



Public Input No. 5-NFPA 51B-2019 [Sections 1.3.1, 1.3.2]

Sections 1.3.1, 1.3.2

1.3.1

This standard shall apply to the following hot work processes:

- (1) Welding and allied processes
- (2) Heat treating
- (3) Grinding
- (4) Thawing pipe
- (5) Powder-driven fasteners
- (6) Hot riveting
- (7) * Torch-applied roofing in conjunction with the requirements of NFPA 241
- (8) Similar applications producing or using a spark, flame, or heat

1.3.2

This standard shall not apply to the following:

- (1) Candles
- (2) Pyrotechnics or special effects
- (3) Cooking operations
- (4) Electric soldering irons
- (5) Design and installation of gas cutting equipment and welding equipment covered in NFPA 51
- (6) Additional requirements for hot work operations in confined spaces
- (7) Lockout/tagout procedures during hot work
- (8) Open flame heating equipment under a laboratory hood
- (9) Soldering using electrical hand held heating devices (i.e., soldering iron for electronics)

Statement of Problem and Substantiation for Public Input

Relative to the use of open flame heating equipment under a fume hood in a laboratory setting, NFPA 51B can be interpreted to include busen burners and similar equipment. The hazard presented by busen burners in a controlled environment does not appear to be consistent with the need for a hot work permit or for designated hot work area controls. The fire loss history seems to confirm it is low hazard. Yet because of the lack of a specific exclusion in the scope of 51B and the lack of inclusion/commentary in NFPA 45, there are efforts to require hot work permits or designated hot work areas for fume hood operations.

Soldering, as a general term, can be applied to open flame torch work (such as soldering a pipe), but can also be applied to soldering electronics using electrical soldering irons. The scope of NFPA 51B and definitions do not provide the clarity to avoid hot work permits be required for these type of operations when using the general term "Hot Work Processes" , instead of the prior "Open Flame Processes".

Submitter Information Verification

Submitter Full Name: Joseph Levesque

Organization: Brookhaven National Laboratory, US Department of Energy Facility run by Brookhaven Science Associates

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jul 12 16:45:12 EDT 2019

Committee: HWO-AAA

Committee Statement

Resolution: The suggested addition of soldering in 1.3.2 number 9 is already addressed in 1.3.2 item 4. The language in NFPA 45 regarding hot work under laboratory hoods is not yet published so no determination can be made.

**Public Input No. 4-NFPA 51B-2019 [Section No. 1.3.2]****1.3.2**

This standard shall not apply to the following:

- (1) Candles
- (2) Pyrotechnics or special effects
- (3) Cooking operations
- (4) Electric soldering irons
- (5) Design and installation of gas cutting equipment and welding equipment covered in NFPA 51
- (6) Additional requirements for hot work operations in confined spaces
- (7) Lockout/tagout procedures during hot work
- (8) Laboratories conducting open flame operations in accordance with NFPA 45.

Statement of Problem and Substantiation for Public Input

The application of NFPA 51B is not practicable in a laboratory setting. NFPA 45, 11.2.6 provides adequate safeguards for open flame operations in labs.

Most laboratory operations with torches involves glass blowing or shaping, ampule sealing, heating of research vessels, or similar operations. Very few lab operations with torches generate any sparks.

Changes were approved to the First Draft of the 2024 edition of NFPA 45 to clarify what type of hot works in a lab need to comply with NFPA 51B.

Submitter Information Verification

Submitter Full Name: William Guffey

Organization: University of Maryland Fire Marshal's Office

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jun 28 10:54:16 EDT 2019

Committee: HWO-AAA

Committee Statement

Resolution: The language in NFPA 45 regarding laboratories conducting open flame operations is not yet published so no determination can be made.



Public Input No. 10-NFPA 51B-2021 [New Section after 5.5]

Hot work on Tanks and Containers

To address the hazards of conducting hot work on or near tanks or containers and strengthen protection for all workers the CSB submits the following comments to NFPA's Hot Work Operations Technical Committee.²

1) Modify Chapter 5, Fire Prevention Precautions, Subsection 5.5, Hot Work Permit, to incorporate NFPA 326, Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair, as a reference when hot work is conducted on or near tanks and containers. Specifically reference NFPA 326 sections 4.2, Ignition Concerns, and

Chapter 6, Testing Procedures.

or

Modify Chapter 5, Fire Prevention Precautions, Subsection 5.5, Hot Work Permit, to include a new subsection to address "tanks or containers that contain or have contained flammable or combustible liquids or vapors"³ with the following language from NFPA 326, Chapter 6:

"To determine that an atmosphere is safe for the designated entry, cleaning, or repair work, tests for oxygen and for flammable, combustible, or other hazardous substance vapors, fumes or dusts shall be made with an appropriate instrument as follows:

(1) Before entry or re-entry

(2) Before start of alterations or repairs

(3) Before and during any hot work, cutting, welding, or heating operations

(4) Continuously or periodically during the course of the work, as determined by a qualified person

(5) After cleaning the interior of each tank or container to determine that the cleaning procedures have been effective

(6) After any process or activity has occurred that might change the atmosphere within the tank or container."⁴

and

* Define the term atmosphere in Chapter 3, Definitions to ensure the classification of atmosphere addresses the air inside a tank, container or vessel involved in hot work.

* Include text on contractor oversight, job preplanning and hazard awareness by referencing subsection 4.1, 4.1.6.2 and 4.5 of NFPA 51B (2014) in the new subsection in Chapter 5, Fire Prevention Precautions, Subsection 5.5, Hot Work Permit.

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
51B_PC4_Hold.pdf	NFPA 51B Public Comment No. 4	

Statement of Problem and Substantiation for Public Input

NOTE: This Public Input appeared as "Reject but Hold" in Public Comment No. 4 of the (A2018) Second Draft Report for NFPA 51B and per the Regs. at 4.4.8.3.1.

The U.S. Chemical Safety and Hazard Investigation Board (CSB) recently learned that the NFPA Standards Council is accepting comments on NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work. The CSB's long history of investigating hot work incidents on or near tanks or vessels containing flammable vapors demonstrates the importance of fully determining and understanding the hazards of this work activity. Our investigative findings also address the frequency and severity of these incidents, which compel more stringent health and safety standards to ensure the work activity is conducted safely, workers are aware of the hazards, and that they are fully protected. The CSB appreciates the Technical Committee's consideration of the comments and justifications found below.

All hot work introduces inherent fire risks and hazards, hence the need for serious consideration of fire risks before commencing the hot work operations. Special procedures and permits are required when hot work is performed in a confined space, tank, vessel or pipeline. However, most permitting programs do not require continuous testing of the atmosphere within or around the vessel involved in the hot work activity. In addition, hot work incidents occur throughout many industries in the United States, (U.S.), including food processing, pulp and paper manufacturing, oil production, fuel storage, and waste treatment—often resulting from the ignition of combustible materials, e.g., a roofing fire, or the ignition of structures or debris near the hot work.

Our analysis of best practices and consensus standards has identified a gap in NFPA 51B when conducting hot work on or near tanks and containers with flammable vapor. The CSB finds that NFPA 51B does not contain guidance on continuous testing of the atmosphere for

flammable vapor inside or surrounding a tank or container prior to and during the work activity. In our review of other NFPA standards addressing work on tanks and containers, the CSB finds that language in NFPA 326, Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair adequately addresses the gap identified in NFPA 51B. Furthermore, our investigations of hot work incidents demonstrate that contract workers, who are typically hired to conduct hot work on tanks and containers with flammable vapors, are more frequently exposed to the hazards of the work activity. Nine of the 14 hot work incidents investigated by the CSB resulted in injury and/or fatality to at least one contractor, indicating a deficiency in hazard awareness among contract workers on a job site. Our investigative findings also illustrate the need for stronger oversight and responsibility for hot work activities.

Justification

Hot work was one of the most common causes of worker deaths among incidents investigated by the CSB, though the hazards associated with hot work are well understood. From 2001 to 2016, the CSB deployed to 14 hot work incidents. See Table 1.

Investigation Date Fatalities Injuries Monitoring

Investigation Date	Fatalities	Injuries	Monitoring
Motiva Enterprise Refinery July 17, 2001	1 Contractor	8 Contractors	Yes
Bethune Point Wastewater Plant January 11, 2006	2 Employees	1 Employee	No
Partridge-Raleigh Oilfield June 5, 2006	3 Contractors	1 Contractor	No
MAR Oil October 19, 2008	2 Contractors	None	No
EMC Use Oil Corporation December 2, 2008	1 Contractor	1 Contractor	No
Packaging Corporation of America July 29, 2008	3 Employees	1 Employee	No
A.V. Thomas Produce March 31, 2009	None	2 Employees	No
TEPPCO Partners, LP May 12, 2009	3 Contractors	None	No
ConAgra Foods, Boardman, OR February 16, 2009	1 Contractor	None	Yes
E.I. DuPont de Nemours & Co. Inc. November 9, 2010	1 Contractor	1 Contractors	Yes
Long Brothers LLC May 21, 2012	3 Employees	None	No
Omega Protein July 28, 2014	2 Contractors	None	Yes
Sunoco Logistics August 12, 2016	None	5 Contractors	Yes
Packaging Corporation of America February 8, 2017	3 Contractors	1 Contractor	--

Table 1: CSB Hot Work Investigations

The CSB reviewed 187 hot work incidents from 2010 to 2013. Of the 187 incidents, 85 incidents resulted in a fire or explosion while hot work was being conducted on or near a tank or container. These incidents resulted in 48 fatalities and 104 significant injuries. 23 percent of the injuries and 42 percent of fatalities involved contract employees/workers. See Table 2.

Employees	Contractors	Total	
Significant Injuries	80	24	104
Fatalities	28	20	48

Table 2: Workers Hurt in Hot Work Incidents – 2010-2013 Involving a Tank or Container In February 2010, the CSB released a Safety Bulletin, Seven Key Lessons to Prevent Worker Deaths During Hot Work In and Around Tanks, specifically highlighting incidents where hot work was conducted on or near a tank or container containing or recently containing a flammable or combustible substance where the atmosphere inside the vessel was not continuously tested. The CSB found that continuous monitoring of the atmosphere inside the tank or container and the surrounding area would have alerted workers to changing conditions inside the tank, likely prompting them to stop all hot work activities and perhaps causing them to evacuate the work space prior to the explosions and/or fires that resulted.

One example of such an incident from the CSB's Safety Bulletin is the TEPPCO Partners LP incident (May 12, 2009, Garner, Arkansas). This incident involved a tank that was environmentally cleaned, and the atmosphere tested hours before the hot work was conducted. However, when contract workers began hot work on the floating roof, hydrocarbons inside the pontoon were liberated and ignited, resulting in a violent explosion which led to three contractor fatalities. The incident demonstrates the need for continuous monitoring that starts prior to and carries through during hot work activities.

After a 2010 incident in Buffalo, New York, the CSB developed and issued a recommendation to address continuous monitoring inside a tank or container. In 2012, the CSB recommended that E. I. du Pont de Nemours and Company (DuPont) revise its corporate policies to require air monitoring inside a container for the duration of hot work, after a slurry tank exploded, fatally injuring one contract worker and seriously injuring another while they were welding on the tank. DuPont successfully completed this recommendation in December 2012 by requiring all of its facilities to develop a hot work program that includes among others, "Criteria for requiring either continuous or periodic monitoring for flammable gases in the vapor spaces of all process equipment or other containers within 11 m (35 ft.) of hot work."

The CSB continues to investigate hot work incidents where continuous monitoring could have alerted workers to the changing conditions inside or surrounding a vessel where hot work activity was conducted. Currently, the CSB is investigating two hot work incidents, one at the Sunoco Logistics LP terminal in Nederland, Texas, and another at the Packaging Corporation of America (PCA) facility in DeRidder, Louisiana. Seven contractors were injured in a flash fire at the Sunoco Logistics LP site on August 12, 2016, while conducting hot work on a pipeline. Atmospheric testing was conducted prior to the issuance of the hot work permit, at shift change and before cutting into the pipeline. Although the contract workers used a combustible gas meter to continuously test the ambient air in the area where the hot work was conducted, they did not continuously or periodically test the atmosphere at the source of the flammable vapors or inside the pipeline during the hot work activity. Furthermore, on February 8, 2017, three contractors were fatally injured and one other contractor sustained injuries in an explosion at the PCA facility while conducting hot work. The contractors were conducting hot work on a pipe ridge above a tank potentially containing a flammable atmosphere. There was no monitoring inside the tank as the hot work was not being done on the tank. The explosion propelled the tank over a building to another area of the facility.

Contract Workers

Our investigations identified a deficiency in training of contract workers on the hazards associated with conducting hot work on tanks, containers and pipelines with flammable vapors. The CSB recognizes that NFPA 51B uses strong "shall" language requiring facilities assign oversight responsibility, preplan the work activity and communicate the fire and explosion hazards associated with hot work to contract workers. For instance, subsection 4.1 uses the "shall" language to recommend "Management or a designated agent [] be responsible for the safe operation of hot work activity." Subsection 4.1.6.2 requires, using "shall" language, that individuals involved in hot work operations "have awareness of the inherent risks involved and understand the emergency procedures in the event of a fire." Similarly, subsection 4.5 on Contractors requires that a facility "discuss the planned project completely including the type of hot work to be

conducted and the hazards in the area" with contractors. The CSB asks that the Technical Committee consider referencing subsections (4.1, 4.1.6.2, and 4.5) in a new subsection in Chapter 5 addressing hot work on tanks and containers and other vessels containing or previously containing flammable vapors.

In summary, the CSB respectfully calls on the NFPA 51B Technical Committee to modify NFPA 51B to prevent future hot work incidents on tanks, containers and other vessels with flammable vapors. Our proposed changes will: (1) ensure that contractor employees are sufficiently aware of the hazards of hot work activity; (2) strengthen supervision of hot work activity, especially with respect to contract workers; and (3) add reference to NFPA 326 in order to address the lack of continuous monitoring inside and surrounding the tank or container. These changes will allow workers across industry to conduct hot work safely.

Submitter Information Verification

Submitter Full Name: TC ON HWO-AAA

Organization: TC on Hot Work Operations

Street Address:

City:

State:

Zip:

Submittal Date: Wed Jun 02 10:56:33 EDT 2021

Committee: HWO-AAA

Committee Statement

Resolution: [FR-5-NFPA 51B-2021](#)

Statement: During prior revision to NFPA 51B, the CSB proposed changes to the standard to address specific hot work hazards identified during investigations. Specifically, the CSB highlighted that atmospheric hazards often exist in and around tanks, piping and related appurtenances and should be monitored to ensure concentrations are less than the LFL (generally less than 10% LFL). Since the CSB public comment was deemed new material in accordance with the NFPA regulations governing committee projects, the Committee acted to Reject, Hold the comment. The First Revision is being offered to establish the basis for addressing the CSB recommendation, while permitting time for further review of NFPA 326 and possible communication with CSB.

**Public Comment No. 4-NFPA 51B-2017 [New Section after 5.5]****Hot work on Tanks and Containers**

To address the hazards of conducting hot work on or near tanks or containers and strengthen protection for all workers the CSB submits the following comments to NFPA's Hot Work Operations Technical Committee.²

1) Modify Chapter 5, Fire Prevention Precautions, Subsection 5.5, Hot Work Permit, to incorporate NFPA 326, Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair, as a reference when hot work is conducted on or near tanks and containers. Specifically reference NFPA 326 sections 4.2, Ignition Concerns, and Chapter 6, Testing Procedures.

or

Modify Chapter 5, Fire Prevention Precautions, Subsection 5.5, Hot Work Permit, to include a new subsection to address "tanks or containers that contain or have contained flammable or combustible liquids or vapors"³ with the following language from NFPA 326, Chapter 6:

"To determine that an atmosphere is safe for the designated entry, cleaning, or repair work, tests for oxygen and for flammable, combustible, or other hazardous substance vapors, fumes or dusts shall be made with an appropriate instrument as follows:

(1) Before entry or re-entry

(2) Before start of alterations or repairs

(3) Before and during any hot work, cutting, welding, or heating operations

(4) Continuously or periodically during the course of the work, as determined by a qualified person

(5) After cleaning the interior of each tank or container to determine that the cleaning procedures have been effective

(6) After any process or activity has occurred that might change the atmosphere within the tank or container."⁴

and

* Define the term atmosphere in Chapter 3, Definitions to ensure the classification of atmosphere addresses the air inside a tank, container or vessel involved in hot work.

* Include text on contractor oversight, job preplanning and hazard awareness by referencing subsection 4.1, 4.1.6.2 and 4.5 of NFPA 51B (2014) in the new subsection in Chapter 5, Fire Prevention Precautions, Subsection 5.5, Hot Work Permit. [Type your content here ...](#)

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CSB_Hot_Work_Investigations_Chart.pdf	Table of CSB investigations of hot work incidents involving tanks and containers from 2001-2017.	

Statement of Problem and Substantiation for Public Comment

The U.S. Chemical Safety and Hazard Investigation Board (CSB) recently learned that the NFPA Standards Council is accepting comments on NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work. The CSB's long history of investigating hot work incidents on or near tanks or vessels containing flammable vapors demonstrates the importance of fully determining and understanding the hazards of this work activity. Our investigative findings also address the frequency and severity of these incidents, which compel more stringent

health and safety standards to ensure the work activity is conducted safely, workers are aware of the hazards, and that they are fully protected. The CSB appreciates the Technical Committee's consideration of the comments and justifications found below.

All hot work introduces inherent fire risks and hazards, hence the need for serious consideration of fire risks before commencing the hot work operations. Special procedures and permits are required when hot work is performed in a confined space, tank, vessel or pipeline. However, most permitting programs do not require continuous testing of the atmosphere within or around the vessel involved in the hot work activity. In addition, hot work incidents occur throughout many industries in the United States, (U.S.), including food processing, pulp and paper manufacturing, oil production, fuel storage, and waste treatment—often resulting from the ignition of combustible materials, e.g., a roofing fire, or the ignition of structures or debris near the hot work.

Our analysis of best practices and consensus standards has identified a gap in NFPA 51B when conducting hot work on or near tanks and containers with flammable vapor. The CSB finds that NFPA 51B does not contain guidance on continuous testing of the atmosphere for flammable vapor inside or surrounding a tank or container prior to and during the work activity. In our review of other NFPA standards addressing work on tanks and containers, the CSB finds that language in NFPA 326, Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair adequately addresses the gap identified in NFPA 51B.

Furthermore, our investigations of hot work incidents demonstrate that contract workers, who are typically hired to conduct hot work on tanks and containers with flammable vapors, are more frequently exposed to the hazards of the work activity. Nine of the 14 hot work incidents investigated by the CSB resulted in injury and/or fatality to at least one contractor, indicating a deficiency in hazard awareness among contract workers on a job site. Our investigative findings also illustrate the need for stronger oversight and responsibility for hot work activities.

Justification

Hot work was one of the most common causes of worker deaths among incidents investigated by the CSB, though the hazards associated with hot work are well understood. From 2001 to 2016, the CSB deployed to 14 hot work incidents. See Table 1.

Investigation	Date	Fatalities	Injuries	Monitoring	
Motiva Enterprise Refinery	July 17, 2001	1 Contractor	8 Contractors	Yes	
Bethune Point Wastewater Plant	January 11, 2006	2 Employees	1 Employee	No	
Partridge-Raleigh Oilfield	June 5, 2006	3 Contractors	1 Contractor	No	
MAR Oil	October 19, 2008	2 Contractors	None	No	
EMC Use Oil Corporation	December 2, 2008	1 Contractor	1 Contractor	No	
Packaging Corporation of America	July 29, 2008	3 Employees	1 Employee	No	
A.V. Thomas Produce	March 31, 2009	None	2 Employees	No	
TEPPCO Partners, LP	May 12, 2009	3 Contractors	None	No	
ConAgra Foods, Boardman, OR	February 16, 2009	1 Contractor	None	Yes	
E.I. DuPont de Nemours & Co. Inc.	November 9, 2010	1 Contractor	1 Contractors	Yes	
Long Brothers LLC	May 21, 2012	3 Employees	None	No	
Omega Protein	July 28, 2014	2 Contractors	None	Yes	
Sunoco Logistics	August 12, 2016	None	5 Contractors	Yes	
Packaging Corporation of America	February 8, 2017	3 Contractors	1 Contractor	--	

Table 1: CSB Hot Work Investigations

The CSB reviewed 187 hot work incidents from 2010 to 2013. Of the 187 incidents, 85 incidents resulted in a fire or explosion while hot work was being conducted on or near a tank or container. These incidents resulted in 48 fatalities and 104 significant injuries. 23 percent of the injuries and 42 percent of fatalities involved contract employees/workers. See Table 2.

	Employees	Contractors	Total
Significant Injuries	80	24	104
Fatalities	28	20	48

Table 2: Workers Hurt in Hot Work Incidents – 2010-2013 Involving a Tank or Container

In February 2010, the CSB released a Safety Bulletin, Seven Key Lessons to Prevent Worker Deaths During Hot Work In and Around Tanks, specifically highlighting incidents where hot work was conducted on or near a tank or

container containing or recently containing a flammable or combustible substance where the atmosphere inside the vessel was not continuously tested. The CSB found that continuous monitoring of the atmosphere inside the tank or container and the surrounding area would have alerted workers to changing conditions inside the tank, likely prompting them to stop all hot work activities and perhaps causing them to evacuate the work space prior to the explosions and/or fires that resulted.

One example of such an incident from the CSB's Safety Bulletin is the TEPPCO Partners LP incident (May 12, 2009, Garner, Arkansas). This incident involved a tank that was environmentally cleaned, and the atmosphere tested hours before the hot work was conducted. However, when contract workers began hot work on the floating roof, hydrocarbons inside the pontoon were liberated and ignited, resulting in a violent explosion which led to three contractor fatalities. The incident demonstrates the need for continuous monitoring that starts prior to and carries through during hot work activities.

After a 2010 incident in Buffalo, New York, the CSB developed and issued a recommendation to address continuous monitoring inside a tank or container. In 2012, the CSB recommended that E. I. du Pont de Nemours and Company (DuPont) revise its corporate policies to require air monitoring inside a container for the duration of hot work, after a slurry tank exploded, fatally injuring one contract worker and seriously injuring another while they were welding on the tank. DuPont successfully completed this recommendation in December 2012 by requiring all of its facilities to develop a hot work program that includes among others, "Criteria for requiring either continuous or periodic monitoring for flammable gases in the vapor spaces of all process equipment or other containers within 11 m (35 ft.) of hot work."

The CSB continues to investigate hot work incidents where continuous monitoring could have alerted workers to the changing conditions inside or surrounding a vessel where hot work activity was conducted. Currently, the CSB is investigating two hot work incidents, one at the Sunoco Logistics LP terminal in Nederland, Texas, and another at the Packaging Corporation of America (PCA) facility in DeRidder, Louisiana. Seven contractors were injured in a flash fire at the Sunoco Logistics LP site on August 12, 2016, while conducting hot work on a pipeline. Atmospheric testing was conducted prior to the issuance of the hot work permit, at shift change and before cutting into the pipeline. Although the contract workers used a combustible gas meter to continuously test the ambient air in the area where the hot work was conducted, they did not continuously or periodically test the atmosphere at the source of the flammable vapors or inside the pipeline during the hot work activity. Furthermore, on February 8, 2017, three contractors were fatally injured and one other contractor sustained injuries in an explosion at the PCA facility while conducting hot work. The contractors were conducting hot work on a pipe ridge above a tank potentially containing a flammable atmosphere. There was no monitoring inside the tank as the hot work was not being done on the tank. The explosion propelled the tank over a building to another area of the facility.

Contract Workers

Our investigations identified a deficiency in training of contract workers on the hazards associated with conducting hot work on tanks, containers and pipelines with flammable vapors. The CSB recognizes that NFPA 51B uses strong "shall" language requiring facilities assign oversight responsibility, preplan the work activity and communicate the fire and explosion hazards associated with hot work to contract workers. For instance, subsection 4.1 uses the "shall" language to recommend "Management or a designated agent [] be responsible for the safe operation of hot work activity." Subsection 4.1.6.2 requires, using "shall" language, that individuals involved in hot work operations "have awareness of the inherent risks involved and understand the emergency procedures in the event of a fire." Similarly, subsection 4.5 on Contractors requires that a facility "discuss the planned project completely including the type of hot work to be conducted and the hazards in the area" with contractors. The CSB asks that the Technical Committee consider referencing subsections (4.1, 4.1.6.2, and 4.5) in a new subsection in Chapter 5 addressing hot work on tanks and containers and other vessels containing or previously containing flammable vapors.

In summary, the CSB respectfully calls on the NFPA 51B Technical Committee to modify NFPA 51B to prevent future hot work incidents on tanks, containers and other vessels with flammable vapors. Our proposed changes will: (1) ensure that contractor employees are sufficiently aware of the hazards of hot work activity; (2) strengthen supervision of hot work activity, especially with respect to contract workers; and (3) add reference to NFPA 326 in order to address the lack of continuous monitoring inside and surrounding the tank or container. These changes will allow workers across industry to conduct hot work safely.

Related Item

[FR-15](#)

Submitter Information Verification

Submitter Full Name: Vidisha Parasram
Organization: US CSB
Affiliation: The US Chemical Safety Board
Street Address:
City:
State:
Zip:
Submittal Date: Wed May 10 15:31:09 EDT 2017

Committee Statement

Committee Rejected but held

Action:

Resolution: The Technical Committee agrees with the merit of this proposed change, but at this time in the revision cycle (Second Draft stage), cannot add new requirements to the standard per the NFPA regulations. There is a reference to NFPA 326 in section A.5.4. The Technical Committee will take time before the next revision cycle to develop language to reference NFPA 326 requirements. A task group has been formed to work on this effort with invitation to the CSB to participate.

CSB Hot Work Investigations 2001-2017

<i>Investigation</i>	<i>Date</i>	<i>Fatalities</i>	<i>Injuries</i>	<i>Monitoring</i>
Motiva Enterprise Refinery	July 17, 2001	1 Contractor	8 Contractors	Yes
Bethune Point Wastewater Plant	January 11, 2006	2 Employees	1 Employee	No
Partridge-Raleigh Oilfield	June 5, 2006	3 Contractors	1 Contractor	No
MAR Oil	October 19, 2008	2 Contractors	None	No
EMC Use Oil Corporation	December 2, 2008	1 Contractor	1 Contractor	No
Packaging Corporation of America	July 29, 2008	3 Employees	1 Employee	No
A.V. Thomas Produce	March 31, 2009	None	2 Employees	No
TEPPCO Partners, LP	May 12, 2009	3 Contractors	None	No
ConAgra Foods, Boardman, OR	February 16, 2009	1 Contractor	None	Yes
E.I. DuPont de Nemours & Co. Inc.	November 9, 2010	1 Contractor	1 Contractors	Yes
Long Brothers LLC	May 21, 2012	3 Employees	None	No
Omega Protein	July 28, 2014	2 Contractors	None	Yes
Sunoco Logistics	August 12, 2016	None	5 Contractors	Yes
Packaging Corporation of America	February 8, 2017	3 Contractors	1 Contractor	--

**Public Input No. 6-NFPA 51B-2020 [Section No. 5.5.1.7 [Excluding any Sub-Sections]]**

" If hot work is done on one side of a wall, partition, ceiling, or roof, the criteria in either 5.5.1.7.1 or 5.5.1.7.2 shall apply."

This should be revised as follows:

"If hot work is done on one side of a wall, partition, ceiling, or roof, and there is any likelihood that heat, flame, spark or combustible ifyings may reach the other side of the wall, partition, ceiling, or roof, the criteria in either 5.5.1.7.1 or 5.5.1.7.2 shall apply."

Statement of Problem and Substantiation for Public Input

Unreasonable or impractical precautions might not be needed at all depending on the characteristics of the wall, ceiling, partition and roof. For example, hot work on concrete walls at prisons when the wall is an exterior solid wall 4 ft. thickness.

Submitter Information Verification

Submitter Full Name: Charles Lankford

Organization: Roman & Lankford International Consulting

Affiliation: N/A

Street Address:

City:

State:

Zip:

Submittal Date: Tue Mar 03 11:33:37 EST 2020

Committee: HWO-AAA

Committee Statement

Resolution: FR-4-NFPA 51B-2021

Statement: Changes clarify the responsibilities of the PAI with regard to the assessment of the planned hot work in areas around noncombustible walls by providing specific steps for assessing the hazard conditions and specific control measures.

**Public Input No. 9-NFPA 51B-2021 [Section No. 5.6.1.1]****5.6.1.1**

A fire watch shall be maintained for 4-hour- at least 1/2 hour after completion of hot work operations in order to detect and extinguish smoldering fires.

Statement of Problem and Substantiation for Public Input

The change that was implemented in the 2019 version places an increased burden to the users of this standard based on limited justification. The proposed change was adopted in the second revision No. 4, based on loss history data from a single insurance company. The proposed data shares the loss history that states 15% of 650 fires over an 18-year period occurred after the 30-minute fire watch period. This means that about 98 fire losses in 18 years, or about 5 fires a year was enough justification to increase the required 30-minute fire watch of hot work by an additional 30 minutes.

The submitted data doesn't show the loss history by occupancy type and does not state whether there was any verification that the fire watch was properly carried out. This data does not include information to determine if all fires would have been detected within 30 minutes had all the requirements in NFPA 51B been followed. The Permit Authorizing Individual (PAI) already has the authority to extend the fire watch duration based on the hazards of the situation as written in paragraph 5.6.1.2 of the standard. In addition, there was new language that requires fire monitoring be provided for up to an additional 3 hours as determined by the PAI.

The purpose of NFPA 51B is to establish the minimum requirements for all persons who manage, request, authorize, perform, or supervise hot work. Any increase to the mandatory fire watch duration should be based on the evaluation of the risk presented after 30 minutes as well as the potential economic impact that such a change will have to users of NFPA 51B. The rationale that was used to extend the hot work duration from 30 minutes to one hour should to be further evaluated.

A change with such broad implications should be based on a broader dataset, or an evaluation of the existing dataset to determine whether the fires originating after the 30-minute period would have been detected had all the requirements in NFPA 51B been followed. Also, if evaluation of this data determines that common factors were present in each of the delayed fires, this information could be presented in the form of specific requirements or annex guidance describing when the fire watch duration should be extended rather than applying a blanket increase in fire watch duration.

Submitter Information Verification

Submitter Full Name: Stephen Jaskolka

Organization: DuPont de Nemours, Inc.

Street Address:

City:

State:

Zip:

Submission Date: Thu Mar 25 13:35:02 EDT 2021

Committee: HWO-AAA

Committee Statement

Resolution: [FR-15-NFPA 51B-2021](#)

Statement: There is a recognized need for a 1 hr fire watch. However, there are circumstances where the fire watch may be reduced to a 30 minutes as determined by the PAI.

**Public Input No. 1-NFPA 51B-2019 [Section No. 5.7]****5.7* Hot Tapping and Cold Cutting ..**

Hot tapping or other cutting, and welding on a flammable gas or liquid transmission or distribution utility pipeline shall be performed by a crew qualified to make hot taps. Pipelines that once held flammable and combustible liquids may be cold cut using air operated equipment by trained technicians. Pipe plugging often accompanies cold cutting to seal any vapors from entering the cold cut zone. Plugs must be used per manufacturer specifications and installed by qualified personnel. To prevent static electrical discharges or arc's and sparks from possible electrical stray currents, a flexible bonding jumper is normally positioned across the proposed section of pipe being cut. Cold cutting is normally considered hot work due to potential static or spark generation and requires a hot work permit issued by the respective authority having jurisdiction. The American Petroleum Institute have written guidelines on precautions associated with hot tapping and cold cutting. Risk Assessments and/or Job Safety Analysis are often required by the facility authority before any permit is issued.

Statement of Problem and Substantiation for Public Input

There should be a discussion of cold cutting of pipe that once held flammable or combustible liquids as this process is often performed during pipe modifications on the oil and gas industry. Its an important message that needs insertion into the standard.

Submitter Information Verification

Submitter Full Name: Thomas Van Hooser

Organization: Retired (previously in the Oil and Gas Industry - Safety and Health)

Affiliation: self

Street Address:

City:

State:

Zip:

Submittal Date: Thu May 30 16:36:04 EDT 2019

Committee: HWO-AAA

Committee Statement

Resolution: [FR-7-NFPA 51B-2021](#)

Statement: The submitter's recommended changes included several items that did not conform to the NFPA Manual of Style (non mandatory language and text is more suitable for annex material). The submitter also suggested including a requirement pertaining to cold work identified as hot work; this is not consistent the scope of this standard. The committee added annex material to reference source for guidance on hot tapping for liquid pipelines to complement the existing guidance for gas pipelines.



Public Input No. 11-NFPA 51B-2021 [Section No. A.5.3.2.2]

A.5.3.2.2

An example of a hot work permit is shown in Figure A.5.3.2.2. This permit can be modified to suit local conditions.

Figure A.5.3.2.2 Sample of a Hot Work Permit.

HOT WORK PERMIT	
Seek an alternative/safer method if possible!	
Before initiating hot work, ensure precautions are in place as required by NFPA 51B and ANSI Z49.1. Make sure an appropriate fire extinguisher is readily available.	
This Hot Work Permit is required for any operation involving open flame or producing heat and/or sparks. This work includes, but is not limited to, welding, brazing, cutting, grinding, soldering, thawing pipes, torch-applied roofing, or chemical welding.	
Date _____	Hot work by ☐ employee ☐ contractor
Location/Building and floor _____	Name (print) and signature of person doing hot work _____
Work to be done _____	I verify that the above location has been examined, the precautions marked on the checklist below have been taken, and permission is granted for this work.
Time started _____ Time completed _____	Name (print) and signature of permit-authorizing individual (PAI) _____
THIS PERMIT IS GOOD FOR ONE DAY ONLY	
☐ Available sprinklers, hose streams, and extinguishers are in service and operable.	
☐ Hot work equipment is in good working condition in accordance with manufacturer's specifications.	
☐ Special permission obtained to conduct hot work on metal vessels or piping lined with rubber or plastic.	
Requirements within 35 ft (11 m) of hot work	
☐ Flammable liquid, dust, lint, and oily deposits removed.	
☐ Explosive atmosphere in area eliminated.	
☐ Floors swept clean and trash removed.	
☐ Combustible floors wet down or covered with damp sand or fire-resistive/noncombustible materials or equivalent.	
☐ Personnel protected from electrical shock when floors are wet.	
☐ Other combustible storage material removed or covered with listed or approved materials (welding pads, blankets, or curtains; fire-resistive tarpaulins), metal shields, or noncombustible materials.	
☐ All wall and floor openings covered.	
☐ Ducts and conveyors that might carry sparks to distant combustible material covered, protected, or shut down.	
Requirements for hot work on walls, ceilings, or roofs	
☐ Construction is noncombustible and without combustible coverings or insulation.	
☐ Combustible material on other side of walls, ceilings, or roofs is moved away.	
Requirements for hot work on enclosed equipment	
☐ Enclosed equipment is cleaned of all combustibles.	
☐ Containers are purged of flammable liquid/vapor.	
☐ Pressurized vessels, piping, and equipment removed from service, isolated, and vented.	
Requirements for hot work fire watch and fire monitoring	
☐ Fire watch is provided during and for a minimum of 1 hour after hot work, including any break activity.	
☐ Fire watch is provided with suitable extinguishers and, where practical, a charged small hose.	
☐ Fire watch is trained in use of equipment and in sounding alarm.	
☐ Fire watch can be required in adjoining areas, above and below.	
☐ Yes ☐ No Per the PAI/fire watch, monitoring of hot work area has been extended beyond 1 hour.	
© 2018 National Fire Protection Association	
NFPA 51B	

Additional Proposed Changes

File Name	Description	Approved
51B_TIA_1482.pdf	51B_TIA19-1	

Statement of Problem and Substantiation for Public Input

NOTE: This public input originates from Tentative Interim Amendment No. 19-1 (Log 1482) issued by the Standards Council on April 1, 2020 and per the NFPA Regs., needs to be reconsidered by the Technical Committee for the next edition of the Document.

Substantiation: The example hot work permit fire watch time period in Annex A was not changed to reflect the code change of a minimum of 1 hour in section 5.6.1.1. This creates inconsistent information within the 51B document.

Emergency Nature: The standard contains an error or an omission that was overlooked during the regular revision process. The NFPA Standard contains a conflict within the NFPA Standards or within another NFPA Standard. The proposed TIA intends to correct a previously unknown existing hazard. The proposed TIA intends to offer to the public a benefit that would lessen a recognized (known) hazard or ameliorate a continuing dangerous condition or situation. The inconsistent information between the code wording in section 5.6.1.1 and the associated hot work permit example in A.5.3.2.2 creates the potential for users to utilize the improper information within the example permit which may result in an inadequate hot work fire watch time period. It was the intent of the 51B Committee that all information within this standard would be consistent in regards to the established hot work fire watch minimum time period.

Submitter Information Verification

Submitter Full Name: TC on HWO-AAA
Organization: TC on Hot Work Operations
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 02 12:03:13 EDT 2021
Committee: HWO-AAA

Committee Statement

Resolution: Figure A.5.3.2.2 language for fire watch requirements has been changed from 30 minutes to 1 hour with the issuance of TIA 19-1.



Tentative Interim Amendment

NFPA® 51B

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work

2019 Edition

Reference: Figure A.5.3.2.2

TIA 19-1

(SC 20-4-7 / TIA Log #1482)

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, 2019 edition. The TIA was processed by the Technical Committee on Hot Work Operations, and was issued by the Standards Council on April 1, 2020, with an effective date of April 21, 2020.

1. Revise Figure A.5.3.2.2 under the heading “Requirements for hot work fire watch and fire monitoring” to read as follows:

Requirements for hot work fire watch and fire monitoring

☐ Fire watch is provided during and for a minimum of ~~30 min.~~ 1 hour after hot work, including any break activity.

...

☐ Yes ☐ No Per the PAI/fire watch, monitoring of hot work area has been extended beyond ~~the 30 min.~~ 1 hour.

Issue Date: April 1, 2020

Effective Date: April 21, 2020

(Note: For further information on NFPA Codes and Standards, please see www.nfpa.org/docinfo)

Copyright © 2020 All Rights Reserved
NATIONAL FIRE PROTECTION ASSOCIATION

**Public Input No. 8-NFPA 51B-2020 [New Section after A.5.6.3]****TITLE OF NEW CONTENT**

Type your content here ...

A.5.6.3. Hot work area monitoring can be provided by any of the following:

Personnel working in the area , to perform monitoring of the Hot Work site a minimum of every 30 minutes .

Statement of Problem and Substantiation for Public Input

Clarification of fire monitoring frequency.

Submitter Information Verification

Submitter Full Name: Dominic Colletti

Organization: Ak Steel

Street Address:

City:

State:

Zip:

Submittal Date: Mon Sep 14 14:47:52 EDT 2020

Committee: HWO-AAA

Committee Statement

Resolution: Personnel working in the area can continuously monitor the hot work operations visually and by smell making it unnecessary to provide time specific monitoring interval in addition to what is already required by the PAI.