

Carbon Dioxide (CO2) Pipeline Safety 49 CFR Part 195

With all the talk about CO2 pipeline safety, I decided to look at the Pipeline and Hazardous Material Safety Administration (PHMSA) information governing the safety of pipelines, including CO2 pipelines. After July 12, 1991, CO2 pipelines were added to the 49 CFR Part 195, a 121 page document detailing what pipelines are covered, how to build and install them as well as keep us safe. I decided to look through the document to see how CO2 is dealt with. I have detailed what I found below, with supporting pages attached.

1. The first page, of the attached pages, identifies the 49 CFR Part 195
 - (a) Page 1 of 121 pages
2. My first search was to see how CO2 was referenced to in the document. I found it added as “or carbon dioxide”, “and carbon dioxide” and also just as plain “carbon dioxide”.
 - (a) CO2 was referenced **49 times** in the 121 pages. I may have missed a few, but did find most of them.
3. Page 2, Excepted, pipelines that are not covered.
 - (a) 49 CFR 195.1(b)(10), excepts from jurisdiction some CO2 pipelines used for Enhanced Oil Recovery (EOR)
 - (b) This is the first of three (3) direct references to CO2.
 - (c) Page 7 of 121
4. Page 3 gives the PHMSA definition of carbon dioxide, the second direct reference to CO2.
 - (a) 49 CFR 195.2
 - i. Carbon dioxide means a fluid consisting of more than 90 percent carbon dioxide molecules compressed to a supercritical state.
 - (b) This is very narrow definition and needs to be expanded to cover all types of CO2.
 - i. This means supercritical CO2 less than 90% pure and all other forms of CO2 are not regulated by PHMSA.
 - (c) Supercritical CO2 is in a fluid state with properties of gas and liquid. To remain in this state the critical temperature and pressure must be exceeded.
 - i. Critical Temperature – **88 F**
 - ii. Critical Pressures – **1071 psi**
 - (d) Page 8 of 121
5. Page 4, Date CO2 came under PHMSA jurisdiction, **after July 12, 1991**
 - (a) Not much change in CO2 regulation in 32 years.
 - (b) 49 CFR 195.8
 - (c) Page 20 of 121
6. Page 5, Fracture propagation, the third and final direct reference to CO2 pipelines
Page 6, Picture, example of ductile fracture
 - (a) 49 CFR 195.111 Fracture propagation
 - i. A carbon dioxide pipeline system must be designed to mitigate the effects of fracture propagation.
 - A. Specific to ductile fractures that run a considerable length of the pipe, as shown in the picture on page 6.
 - ii. Supercritical CO2 pipelines are more susceptible to ductile fractures due in part to higher operating pressures of **2000 psi** or greater.
 - iii. Crude oil pipelines usually operate in the **1000 to 1300 psi** range
 - (b) No specific guidelines or requirements. Left totally up to the pipeline company to determine how to comply.
 - (c) Page 37 of 121
7. Page 7, Location of pipelines, a very broad definition.
 - (a) 49 CFR 195.210(a) Pipeline location
 - i. Pipeline right-of-way must be selected to avoid, as far as practicable, areas containing private dwellings, industrial buildings, and places of public assembly.
 - (b) Page 42 of 121



8. Page 8, How far from private dwellings?
 - (a) 49 CFR 195.210(b) Pipeline location
 - i. No pipeline may be **located within 50 feet (15 meters) of any private dwelling**, or any industrial building or place of public assembly in which persons work, congregate, or assemble unless it is provided with at least 12 inches (305 millimeters) of cover in addition to that prescribed in § 195.248.
 - (b) PHMSA outside of this section is not allowed to address siting or setbacks of pipelines. Therefore it is the responsibility of the local, county and state authorities to set the guidelines.
 - (c) Page 43 of 121
9. Page 9, How deep is the pipe?
 - (a) 49 CFR 195.248(a) Cover over buried pipelines
 - i. Unless specifically exempted in this subpart, all pipe must be buried so that it is below the level of cultivation.

<u>Location</u>	<u>Cover inches (mm)</u>	
	<u>Normal Excavation</u>	<u>Rock excavation</u>
<u>Industrial, commercial and residential area</u>	<u>36 (914)</u>	<u>30 (762)</u>
<u>Any other area</u>	<u>30 (762)</u>	<u>18 (457)</u>

- (b) My easement offers did not specify the depth of the pipe. It is essential that the PSC and/or other governmental agencies determine realistic minimum standards for CO2 pipelines that the pipeline companies be required to follow.
- (c) Page 46 of 121
10. Page 10, Emergency response, control of released CO2
 - (a) 49 CFR 195(e)(5)
 - i. Control of released hazardous liquid or carbon dioxide at an accident scene to minimize the hazards, including possible intentional ignition in the cases of flammable highly volatile liquid
 - (b) Control of released CO2 is impossible and needs to be specifically addressed.
 - (c) Page 61 of 121

Summary

Just simply adding CO2 to existing regulations in 1991, seemed to have worked until **February 22, 2020** when the 24" CO2 pipeline near Sartatia, MS failed. This failure exposed the shortsightedness of not having CO2 specific regulations in place.

The proposed pipeline crossing Emmons County, McIntosh County, Logan County and Burleigh County is also a 24" CO2 pipeline.

Now is not the time to move forward with this pipeline, while PHMSA is developing CO2 specific regulations. PHMSA has scheduled an unprecedented public meeting to gather public input. I ask that if nothing else the PSC allow PHMSA to work through their process before making a final decision on this pipeline.

CO2 Public Safety Meeting 2023

Start – May 31, 2023

End – June 1, 2023

Location – Des Moines, Iowa

This content is from the eCFR and is authoritative but unofficial.

Title 49 –Transportation

Subtitle B –Other Regulations Relating to Transportation

Chapter I –Pipeline and Hazardous Materials Safety Administration, Department of Transportation

Subchapter D –Pipeline Safety

Part 195 Transportation of Hazardous Liquids by Pipeline

Subpart A General

§ 195.0 Scope.

§ 195.1 Which pipelines are covered by this Part?

§ 195.2 Definitions.

§ 195.3 What documents are incorporated by reference partly or wholly in this part?

§ 195.4 Compatibility necessary for transportation of hazardous liquids or carbon dioxide.

§ 195.5 Conversion to service subject to this part.

§ 195.6 Unusually Sensitive Areas (USAs).

§ 195.8 Transportation of hazardous liquid or carbon dioxide in pipelines constructed with other than steel pipe.

§ 195.9 Outer continental shelf pipelines.

§ 195.10 Responsibility of operator for compliance with this part.

§ 195.11 What is a regulated rural gathering line and what requirements apply?

§ 195.12 What requirements apply to low-stress pipelines in rural areas?

§ 195.13 What requirements apply to pipelines transporting hazardous liquids by gravity?

§ 195.15 What requirements apply to reporting-regulated-only gathering lines?

§ 195.18 How to notify PHMSA.

Subpart B Annual, Accident, and Safety-Related Condition Reporting

§ 195.48 Scope.

§ 195.49 Annual report.

§ 195.50 Reporting accidents.

§ 195.52 Immediate notice of certain accidents.

§ 195.54 Accident reports.

§ 195.55 Reporting safety-related conditions.

§ 195.56 Filing safety-related condition reports.

§ 195.58 Report submission requirements.

§ 195.59 Abandonment or deactivation of facilities.

§ 195.60 Operator assistance in investigation.

§ 195.61 National Pipeline Mapping System.

§ 195.63 OMB control number assigned to information collection.

- (5) Transportation of hazardous liquid or carbon dioxide in an offshore pipeline in state waters where the pipeline is located upstream from the outlet flange of the following farthest downstream facility: The facility where hydrocarbons or carbon dioxide are produced or the facility where produced hydrocarbons or carbon dioxide are first separated, dehydrated, or otherwise processed;
 - (6) Transportation of hazardous liquid or carbon dioxide in a pipeline on the OCS where the pipeline is located upstream of the point at which operating responsibility transfers from a producing operator to a transporting operator;
 - (7) A pipeline segment upstream (generally seaward) of the last valve on the last production facility on the OCS where a pipeline on the OCS is producer-operated and crosses into state waters without first connecting to a transporting operator's facility on the OCS. Safety equipment protecting PHMSA-regulated pipeline segments is not excluded. A producing operator of a segment falling within this exception may petition the Administrator, under § 190.9 of this chapter, for approval to operate under PHMSA regulations governing pipeline design, construction, operation, and maintenance;
 - (8) Transportation of hazardous liquid or carbon dioxide through onshore production (including flow lines), refining, or manufacturing facilities or storage or in-plant piping systems associated with such facilities;
 - (9) Transportation of hazardous liquid or carbon dioxide:
 - (i) By vessel, aircraft, tank truck, tank car, or other non-pipeline mode of transportation; or
 - (ii) Through facilities located on the grounds of a materials transportation terminal if the facilities are used exclusively to transfer hazardous liquid or carbon dioxide between non-pipeline modes of transportation or between a non-pipeline mode and a pipeline. These facilities do not include any device and associated piping that are necessary to control pressure in the pipeline under § 195.406(b); or
 - (10) Transportation of carbon dioxide downstream from the applicable following point:
 - (i) The inlet of a compressor used in the injection of carbon dioxide for oil recovery operations, or the point where recycled carbon dioxide enters the injection system, whichever is farther upstream; or
 - (ii) The connection of the first branch pipeline in the production field where the pipeline transports carbon dioxide to an injection well or to a header or manifold from which a pipeline branches to an injection well.
- (c) **Breakout tanks.** Breakout tanks subject to this Part must comply with requirements that apply specifically to breakout tanks and, to the extent applicable, with requirements that apply to pipeline systems and pipeline facilities. If a conflict exists between a requirement that applies specifically to breakout tanks and a requirement that applies to pipeline systems or pipeline facilities, the requirement that applies specifically to breakout tanks prevails. Anhydrous ammonia breakout tanks need not comply with §§ 195.132(b), 195.205(b), 195.242(c) and (d), 195.264(b) and (e), 195.307, 195.428(c) and (d), and 195.432(b) and (c).

Editorial Note: For FEDERAL REGISTER citations affecting § 195.1, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.govinfo.gov.

§ 195.2 Definitions.

As used in this part—

Abandoned means permanently removed from service.

Administrator means the Administrator, Pipeline and Hazardous Materials Safety Administration or his or her delegate.

Alarm means an audible or visible means of indicating to the controller that equipment or processes are outside operator-defined, safety-related parameters.

Barrel means a unit of measurement equal to 42 U.S. standard gallons.

Breakout tank means a tank used to

- (a) relieve surges in a hazardous liquid pipeline system or
- (b) receive and store hazardous liquid transported by a pipeline for reinjection and continued transportation by pipeline.

Carbon dioxide means a fluid consisting of more than 90 percent carbon dioxide molecules compressed to a supercritical state.

Component means any part of a pipeline which may be subjected to pump pressure including, but not limited to, pipe, valves, elbows, tees, flanges, and closures.

Computation Pipeline Monitoring (CPM) means a software-based monitoring tool that alerts the pipeline dispatcher of a possible pipeline operating anomaly that may be indicative of a commodity release.

Confirmed Discovery means when it can be reasonably determined, based on information available to the operator at the time a reportable event has occurred, even if only based on a preliminary evaluation.

Control room means an operations center staffed by personnel charged with the responsibility for remotely monitoring and controlling a pipeline facility.

Controller means a qualified individual who remotely monitors and controls the safety-related operations of a pipeline facility via a SCADA system from a control room, and who has operational authority and accountability for the remote operational functions of the pipeline facility.

Corrosive product means "corrosive material" as defined by § 173.136 Class 8—Definitions of this chapter.

Entirely replaced onshore hazardous liquid or carbon dioxide pipeline segments, for the purposes of §§ 195.258, 195.260, and 195.418, means where 2 or more miles of pipe, in the aggregate, have been replaced within any 5 contiguous miles within any 24-month period.

Exposed underwater pipeline means an underwater pipeline where the top of the pipe protrudes above the underwater natural bottom (as determined by recognized and generally accepted practices) in waters less than 15 feet (4.6 meters) deep, as measured from mean low water.

Flammable product means "flammable liquid" as defined by § 173.120 Class 3—Definitions of this chapter.

Gathering line means a pipeline 219.1 mm (8⁵/₈ in) or less nominal outside diameter that transports petroleum from a production facility.

§ 195.8 Transportation of hazardous liquid or carbon dioxide in pipelines constructed with other than steel pipe.

No person may transport any hazardous liquid or carbon dioxide through a pipe that is constructed after October 1, 1970, for hazardous liquids or after July 12, 1991 for carbon dioxide of material other than steel unless the person has notified the Administrator in writing at least 90 days before the transportation is to begin. The notice must state whether carbon dioxide or a hazardous liquid is to be transported and the chemical name, common name, properties and characteristics of the hazardous liquid to be transported and the material used in construction of the pipeline. If the Administrator determines that the transportation of the hazardous liquid or carbon dioxide in the manner proposed would be unduly hazardous, he will, within 90 days after receipt of the notice, order the person that gave the notice, in writing, not to transport the hazardous liquid or carbon dioxide in the proposed manner until further notice.

[Amdt. 195-45, 56 FR 26925, June 12, 1991, as amended by Amdt. 195-50, 59 FR 17281, Apr. 12, 1994]

§ 195.9 Outer continental shelf pipelines.

Operators of transportation pipelines on the Outer Continental Shelf must identify on all their respective pipelines the specific points at which operating responsibility transfers to a producing operator. For those instances in which the transfer points are not identifiable by a durable marking, each operator will have until September 15, 1998 to identify the transfer points. If it is not practicable to durably mark a transfer point and the transfer point is located above water, the operator must depict the transfer point on a schematic maintained near the transfer point. If a transfer point is located subsea, the operator must identify the transfer point on a schematic which must be maintained at the nearest upstream facility and provided to PHMSA upon request. For those cases in which adjoining operators have not agreed on a transfer point by September 15, 1998 the Regional Director and the MMS Regional Supervisor will make a joint determination of the transfer point.

[Amdt. 195-59, 62 FR 61695, Nov. 19, 1997, as amended at 70 FR 11140, Mar. 8, 2005]

§ 195.10 Responsibility of operator for compliance with this part.

An operator may make arrangements with another person for the performance of any action required by this part. However, the operator is not thereby relieved from the responsibility for compliance with any requirement of this part.

§ 195.11 What is a regulated rural gathering line and what requirements apply?

Each operator of a regulated rural gathering line, as defined in paragraph (a) of this section, must comply with the safety requirements described in paragraph (b) of this section.

- (a) **Definition.** As used in this section, a regulated rural gathering line means an onshore gathering line in a rural area that meets all of the following criteria—
- (1) Has a nominal diameter from $6\frac{5}{8}$ inches (168 mm) to $8\frac{5}{8}$ inches (219.1 mm);
 - (2) Is located in or within one-quarter mile (.40 km) of an unusually sensitive area as defined in § 195.6; and
 - (3) Operates at a maximum pressure established under § 195.406 corresponding to—

§ 195.108 External pressure.

Any external pressure that will be exerted on the pipe must be provided for in designing a pipeline system.

§ 195.110 External loads.

- (a) Anticipated external loads (e.g., earthquakes, vibration, thermal expansion, and contraction) must be provided for in designing a pipeline system. In providing for expansion and flexibility, section 419 of ASME/ANSI B31.4 must be followed.
- (b) The pipe and other components must be supported in such a way that the support does not cause excess localized stresses. In designing attachments to pipe, the added stress to the wall of the pipe must be computed and compensated for.

[Amdt. 195-22, 46 FR 38360, July 27, 1981, as amended at 58 FR 14524, Mar. 18, 1993]

§ 195.111 Fracture propagation.

A carbon dioxide pipeline system must be designed to mitigate the effects of fracture propagation.

[Amdt. 195-45, 56 FR 26926, June 12, 1991]

§ 195.112 New pipe.

Any new pipe installed in a pipeline system must comply with the following:

- (a) The pipe must be made of steel of the carbon, low alloy-high strength, or alloy type that is able to withstand the internal pressures and external loads and pressures anticipated for the pipeline system.
- (b) The pipe must be made in accordance with a written pipe specification that sets forth the chemical requirements for the pipe steel and mechanical tests for the pipe to provide pipe suitable for the use intended.
- (c) Each length of pipe with a nominal outside diameter of 4¹/₂ in (114.3 mm) or more must be marked on the pipe or pipe coating with the specification to which it was made, the specified minimum yield strength or grade, and the pipe size. The marking must be applied in a manner that does not damage the pipe or pipe coating and must remain visible until the pipe is installed.

[Amdt. 195-22, 46 FR 38360, July 27, 1981, as amended by Amdt. 195-52, 59 FR 33396, June 28, 1994; Amdt. 195-63, 63 FR 37506, July 13, 1998]

§ 195.114 Used pipe.

Any used pipe installed in a pipeline system must comply with § 195.112 (a) and (b) and the following:

- (a) The pipe must be of a known specification and the seam joint factor must be determined in accordance with § 195.106(e). If the specified minimum yield strength or the wall thickness is not known, it is determined in accordance with § 195.106 (b) or (c) as appropriate.
- (b) There may not be any:
 - (1) Buckles;

Ductile fracture
22 feet long, 2-inch wide
Operating Pressure 1308 psi
Pipe diameter, 30-inch



Picture of the tear, courtesy of the Duncan Firm, in ExxonMobil's Pegasus pipeline that spilled as many as 420,000 gallons in the town of Mayflower in central Arkansas. The Duncan Firm conducted a preliminary inspection of the ruptured pipeline on April 10, 2013.

- 1 For tanks designed for approximate atmospheric pressure, constructed of carbon and low alloy steel, welded or riveted, and non-refrigerated; and for tanks built to API Std 650 (incorporated by reference, see § 195.3) or its predecessor Standard 12C; repair, alteration; and reconstruction must be in accordance with API Std 653 (except section 6.4.3) (incorporated by reference, see § 195.3).
- 2 For tanks built to API Spec 12F (incorporated by reference, see § 195.3) or API Std 620 (incorporated by reference, see § 195.3), repair, alteration, and reconstruction must be in accordance with the design, welding, examination, and material requirements of those respective standards.
- 3 For high-pressure tanks built to API Std 2510 (incorporated by reference, see § 195.3), repairs, alterations, and reconstruction must be in accordance with API Std 510 (incorporated by reference, see § 195.3).

[Amdt. 195–66, 64 FR 15935, Apr. 2, 1999, as amended by Amdt. 195–99, 80 FR 186, Jan. 5, 2015; 80 FR 46848, Aug. 6, 2015]

§ 195.206 Material inspection.

No pipe or other component may be installed in a pipeline system unless it has been visually inspected at the site of installation to ensure that it is not damaged in a manner that could impair its strength or reduce its serviceability.

§ 195.207 Transportation of pipe.

- a **Railroad.** In a pipeline operated at a hoop stress of 20 percent or more of SMYS, an operator may not use pipe having an outer diameter to wall thickness ratio of 70 to 1, or more, that is transported by railroad unless the transportation is performed in accordance with API RP 5L1 (incorporated by reference, see § 195.3).
- b **Ship or barge.** In a pipeline operated at a hoop stress of 20 percent or more of SMYS, an operator may not use pipe having an outer diameter to wall thickness ratio of 70 to 1, or more, that is transported by ship or barge on both inland and marine waterways, unless the transportation is performed in accordance with API RP 5LW (incorporated by reference, see § 195.3).
- c **Truck.** In a pipeline to be operated at a hoop stress of 20 percent or more of SMYS, an operator may not use pipe having an outer diameter to wall thickness ratio of 70 to 1, or more, that is transported by truck unless the transportation is performed in accordance with API RP 5LT (incorporated by reference, see § 195.3).

[Amdt. 195–94, 75 FR 48606, Aug. 11, 2010, as amended by Amdt. 195–99, 80 FR 186, Jan. 5, 2015]

§ 195.208 Welding of supports and braces.

Supports or braces may not be welded directly to pipe that will be operated at a pressure of more than 100 p.s.i. (689 kPa) gage.

[Amdt. 195–22, 46 FR 38360, July 27, 1981, as amended by Amdt. 195–63, 63 FR 37506, July 13, 1998]

§ 195.210 Pipeline location.

- a Pipeline right-of-way must be selected to avoid, as far as practicable, areas containing private dwellings, industrial buildings, and places of public assembly.

- (b) No pipeline may be located within 50 feet (15 meters) of any private dwelling, or any industrial building or place of public assembly in which persons work, congregate, or assemble, unless it is provided with at least 12 inches (305 millimeters) of cover in addition to that prescribed in § 195.248.

[Amdt. 195-22, 46 FR 39360, July 27, 1981, as amended by Amdt. 195-63, 63 FR 37506, July 13, 1998]

§ 195.212 Bending of pipe.

- (a) Pipe must not have a wrinkle bend.
- (b) Each field bend must comply with the following:
 - (1) A bend must not impair the serviceability of the pipe.
 - (2) Each bend must have a smooth contour and be free from buckling, cracks, or any other mechanical damage.
 - (3) On pipe containing a longitudinal weld, the longitudinal weld must be as near as practicable to the neutral axis of the bend unless—
 - (i) The bend is made with an internal bending mandrel; or
 - (ii) The pipe is 12³/₄ in (324 mm) or less nominal outside diameter or has a diameter to wall thickness ratio less than 70.
- (c) Each circumferential weld which is located where the stress during bending causes a permanent deformation in the pipe must be nondestructively tested either before or after the bending process.

[Amdt. 195-22, 46 FR 38360, July 27, 1981, as amended by Amdt. 195-52, 59 FR 33396, June 28, 1994; Amdt. 195-63, 63 FR 37506, July 13, 1998]

§ 195.214 Welding procedures.

- (a) Welding must be performed by a qualified welder or welding operator in accordance with welding procedures qualified under section 5, section 12, Appendix A or Appendix B of API Std 1104 (incorporated by reference, see § 195.3), or Section IX of the ASME Boiler and Pressure Vessel Code (ASME BPVC) (incorporated by reference, see § 195.3). The quality of the test welds used to qualify the welding procedures must be determined by destructive testing.
- (b) Each welding procedure must be recorded in detail, including the results of the qualifying tests. This record must be retained and followed whenever the procedure is used.

[Amdt. 195-38, 51 FR 20297, June 4, 1986, as amended at Amdt. 195-81, 69 FR 32897, June 14, 2004; Amdt. 195-99, 80 FR 186, Jan. 5, 2015; Amdt. 195-100, 80 FR 12780, Mar. 11, 2015; Amdt. 195-101, 82 FR 7999, Jan. 23, 2017]

§ 195.216 Welding: Miter joints.

A miter joint is not permitted (not including deflections up to 3 degrees that are caused by misalignment).

§§ 195.236-195.244 [Reserved]

§ 195.246 Installation of pipe in a ditch.

- (a) All pipe installed in a ditch must be installed in a manner that minimizes the introduction of secondary stresses and the possibility of damage to the pipe.
- (b) Except for pipe in the Gulf of Mexico and its inlets in waters less than 15 feet deep, all offshore pipe in water at least 12 feet deep (3.7 meters) but not more than 200 feet deep (61 meters) deep as measured from the mean low water must be installed so that the top of the pipe is below the underwater natural bottom (as determined by recognized and generally accepted practices) unless the pipe is supported by stanchions held in place by anchors or heavy concrete coating or protected by an equivalent means.

[Amdt. 195-22, 46 FR 38360, July 27, 1981, as amended by Amdt. 195-52, 59 FR 33397, June 28, 1994; 59 FR 36256, July 15, 1994; Amdt. 195-85, 69 FR 48407, Aug. 10, 2004]

§ 195.248 Cover over buried pipeline.

- (a) Unless specifically exempted in this subpart, all pipe must be buried so that it is below the level of cultivation. Except as provided in paragraph (b) of this section, the pipe must be installed so that the cover between the top of the pipe and the ground level, road bed, river bottom, or underwater natural bottom (as determined by recognized and generally accepted practices), as applicable, complies with the following table:

Location	Cover inches (millimeters)	
	For normal excavation	For rock excavation ¹
Industrial, commercial, and residential areas	36 (914)	30 (762)
Crossing of inland bodies of water with a width of at least 100 feet (30.5 meters) from high water mark to high water mark	48 (1219)	18 (457)
Drainage ditches at public roads and railroads	36 (914)	36 (914)
Deepwater port safety zones	48 (1219)	24 (610)
Gulf of Mexico and its inlets in waters less than 15 feet (4.6 meters) deep as measured from mean low water	36 (914)	18 (457)
Other offshore areas under water less than 12 ft (3.7 meters) deep as measured from mean low water	36 (914)	18 (457)
Any other area	30 (762)	18 (457)

¹ Rock excavation is any excavation that requires blasting or removal by equivalent means.

- (b) Except for the Gulf of Mexico and its inlets in waters less than 15 feet (4.6 meters) deep, less cover than the minimum required by paragraph (a) of this section and § 195.210 may be used if—
 - (1) It is impracticable to comply with the minimum cover requirements; and
 - (2) Additional protection is provided that is equivalent to the minimum required cover.

- (v) Any other malfunction of a component, deviation from normal operation, or personnel error which could cause a hazard to persons or property.
- (2) Checking variations from normal operation after abnormal operation has ended at sufficient critical locations in the system to determine continued integrity and safe operation.
- (3) Correcting variations from normal operation of pressure and flow equipment and controls.
- (4) Notifying responsible operator personnel when notice of an abnormal operation is received.
- (5) Periodically reviewing the response of operator personnel to determine the effectiveness of the procedures controlling abnormal operation and taking corrective action where deficiencies are found.

e Emergencies. The manual required by paragraph (a) of this section must include procedures for the following to provide safety when an emergency condition occurs:

- (1) Receiving, identifying, and classifying notices of events that need immediate response by the operator or notice to the appropriate public safety answering point (*i.e.*, 9-1-1 emergency call center), where direct access to a 9-1-1 emergency call center is available from the location of the pipeline, and fire, police, and other appropriate public officials, and communicating this information to appropriate operator personnel for prompt corrective action. Operators may establish liaison with the appropriate local emergency coordinating agencies, such as 9-1-1 emergency call centers or county emergency managers, in lieu of communicating individually with each fire, police, or other public entity.
- (2) Prompt and effective response to a notice of each type emergency, including 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.
- (3) Having personnel, equipment, instruments, tools, and material available as needed at the scene of an emergency.
- (4) Taking necessary actions, including but not limited to, emergency shutdown, valve shut-off, or pressure reduction, in any section of the operator's pipeline system, to minimize hazards of released hazardous liquid or carbon dioxide to life, property, or the environment. Each operator must also develop written rupture identification procedures to evaluate and identify whether a notification of potential rupture, as defined in § 195.2, is an actual rupture event or non-rupture event. These procedures must, at a minimum, specify the sources of information, operational factors, and other criteria that operator personnel use to evaluate a notification of potential rupture, as defined at § 195.2. For operators installing valves in accordance with § 195.258(c), § 195.258(d), or that are subject to the requirements in § 195.418, those procedures should provide for rupture identification as soon as practicable.
- 5 Control of released hazardous liquid or carbon dioxide at an accident scene to minimize the hazards, including possible intentional ignition in the cases of flammable highly volatile liquid.
- (6) Minimization of public exposure to injury and probability of accidental ignition by assisting with evacuation of residents and assisting with halting traffic on roads and railroads in the affected area, or taking other appropriate action.