

PRIMARY: 192.605(c)

PURPOSE: Clarify abnormal operations events and the difference between abnormal operations and abnormal operating conditions

ORIGIN/RATIONALE: Mary Friend 11/5/18email

During a recent inspection, the topic of abnormal operations was discussed. It was clear that there is confusion between the terms abnormal operation and abnormal operating conditions. I believe some explanation of the differences between the two is useful. The list as found in GM 192.605 Section 4.1 does not provide any clarity to the types of events that might be considered an abnormal operation. For example, what does loss of communications mean to the operator: is this loss of phone service at the station, or truck radios that do not work, or is it the loss of SCADA communications such that an unmanned station needs to be manned? Guidance on what “normal limits” are would be useful. Who decides the normal limits? Are normal limits tied to the control room? We include high temperature as a potential abnormal operation, but this is not one of the items mentioned in the code. Although there is language about documents certain post abnormal operations activities, there is also no discussion in this section regarding documentation of the event, or the post event evaluations.

There is a difference between abnormal operations and abnormal operating conditions as defined in 192.803. An example of an abnormal operating condition is a relief valve set at the wrong set point, while an abnormal operation is the actual operation of the relief valve, regardless of the set point. Abnormal operations are near misses, and provide safety when the operating design limits have been exceeded. The operator should define the events that might qualify as abnormal operations and could include:

- Unintended closure of valves such automatic valves, flow reducing devices, vandalism, or failure to reopen valves after routine maintenance
- Increase or decrease in pressure or flow outside of normal limits. The operator should define normal limits. This type of event might include loss of customers to distribution systems or large volume customers, or pressure surges.
- Loss of communication should be defined by the operator. This might include loss of SCADA communications such that an unmanned station must be manned. The operator might consider giving them a period of time to restore these communications prior to declaring an abnormal operation.
- Operation of a safety device might include the operation of a relief valve, noticeable operation of a monitor regulator, compressor engine shutdowns due to pressure deviation, or operation of slam shuts.

RESPONSIBLE GROUP: O&M/OQ Task Group

## Section 192.605

### 3 ABNORMAL OPERATION OF TRANSMISSION LINES

#### 3.1 General.

- (a) The abnormal operation requirements in §192.605(c) do not apply to distribution operators that are operating transmission lines in connection with their distribution system (§192.605(c)(5)).
- (b) An abnormal operation is an non-emergency event on a gas transmission or Type A gathering facility that occurs when operations the operating design limits have been exceeded due to a change in pressure, flow rate, or temperature that is are outside the normal limits. When an abnormal operation occurs, it does might not pose an immediate threat to life or property, but could if not promptly corrected.
- (c) Where applicable, the actions to be taken by the transmission operator in each situation should incorporate ~~the~~ current procedures. The procedures should be specific enough to ensure uniformity of action relative to the situation, ~~such as those referenced above~~, while allowing sufficient flexibility to consider the particular details, material, equipment, and configurations involved.
- (d) The term “abnormal operating condition-(AOC)” relates to the Operator Qualification requirement that personnel can recognize and react to abnormal operating conditions. See guide material under §192.803 for more information. An example of an AOC is a relief valve with an incorrect set point. An example of an abnormal operation is the relief valve activating.

Note: A condition can be both an abnormal operation under §192.605(c) and an abnormal operating condition under §192.803.

3.2 Types of abnormal operations.

Descriptions of types of abnormal operations could include the following.

- (a) Unintended closure of valves or shutdowns could include the following.
  - (i) Automatic valves.
  - (ii) Flow reducing valves.
  - (iii) Failure to reopen or to close after routine maintenance.
  - (iv) Vandalism.
- (b) Increase or decrease in pressure or flow rate outside normal operating limits.
  - (i) Operator should define the source or basis for “normal operating limits”, and could include engineering design basis, SCADA set points.
  - (ii) Examples include flow that decreases where customer service cannot be maintained, or overpressure events.
  - (iii) Temperature, high or low.
- (c) Loss of communications should be defined by the operator based on communication methods in use to ensure safe operation, which may include the following.
  - (i) A SCADA outage, which may require manning of normally unmanned stations. The operator **might** consider defining a period of time to restore these communications prior to declaring an abnormal operation.
  - (ii) Backup communications systems, if the outage requires manning assets or stations, such as the following.
    - A. Telephone service (wired).
    - B. Cell phone service.
    - C. Radios (portable).
- (d) Operation of safety devices used to protect pipeline pressure, including the following.
  - (i) Relief ~~device valve~~.
  - (ii) Noticeable operation of a monitor regulator.
  - (iii) Compressor engine shutdowns due to pressure deviation.
  - (iv) Operation of slam shuts.
- (e) Any other foreseeable malfunction of a component, deviation from normal operation, or personnel error, which may result in a hazard to persons or property.

3.2.3 Considerations for abnormal operations.

When developing response procedures for abnormal operations, the transmission operator should consider the following:

- (a) Type of event. See list under 192.605(c)(1) 3.2 above.
- (b) Proximity of the event to the public.
- (c) Potential for the event to become an emergency situation if not immediately corrected.
- (d) Effect of the event on the pipeline system.
- (e) Notification of appropriate operator personnel regarding the abnormal operation.
- (f) Documentation of the abnormal operations, including any relevant information regarding the discovery and confirmation of the event. This may include the following.
  - (i) Operational information (including SCADA readouts) that confirms the event (e.g., pressure readings, indications of valve closure, flow rates, control room log books indicating loss of communication, other relevant information).
  - (ii) Photos of affected equipment.
  - (iii) Names of personnel identifying and responding to abnormal operations events.
  - (iv) Abnormal Operations forms completed with above information.
- (f-g) Documentation of the response actions taken. **Relevant information regarding the discovery and confirmation of the event. See 3.7 below regarding documentation.**
- (g-h) If the event is an increase in pressure outside normal operating limits, the potential for MAOP plus allowable buildup to be exceeded. See 4.4(f) below and (d) of the guide material under §191.23.

- (i) Consider the need to communicate abnormal operation information to integrity management personnel for threat consideration.
- (h-) Determine if a failure investigation of equipment is needed in accordance with the requirements of §192.617.

~~3.3 *Preventing recurrence of abnormal operation.* {Editorial note: moved to 3.5 below}~~

~~Once the event has been investigated, and normal or safe operations have been restored, the operator should determine what measures can be taken to prevent the cause of the event from recurring. The operator should also consider whether these measures should be implemented elsewhere in the transmission system to avoid similar occurrences of abnormal operation.~~

3.4 Follow up monitoring-Return to normal operations criteria and verification.

- (a) The extent of follow-up monitoring should be based on the nature of the event and the probability that the cause of the event could recur. This should include checking variations from normal operation after abnormal operation has ended at sufficient critical locations in the system to determine continued integrity and safe operation.
- (b) The abnormal operation is considered corrected when an operator determines, at the end of the monitoring period, that the pipeline facility has maintained operations within its operating design limits and is capable of safely operating up to its MAOP.

~~3.5 *Follow-up actions to consider.*~~

- (c) Actions to consider to confirm return to normal operations readiness.
  - (i) Notify field operations and maintenance personnel to be alert to signs of leakage or damage to pipeline facilities.
  - (ii) Notify control room personnel, so they can more closely monitor facilities.
  - (iii) Conduct and document right-of-way patrol of the affected pipeline segment.
  - (iv) Conduct and document leak survey of the affected pipeline segment.
  - (v) Conduct and document inspection of overpressure protection devices for signs of activation. Determine if the devices activated as expected and at the correct pressures.
  - (vi) Determine probable cause or conduct failure analysis; share results with appropriate personnel. For guidance on performing a failure investigation, see guide material under §192.617.
  - (vii) Ensure integrity management personnel are informed so this event and associated data can be considered in future risk analyses.
  - (vii) Review procedural manual, operator qualification program, control room management procedures, and other written procedures for any needed revisions, per 3.6 below.

~~3.5 *Preventing recurrence of abnormal operation.*~~

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3.6 *Review of response activities.*

Response activities should be reviewed based on the extent of the abnormal operation. The review should consider the actions taken and whether the procedures followed were adequate for the given situation or should be revised to provide more specificity or more flexibility. Response activity reviews can include various processes. The specific processes followed should be based on the extent and type of abnormal operations and can include the following.

- (a) Root cause analysis.
- (b) Post-event reports.
- (c) Tailgate or safety meeting discussions.
- (d) Near-miss and accident investigation analysis.
- (e) Simulation or event reconstruction reviews.
- (f) Drills or other exercises.

## 3.7 Documentation

Depending on the circumstances and extent of the event, documentation after abnormal operations can include the following.

- (a) Event details and completed forms or information verifying abnormal operations.
- (b) Operational information (including SCADA readouts) that confirms the event, such as pressure readings, indications of valve closure, flow rates, control room logbooks indicating loss of communication, or other relevant information.
- (c) Photos of affected equipment.
- (d) Names of personnel identifying and responding to abnormal operations events.
- (b) Any post-event O&M activity to confirm the condition no longer exists and that normal operations can resume, such as leak surveys, ROW patrols, or inspection of overpressure protection devices.
- (c) Root cause or failure analysis.
- (d) Lessons learned.
- (e) Meeting notes and other communication regarding identification and response.
- (f) Manual and procedure reviews completed as a result of the abnormal operations.

## 4 **POTENTIAL SAFETY-RELATED CONDITIONS, ANALYSIS, AND ACTIONS**

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