



Public Comment No. 27-NFPA 85-2017 [Section No. 8.4.2]

8.4.2 Combustion Turbine.

8.4.2.1* Fuel Supply.

8.4.2.1.1 Liquid Fuels.

8.4.2.1.1.1

Two safety shutoff valves in series, with proof of closure, shall be provided in each fuel line to the combustion turbine. Means shall be provided to prevent or relieve excess pressure between the two valves (double block and drain).

8.4.2.1.1.2

Three safety shutoff valves in series, with proof of closure, shall be provided in each fuel line to the combustion turbine for units with combustion turbine purge credit provisions in accordance with 8.8.4.7. Means shall be provided to prevent or relieve excess pressure between these valves (triple block and double drain).

8.4.2.1.2 Gaseous Fuels.

8.4.2.1.2.1

Two safety shutoff valves in series, with proof of closure, shall be provided in the line to the combustion turbine. An automatic vent valve shall be provided between the two valves (double block and vent).

8.4.2.1.2.2

Three safety shutoff valves in series, with proof of closure, shall be provided in each fuel line to the combustion turbine for units with combustion turbine purge credit provisions in accordance with 8.8.4.6. Automatic vent valves shall be provided between these valves (triple block and double vent).

8.4.2.2* Interlocks.

8.4.2.2.1

The HRSG system's required permissives shall prevent starting of the combustion turbine unless the HRSG starting conditions are satisfied, which shall include but not be limited to the following:

- (1) The water levels in drum(s), if provided, are within the defined start-up range.
- (2) The feedwater supply system is available to respond to demand.
- (3) The pressure in steam or water spaces is not high.
- (4) The exit temperature of duct burner(s), if provided, is not high.
- (5) The position of stack closure, if provided, is correct.
- (6) The pressure in the HRSG enclosure is not high.
- (7) Where a combustion turbine purge credit is being used, all fuel systems connected to the HRSG are satisfactorily isolated.

8.4.2.2.2

The following combustion turbine interlocks shall be provided when fuel gas is being burned:

- (1) Failure of the fuel gas vent valve required in 8.4.2.1.2.2 to be proved open during the combustion turbine purge shall cause the purge and light-off sequence to be terminated.
- (2) During combustion turbine light-off as described in 8.8.4, fuel gas pressure downstream of the fuel gas flow control valve or fuel gas flow to the turbine shall be monitored and shall cause the light-off attempt to be terminated and shall cause purge credit to be lost if the maximum allowable value as determined by the combustion turbine manufacturer is exceeded.

8.4.2.2.3*

Signals shall be provided to the combustion turbine control system to initiate a change in the combustion turbine operating mode if HRSG conditions deviate beyond preset safety limits, including but not limited to those listed in Table 8.4.2.2.3.

Table 8.4.2.2.3 HRSG Interlock Conditions and Responses

<u>Condition</u>	<u>Response</u>
Water in drum(s) below minimum permitted level	Reduce combustion turbine load or trip combustion turbine as required by HRSG manufacturer.*
Pressure in combustion turbine exhaust plenum high	Trip combustion turbine.
Position of stack closure (if provided) not correct (See 8.9.5.1.2 and 8.9.5.1.3.)	Reduce combustion turbine load , initiate a combustion turbine normal shutdown, or trip.

*Due to rapid steam pressure rise following a steam turbine trip, drum water level drops but inventory remains the same. A combustion turbine response to this transient should not be required, and a delay for the time required immediately after the steam turbine trip to permit pressure recovery and level restoration should be permitted.

8.4.2.2.4

Where a HRSG is not provided, a permissive shall prohibit starting the combustion turbine if the combustion turbine exhaust system pressure is high.

8.4.2.3 Operating Interfaces.**8.4.2.3.1**

Combustion turbine loading and low-load hold/soak periods shall be established based on the following HRSG parameters:

- (1) Tube and drum metal temperatures
- (2) Differential metal temperatures within a particular component (e.g., steam drum)
- (3) Rate of change of critical temperatures
- (4) Drum water level

8.4.2.3.2

The control system or the operator shall trip the combustion turbine in the case of an emergency that would lead to a safety hazard or catastrophic failure after the actions in 8.4.2.2.3 have been accomplished.

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CCN_6.pdf	85_CN6	✓

Statement of Problem and Substantiation for Public Comment

NOTE: The Public Comment appeared as CC Note No. 6 in the First Draft Report.

The HRS Committee is encouraged to communicate with the NFPA 37 Technical Committee to ensure that NFPA 85 requirements for combustion turbines are not in conflict with NFPA 37 requirements and are being referenced as appropriate within NFPA 37.

Related Item

- Correlating Committee Note 6

Submitter Information Verification

Submitter Full Name: CC ON BCS-AAC

Organization: Correlating Committee on Boiler Combustion System Hazards
Street Address:
City:
State:
Zip:
Submission Date: Wed Nov 08 14:21:49 EST 2017

Committee Statement

Committee Action: Rejected but held
Resolution: The Technical Committee agrees that this correlation should be done, and has assembled a Task Group to investigate this issue for the next edition.

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Correlating Committee Note No. 6-NFPA 85-2017 [Section No. 8.4.2]

Submitter Information Verification

Submitter Full Name: Laura Moreno
Organization: National Fire Protection Assoc
Street Address:
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State:
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Submission Date: Wed Jun 21 13:24:46 EDT 2017

Committee Statement and Meeting Notes

Committee Statement: The HRS Committee is encouraged to communicate with the NFPA 37 Technical Committee to ensure that NFPA 85 requirements for combustion turbines are not in conflict with NFPA 37 requirements and are being referenced as appropriate within NFPA 37.

Ballot Results

✓ **This item has passed ballot**

20 Eligible Voters
3 Not Returned
17 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Basile, Barry J.
Dexter, David E.
Schexnayder, Jimmie J.

Affirmative All

Buckingham, Fred P.
Cannon, David Paul
Chappell, Timothy
Evely, Dale P.
Fleming, Ronald J.
Franks, James E.
King, David W.
Kinoshita, Masaaki
Lance, Gail J.
Mason, Dennis P.

May, Daniel R.
Schmidt, Celso G.
Steen, Lloyd E.
Voss, Justin D.
Wolff, Marc A.
Wong, Henry K.
Yates, Harold R.



Public Comment No. 31-NFPA 85-2017 [Section No. 8.4.3.2.2.3]

8.4.3.2.2.3 Triple Block and Double Vent Valve Arrangement.

Three safety shutoff valves in series, with proof of closure, shall be provided in the fuel line to the duct burner for units with combustion turbine purge credit provisions in accordance with 8.8.4.6. An automatic vent valve shall be provided between each of these valves.

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CCN_8.pdf	85_CN8	✓

Statement of Problem and Substantiation for Public Comment

NOTE: This Public Comment appeared as CC Note No. 8 in the First Draft Report.

The HRS Committee should consider adding the language shown in brackets below, to clarify that this section applies to both the igniter and the main fuel lines and to correlate with 8.4.2.1.1.2 and 8.4.2.1.2.2:

8.4.3.2.2.3 Triple Block and Double Vent Valve Arrangement.

Three safety shutoff valves in series, with proof of closure, shall be provided in [each] fuel line to the duct burner for units with combustion turbine purge credit provisions in accordance with 8.8.4.6. An automatic vent valve shall be provided between each of these valves.

Related Item

- Correlating Committee Note 8

Submitter Information Verification

Submitter Full Name: CC ON BCS-AAC

Organization: Correlating Committee on Boiler Combustion System Hazards

Street Address:

City:

State:

Zip:

Submission Date: Wed Nov 08 14:28:36 EST 2017

Committee Statement

Committee Action: Rejected but see related SR

Resolution: [SR-730-NFPA 85-2018](#)

Statement: This revision clarifies that this section applies to both the igniter and the main fuel lines and correlates with 8.4.2.1.1.2 and 8.4.2.1.2.2.

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Correlating Committee Note No. 8-NFPA 85-2017 [Section No. 8.4.3.2.2.3]

Submitter Information Verification

Submitter Full Name: Laura Moreno
Organization: National Fire Protection Assoc
Street Address:
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Submission Date: Wed Jun 21 13:59:21 EDT 2017

Committee Statement and Meeting Notes

Committee Statement: The HRS Committee should consider adding the language shown in brackets below, to clarify that this section applies to both the igniter and the main fuel lines and to correlate with 8.4.2.1.1.2 and 8.4.2.1.2.2:

8.4.3.2.2.3 Triple Block and Double Vent Valve Arrangement.

Three safety shutoff valves in series, with proof of closure, shall be provided in [each] fuel line to the duct burner for units with combustion turbine purge credit provisions in accordance with 8.8.4.6. An automatic vent valve shall be provided between each of these valves.

Ballot Results

✓ **This item has passed ballot**

20 Eligible Voters
3 Not Returned
17 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Basile, Barry J.
Dexter, David E.
Schexnayder, Jimmie J.

Affirmative All

Buckingham, Fred P.
Cannon, David Paul
Chappell, Timothy
Evely, Dale P.
Fleming, Ronald J.
Franks, James E.

King, David W.
Kinoshita, Masaaki
Lance, Gail J.
Mason, Dennis P.
May, Daniel R.
Schmidt, Celso G.
Steen, Lloyd E.
Voss, Justin D.
Wolff, Marc A.
Wong, Henry K.
Yates, Harold R.



Public Comment No. 29-NFPA 85-2017 [Section No. 8.7.4.3]

8.7.4.3 Duct Burner Master Fuel Trip.

For an operating duct burner, including the start-up or shutdown sequences, a duct burner master fuel trip shall be initiated by the following conditions:

- (1) Low fuel pressure
- (2) Combustion turbine exhaust or fresh air (if provided) flow across the duct burner that drops below the minimum required for operation of the duct burner as specified by the burner manufacturer or as proven by trial; it is permitted to infer this flow from the operating status of the combustion turbine, fresh air fan (if provided), and damper(s) (if provided) position(s)
- (3) Combustion turbine trip except for systems operating as defined in 8.10.2.4
- (4) Loss of all burner flame other than during a normal duct burner shutdown sequence
- (5) Partial loss of flame determined to create a hazardous accumulation of unburned fuel at any burner element or zone
- (6) Loss of duct burner element(s) resulting in incorrect element firing configuration, in accordance with 8.8.5.8.3.2
- (7) Light-off failure of first burner in multiple burner operation
- (8) Failure to prove a safety shutoff valve closed on command to close
- (9) Closing of last individual burner safety shutoff valve other than during a normal duct burner shutdown sequence
- (10) High fuel pressure
- (11) Low water level on high pressure section of HRSG
- (12) Loss of energy supply for HRSG control, burner management, or trips and associated devices
- (13) Low atomizing media (if provided) supply pressure
- (14) Detection of burner management system malfunction
- (15) Manual trip [See 4.11.7(8).]
- (16) Loss of augmented air supply where the operation of the duct burner requires augmented air.
- (17) Fresh air (if provided) transfer failure (See 8.10.2.4.)
- (18) Logic controller failure [See 4.11.7(10) and 4.11.7(11).]

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
CCN_7.pdf	85_CN7	✓

Statement of Problem and Substantiation for Public Comment

NOTE: This Public Comment appeared as CC Note No. 7 in the First Draft Report.

In subparagraph (12), the HRS committee should reconsider the wording "trips and associated devices" because the associated devices are already covered in the HRSG control and burner management systems. The word "system" was appropriate for HRSG control and burner management, and should be reinstated. See the First Revision on 6.6.5.2.5.3 for a similar change.

Related Item

- Correlating Committee Note 7

Submitter Information Verification

Submitter Full Name: CC ON BCS-AAC

Organization: Correlating Committee on Boiler Combustion System Hazards

Street Address:

City:

State:

Zip:

Submittal Date: Wed Nov 08 14:24:33 EST 2017

Committee Statement

Committee Action: Rejected but see related SR

Resolution: [SR-731-NFPA 85-2018](#)

Statement: This revision corrects the unintentional removal of the word "system" as it relates to HRSG control and burner management. The associated devices are already covered in the HRSG control and burner management systems. The term "interlocks" is more appropriate than "trips and associated devices".

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Correlating Committee Note No. 7-NFPA 85-2017 [Section No. 8.7.4.3]

Submitter Information Verification

Submitter Full Name: Laura Moreno
Organization: National Fire Protection Assoc
Street Address:
City:
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Zip:
Submission Date: Wed Jun 21 13:38:14 EDT 2017

Committee Statement and Meeting Notes

Committee Statement: In subparagraph (12), the HRS committee should reconsider the wording "trips and associated devices" because the associated devices are already covered in the HRSG control and burner management systems. The word "system" was appropriate for HRSG control and burner management, and should be reinstated. See the First Revision on 6.6.5.2.5.3 for a similar change.

Ballot Results

✓ **This item has passed ballot**

20 Eligible Voters
3 Not Returned
17 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Basile, Barry J.
Dexter, David E.
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Affirmative All

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Kinoshita, Masaaki
Lance, Gail J.

Mason, Dennis P.

May, Daniel R.

Schmidt, Celso G.

Steen, Lloyd E.

Voss, Justin D.

Wolff, Marc A.

Wong, Henry K.

Yates, Harold R.



Public Comment No. 1-NFPA 85-2017 [Section No. 8.8.4.2.2]

8.8.4.2.2

Purge of exhaust bypass systems shall be accomplished as follows:

- (1) Where the bypass system includes an exhaust system (such as a selective catalytic reduction (SCR) system), the purge shall be accomplished by at least five volume changes at purge rate and for a duration of not less than 5 minutes.
- (2) * Where the bypass system consists of only ductwork and a damper, the bypass system purge shall be accomplished by at least five volume changes at purge rate.

A.8.8.4.2.2 The inclusion of a silencer in a bypass stack is not be considered a significant restriction to the exhaust flow (in the same category as an SCR) that would result in applying Paragraph 8.8.4.2.2(1)

Statement of Problem and Substantiation for Public Comment

We have received requests from users trying to understand the impact of a silencer in the bypass stack on the purge requirements for the system. These questions have been with respect to both pure simple cycle machines (a similar annex proposal for NFPA 37 is to be developed) and combined cycle machines with a bypass stack. Per the exhaust design experts, the silencers consist of aerodynamic panels installed parallel to the flow path offering a minimal restriction to flow and are specifically designed to avoid cavities that could "trap" gas or vapor; they have no more propensity to retain gas / vapor than the acoustic treatment of the stack itself. Hence, the existence of such panels in the stack should not drive any additional purge requirements beyond those of the stack itself.

Related Item

- FR-740

Submitter Information Verification

Submitter Full Name: Larry Danner

Organization: GE Power Water

Street Address:

City:

State:

Zip:

Submission Date: Wed Sep 06 14:42:41 EDT 2017

Committee Statement

Committee Action: Rejected but see related SR

Resolution: [SR-732-NFPA 85-2018](#)

Statement: Annex material has been added to clarify the application of these purge requirements.

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Public Comment No. 37-NFPA 85-2017 [Section No. 8.8.4.2.3.2]

8.8.4.2.3.2

In no case shall the volume in 8.8.4.2.3.1(2) be less than the volume of the HRSG enclosure between the combustion turbine outlet and the outlet of the first evaporator section in the HRSG. For other combustion turbine exhaust systems without heat recovery, the purge volume shall extend to the stack inlet .

Statement of Problem and Substantiation for Public Comment

Will the committee please clarify if the measurement is intended to be to the stack inlet or the stack outlet on simple cycle installations

Related Item

- FR740

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submission Date: Tue Nov 14 16:46:09 EST 2017

Committee Statement

Committee Action: Accepted

Resolution: [SR-733-NFPA 85-2018](#)

Statement: This revision is clarifying that the measurement is intended to be to the stack inlet.

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Public Comment No. 39-NFPA 85-2017 [Section No. 8.8.4.4]

8.8.4.4 Light-Off Airflow.

After the purge has been completed, the airflow through the combustion turbine shall be permitted to be dropped below the purge rate if required by the design to accomplish combustion turbine ignition. i.e. if directly after the finalized purge the combustion turbine is to be started

Statement of Problem and Substantiation for Public Comment

Would the committee please clarify their statement

Related Item

- FR740

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submission Date: Tue Nov 14 17:45:56 EST 2017

Committee Statement

Committee Action: Rejected

Resolution: The submitter has not provided enough information as to what needs to be clarified in this section. The text was not revised and reflects the intent of the Technical Committee. The proposed language seems to add another requirement to immediately start after purge is completed, which is not the intent of this section.

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Public Comment No. 40-NFPA 85-2017 [Section No. 8.8.4.6 [Excluding any Sub-Sections]]

Following a combustion turbine normal shutdown or any combustion turbine trip scenario which was not related to an unallowed fuel ingress into exhaust systems e.g. due to a preceeding loss of flame , a combustion turbine purge credit shall be permitted to be established within a technically feasible time period for the next start-up event provided that the following requirements are met for each combustion turbine and duct burner fuel system.

Statement of Problem and Substantiation for Public Comment

Per Section A.8.8.4.6.4(A)(2) The philosophy for a combustion turbine purge credit is that a combustion turbine normal shutdown does not result in a hazardous atmosphere being introduced. Therefore, a combustion turbine purge should not be required for subsequent startup provided that a combustion turbine purge credit is maintained.

We feel there are a number of unplanned shutdowns (engine trips) that meet these criteria in that these shutdowns do not lead to the introduction of a hazardous atmosphere and therefore should qualify for the purge credit. However, we do not feel that the committee has made clear whether or not these shutdowns qualify for the credit. This is particularly true with the committee deleting the definition of "Combustion Turbine Normal Shutdown" in FR 112. We would like to state that while we fully support the need for purging, in some cases un-necessary purging upon a hot turbine can have a profound impact on the life of the machine as purging causes an unnecessary cooling effect of GT components before hot re-start.

We believe that if the committee will clarify the philosophy in such a way so that non-critical trip events are clearly included in the philosophy of the purge credit, that it will help to eliminate un-necessary purge events and help to extend the life of the equipment without compromising safety in any way

Additionally, would the committee define what technically feasible time period is allowed after combustion turbine shutdown to establish the required conditions for the purge credit?

Related Item

- FR210 • FR 112

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

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Submittal Date: Wed Nov 15 09:17:16 EST 2017

Committee Statement

Committee Action: Rejected but held

Resolution:

The definition for Combustion Turbine Normal Shutdown has been reinstated in Chapter 3. It was not the original intent that any trip can be considered a normal shutdown. A task group has been formed to discuss the potential for adding additional qualifying language around what trips could be considered normal or safe for the purpose of purge credit.

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Public Comment No. 53-NFPA 85-2017 [Section No. 8.8.4.6.4(A)]

(A)* Valve Proving Method.

- (1) Where provided, duct burner normal shutdown shall be accomplished.
- (2)* Combustion turbine normal shutdown or any combustion turbine trip scenario which was not related to an unallowed fuel ingress into exhaust gas systems e.g. due to a preceding loss of flame shall be accomplished.
- (3) The vent valves shall remain in the fully open position as long as purge credit is established.
- (4) Fuel gas block and vent valve positions shall be continuously monitored. If continuous monitoring is lost or any valve deviates from its assigned position, purge credit is lost, and subsequent start of the combustion turbine requires a combustion turbine purge prior to light-off, in accordance with 8.8.4.2.
- (5) Pressures in the two double block and vent pipe sections shall be continuously monitored. If continuous monitoring is lost or either pressure indicates leakage, purge credit is lost, and subsequent start of the combustion turbine requires a combustion turbine purge prior to light-off, in accordance with 8.8.4.2.
- (6) Prior to each start-up and following each normal shutdown, block valves shall be validated for gas leak tightness via a valve-proving system. As a minimum, the most downstream block valve shall be valve proved during the start-up sequence, and the middle block valve shall be valve proved during the shutdown sequence. The most downstream block valve shall be tested only when airflow is passing through the combustion turbine.
- (7) The combustion turbine purge credit period shall not exceed 8 days (192 hours). If a combustion turbine purge in accordance with 8.8.4.2 is performed during the 8-day period, the combustion turbine purge credit is reinitiated for an 8-day period.

Statement of Problem and Substantiation for Public Comment

Per Section A.8.8.4.6.4(A)(2) The philosophy for a combustion turbine purge credit is that a combustion turbine normal shutdown does not result in a hazardous atmosphere being introduced. Therefore, a combustion turbine purge should not be required for subsequent startup provided that a combustion turbine purge credit is maintained.

We feel there are a number of unplanned shutdowns (engine trips) that meet these criteria in that these shutdowns do not lead to the introduction of a hazardous atmosphere and therefore should qualify for the purge credit. However, we do not feel that the committee has made clear whether or not these shutdowns qualify for the credit. This is particularly true with the committee deleting the definition of "Combustion Turbine Normal Shutdown" in FR 112. We would like to state that while we fully support the need for purging, in some cases un-necessary purging upon a hot turbine can have a profound impact on the life of the machine as purging causes an unnecessary cooling effect of GT components before hot re-start.

We believe that if the committee will clarify the philosophy in such a way so that non-critical trip events are clearly included in the philosophy of the purge credit, that is will help to eliminate un-necessary purge events and help to extend the life of the equipment without compromising safety in any way

Related Public Comments for This Document

Related Comment

[Public Comment No. 52-NFPA 85-2017 \[Section No. 8.8.4.6.4\(B\)\]](#)

Related Item

- [FR 112](#)

Relationship

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy
Street Address:
City:
State:
Zip:
Submission Date: Wed Nov 15 14:03:02 EST 2017

Committee Statement

Committee Action: Rejected but held

Resolution: The definition for Combustion Turbine Normal Shutdown has been reinstated in Chapter 3. It was not the original intent that any trip can be considered a normal shutdown. A task group has been formed to discuss the potential for adding additional qualifying language around what trips could be considered normal or safe for the purpose of purge credit.

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Public Comment No. 52-NFPA 85-2017 [Section No. 8.8.4.6.4(B)]

(B)* Pressurized Pipe Section Method.

- (1) Where provided, duct burner normal shutdown shall ~~or any duct burner trip scenario which was not related to an unallowed fuel ingress into the exhaust system e.g. due to a preceeding loss of flame or duct burner fuel system proof of tightness shall~~ be accomplished.
- (2)* Combustion turbine normal shutdown ~~or any combustion turbine trip scenario which was not related to an unallowed fuel ingress into exhaust gas systems e.g. due to a preceeding loss of flame~~ shall be accomplished.
- (3) The upstream vent valve shall remain in the fully open position, and the downstream vent valve shall remain in the fully closed position as long as purge credit is established.
- (4) Air or inert gas shall be introduced to create and maintain a pressurized pipe section between the middle and most downstream block valves.
- (5) Fuel gas block and vent valve positions shall be continuously monitored. If continuous monitoring is lost or any valve deviates from its assigned position, purge credit is lost and subsequent start-up of the combustion turbine requires a combustion turbine purge prior to light-off, in accordance with 8.8.4.2.
- (6) Pressures in the two double block and vent pipe sections shall be continuously monitored. If continuous monitoring is lost or the pressure downstream of the middle block valve decreases to less than 20.7 kPa (3 psid) above the upstream pressure, purge credit is lost and subsequent start-up of the combustion turbine requires a combustion turbine purge prior to light-off, in accordance with 8.8.4.2.
- (7) The combustion turbine purge credit period shall be considered to be maintained as long as the conditions in 8.8.4.6.4(B)(4), 8.8.4.6.4(B)(5), and 8.8.4.6.4(B)(6) are met.
- (8) Provisions shall be made to ensure that fuel cannot enter the air or inert gas supply line at any time.

Statement of Problem and Substantiation for Public Comment

Per Section A.8.8.4.6.4(A)(2) The philosophy for a combustion turbine purge credit is that a combustion turbine normal shutdown does not result in a hazardous atmosphere being introduced. Therefore, a combustion turbine purge should not be required for subsequent startup provided that a combustion turbine purge credit is maintained.

We feel there are a number of unplanned shutdowns (engine trips) that meet these criteria in that these shutdowns do not lead to the introduction of a hazardous atmosphere and therefore should qualify for the purge credit. However, we do not feel that the committee has made clear whether or not these shutdowns qualify for the credit. This is particularly true with the committee deleting the definition of "Combustion Turbine Normal Shutdown" in FR 112. We would like to state that while we fully support the need for purging, in some cases un-necessary purging upon a hot turbine can have a profound impact on the life of the machine as purging causes an unnecessary cooling effect of GT components before hot re-start.

We believe that if the committee will clarify the philosophy in such a way so that non-critical trip events are clearly included in the philosophy of the purge credit, that is will help to eliminate un-necessary purge events and help to extend the life of the equipment without compromising safety in any way

Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
Public Comment No. 40-NFPA 85-2017 [Section No. 8.8.4.6 [Excluding any Sub-Sections]]	

Related Item

- FR 112

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Committee Statement

Street Address:

City:
Committee Action: Rejected but held

State:

Zip:

Resolution: The definition for Combustion Turbine Normal Shutdown has been reinstated in Chapter 3. It was not the original intent that this trip be considered a normal shutdown. A task group has been formed to discuss the potential for adding additional qualifying language around what trips could be considered normal or safe for the purpose of purge credit.

Submittal Date: Wed Nov 15 at 3:03:46 EST 2017

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Public Comment No. 47-NFPA 85-2017 [Section No. 8.9.2.1.1]

8.9.2.1.1

A purge of both the appropriate portion of the HRSG enclosure and the bypass system shall be completed as required in 8.8.4 prior to the admission of combustion turbine exhaust gas into the HRSG.

Statement of Problem and Substantiation for Public Comment

Is the term "HRSG enclosure" correct? Per 8.8.4.2.1.1 the purge volume is limited to the portion of the HRSG or other combustion turbine exhaust system where the exhaust gas temperature is reduced to at least 56C (100F) for which the system is designed. As currently worded it seems the committee is saying the whole volume of the HRSG enclosure needs to be included.

Related Item

- FR 217

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submission Date: Wed Nov 15 11:02:50 EST 2017

Committee Statement

Committee Action: Rejected

Resolution: The reference to section 8.8.4 specifies what part of the enclosure is included in the purge volume calculation. The whole HRSG enclosure is purged, but the purge volume is based on the portions in 8.8.4. The term "appropriate portion" would be vague and unenforceable.

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Public Comment No. 48-NFPA 85-2017 [Section No. 8.9.2.1.4.1]

8.9.2.1.4.1

When it is desired to return the HRSG to service, a purge of the the appropriate portion of the HRSG enclosure shall be performed as required by 8.9.2.1.1.

Statement of Problem and Substantiation for Public Comment

Is the term "HRSG enclosure" correct? Per 8.8.4.2.1.1 the purge volume is limited to the portion of the HRSG or other combustion turbine exhaust system where the exhaust gas temperature is reduced to at least 56C (100F) for which the system is designed. As currently worded it seems the committee is saying the whole volume of the HRSG enclosure needs to be included.

Related Public Comments for This Document

Related Comment

[Public Comment No. 46-NFPA 85-2017 \[Section No. 8.9.2.2.1\]](#)

[Public Comment No. 47-NFPA 85-2017 \[Section No. 8.9.2.1.1\]](#)

Relationship

Definition of volume that needs to be purged

Definition of volume that needs to be purged

Related Item

- FR 217

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submission Date: Wed Nov 15 12:26:22 EST 2017

Committee Statement

Committee Action: Rejected

Resolution: The reference to section 8.8.4 in 8.9.2.1.1 specifies what part of the enclosure is included in the purge volume calculation. The whole HRSG enclosure is purged, but the purge volume is based on the portions in 8.8.4. The term "appropriate portion" would be vague and unenforceable.

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Public Comment No. 41-NFPA 85-2017 [Section No. 8.9.2.1.4.3]

8.9.2.1.4.3

Where the combustion turbine operation has been interrupted and has been started again by bypass stack and it is desired to return the HRSG to service, the combustion turbine shall be permitted to continue operating and the combustion turbine exhaust shall be permitted to be used to purge the HRSG, provided the exhaust temperature is at least 56°C (100°F) lower than the autoignition temperature of the fuels designed for use in the specific combustion turbine.

Statement of Problem and Substantiation for Public Comment

Would the committee please clarify the meaning of the paragraph. We feel we are missing information about the restart of the combustion turbine using the bypass stack

Related Item

- FR217

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submission Date: Wed Nov 15 09:36:26 EST 2017

Committee Statement

Committee Action: Rejected

Resolution: This information is covered by section 8.9.2.1.4, which is the parent paragraph to this section.

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Public Comment No. 46-NFPA 85-2017 [Section No. 8.9.2.2.1]

8.9.2.2.1

A purge of both the appropriate portion of the HRSG enclosure and the bypass system shall be completed as required in 8.8.4 prior to the admission of combustion turbine exhaust gas into the HRSG. In cases where the HRSG is still hot with temperatures exceeding the auto ignition temperature of the fuel(s) the HRSG purge may be waived.

Statement of Problem and Substantiation for Public Comment

In cases where a bypass stack with a diverter damper is provided, is there a HRSG purge needed if the equipment is still in hot condition above the auto ignition temperature of the fuel? In this case a possible explosive mixture should have been ignited during the shutdown period. An omission of the unnecessary purge would save startup time for the utility and reduce stress on the HRSG thereby extending life

Related Public Comments for This Document

Related Comment

Public Comment No. 47-NFPA 85-2017
[Section No. 8.9.2.1.1]

Relationship

This comment is also intended to clarify the portion of the HRSG enclosure needed for the volume calculations

Related Item

- FR-217

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submittal Date: Wed Nov 15 10:42:11 EST 2017

Committee Statement

Committee Action: Rejected

Resolution: The reference to section 8.8.4 specifies what part of the enclosure is included in the purge volume calculation. The whole HRSG enclosure is purged, but the purge volume is based on the portions in 8.8.4. The term "appropriate portion" would be vague and unenforceable. The Technical Committee strongly disagrees with the concept of waiving HRSG purge in high temperature conditions.

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Public Comment No. 43-NFPA 85-2017 [Section No. 8.9.2.2.2 [Excluding any Sub-Sections]

]

Where HRSG isolation is continuously maintained and the combustion turbine operation is interrupted, the combustion turbine shall be permitted to purge and operate with combustion turbine exhaust through the bypass stack. The duct burner fuel systems and the ammonia systems shall comply with 8.8.4.6 and 8.8.4.7 respectively

Statement of Problem and Substantiation for Public Comment

Has the committee considered hot spots on the diverter damper back side during combustion turbine operation via the bypass stack? This might also lead to a hazardous situation. Therefore we consider a proven tight fuel supply according to 8.8.4.4 and 8.8.4.7 for the supplementary firing as essential arrangements with exhaust bypass systems.

Related Item

- FR217

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submittal Date: Wed Nov 15 10:00:39 EST 2017

Committee Statement

Committee Action: Rejected

Resolution: Section 8.9.1.2 requires evaluation of the particular hazards involved in adding dampers. Section 8.9.1.3 requires those hazards to be addressed, and 8.9.1.6(2) addresses leaking fuel valves creating an explosive mixture on either side of the damper. While there is nothing to prohibit a designer from applying triple block and double bleed to duct burner fuel or ammonia systems, the Technical Committee does not agree that it should be a requirement without further substantiation.

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Public Comment No. 49-NFPA 85-2017 [Section No. 8.9.2.2.1]

8.9.2.2.1

When HRSG isolation is removed, a purge of the appropriate portion of the HRSG enclosure shall be performed as required by 8.9.2.2.1, except as permitted in 8.9.2.2.4.

Statement of Problem and Substantiation for Public Comment

Is the term "HRSG enclosure" correct? Per 8.8.4.2.1.1 the purge volume is limited to the portion of the HRSG or other combustion turbine exhaust system where the exhaust gas temperature is reduced to at least 56C (100F) for which the system is designed. As currently worded it seems the committee is saying the whole volume of the HRSG enclosure needs to be included.

Related Public Comments for This Document

Related Comment

[Public Comment No. 47-NFPA 85-2017 \[Section No. 8.9.2.1.1\]](#)

[Public Comment No. 46-NFPA 85-2017 \[Section No. 8.9.2.2.1\]](#)

[Public Comment No. 48-NFPA 85-2017 \[Section No. 8.9.2.1.4.1\]](#)

Relationship

Same definition

Same definition

Same definition

Related Item

- FR 217

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submittal Date: Wed Nov 15 12:32:18 EST 2017

Committee Statement

Committee Action: Rejected

Resolution: The reference to section 8.8.4 in 8.9.2.2.1 specifies what part of the enclosure is included in the purge volume calculation. The whole HRSG enclosure is purged, but the purge volume is based on the portions in 8.8.4. The term "appropriate portion" would be vague and unenforceable.

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Public Comment No. 42-NFPA 85-2017 [Section No. 8.9.2.2.2.2]

8.9.2.2.2.2

Where the combustion turbine operation has been interrupted and has been started again via bypass stack, and it is desired to return the HRSG to service, the combustion turbine shall be permitted to continue operating and the combustion turbine exhaust shall be permitted to be used to purge the HRSG, provided the exhaust temperature is at least 56°C (100°F) lower than the autoignition temperature of the fuels designed for use in the specific combustion turbine and the duct burner.

Statement of Problem and Substantiation for Public Comment

Would the committee please clarify the meaning of the paragraph. We feel we are missing information about the restart of the combustion turbine using the bypass stack

Related Item

- FR217

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submittal Date: Wed Nov 15 09:41:05 EST 2017

Committee Statement

Committee Action: Rejected

Resolution: This information is covered by section 8.9.2.2.2, which is the parent paragraph to this section.

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Public Comment No. 51-NFPA 85-2017 [Section No. 8.9.3.2.3]

8.9.3.2.3 –

~~Where leakage is detected, the HRSG shall be purged at a temperature at least 56°C (100°F) below the autoignition temperature of the fuel before hot combustion turbine gases are allowed to enter the HRSG enclosure.~~

Statement of Problem and Substantiation for Public Comment

We don't understand the reason for the paragraph. Can the committee clarify? If the combustion turbine has been operated without any interruption, why should a purge be necessary?

Related Item

.

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submission Date: Wed Nov 15 13:16:31 EST 2017

Committee Statement

Committee Action: Rejected

Resolution: The text is important and should not be deleted, because it provides further steps to take when leakage is detected in accordance with 8.9.3.2.2. Because leakage has been detected, isolation has not been maintained and a purge is required.

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Public Comment No. 50-NFPA 85-2017 [Section No. 8.9.3.2.8]

8.9.3.2.8

Where shutoff dampers are utilized, a means to prevent combustible fuel accumulation upstream of the damper respectively in the compartment between the diverter damper and the shutoff damper shall be provided.

Statement of Problem and Substantiation for Public Comment

Would the committee please clarify the statement

Related Item

.

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submission Date: Wed Nov 15 12:47:01 EST 2017

Committee Statement

Committee Action: Rejected

Resolution: This section was meant to be inclusive of all areas upstream of any damper and not meant to be overly prescriptive.

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Public Comment No. 44-NFPA 85-2017 [Section No. 8.9.4.2]

8.9.4.2 –

In addition to the required alarms in 8.7.3.2, reverse flow through a HRSG (airflow from exhaust stack through a HRSG to bypass stack) shall be alarmed if the bypass damper system can be maintained in an intermediate position.

Statement of Problem and Substantiation for Public Comment

We don't see any technically feasible solution to fulfill this requirement. What is the idea behind it?

Related Item

.

Submitter Information Verification

Submitter Full Name: James Sharp

Organization: Siemens Energy

Street Address:

City:

State:

Zip:

Submittal Date: Wed Nov 15 10:18:49 EST 2017

Committee Statement

Committee Action: Rejected

Resolution: This language has been in the HRSG code since at least 1995, and removing it at this time would constitute new material without the benefit of public review. There are technologies available to measure this type of flow.

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Public Comment No. 45-NFPA 85-2017 [Section No. 8.9.5.1.2]

8.9.5.1.2

To satisfy the stack closure not correct interlock (see 8.4.2.2.3), either of the following conditions shall be met:

- (1) The bypass damper proven closed and the HRSG isolation damper (~~and stack~~ or stack damper if provided) not proven open
- (2) Where a stack damper is provided, the diverter damper proven open to HRSG and stack damper not proven open

Statement of Problem and Substantiation for Public Comment

The word "and" has to be replaced by an "or" in our opinion as the exhaust duct has to be always fully open in one direction

Related Item

.

Submitter Information Verification

Submitter Full Name: James Sharp
Organization: Siemens Energy
Street Address:
City:
State:
Zip:
Submittal Date: Wed Nov 15 10:23:30 EST 2017

Committee Statement

Committee Action: Accepted
Resolution: [SR-734-NFPA 85-2018](#)
Statement: The word "and" was replaced by an "or" to correctly indicate that if either the HRSG isolation damper or stack damper is not open, the interlock must be activated.

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Public Comment No. 54-NFPA 85-2017 [Section No. A.8.8.4.6.4(A)(2)]

A.8.8.4.6.4(A)(2) [🔗](#)

The philosophy for combustion turbine purge credit is that a combustion turbine normal shutdown does not result in a hazardous atmosphere being introduced. Such a result can be accomplished through either a planned combustion turbine normal shutdown or through an unplanned trip of the combustion turbine provided the unplanned trip is of a nature that it does not allow fuel ingress into the exhaust spaces e.g. due to a preceding loss of flame. Therefore, a combustion turbine purge should not be required for subsequent startup provided that a combustion turbine purge credit is maintained.

Statement of Problem and Substantiation for Public Comment

Per this section the philosophy for a combustion turbine purge credit is that a combustion turbine normal shutdown does not result in a hazardous atmosphere being introduced. This philosophy can be realized in in various ways. We feel this clarification is needed in particular since the committee has removed the definition 3.3.119.1 Combustion Turbine Normal Shutdown from the definitions section yet continues to use the term throughout the first draft without defining what it means.

We feel there are a number of unplanned shutdowns (engine trips) that meet these criteria in that these shutdowns do not lead to the introduction of a hazardous atmosphere and therefore should qualify for the purge credit. However, we do not feel that the committee has made clear whether or not these shutdowns qualify for the credit. We would like to state that while we fully support the need for purging, in some cases un-necessary purging upon a hot turbine can have a profound impact on the life of the machine as purging causes an unnecessary cooling effect of GT components before hot re-start.

We believe that if the committee will clarify the philosophy in such a way so that non-critical trip events are clearly included in the philosophy of the purge credit, that it will help to eliminate un-necessary purge events and help to extend the life of the equipment without compromising safety in any way

Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
Public Comment No. 53-NFPA 85-2017 [Section No. 8.8.4.6.4(A)]	Same definition
Public Comment No. 52-NFPA 85-2017 [Section No. 8.8.4.6.4(B)]	Same Definition

Related Item

- FR 112

Submitter Information Verification

Submitter Full Name: James Sharp
Organization: Siemens Energy
Street Address:
City:
State:
Zip:
Submission Date: Wed Nov 15 14:13:22 EST 2017

Committee Statement

Committee Action: Rejected but held

Resolution: The definition for Combustion Turbine Normal Shutdown has been reinstated in Chapter 3. It was not the original intent that any trip can be considered a normal shutdown. A task group has been formed to discuss the potential for adding additional qualifying language around what trips could be considered normal or safe for the purpose of purge credit.

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Public Comment No. 55-NFPA 85-2017 [Section No. A.8.8.4.7.4(A)(2)]

A.8.8.4.7.4(A)(2) [🔗](#)

The philosophy for combustion turbine purge credit is that a combustion turbine normal shutdown does not result in a hazardous atmosphere being introduced. ~~Therefore~~ Such a result can be accomplished through either a planned combustion turbine normal shutdown or through an unplanned trip of the combustion turbine provided the unplanned trip is of a nature that it does not allow fuel ingress into the exhaust spaces e.g. due to a preceding loss of flame. Therefore, a combustion turbine purge should not be required for subsequent startup provided that a combustion turbine purge credit is maintained.

Statement of Problem and Substantiation for Public Comment

Per this section the philosophy for a combustion turbine purge credit is that a combustion turbine normal shutdown does not result in a hazardous atmosphere being introduced. This philosophy can be realized in various ways. We feel this clarification is needed in particular since the committee has removed the definition 3.3.119.1 Combustion Turbine Normal Shutdown from the definitions section yet continues to use the term throughout the first draft without defining what it means.

We feel there are a number of unplanned shutdowns (engine trips) that meet these criteria in that these shutdowns do not lead to the introduction of a hazardous atmosphere and therefore should qualify for the purge credit. However, we do not feel that the committee has made clear whether or not these shutdowns qualify for the credit. We would like to state that while we fully support the need for purging, in some cases unnecessary purging upon a hot turbine can have a profound impact on the life of the machine as purging causes an unnecessary cooling effect of GT components before hot re-start.

We believe that if the committee will clarify the philosophy in such a way so that non-critical trip events are clearly included in the philosophy of the purge credit, that it will help to eliminate unnecessary purge events and help to extend the life of the equipment without compromising safety in any way.

Related Public Comments for This Document

Related Comment

Relationship

[Public Comment No. 52-NFPA 85-2017 \[Section No. 8.8.4.6.4\(B\)\]](#)

[Public Comment No. 53-NFPA 85-2017 \[Section No. 8.8.4.6.4\(A\)\]](#)

[Public Comment No. 54-NFPA 85-2017 \[Section No. A.8.8.4.6.4\(A\)\(2\)\]](#)

Related Item

- FR 112

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Submission Date: Wed Nov 15 14:17:03 EST 2017

Committee Statement

Committee Action: Rejected but held

Resolution: The definition for Combustion Turbine Normal Shutdown has been reinstated in Chapter 3. It was not the original intent that any trip can be considered a normal shutdown. A task group has been formed to discuss the potential for adding additional qualifying language around what trips could be considered normal or safe for the purpose of purge credit.

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