

# RAGAGEP Explained

## It is NOT Scary (really, I promise)

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# Objectives

1. Discuss the RAGAGEP concept and how it fits into the process safety lifecycle
2. Identify the PSM sub-elements relevant to RAGAGEP enforcement
3. Identify major sources of RAGAGEP
4. Understand other uses of RAGAGEP and RAGAGEP-like materials in PSM enforcement and other PSM elements

# Process Safety Information

Process safety information enables the employer and the employees involved in operating the process to identify and understand the hazards posed by those processes involving highly hazardous chemicals. This process safety information shall include:

- Information pertaining to the hazards of the highly hazardous chemicals used or produced by the process,
- Information pertaining to the technology of the process, and
- Information pertaining to the equipment in the process.

From Appendix C of the standard:

Complete and accurate written information concerning process chemicals, process technology, and process equipment is essential to an effective process safety management program and to a process hazards analysis.

- **Recognized**
- **And**
- **Generally**
- **Accepted**
- **Good**
- **Engineering**
- **Practices**

Say what you do and do what you say

# RAGAGEP Background

- ***Two PSM Elements Reference RAGAGEP***
  - 1910.119(d) Process Safety Information
    - For the design of **all** process equipment
  - 1910.119(j) Mechanical Integrity
    - For inspection and test (I&T) methods and frequency for equipment covered under (j)(1)
- Among the most frequently cited violations!

# RAGAGEP – Process Safety Information

(d)(3)(i)(F) – **document** design codes and standards

(d)(3)(ii) – **document** that process equipment complies with RAGAGEP

(d)(3)(iii) – **determine and document** that existing equipment built to out-of-use standards is safe



# RAGAGEP – Process Safety Information (d)(3)(i)(F)

**(d)(3)(i)(F)** -The employer shall develop and maintain a compilation of written safety information...information pertaining to the equipment in the process shall include...**design codes and standards** employed.

# RAGAGEP – Process Safety Information

## (d)(3)(ii)

**(d)(3)(ii)** - The employer shall document that equipment complies with recognized and generally accepted good engineering practices

- The **employer** (not OSHA!) **selects** the applicable and protective RAGAGEP it will use / comply with!

# RAGAGEP – Process Safety Information (d)(3)(ii)

- PSI requirements relate to **equipment** in covered processes
  - Equipment must actually comply with RAGAGEP for the employer to document compliance

# RAGAGEP – Process Safety Information (d)(3)(iii)

**(d)(3)(iii)** - For existing equipment designed and constructed in accordance with codes, standards, or practices that are no longer in general use, the employer shall determine and document that the equipment is designed, maintained, inspected, tested, and operating in a safe manner

# RAGAGEP – Process Safety Information (d)(3)(iii)

- RAGAGEP can change over time:
  - ASME Code pressure vessel safety factors (reduced due to better alloys, inspection methods)
  - ANSI/CGA G2.1 2014 edition
  - ASHRAE 15 guidance on maximum refrigerant quantities in working areas (limits based on toxicity)

# RAGAGEP – Process Safety Information

## (d)(3)(iii)

- OSHA **cannot** require employers to update their equipment to current RAGAGEP unless it is explicitly retroactive
- The employer is required to determine and document that its process equipment is safe
- OSHA expects employers to consider relevant changes in RAGAGEP as part of the risk management activities

# Mechanical Integrity

- In process safety, mechanical integrity (MI) is more than standard breakdown maintenance
- Predictive, preventive, and risk-based techniques are used to ensure the equipment in the process is maintained as designed
- MI includes inspection and tests

**(j)(4)(ii)** - Inspection and testing practices shall follow recognized and generally accepted good engineering practices

- There are published standards/practices for inspecting most PSM/MI covered equipment



# RAGAGEP – Mechanical Integrity

## (j)(4)(ii)

- Intended to ensure that deficiencies in process equipment subject to mechanical integrity requirements are detected **before** failure
- OSHA typically expects employers to update their inspection and test practices within a reasonable time period (not fixed) when RAGAGEP is changed/upgraded

**(j)(4)(iii)** - The frequency of inspections and tests of process equipment shall be consistent with applicable **manufacturer's recommendations and good engineering practices**, and more frequently if determined to be necessary by prior operating experience.

# RAGAGEP – Mechanical Integrity

(j)(4)(iii)

- I&T must be performed **MORE FREQUENTLY** when operating experience shows it is necessary
  - Relief valves fouled or corroded at normal interval
  - Piping or pressure vessel corrosion **faster** or **more variable** than expected

# RAGAGEP Guidance: Non-mandatory Appendix C

- Gives examples of organizations producing codes and standards relied on to establish good engineering practices
- Recognizes technical reports from engineering societies for equipment design
- Recognizes the need for specific criteria for inspections

# RAGAGEP Guidance: Non-mandatory Appendix C

- Describes the need for inspections and for taking into account the various mechanisms that can damage piping and equipment
- Highlights the need for procedures and training in conducting inspections and tests to ensure their consistency and effectiveness

# RAGAGEP Guidance

## Revised RA Memo

- On May 11, 2016, OSHA published a **revised RAGAGEP** enforcement policy
  - Modifies the RA Memo of June 5, 2015
  - Links to the memo available at <http://www.osha.gov/chemicalexecutiveorder/>

# RAGAGEP Guidance

## Revised RA Memo – Determining RAGAGEP

- Several sections of the revised memo direct CSHOs to determine if an internally developed ER standard is RAGAGEP:
  - When the internally developed standard is less protective than published codes, standards, or practices
  - When the ER does not follow “should” or “should not” language in published codes, standards, or practices, but rather uses alternate approaches to control hazards

# RAGAGEP Guidance

## Revised RA Memo – Determining RAGAGEP

- If internal standards are consistent with commonly used published documents, they are likely acceptable
- CSHOs must thoroughly document problematic ER internal standards:
  - External RAGAGEP referenced, if any
  - Deviations that appear to be less protective and the associated hazards
  - Evidence that the ER has implemented / is following their internal standard (exposure)
  - Risk management documents (e.g., PHA, studies)



# RA Memo – Sources of RAGAGEP

- Codes (e.g., ASME B&PV Code, NFPA-70, the NEC, IBC, & etc.)
- Consensus recommended practices and standards (e.g., NFPA 30, API 752, IIAR-2)
- Published non-consensus - typically narrower in scope (e.g., Chlorine Institute pamphlets, DIERS, technical papers on specific hazards)

# RAGAGEP – Other Possible Uses in PSM

- The PSM elements discussed here are the only ones referring to RAGAGEP!
- However, codes, standards, and recommended practices can be useful in informing and educating CSHOs in hazard identification, feasible means of abating hazards, and good practices when evaluating employer compliance with other PSM elements and the GDC

# RAGAGEP – Other Possible Uses in PSM

- Examples include:
  - Documenting relevant hazards, failure mechanisms, and previous incidents for PHAs
  - Documenting feasible means of abatement for hazards identified in incident investigations
  - Providing guidance on effective approaches to management of change
  - Documenting good compliance audit practices

# Thank You!

## ANY QUESTIONS?

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