know that agreed actions are properly closed out?
- What else would you like me to know?!



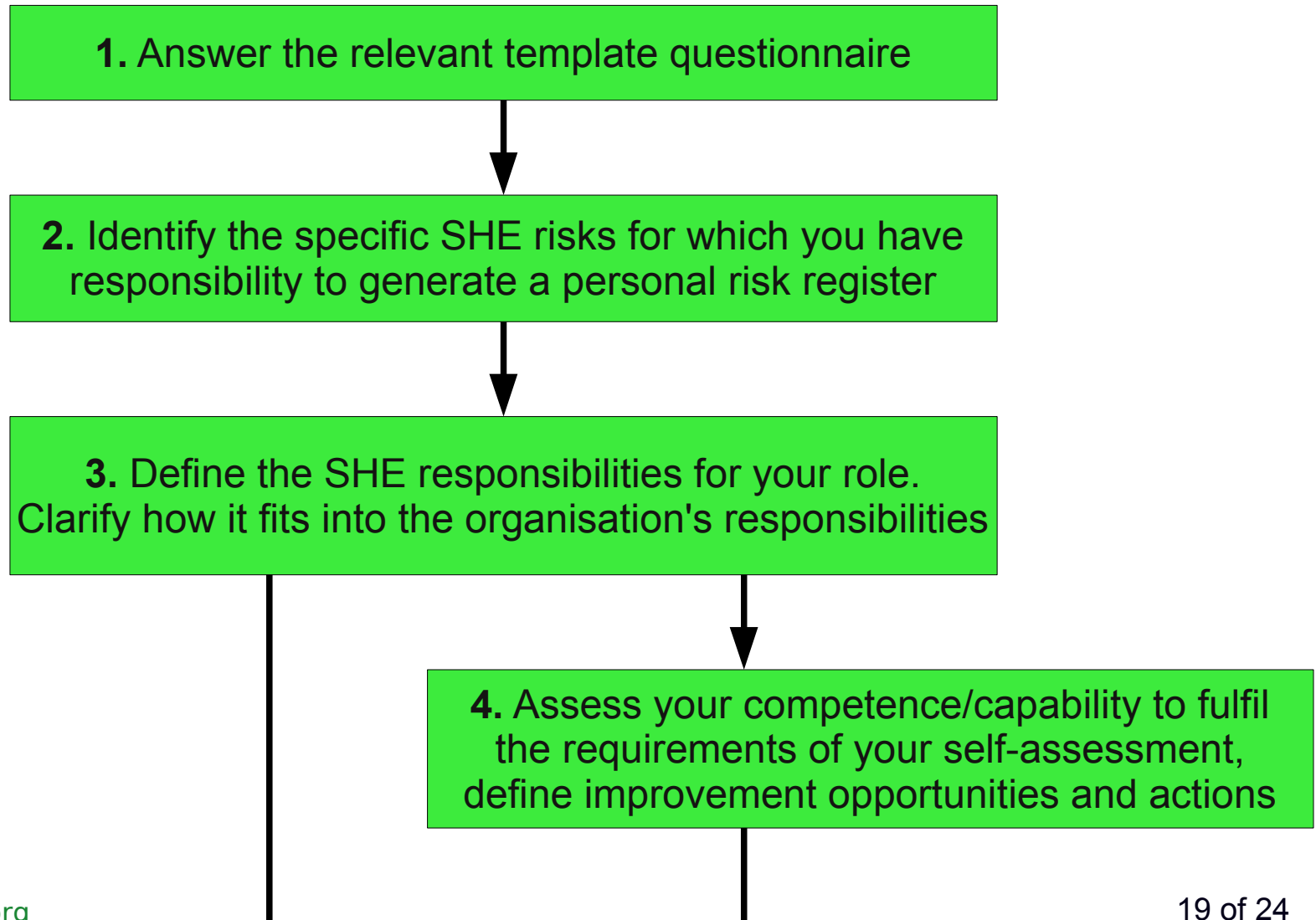
# The Aftermath and Actions

- Company prosecuted 29 March 1990
  - lack of supervision of compliance with operating instructions
  - fined £100,000 and £30,000 costs
  - other costs both personal and business
- Loss Prevention Bulletin Paper
  - To record his experience and thoughts
- IChemE Self Assessment Toolkit for SHE Assurance
  - To provide practical help to those who might otherwise be in a similar position

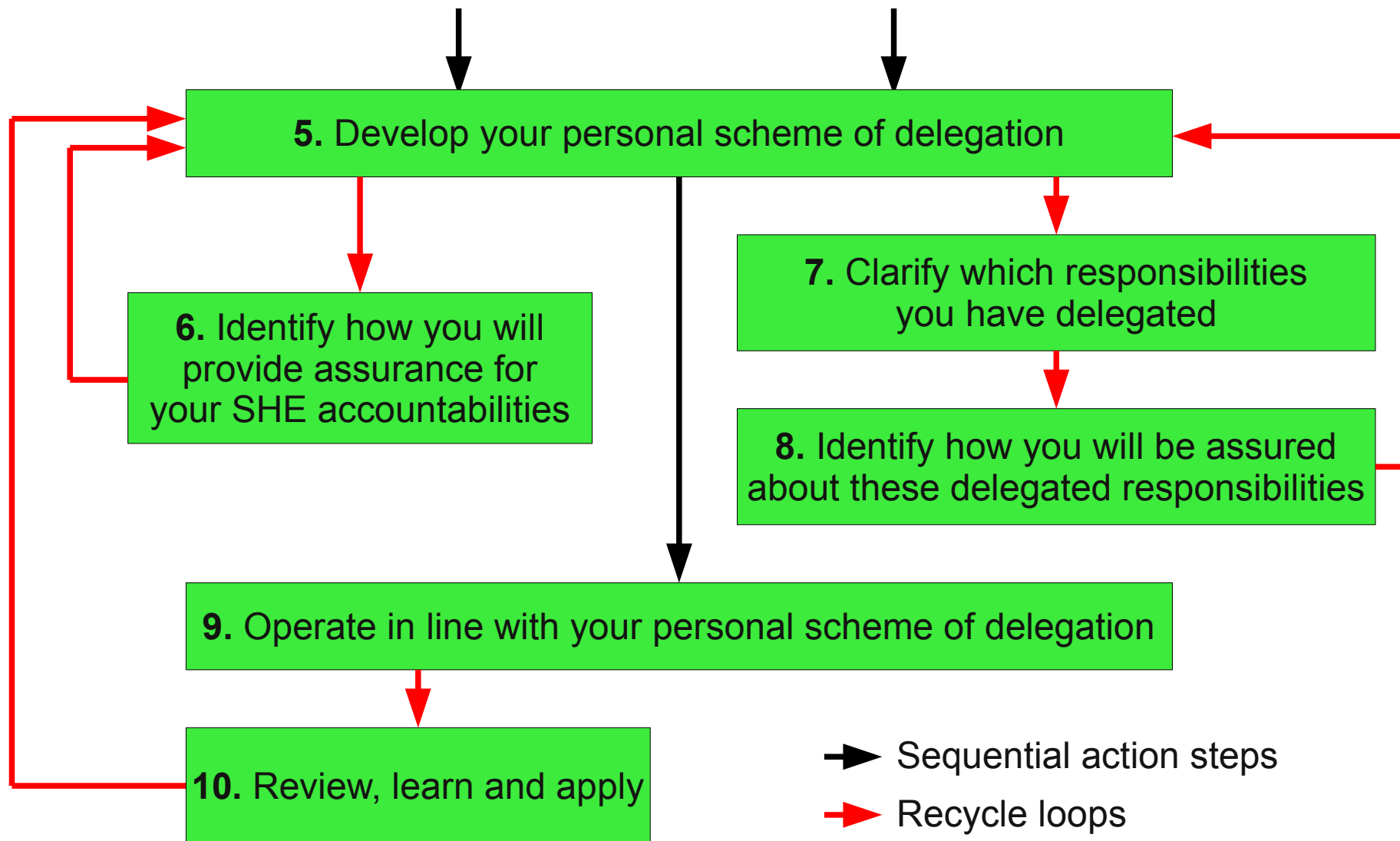
# Some Definitions

- *Responsibility*
  - the contribution of the individual to the organisation
  - the contribution can be wholly or partly delegated.
- *Accountability*
  - the way in which a specific personal responsibility is measured;
  - accountability can not be delegated
- *Delegation*
  - the act of committing (powers, functions, etc.) to another as agent or deputy
- *Assurance*
  - a positive declaration intended to give confidence that a delegated function has been carried out

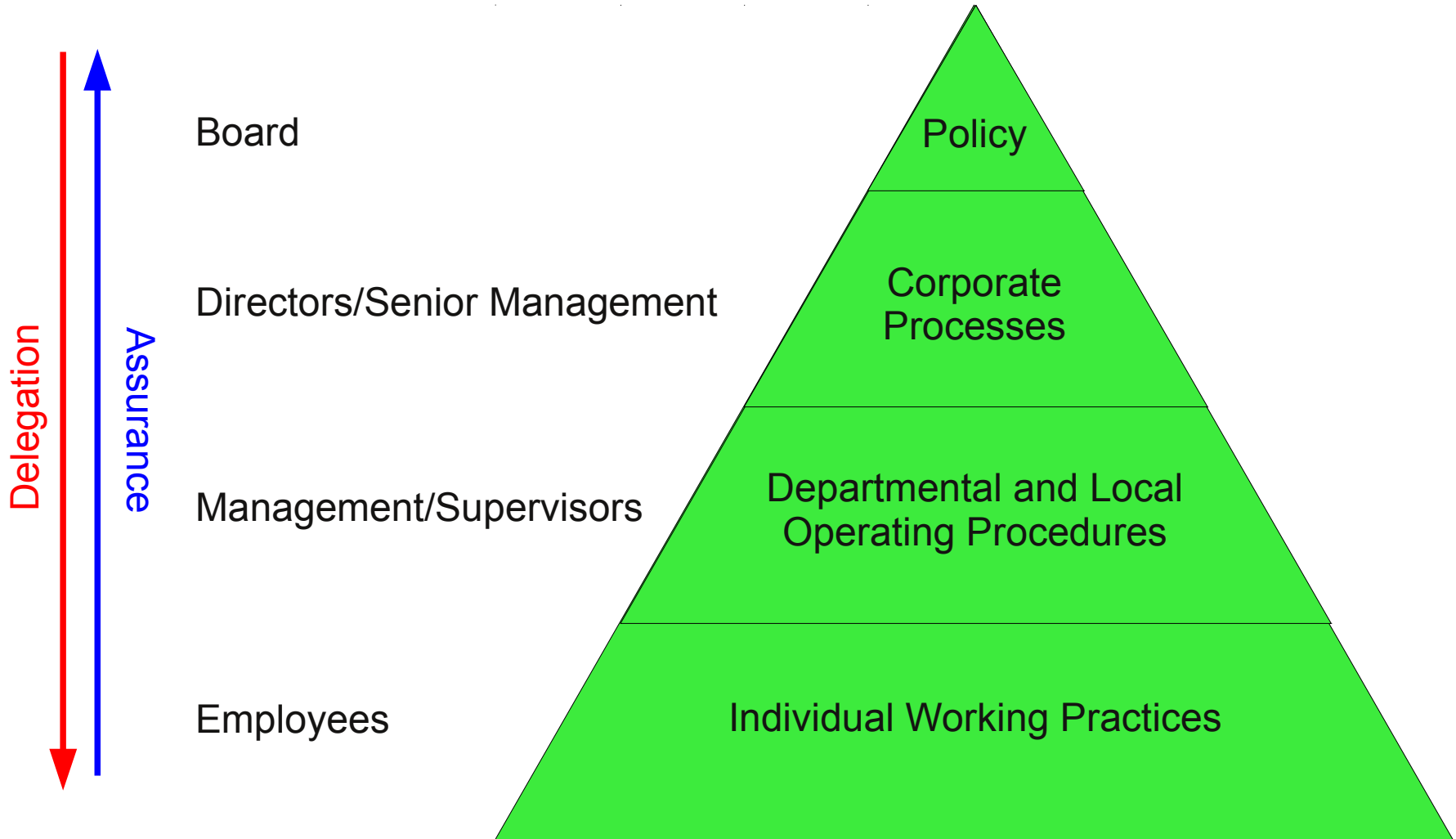
# The Self Assessment Toolkit



# The Self Assessment Toolkit



# The Self Assessment Toolkit



# The Self Assessment Toolkit

- Templates Questionnaires for:
  - Non-Executive Director
  - Executive Director
  - Internal Audit Manager
  - Director for Safety, Health and Environment
  - Senior Operations Manager
  - Senior Maintenance Manager
  - Plant Manager
  - Plant Engineer
  - Maintenance Manager
  - Senior Design Manager
  - Design Engineer
  - Safety, Health and Environment Manager

## References

- Directors' and Engineers' Responsibilities for Safety—a Cautionary Tale, Brian Harris (IChemE Loss Prevention Bulletin, Issue 172, August 2003)
- Self Assessment Toolkit for Safety, Health & Environment Assurance
- Both documents can be downloaded from <http://www.icheme.org/SLP-Resources>
- This presentation (and other documents) by the current author can be downloaded from <http://www.alarp.plus.com>

Thank You For Listening

Merci pour votre écoute

Vielen Dank fürs Zuhören