

-WHITEPAPER-

NFPA 56 (2012 Ed.)
Standard for Fire and Explosion Prevention
During Cleaning and Purging
of Flammable Gas Piping Systems

**Compliance Guidance
for non-technical managers**

(10 important points to consider)

Background of this document

NFPA 56 was developed at the request of the US Chemical Safety Board, CSB, after two horrific accidents involving natural gas just 8 months apart. NFPA solicited a group of experts from across North America to convene at their headquarters in Boston for a series of face-to-face meetings to develop this document. This document is a provisional standard. The term provisional in the NFPA world means that its development and publishing was deemed so urgent of a need that it bypassed the normal process and was on an expedited process. This, however, also means that the document will now be immediately submitted into the normal NFPA revision cycle process with meetings expected again later this fall and an additional revised document to then follow. It is likely that the revised document will take many months if not over a year to complete and it will not change markedly. This document seeks to provide highlights of administrative and non-technical issues that will have a major impact on the way many industries do business in the future.

Our firm, CEC Combustion Safety Inc. is a worldwide leader in the development and application of purging and gas safety programs for major corporations on a global basis. The firm's principal, John R. Puskar, P.E. was one of the founding committee members for this standard and will be one of the revision committee members as well. CEC has developed corporate-wide programs for clients such as Ford, GM, Conagra, US Steel and others.

Disclaimer: Everyone reading this document should also purchase from NFPA, www.nfpa.org, a copy of the NFPA 56 and read and discuss all parts of it thoroughly. This document and the comments provided are no substitute for a thorough understanding of the complete standard. This document does not consider many other issues, some technical, that will also impact your organization as this standard is applied.

NFPA 56 Non-technical, management and administrative compliance issues impact analysis for industrial facilities:

1. Applicability:

All gases including natural gas over 125 psig and coke oven gas, blast furnace gas and others are now in a standard or code. NFPA 56 finally brings in natural gas over 125 psig operating pressure and other common industrial gases, (not just fuel gases). Adoption of NFPA 56 by users for liability protection is likely to be significant in the face of the Kleen disaster and since Congress wanted the US Chemical Safety board to make NFPA do something. This will apply to both new facilities (for cleaning and placing into service) and existing facilities for purging operations.

1.1.1* Applicability. This standard applies to fire and explosion prevention during cleaning and purging activities for new and existing **flammable gas piping** found in **electric-generating plants**, industrial, institutional and commercial applications.

Recommendation: Develop a plan for implementing the document's requirements for both new and existing facilities.

2. Non-Application of Standard:

The following are exempt from the standard. Hydrogen and Propane are also important to many generation facilities. When one considers the possible hazard that exists with these possibly exempted gases, we believe that any program should also include them.

1.1.2 Non-application of Standard. This standard shall not apply to the following items:

- (1)* Piping systems covered by **NFPA 2** [*Hydrogen Technologies Code*]
- (2)* Piping systems covered by **NFPA 54** [*National Fuel Gas Code*]
- (3)* Piping systems covered by **NFPA 58** [*Liquefied Petroleum Gas Code*]
- (4)* LP-Gas (including refrigerated storage) at utility gas plants (*see NFPA 59*) [*Utility LP-Gas Plant Code*]
- (5)* LNG Facilities covered by NFPA 59A [*Standard for the Production, Storage and Handling of Liquefied Natural Gas*]
- (6) LP-Gas used with oxygen for cutting, welding or other hot work
- (7)* Vehicle fuel dispensers
- (8) Commissioning and maintenance of appliances or equipment
- (9) Vent lines from pressure relief valves
- (10) Systems regulated by US Department of Transportation 49 CFR 191 and 192

Recommendation: Include all of the facility's gases in the scope of plans and programs that are created.

3. Retroactivity:

The standard clearly applies to plants built before the standard was published.

1.3.1 Unless otherwise specified, the provisions of this standard shall apply to facilities, equipment, structures, or installations that existed or were approved for construction or installation prior to the effective date of the standard.

1.3.2 The retroactive requirements of this standard shall be permitted to be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction and only where it is clearly evident that a reasonable degree of safety is provided.

4. New Construction and possible retrofit issues:

Most EPC (engineer, procure & construct) contractors anywhere would be following these codes. However, there could be instances where the requirements for the documentation portions of these, like pressure testing records, are not well conceived at this time.

4.1 Piping System Construction. Flammable gas piping systems shall be constructed in accordance with ASME B31.1 [*Power Piping*], ASME B31.3 [*Process Piping*], or NFPA 54 [*National Fuel Gas Code*], as applicable.

Recommendation: Review all of the requirements of these codes for new or major retrofits that are occurring and be sure that important commissioning related issues are being handled correctly and are well documented with regards to things like pressure testing of piping.

5. Extensive cleaning and purge procedures will be required:

Detailed procedures will need to be developed for handling cleaning and purging procedures for new and existing facilities. There is an extensive list of considerations and requirements for these procedures, as is indicated below.

4.3* Cleaning and Purging Procedures. Written cleaning and purging procedures shall be developed and implemented by a competent person.

4.3.1* The written procedure for each cleaning and purging activity shall address, as a minimum, the following items:

(1) Scope of Work & Site Specific Purge Procedure Development

- (a) Cleaning and purging method
- (b) Piping and instrument diagrams (PID's)
- (c) Chemical and physical properties of flammable gas, purge media and discharge gas
- (d) Determination of purge end-point introducing flammable gas, inert gas, or air
- (e) Assessment and control of purge inlet and discharge locations
- (f) Temporary piping system design
- (g) Personal protective equipment (PPE)
- (h) Training and qualifications
- (i) Management review and approval
- (j) Restoration of service

- (k) Target design, launcher/receiver venting review for pigging operations
 - (l) Regulatory permits
 - (m) Evaluation of engineering controls to limit potential unintended ignition of gases (controlled oxidation, “flaring”)
 - (n) Written stand-down instructions to stop activity in a controlled manner
 - (o) Hazards
- (2)* Environmental conditions and work locations**
- (a) Establish and clearly identify exclusion zones where flammable gas-air mixtures are likely to exist
 - (b) Limit access for personnel not directly involved with purge operations
 - (c) Assessment of potential for gas migration (building openings, adjacent structures)
 - (d) Prohibit hot work within exclusion zones
 - (e) Lock Out / tagout
 - (f) Impact of environmental conditions (wind speed and direction, temperature, barometric pressure) on purge operations
 - (g) Vehicular and air traffic, if applicable
 - (h) Topography
 - (i) Noise control / monitoring
- (3) Communication plans**
- (a) Pre-job briefings
 - (b) Work permits
 - (c) Roles and responsibilities
 - (d) Emergency response plan
 - (e) Facility alarm, alert and warning systems
 - (f) General facility notification prior to start of purge operations
 - (g) General facility notification at the conclusion of purge operations
 - (h) Notification of regulatory authorities as required (local emergency responders, utility operators, community officials, environmental authorities, etc.)
- (4)* Control of Ignition Sources**
- (a) Bonding and grounding considerations
 - (b) No smoking or spark producing work within exclusion zones
 - (c) Eliminate hot work within exclusion zone
 - (d) Static electricity ignition sources at discharge point
- (5) Pre-Purge Piping System Assessment**
- (a) Assessment of piping system for trapped liquids, pyrophoric solids, and other flammable or combustible deposits within the piping system
 - (b) Ensuring that the piping system is properly isolated
 - (c) Limiting site conditions that impact the safety of the activity
- (6)* Purge monitoring and instrumentation**
- (a) Ensure monitoring instruments are appropriate for gas being purged
 - (b) Training
 - (c) Calibration
 - (d) Monitoring frequency and reporting
 - (e) Selection of appropriate sample point(s)
 - (f) General atmosphere checks in vicinity of purge gas release

Recommendations: Develop a corporate-wide template approach for implementing a checklist type of system that can document and vette cleaning and purge jobs as they occur.

6. Development of detailed cleaning and purging procedures:

Detailed plans and procedures for cleaning and purging will need to be written and well documented and made available on the jobsite and be written and shall include names of the primary developer and team members.

4.6 Documentation.

4.6.1 Cleaning and purging procedures shall be documented and available at the job site.

4.6.2 The safety validation documentation shall include the following items:

- (1) Names, company names, and addresses of the primary developer and other principal team members responsible for the safety validation.

Recommendations: Develop a corporate-wide template approach for implementing a checklist type of system that can document and vetted cleaning and purge jobs as they occur.

7. Written safety validations of procedures:

Written safety validations, of the plans referenced above, will be required for each time the plans are used. The safety validation review will also need to document the persons who created it.

4.6.2 The safety validation documentation shall include the following:

- (1) Names, company names, and addresses of the primary developer and other principal team members responsible for the safety validation.
- (2) Name, company name, and address of the principal operational personnel representing the plant owner or operator
- (3) Date of preparation and any applicable modification dates
- (4) The completed safety validation in accordance with section 4.4
- (5) Any procedures related to the safety validation and any limiting conditions identified in the management of change assessment required in section 4.5

Recommendations: Develop a corporate-wide template approach for implementing a checklist type of system that can document and vette cleaning and purge jobs as they occur.

8. Management of change:

Management of change issues need to be integrated into gas and purging matters as indicated below.

4.5* Management of Change. Written procedures to manage change to process materials, technology, equipment, procedures, and facilities shall be established and implemented. [654:4.3]

4.5.1 The management-of-change procedures shall ensure that the following issues are addressed prior to any change:

- (1)The technical basis for the proposed change
- (2)The safety and health implications
- (3)Whether the change is permanent or temporary
- (4)Modifications to cleaning and purging procedures
- (5)Employee training requirements
- (6)Authorization requirements for the proposed change

Recommendations: Review existing management of change procedures for how adequately they address gas line cleaning and purging issues.

9. Training:

There are considerable training requirements for all staff. Sites should have a process for providing training and certification of competent persons related to this topic and for personnel who would be participating in purge operations.

5.1 Training. Persons whose duties fall within the scope of this standard shall be provided with training that is consistent with the scope of their job activities.

5.1.1 Such training shall include hazards of flammable gas, hazards of any compressed gas used for cleaning or purging, safe handling practices of flammable gas and compressed gas as applicable, emergency response procedures and equipment, and company policy.

5.1.2 Personnel training shall be conducted by a competent person knowledgeable in the subject matter and shall be documented.

5.1.3 Training records shall be maintained for a period not less than 5 years from the date of completion of the activity.

Recommendation: Develop a SME, subject matter expert, and QPP, qualified purge participant, in-house training and certification processes. Include elements of knowledge, transfer validation, and hands-on skill transfer. Part of this program should also include general awareness training for all staff. Contractors will also need to be included on some level.