The Importance of Safe Isolation of Plant and Equipment

Graeme Hughes  HID CI 1G
HM Specialist Inspector (Mechanical)
• Issue of guidance in January 2006.
• Widening out scope of the Oil Industry Advisory Committee 1997 document to include all industries.
• So it is not new.
• Safe isolation should include environmental protection.
• This is not an ACOP but sets a standard that all COMAH sites should seek to attain. It represents ‘Good Practice’ and can be enforced.
Legal basis

- HSWA – keeping people safe
- Management Regs – assessing the risk
- PUWER – safety of work equipment Reg 19.
- PSSR – unintentional release of stored energy
- COSHH – exposure to dangerous substances
- Confined spaces Regs – exposure to hazardous atmosphere
- COMAH – all measures necessary
PUWER Regulation 19

• Every employer shall ensure that where appropriate work equipment is provided with suitable means to isolate it from all its sources of energy.

• Clearly identifiable and readily accessible.

• Risks during reconnection.

• These are all covered by HS(G) 253.
Who has duty?

- COMAH sites - the duty is with the COMAH operator and cannot be passed on to a contractor.

- The COMAH operator needs to ensure that the recommendations in HS(G) 253 are followed as far as is reasonably practicable.

- The COMAH operator needs to be able to demonstrate risk is ALARP for each isolation on site that could lead to a MAH.
Reducing the risk

- Avoid risk wherever possible.
- Engineering not PPE (6 step risk assessment model - ERIC PD) Eliminate, Reduce, Isolate, Control, PPE, Discipline.
- If risk is intolerable the work should not go ahead.
- Opening up any system involves a risk, isolation is required for a 1/4” pipe as well as for a 6’ gas main.
- Use CBA to assure ALARP position.
So are all isolations the same?

• A leak from a ¼” gas line may be far more hazardous than an open end on (say) water main.

• HS(G) 253 recognises this and allows each isolation to be assessed differently.

• This ensures that the risks are controlled and gives a good indication on where the ALARP solution might lay.
Examples
So why the interest now?

• Recent incidents where poor containment was a contributory factor.
  • Water main.
  • Process gas
  • Steam
  • Refinery Plant
Water Main

- Two men working in a pit with open ended 2m water main supply line.
- Single valve isolation failed.
- Double fatality as water swirled around the pit.
- We will see later if the single valve isolation met HS(G)253 expectations.
Process gas

- Two contractors injured after blast from burning hydrocarbons in a large open topped vessel opened for maintenance.
- Isolation by single valve on live inlet and blank on live outlet. Valve not locked shut.
- Valve opened allowing flammable toxic gas into vessel.
- Routine operation - so major maintenance isolation standards were not followed.
Steam

- Fatality from high pressure steam where complex isolation failed.
- More than twenty lines fed into the isolated vessel.
- Isolations were by a number of types of valve, including control valves.
- Some were locked off, others could not be.
- Control valve operated and released superheated steam into work area. HSG 253 recommends **not** to use control valves for isolations.
Toxic & Flammable

- Isolation required for work on process pipework.
- Complex refinery with miles of piping.
- Isolation identified and fitted to standard.
- Did not check effectiveness of isolation fully before breaking into pipe.
- Isolation was on the adjacent line.
- Release of toxic and flammable gases, workers hospitalised.
# Mechanical Isolation

## Determination of baseline isolation standard – HSG 253

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<th>Substance Category</th>
<th>Outcome Factor</th>
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Mechanical isolation

- Other isolations are often required – for example electrical. These are not dealt with today, where the emphasis is on the safe mechanical isolation of plant and machinery.

- Mechanical isolation can be achieved in a variety of ways and today looks at the most appropriate methods for some generic scenarios using the tools provided in HS(G) 253.
So why isolate?

- To prevent the loss of containment of what is in the piping system or the vessel.
- This may be a gas, a liquid or a powder.
- Sometimes you may isolate to stop something getting in rather than to stop something getting out.
- Sometimes you may isolate to prevent mixing of two substances that could react.
So why isolate?

• To allow maintenance or inspection.
• To take a piece of plant out of use for a short or a longer period.
• To change process streams.
• To ensure that, even on dead plant, a mistake elsewhere cannot lead to danger.
• Because there is always a potential for human error or mechanical failure.
• Defence in depth
Basic principles

• Set a policy and standards for isolation – HSG 253 Appendix 3 gives examples.
• Set procedures with workers help.
• Train all staff – Make contractors aware and ensure compliance with company standards and expectations.
• Assess any deviation from standard.
Basic principles

- Set a plan to remedy any deviations.
- Monitor, review and audit isolations – HSG 253 Appendix 3 gives checklists for monitoring & review.
- Revise policy, standards and procedures as required.
- Set KPIs and ensure corporate overview.
Thank you

Any questions?