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## **Annex G** **(informative)**

### **Abnormal Operating Conditions (AOC) Guidance**

#### **G.1 Purpose**

This annex provides guidance to identify Abnormal Operating Conditions (AOCs) for inclusion in the AOC section of individual covered task standards.

Operators can use all, part, or none of this method to identify AOCs, as alternative and equally valid methods exist.

#### **G.2 Objective**

Annex B includes a set of normative covered task standards that may be adopted by the operator as part of their qualification program. Each covered task standard includes a section that documents AOCs specific to the performance of the covered task that should be evaluated when individuals are being qualified to perform the work described in the covered task standard.

Guidance is provided to distinguish AOCs from emergencies, abnormal operations (AOs), and safety-related conditions (SRCs), which are other 49 CFR 195 regulatory terms that should not be confused with AOCs. Guidance is also provided to eliminate potential AOCs that are listed as a task step, related to improper task performance, or are generic in nature and not directly related to the task being performed.

#### **G.3 Terms and Definitions**

For the purposes of this annex, the following definitions apply.

##### **G.3.1 component**

Any part of a pipeline that may be subjected to pump pressure including, but not limited to, pipe, valves, elbows, tees, flanges, and closures.

##### **G.3.2 pipeline condition**

A circumstance that affects the appearance, quality, or working order of a pipeline, pipeline component, or the pipeline system.

##### **G.3.3 pipeline or pipeline system**

All parts of a pipeline facility through which a hazardous liquid or carbon dioxide moves in transportation, including, but not limited to, line pipe, valves, and other appurtenances connected to line pipe, pumping units, fabricated assemblies associated with pumping units, metering and delivery stations and fabricated assemblies therein, and breakout tanks.

#### **G.4 AOCs**

##### **G.4.1 General**

An AOC is defined in Section 3 of this document.

##### **G.4.2 Distinguishing Between Emergencies and AOCs**

The U.S. regulatory framework requires operators to establish procedures that govern the response to

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emergencies. Emergencies are defined as follows, for liquids pipelines in 49 *CFR* § 195.402(e)(2):.

- fire or explosion occurring near or directly involving a pipeline facility;
- accidental release of hazardous liquid or carbon dioxide from a pipeline facility;
- operational failure causing a hazardous condition; and
- natural disaster affecting pipeline facilities.

Emergencies are different than AOCs and AOs. Emergencies involve significant consequences that cannot be easily addressed or resolved. Investigation after an AOC or an AO is identified may lead to the discovery of an emergency, but once identified, the response to the emergency must follow an established emergency procedure.

An emergency should not be identified as an AOC.

### **G.4.3 Distinguishing Between AOs and AOCs**

The U.S. regulatory framework distinguishes between an AOC and an AO. Operators are mandated to have procedures in place by 49 *CFR* § 195.402(d)(1) for abnormal operations.

AO procedures describe how an operator will respond to, investigate, and correct the cause of the following events to provide safety when operating design limits have been exceeded:

- unintended closure of valves or shutdowns;
- increase or decrease in pressure or flow rate outside normal operating limits;
- loss of communications;
- operation of any safety device; or
- any other malfunction of a component, deviation from normal operation, or personnel error that could cause a hazard to persons or property.

The key distinction that should be made when interpreting between an AOC and an AO is related to the final bullet point listed above. An AOC is a *condition* that *may indicate* a malfunction of a component or deviation from normal operations, whereas an AO would *require* a malfunction of a component or a deviation from normal operation to have occurred before it can be realized. Put another way, an AOC is an observation that something may be wrong and further investigation is warranted, whereas an AO occurs when something has gone wrong, and an established procedure must be followed to mitigate the consequence and prevent a potential emergency. Investigating an AOC may lead to the discovery of an AO.

Both AOCs and AOs are designed to prepare individuals to recognize and react to abnormal situations, but they are distinguished by the degree of evidence that is available to the observer and the level of procedural control each operator must establish to guide the response.

AOs should not be identified as an AOC.

### **G.4.4 Distinguishing Between SRCs and AOCs**

The U.S. regulatory framework has established a series of SRCs that must be reported to the Office of Pipeline Safety (OPS). SRCs are listed in 49 *CFR* § 195.55(a).

SRCs are related to reporting and overlap exists with AOs and emergencies. However, all SRCs involve the identification of an actual malfunction of a component or an actual deviation from normal operations that preclude them from meeting the definition of an AOC.

SRCs should not be identified as an AOC.

### **G.4.5 Distinguishing Between Task Steps and AOCs**

Conditions observed as a result of performing a task step that also meet the definition of an AOC should

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be identified as a task specific AOC on the task standard.

For example, Task 15.1 (Perform Visual Inspection of Surface Conditions of Right-of-way) includes a task step directing the individual to “*perform the visual inspection/patrol of the right-of-way.*” If the individual identifies conditions such as stained soil, dead vegetation, or pipeline damage, which also meet the definition of an AOC, the task should include the appropriate response in the task step explanation and the recognition and response should be listed in the AOC section of the task standard.

#### **G.4.6 Distinguishing Between Failure to Correctly Perform Tasks and AOCs**

Operators are required to qualify individuals to correctly perform covered tasks. Failure by an individual to properly perform a covered task is a qualification issue.

A potential mode of task performance failure should be addressed as part of the qualification process and should not be identified as an AOC.

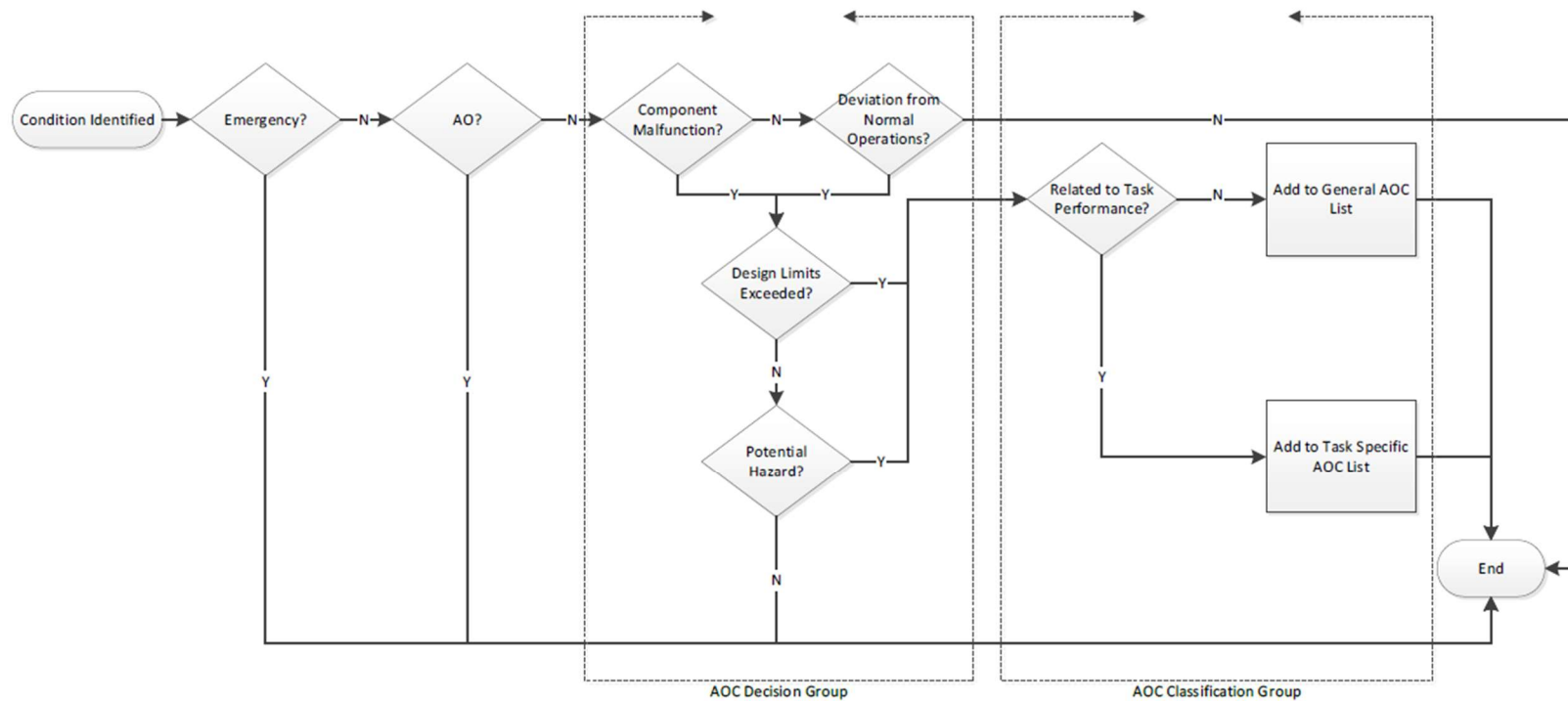
### **G.5 Identifying AOCs**

Figure G.1 depicts the recommended process to identify AOCs. Table G.1 provides guidance on the decisions and actions listed in the process as they relate to the regulatory interpretation provided in this annex.

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**Figure G.1—AOC Identification Process**



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**Table G.1—AOC Identification Process Description**

	Condition Identified	The process begins with the identification of a “pipeline condition” as defined in G.3.3.
	Emergency Decision — If yes, then no further action is required.	If the condition meets the definition of an emergency, then it is not an AOC. Operators should verify an emergency procedure exists to guide response to the condition.
	AO Decision — If yes, then no further action is required.	If the condition meets the definition of an AO, then it is not an AOC. Operators should verify an AO procedure exists to guide response to the condition.
AOC Decision Group	Component Malfunction or Deviation from Normal Operations Decision — If yes to either question, then proceed to “Design Limits Exceeded” decision. — If no, then further action is not required.	For the condition to be deemed an AOC, it should indicate a malfunction of a component or a deviation from normal operations may have occurred.
	Design Limits Exceeded or Potential Hazard Decision — If yes, then proceed to AOC Classification Group. — If no, then further action is not required.	For the condition to be deemed an AOC, it should also indicate that design limits may have been exceeded or that it may result in a hazard(s) to persons, property, or the environment.
AOC Classification Group	Related to Task Performance Decision — If yes, then “Add to Generic AOC List.” — If no, then “Add to AOC Section of the Task Standard.”	AOCs not directly related to work being performed should not be in individual task standards
	End	The process concludes after the identified condition has been appropriately classified.



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## Annex G (informative)

### **Abnormal Operating Conditions (AOC) Guidance**

#### **G.1 Purpose**

This annex provides guidance to identify Abnormal Operating Conditions (AOCs) for inclusion in the AOC section of individual covered task standards.

Operators can use all, part, or none of this method to identify AOCs, as alternative and equally valid methods exist.

#### **G.2 Objective**

Annex B includes a set of normative covered task standards that may be adopted by the operator as part of their qualification program. Each covered task standard includes a section that documents AOCs specific to the performance of the covered task that should be evaluated when individuals are being qualified to perform the work described in the covered task standard.

Guidance is provided to distinguish AOCs from emergencies, abnormal operations (AOs), and safety-related conditions (SRCs), which are other U.S. 49 CFR 195 regulatory terms that should not be confused with AOCs. Guidance is also provided to eliminate potential AOCs that are listed as a task step, related to improper task performance, or are generic in nature and not directly related to the task being performed.

#### **G.3 Terms and Definitions**

For the purposes of this annex, the following definitions apply. **G.3.1**

##### **component (gas)**

~~Any part of a pipeline that may be subjected to operating pressure including, but not limited to, pipe, valves, elbows, tees, flanges, and closures.~~

##### **G.3.12**

##### **component (liquids)**

Any part of a pipeline that may be subjected to pump pressure including, but not limited to, pipe, valves, elbows, tees, flanges, and closures.

##### **G.3.23**

##### **pipeline condition**

A circumstance that affects the appearance, quality, or working order of a pipeline, pipeline component, or the pipeline system. **G.3.4**

##### **pipeline (gas)**

~~All parts of those physical facilities through which gas moves in transportation, including pipe, valves, and other appurtenance attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies.~~

##### **G.3.35**

##### **pipeline or pipeline system (liquids)**

All parts of a pipeline facility through which a hazardous liquid or carbon dioxide moves in

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transportation, including, but not limited to, line pipe, valves, and other appurtenances connected to line pipe, pumping units, fabricated assemblies associated with pumping units, metering and delivery stations and fabricated assemblies therein, and breakout tanks.

## G.4 AOCs

### G.4.1 General

An AOC is defined in Section 3 of this document.

### G.4.2 Distinguishing Between Emergencies and AOCs

The U.S. regulatory framework requires operators to establish procedures that govern the response to emergencies. Emergencies are defined as follows, for liquids pipelines in 49 *CFR* § 195.402(e)(2); ~~and gas pipelines in 49 *CFR* § 192.615(a)(3) and are below.~~

~~For liquids pipelines:~~

- fire or explosion occurring near or directly involving a pipeline facility;
- accidental release of hazardous liquid or carbon dioxide from a pipeline facility;
- operational failure causing a hazardous condition; and

natural disaster affecting pipeline facilities. ~~For gas pipelines:~~

- ~~— gas detected inside or near a building;~~
- ~~— fire located near or directly involving a pipeline facility;~~
- ~~— explosion occurring near or directly involving a pipeline facility; and~~
- ~~— natural disaster.~~

Emergencies are different than AOCs and AOs. Emergencies involve significant consequences that cannot be easily addressed or resolved. Investigation after an AOC or an AO is identified may lead to the discovery of an emergency, but once identified, the response to the emergency must follow an established emergency procedure.

An emergency should not be identified as an AOC.

### G.4.3 Distinguishing Between AOs and AOCs

The U.S. regulatory framework distinguishes between an AOC and an ~~abnormal operation (AO)~~. Operators are mandated to have procedures in place by 49 *CFR* § 195.402(d)(1) ~~for liquids pipelines and 49 *CFR* § 192.605(c)(1) for gas pipelines~~ for abnormal operations.

AO procedures describe how an operator will respond to, investigate, and correct the cause of the following events to provide safety when operating design limits have been exceeded:

- unintended closure of valves or shutdowns;
- increase or decrease in pressure or flow rate outside normal operating limits;
- loss of communications;
- operation of any safety device; or



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— any other malfunction of a component, deviation from normal operation, or personnel error that could cause a hazard to persons or property.

The key distinction that should be made when interpreting between an AOC and an AO is related to the final bullet point listed above. An AOC is a *condition* that *may indicate* a malfunction of a component or deviation from normal operations, whereas an AO would *require* a malfunction of a component or a deviation from normal operation to have occurred before it can be realized. Put another way, an AOC is an observation that something may be wrong and further investigation is warranted, whereas an AO occurs when something has gone wrong, and an established procedure must be followed to mitigate the consequence and prevent a potential emergency. Investigating an AOC may lead to the discovery of an AO.

Both AOCs and AOs are designed to prepare [staff individuals](#) to recognize and react to abnormal situations, but they are distinguished by the degree of evidence that is available to the observer and the level of procedural control each operator must establish to guide the response.

AOs should not be identified as an AOC.

#### G.4.4 Distinguishing Between SRCs and AOCs

The U.S. regulatory framework has established a series of SRCs that must be reported to the Office of Pipeline Safety (OPS). SRCs are listed in 49 CFR § 195.55(a) ~~for liquids pipelines and 49 CFR § 191.23 for gas pipelines.~~

SRCs are related to reporting and overlap exists with AOs and emergencies. However, all SRCs involve the identification of an actual malfunction of a component or an actual deviation from normal operations that preclude them from meeting the definition of an AOC.

SRCs should not be identified as an AOC.

#### G.4.5 Distinguishing Between Task Steps and AOCs

Conditions observed as a result of performing a task step ~~that also meet the definition of an AOC should be that specifically instructs an individual to identify the condition should not be identified as a task specific AOC on the task standard. The task step explanation should be written to provide the individual with sufficient direction to react appropriately.~~

For example, Task 15.1 (Perform Visual Inspection of Surface Conditions of Right-of-way) includes a task step directing the individual to “*perform the visual inspection/patrol of the right-of-way.*” If ~~in the course of doing so,~~ the individual identifies conditions such as stained soil, dead vegetation, or pipeline damage, ~~which also meet the definition of an AOC,~~ the task ~~should include the appropriate response in the task step explanation and the recognition and response should be listed in the AOC section of the task standard. requires them to make proper notification.~~

~~When the purpose of the task step is to identify specific conditions, the conditions should not be identified as an AOC.~~

#### G.4.6 Distinguishing Between Failure to Correctly Perform Tasks and AOCs

Operators are required to qualify individuals to correctly perform covered tasks. Failure by an individual to properly perform a covered task is a qualification issue.

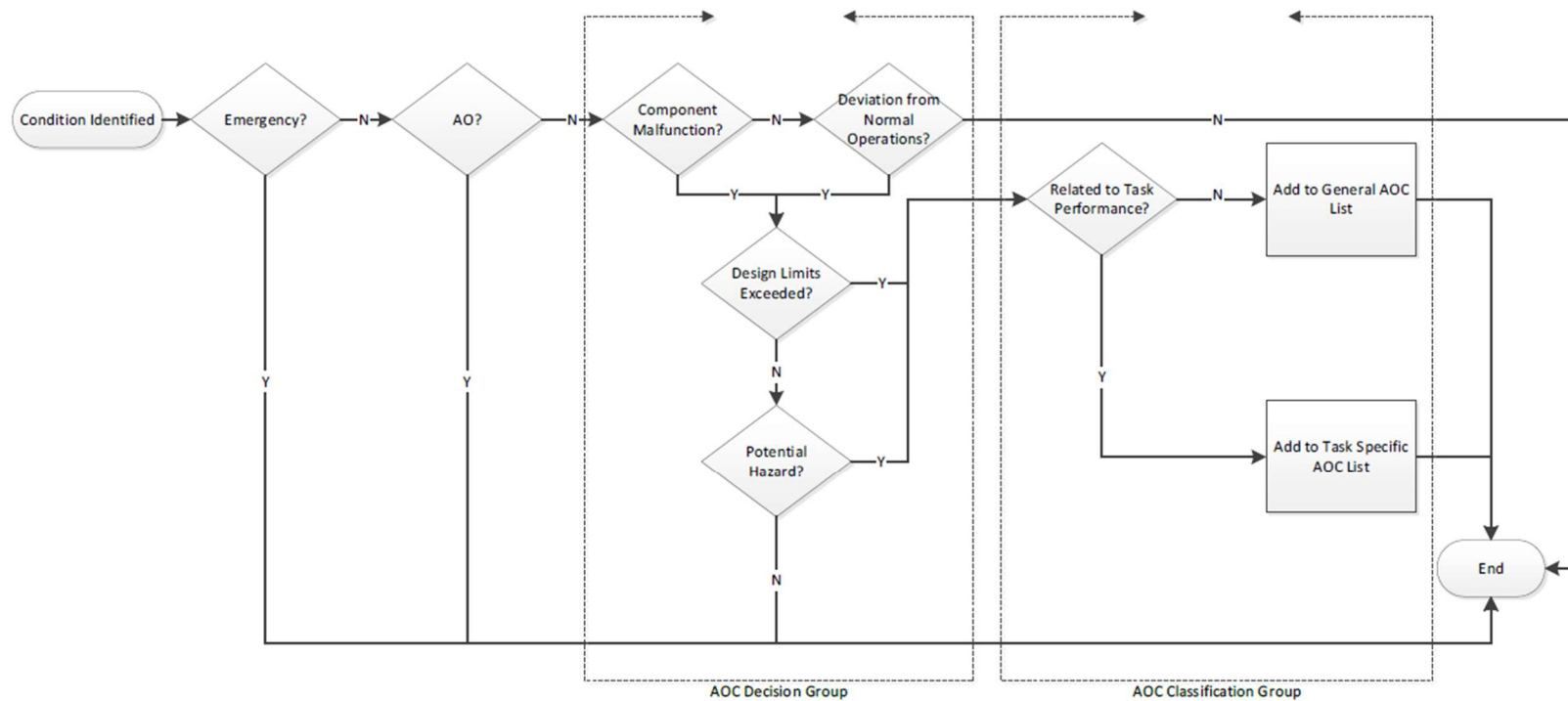
A potential mode of task performance failure should be addressed as part of the qualification process and should not be identified as an AOC.

### G.5 Identifying AOCs

Figure G.1 depicts the recommended process to identify AOCs. Table G.1 provides guidance on the decisions and actions listed in the process as they relate to the regulatory interpretation provided in this annex.

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**Figure G.1—AOC Identification Process**



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**Table G.1—AOC Identification Process**  
**Description**

	Condition Identified	The process begins with the identification of a “pipeline condition” as defined in G.3.3.
	Emergency Decision  — If yes, then <u>no further action is required. “Verify Emergency Procedure Exists” and proceed to SRC decision.</u>  — <u>If no, then proceed to AO decision.</u>	If the condition meets the definition of an emergency, then it is not an <del>AO or an</del> AOC. Operators should verify an emergency procedure exists to guide response to the condition.
	AO Decision  — If yes, then <u>“Verify AO Procedure Exists” and proceed to SRC decision.</u>  — <u>If no, then proceed to AOC Decision Group; no further action is required.</u>	If the condition meets the definition of an AO, then it is not an AOC. Operators should verify an AO procedure exists to guide response to the condition.
AOC Decision Group	Component Malfunction or Deviation from Normal Operations Decision  — If yes to either question, then proceed to “Design Limits Exceeded” decision. — If no, then further action is not required.	For the condition to be deemed an AOC, it should indicate a malfunction of a component or a deviation from normal operations may have occurred.
	Design Limits Exceeded or Potential Hazard Decision  — If yes, then proceed to AOC Classification Group. — If no, then further action is not required.	For the condition to be deemed an AOC, it should also indicate that design limits may have been exceeded or that it may result in a hazard(s) to persons, property, or the environment.
AOC Classification Group	Related to Task Performance Decision  — If yes, <u>then “Add to Generic AOC List.” proceed to “Task Step” decision.</u>  — If no, then <u>further action is not required. “Add to AOC Section of the Task Standard.”</u> <u>Task Step Decision</u>  <u>If yes, then “Document Reaction in Task Step Explanation.”</u> <u>If no, then proceed to “Improper Task Performance” decision.</u> <u>Improper Task Performance Decision</u>  <u>If yes, then “Revise Task Evaluation Process.”</u> <u>If no, then “Add to AOC Section of the Task Standard.”</u>	AOCs not directly related to work being performed should not be in individual task standards <del>Conditions observed as a direct result of performing a task step should not be considered an AOC. The task step explanation should document the appropriate reaction.</del> <del>Failure to properly perform a covered task is a qualification issue and not an AOC.</del>  <b><i>AOCs that remain after this step should be included in the AOC table of the appropriate task standard(s).</i></b>
	End	The process concludes after the identified condition has been appropriately classified.