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MEMO

To: OSH Division
From: Scott Mabry, Assistant Deputy Commissioner
Date: April 10, 2017
Re: Recognized And Generally Accepted Good Engineering Practices (RAGAGEP) in Process Safety Management Enforcement

On May 11, 2016, the Occupational Safety and Health Administration (OSHA) issued a memorandum on “Recognized And Generally Accepted Good Engineering Practices (RAGAGEP) in Process Safety Management (PSM) Enforcement.” This memorandum provided guidance on the enforcement of the PSM standard’s RAGAGEP requirements, including how to interpret “shall” and “should” language in published codes, standards, technical reports, recommended practices or similar documents, as well as the use of internal employer documents as RAGAGEP.

Per this memorandum, the Occupational Safety and Health (OSH) Division of the North Carolina Department of Labor adopts the above mentioned OSHA enforcement procedure for use in North Carolina. The document is attached.

Please note:

Where reference is made to contacting the appropriate Office of Chemical Process Safety and Enforcement Initiatives, Regional Office, or National Office, NC OSH personnel will contact the appropriate Program Quality Verification (PQV) Team Leader or Director’s Office, respectively.

Where reference is made for compliance safety and health officers (CSHOs) to consult with the Regional PSM Coordinator, Technical Support Engineer, or the Office of Chemical Process Safety and Enforcement Initiatives, NC OSH personnel will contact the appropriate PQV Team Leader.

Where guidance is given on citation grouping, CSHOs shall consult the Field Operations Manual (FOM) Chapter V: Citations for grouping recommendations.

Where guidance is given on inspection procedures, CSHOs shall consult FOM Chapter III: Inspection procedures.

May 11, 2016

MEMORANDUM FOR: REGIONAL ADMINISTRATORS

THROUGH: DOROTHY DOUGHERTY
Deputy Assistant Secretary

FROM: THOMAS M. GALASSI, Director
Directorate of Enforcement Programs

SUBJECT: RAGAGEP in Process Safety Management Enforcement

This enforcement policy addresses the Process Safety Management (PSM) Standard's recognized and generally accepted good engineering practices (RAGAGEP) requirements. Enforcement activity, including the *Petroleum Refinery Process Safety Management National Emphasis Program* (Refinery NEP), and requests for assistance from the field, revealed the need for this guidance. This memorandum rescinds and replaces the memorandum of the same title dated June 5, 2015. It is intended to be a clarification of the policy described in the earlier memorandum and does not reflect any substantive change in OSHA enforcement policy.

Background on Recognized and Generally Accepted Good Engineering Practices

The PSM Standard, 29 CFR 1910.119, directly references or implies the use of RAGAGEP in three provisions:

- **(d)(3)(ii):** Employers must document that all **equipment** in PSM-covered processes complies with RAGAGEP;
- **(j)(4)(ii): Inspections and tests** are performed on process equipment subject to the standard's mechanical integrity requirements in accordance with RAGAGEP; and
- **(j)(4)(iii):** Inspection and test **frequency** follows manufacturer's recommendations and good engineering practice, and more frequently if indicated by operating experience.

In addition, **(d)(3)(iii)** addresses situations where the design codes, standards, or practices used in the design and construction of existing equipment are no longer in general use. In such cases, the employer must determine and document that the equipment is designed, maintained, inspected, tested, and operating in a safe manner.

As used in the PSM standard, RAGAGEP apply to process equipment design and maintenance; inspection and test practices; and inspection and test frequencies.

Examples of RAGAGEP

1. Widely adopted codes

Certain consensus standards have been widely adopted by federal, state, or municipal jurisdictions. For example, many state and municipal building and other codes incorporate or adopt codes such as the National Fire Protection Association (NFPA) 101 *Life Safety* and NFPA 70 *National Electric* codes.

2. **Consensus documents**

Certain organizations like the American Society of Mechanical Engineers (ASME) follow the American National Standards Institute's (ANSI) *Essential Requirements: Due process requirements for American National Standards* (Essential Requirements) when developing consensus standards and recommended practices. Under the ANSI and similar requirements, these organizations must demonstrate that they have diverse and broadly representative committee memberships. Examples of consensus documents include the ASME B31.3 *Process Piping Code* and the International Institute of Ammonia Refrigeration's (IIAR) ANSI/IIAR 2-2008 — *Equipment, Design, and Installation of Closed-Circuit Ammonia Mechanical Refrigerating Systems*. Such consensus documents are widely used as sources of RAGAGEP by those knowledgeable in the industry.

3. **Non-consensus documents**

Some industries develop non-consensus engineering documents using processes not conforming to ANSI's Essential Requirements. Where applicable, the practices described in these documents can be widely accepted as good practices. For example, the Chlorine Institute's (CI) "pamphlets" focus on chlorine and sodium hypochlorite (bleach) safety and are used by some companies handling these materials. Note that OSHA also recognizes applicable manufacturer's recommendations as potential sources of RAGAGEP.

4. **Internal standards**

The preamble to the PSM standard recognizes that employers may develop internal standards for use within their facilities. The preamble states, in relevant part:

The phrase suggested by rulemaking participants: "recognized and generally accepted good engineering practices" is consistent with OSHA's intent. The Agency also believes that this phrase would include appropriate internal standards of a facility⁽¹⁾

Internally developed standards must still represent *recognized* and *generally accepted good* engineering practices.

Reasons an employer might choose to follow internal standards can include:

1. Translating the requirements of published RAGAGEP into detailed corporate or facility implementation programs and/or procedures.
2. Setting design, maintenance, inspection, and testing requirements for unique equipment for which no other RAGAGEP exists.
3. Supplementing or augmenting RAGAGEP selected by the employer that only partially or inadequately address the employer's equipment.
4. Controlling hazards more effectively than the available codes and consensus and/or non-consensus documents when deemed necessary by the employer's PSM program.
5. Addressing hazards when the codes and consensus and/or non-consensus documents used for existing equipment are outdated and no longer describe good engineering practice.

In keeping with the performance-oriented nature of the PSM standard, employers select the RAGAGEP they apply in their covered processes. The examples of RAGAGEP noted above are not intended to reflect a hierarchy of RAGAGEP.

If an employer selects and follows widely adopted codes or consensus documents or widely adopted non-consensus documents for RAGAGEP, OSHA will accept such materials as RAGAGEP where applicable and appropriate.

If an employer develops and follows internal procedures, the compliance safety and health officer (CSHO) should assess whether the internal procedures represent *recognized* and *generally accepted good engineering practices*. Like all employers complying with the PSM standard, an employer using internal procedures as RAGAGEP has an obligation under 1910.119(d)(3)(ii) to document that its equipment complies with recognized and generally accepted good engineering practices.

For technical help, consult with the Regional PSM Coordinator, a technical support engineer, or the PSM group at OSHA's Directorate of Enforcement Programs - Office of Chemical Process Safety and Enforcement Initiatives at 202-693-2341.

"Shall" and "Should" in RAGAGEP

"Shall," "must," or similar language used in RAGAGEP reflects the developer's view that the practice is a mandatory minimum requirement to control a hazard. Similarly, "shall not," "prohibited," or similar language references or describes unacceptable approaches or practices. If an employer deviates from an applicable "shall" or "shall not" requirement in the employer's adopted RAGAGEP, OSHA will presume a violation. In accordance with the inspection procedures described in Chapter 3 of OSHA's Field Operations Manual (CPL 02-00-159, Oct. 1, 2015), the employer will have an opportunity to explain the rationale for the deviation and why it believes its approach reflects recognized and generally accepted good engineering practices.

Use of the term "should" or similar language in RAGAGEP denotes a recommendation that reflects an acceptable and preferred practice. If a "should" provision in the employer's selected RAGAGEP is applicable to the covered process or particular situation, OSHA presumes that employer compliance with the recommended approach is acceptable.

If an employer selects RAGAGEP that contains "should" provisions, but does not follow them, OSHA will not presume a violation. In such cases, the CSHO should evaluate whether the employer's approach reflects recognized and generally accepted good engineering practices and whether the employer documented that its equipment complies with RAGAGEP. An employer does not need to document deviations from a "should" statement provided it documents that its equipment complies with RAGAGEP.

If an employer selects RAGAGEP that contains "should not" provisions (or similar language describing disfavored practices), and then follows the disfavored practices, OSHA will not presume a violation. In such cases, the CSHO should evaluate whether the employer's approach reflects recognized and generally accepted good engineering practices and whether the employer documented that its equipment complies with RAGAGEP. An employer does not need to document deviations from a "should not" statement provided it documents that its equipment complies with RAGAGEP.

For technical help, consult with your Regional PSM Coordinator, a technical support engineer, or the PSM group at OSHA's Directorate of Enforcement Programs - Office of Chemical Process Safety and Enforcement Initiatives at 202-693-2341.

"Normative" and "Informative" Requirements in RAGAGEP

Codes and consensus documents frequently contain appendices or annexes that provide supplemental information and/or requirements. The content of these appendices or annexes may be "normative" or "informative."

"Normative" sections generally explain how to comply with the code and/or consensus document requirements and may contain both "shall" and "should" language. As discussed above, "shall" denotes the developer's view that the normative statement is mandatory, while "should" indicates a recommendation that reflects an acceptable and preferred practice. "Informative" sections generally provide background and reference information with respect to the code and/or consensus document requirements but may also identify and/or address hazards or acceptable means of abatement. Employers should read and consider these sections, but OSHA does not expect employers to consult all of the sources that are cited in an informative section or appendix. Again, for technical help, CSHOs should consult their Regional PSM coordinator, technical support engineer, or the Office of Chemical Process Safety and Enforcement Initiatives.

Enforcement Considerations

Under 1910.119, employers select the RAGAGEP with which their equipment and procedures must comply. In evaluating RAGAGEP compliance, CSHOs should be aware of a number of potential issues:

1. There may be multiple RAGAGEP that apply to a specific process. For example, American Petroleum Institute (API), RP 520 *Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries Part II - Installation*, and International Standards Organization, Standard No. 4126-9, *Application and installation of safety devices*, are both RAGAGEP for relief valve installation and contain similar but not identical requirements. Both documents are protective and either is acceptable to OSHA.
2. Employers do not need to consider or comply with a RAGAGEP provision that is not applicable to their specific worksite conditions, situations, or applications.
3. Some employers apply RAGAGEP outside of their intended area of application, such as using ammonia refrigeration pressure vessel inspection recommended practices in a chemical plant or refinery process. Use of inapplicable RAGAGEP can result in poor hazard control and can be grounds for citations.
4. There may be cases where the selected RAGAGEP does not control all of the hazards in an employer's covered process. As discussed above, the employer is expected to adopt other RAGAGEP (potentially including internal standards, guidance, or procedures) to address remaining process hazards. Whether internal standards constitute RAGAGEP should be reviewed on a case-by-case basis.
5. An employer's internal standards may be more stringent than other relevant sources of RAGAGEP. More-stringent standards may be needed to adequately control hazards due to the unique characteristics of the employer's process. In all cases the employer must document that its equipment complies with recognized and generally accepted good engineering practices. Employers that meet the requirements of other applicable sources of RAGAGEP, but fail to comply with their own more stringent internal requirements, may be citable under other PSM provisions:
 - If there is a failure to follow more stringent internal Inspection & Test (I&T) procedures, consider citations under 1910.119(j)(2) for failure to implement their written I&T procedures
 - Process equipment may be outside acceptable limits defined in the employer's PSI. If so, consider citations under 1910.119(j)(5).

- Additional or more stringent equipment safeguards may be specified by employers based on findings and recommendations from PHAs, Incident Investigations, or Management of Change procedures. Failure to implement or complete documented actions-to-be-taken may be cited under the relevant section of the Standard (e.g., 1910.119(e), (l), or (m)).
6. Selectively applying individual provisions from multiple RAGAGEP addressing similar hazards might be inappropriate. Standard writing organizations develop their requirements as packages and mixing-and-matching provisions from multiple sources could result in inadequately controlled hazards. Internal standards that incorporate select provisions from different sources of RAGAGEP may in some circumstances be appropriate, or may be more protective than applying one source of RAGAGEP. This situation should be evaluated on a case-by-case basis. Consult the regional PSM Coordinator, regional engineering support, or the Office of Chemical Process Safety and Enforcement Initiatives if you are uncertain how to proceed.
 7. The PSM standard at 1910.119(j)(4)(ii) requires employers to follow RAGAGEP in establishing and implementing inspection and testing procedures. At 1910.119(j)(4)(iii), the standard provides that the frequency of inspections and tests of process equipment must be consistent with applicable manufacturers' recommendations and good engineering practices, and that inspections and tests must be performed more frequently if determined to be necessary by prior operating experience. CSHOs should review relevant documents, such as the employer's written inspection and test procedures (required under 1910.119(j)(2)), to determine the employer's selected RAGAGEP.
 8. In accordance with 1910.119(d)(3)(ii), employers must document that their covered process equipment complies with RAGAGEP (equipment built to older standards may come under 1910.119(d)(3)(iii), see paragraph 10 below). Equipment that does not comply with RAGAGEP cannot be documented as compliant. Therefore, both the failure to document compliance and the deviations from compliance with RAGAGEP can be the basis for citations under 1910.119(d)(3)(ii) (see procedures for combining and grouping violations in Chapter 4 of the Field Operations Manual (CPL 02-00-159, Oct. 1, 2015)). Note that the documentation requirement in 1910.119(d)(3)(ii) does not require the employer to document all of its engineering judgments.

When writing 1910.119(d)(3)(ii) RAGAGEP-related citations, always cite the employer for **failing to document** compliance with recognized and generally accepted good engineering practices, describe the hazard, e.g., exposure of employees to fire, explosion, or toxic hazards, and reference the RAGAGEP selected by the employer. If the employer has not specified an applicable RAGAGEP, use "such as" language to reference an applicable source of RAGAGEP.

9. Equipment covered under PSM's Mechanical Integrity provisions (listed in 1910.119(j)) that is outside acceptable limits, as defined by the process safety information (including RAGAGEP), is deficient under 1910.119(j)(5). Employers are required by this provision to correct deficiencies before further use or in a safe and timely manner when necessary means are taken to assure safe operation in the interim. If an employer fails to correct the deficiency before further use, or fails to assure safe operation and schedule a permanent correction timely, the failure may be cited under 1910.119(j)(5). If an employer has implemented interim measures and scheduled correction, additional investigation may be required to determine whether the employer has assured safe operation and the scheduled correction is timely.

1910.119(d)(3)(ii) and (j)(5) citations are often grouped. Consult your Regional OSHA support staff and/or SOL if you are uncertain if grouped citations are appropriate.

Note, in the case where an employer is operating deficient equipment based on the use of interim safeguards pending final correction of the deficiency, the employer must develop and implement a management of change procedure for the continued safe operation of the equipment when required by 29 CFR 1910.119(l).

10. Older covered equipment may not have been designed and constructed under an applicable RAGAGEP because none existed at the time of design and construction. Alternatively, the equipment may have been designed and constructed under provisions of codes, standards, or practices that are no longer in general use. In such cases, 29 CFR 1910.119(d)(3)(iii) requires employers to determine and document that the equipment is designed, maintained, inspected, tested, and operating in a safe manner. Failure to do so may be cited under 1910.119(d)(3)(iii).

When writing 1910.119(d)(3)(iii) citations, always cite the employer for **failing to determine and document** that the relevant equipment is designed, maintained, inspected, tested, and operating in a safe manner.

If the employer has adopted an appropriate internal standard applicable to such older equipment, 29 CFR 1910.119(d)(3)(ii) requires the employer to document that the equipment complies with the internal standard. Failure to do so may result in a citation under 29 CFR 1910.119(d)(3)(ii).

11. When a 29 CFR 1910.119(d)(3)(ii) or (iii) citation is under consideration, it is important to establish and to document the age and installation date of the relevant process and equipment, and the dates and extent of process and equipment modifications, as well as the RAGAGEP selected by the employer, including the edition and publication date.
12. Organizations that develop codes and consensus and/or non-consensus documents may update them based on newly identified or recognized hazards; improved understanding of existing hazards; industry operating experience; and/or incidents indicating that more stringent hazard control is needed. If the updated document explicitly provides that new clauses or requirements are retroactive, those updates are relevant to determining whether the employer's practice continues to conform to RAGAGEP. Where RAGAGEP are updated to be more protective but are not explicitly retroactive, PSM does not mandate that employers upgrade their equipment, facilities, or practices to meet current versions of their selected RAGAGEP. However, under 1910.119(d)(3)(iii), employers must determine and document that their equipment is designed, maintained, inspected, tested, and operating in a safe manner.
13. Notify the Office of Chemical Process Safety and Enforcement Initiatives if you encounter sources of RAGAGEP that appear to have changed to be less protective or that are being interpreted by employers in a manner that is less protective. There have been times in the past when OSHA has determined that specific provisions in published guidance documents no longer reflect generally accepted and good engineering practices. Such determinations should only be made in consultation with the Office of Chemical Process Safety and Enforcement Initiatives.

14. When writing 1910.119(j)(4)(ii) citations, always cite the employer for failing to follow RAGAGEP in its inspection and testing procedures, and reference the relevant RAGAGEP adopted / recognized by the employer. If the employer has not specified an applicable RAGAGEP, use "such as" language to reference an applicable source of RAGAGEP. When the employer's I&T procedures comply with RAGAGEP, but are not implemented or followed, consider 1910.119(j)(2) citations.
15. When writing 1910.119(j)(4)(iii) citations, always cite the employer for not inspecting and/or testing process equipment at frequencies **consistent** with applicable manufacturers' recommendations and good engineering practices, **or more frequently** if indicated by prior operating experience, i.e., based on the condition of the equipment when previously inspected or tested.
16. When writing RAGAGEP-related citations when the employer has not specified a RAGAGEP, CSHOs should be careful to reference in the citation's alleged violation description only RAGAGEP that are actually applicable to the equipment and process being inspected. CSHOs have sometimes referenced inapplicable API relief valve RAGAGEP in citations involving ammonia refrigeration processes.

(1) PSM preamble accessed
at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=PREAMBLES&p_id=1041 on
January 15, 2013.

(via https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=30785)