

DEPARTMENT OF TRANSPORTATION

Research and Special Programs Administration

49 CFR Part 195

[Docket No. PS-112; Notice 1]

RIN 2137-AB72

Transportation of Carbon Dioxide by Pipeline

AGENCY: Office of Pipeline Safety (OPS), RSPA, DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: This notice proposes new regulations to provide for the safe transportation of carbon dioxide by pipeline facilities. Section 211 of the Pipeline Safety Reauthorization Act of 1988 (Pub. L. 100-561) requires that the DOT regulate such pipelines under the hazardous liquid pipeline safety regulations.

DATE: Comments must be received by December 11, 1989. Late filed comments will be considered so far as is practicable.

ADDRESS: Send comments in duplicate to the Dockets Unit, Room 8417 Office of Pipeline Safety, Research and Special Programs Administration, U.S. Department of Transportation, 400 Seventh Street, SW Washington, DC 20590. Identify the docket and notice numbers stated in the heading of this notice. All comments and docketed material will be available for inspection and copying in Room 8426 between 8:30 a.m. and 5:00 p.m. each business day.

FOR FURTHER INFORMATION CONTACT: Cesar De Leon, (202) 366-1640, regarding changes to safety standards; or the Dockets Unit, (202) 366-5046, for copies of this notice or other material in the docket.

SUPPLEMENTARY INFORMATION:

Background

The regulations in part 195 currently prescribe safety standards and accident reporting requirements for pipeline facilities used in the transportation of hazardous liquids. Hazardous liquid is defined to include petroleum, petroleum products, or anhydrous ammonia. Therefore, part 195 does not currently apply to the transportation of carbon dioxide (CO₂) by pipeline.

Physical Properties of CO₂

At normal temperatures and atmospheric pressure, CO₂ is an odorless and colorless gas, not flammable, with a density 1.5 times the density of air. It will not support

combustion nor will it sustain life if inhaled.

Carbon dioxide may exist simultaneously as a gas, liquid, and solid at its triple point which is -69 °F and 60.43 psig. Below the triple point, it may be either a solid or gas depending on temperature and pressure. Dry ice for refrigeration is a common use of CO₂ in solid form. Dry ice at a temperature of -109 °F and atmospheric pressure will sublime, that is, pass to the gas phase without going through the liquid state. The critical temperature of CO₂ is 87.8 °F. When pressure reaches 1,200 psig, CO₂ enters what is called the supercritical phase (also referred to as a dense vapor phase). Pipeline transportation in the supercritical phase is more desirable than transportation in the gaseous phase.

Carbon dioxide as a gas is considered to be inert and does not easily react with other gases in the atmosphere. Carbon dioxide's chemical reaction with water is most significant in pipeline transportation, since it forms carbonic acid, which has a pH of 3 and is corrosive to metals, including steel pipe, valves, and fittings. Because of this chemical reaction, it is essential that a CO₂ pipeline be dried out completely after a hydrostatic test.

Carbon Dioxide Pipelines

Gases have been used for many years to aid in the production of crude oil. They were initially used as a cap on the oil, injected into oil reservoirs to slow down the pressure decline from production. The displacement during production of crude oil by these gases was principally of the immiscible (not capable of mixing) type.

Research in the 1950s and 1960s was conducted into the use of gas which would mix with the crude oil and displace it in the formation. Because of its high degree of solubility in crude oil and abundance from natural sources, CO₂ became a natural candidate for use in enhanced oil recovery (EOR) projects.

Carbon dioxide extracts crude oil from the formation. Under favorable conditions of pressure, temperature, and composition, the CO₂ mixes with the crude oil. The CO₂ that dissolves in the crude oil increases the volume and decreases the viscosity making the oil more mobile. It also exerts an acidic effect on some types of reservoir rocks and vaporizes some of the oil.

There are a number of sources of CO₂ for EOR projects. It can be produced commercially in natural gas plants, ammonia plants, and recovered from power plant stack gas. These sources generally require a considerable amount of energy to compress CO₂ for

introduction into a pipeline. A better source is from underground reservoirs where CO₂ under pressure occurs naturally. The reported location and size of the largest such reservoirs are presented in Table 1.

TABLE 1.—CO₂ FIELDS IN THE U.S. AND THEIR RESERVES 1987

Field	Location (state)	Proven reserves (TCF)
Jackson Dome.....	Mississippi.....	3
Paradox Basin.....	Utah.....	1
Farnam Dome.....	Utah.....	1.5-2.2
LaBarge-Big Piney...	Wyoming.....	20-55
Doe Canyon/ McElmo Dome.....	Colorado.....	10-12
Sheep Mountain.....	Colorado.....	1-2
Bravo Dome.....	New Mexico.....	6-8

There are various modes of transportation for CO₂, but for the large volumes required in EOR projects, pipeline transportation is the most reliable and economical. A paper by Dwight L. Recht titled "Carbon Dioxide Pipeline Design Considerations" presented at Interpipe 85 in Houston, Texas, in 1985 describes the design of pipelines for transporting CO₂. The most significant points concerning the design of CO₂ pipelines are:

Pipeline transportation in the supercritical phase (where pressure exceeds 1,200 psig at any temperature) is more desirable than transportation in the gaseous phase. When transporting CO₂ in the gaseous phase at pressures above 700 psig in winter conditions, two-phase flow may occur, resulting in excessive pressure losses in hilly terrain and requiring the installation of expensive liquid separation equipment at booster stations.

- The pressure at which CO₂ will mix with crude oil (its miscibility pressure) can be as high as 3,000 psig, necessitating very high design pressures for pipelines.

- To minimize the formation of carbonic acid, CO₂ gas should be dehydrated to a water dewpoint below the minimum CO₂ service temperature.

- Temperature variations during pipeline transportation produce nonlinear fluctuations in hydraulic characteristics of the CO₂, requiring design by short sections, particularly in hill terrain.

- Supercompressibility must be considered in design, even in the supercritical phase. This results in negligible pressure surges caused by valve closings or the starting/shutdown of pumps.

The refrigeration effects when pressures are reduced from 1200 psig or higher to atmospheric during initial fill of a pipeline or during blow down during operation results in very low temperatures so that steel pipe and

components must be chosen with suitable properties to prevent brittle fracture failures.

The discussion above indicates that CO₂ pipelines require certain special design considerations in addition to

those used for most natural gas or hazardous liquid pipelines that the Department currently regulates.

Table 2 lists a summary of existing CO₂ pipelines.

TABLE 2—SUMMARY OF EXISTING CO₂ PIPELINES

Pipeline	Operator	Length (miles)	Diameter (inch)	Location
Cortez Pipeline Co.....	Shell Pipeline Corp.....	500	30	Colorado to Texas.
Bravo Pipeline Co.....	Amoco Pipeline.....	218	20	New Mexico to Texas.
Sheep Mt. Pipeline.....	ARCO Pipeline.....	408	24, & 20	Colorado to Texas.
Central Basin Pipeline.....	Enron Corp.....	144	26, 24, 20, & 16	Texas.
West Texas Carbon Dioxide Pipeline.....	Big Three Industries, Inc.	125	12, 10, & 8	Texas.
Choctaw Pipeline.....	Shell Pipeline Corp.....	140	20 & 10	Mississippi.
Raven Ridge Pipeline.....	Chevron Pipeline Co.	129	16	Wyoming to Colorado.
Pecos Pipeline.....	Marathon Pipeline.....	26	8	Texas.
Canyon Reef Carrier Pipeline (Sacroc Pipeline).	Chevron U.S.A.....	180, 40	16, 12	Northern Texas.
Texas Tertiary Ventures	Production Operators, Inc.	110	6	Texas.
Ranger Carriers	Production Operators, Inc.	15	6	California.
Shute Creek—Rock Springs	Exxon Company, USA	48	24	Wyoming.
Baroil Pipeline.....	Exxon Company, USA	112	20	Wyoming.
Seminole to Means Pipeline	Exxon Company, USA	25	12	Texas.
Denver City to Cornell.....	Exxon Company, USA	4	6	Texas.
Denver City to Shell Tie-In.....	Exxon Company, USA	4	6	Texas.

Generally these pipelines originate in the reservoirs of the Four Corners area and terminate in the Permian Basin oil field in Texas where most of the EOR projects exist. An exception is the Choctaw Pipeline which originates near Jackson, Mississippi, and terminates near McComb, Mississippi.

Pipeline Safety Reauthorization Act of 1988

There have been Congressional concerns regarding the transportation of CO₂ by pipeline over a number of years. The report on the Pipeline Safety Reauthorization Act of 1988 from the House Committee on Energy and Commerce in the 1987 session of the 100th Congress points out that "The Committee has for sometime recommended the safety regulation and inspection of CO₂ pipelines. The Committee further notes that:

The CO₂ pipeline industry has a good safety record and performs an essential service for enhanced oil recovery, but it is a very new industry. It is not a question of its safety record that caused the requirement for safety regulation, but rather the unique potential for disaster if there were ever a break in a CO₂ pipeline.

Despite its pervasive nature and absolute necessity to life, CO₂ has the potential to be as lethal as any other gas when it is present in concentrations greater than 10 percent. This could happen if a CO₂ pipeline ruptured. Water is equally benign, but in a flood it can kill. CO₂ is similar; in concentrations over 10% it is deadly.

The industry suggested that since they

have a good safety record, they do not need safety inspection under the HLPSPA or any other appropriate statute. When DOT asked for industry comments on the need for CO₂ safety regulations, a typical industry comment was, "CO₂ is not a toxic substance

By strict definition, this is correct; CO₂ is not toxic substance. Rather CO₂ causes death by asphyxiation.

A recent event demonstrated just how lethal CO₂ can be. On August 21, 1986, a catastrophic release on gas dissolved in Lake Nyos in Cameroon, Africa, killed 1,700 people. At the time, the news media characterized the gas as "toxic," "poisonous" and "lethal. Subsequent investigation proved the gas was carbon dioxide.

As far as the source of the carbon dioxide is concerned, the Lake Nyos incident bears no relation to a pipeline. The CO₂ in Lake Nyos was derived from volcanic sources. The result of this CO₂ release from the lake could be similar to the results if a CO₂ line under 3000 psi were to rupture. The quantity of CO₂ released at Lake Nyos, however, was approximately eight times greater than the volume would be released from any existing pipeline.

The Committee recognizes the role CO₂ will play in expanding the enhanced oil recovery industry. It is for this very reason additional CO₂ lines are likely to be constructed. The Committee does not want to limit the future construction of CO₂ pipelines because of unnecessary safety regulations. None-the-less the Committee believes that since CO₂ is deadly, CO₂ pipelines should have appropriate Federal safety regulations.

The requirement to issue regulations for the pipeline transportation of carbon dioxide was included in section 211 of title II of the Pipeline Safety

Reauthorization Act of 1988. That section added section 219 to the Hazardous Liquid Pipeline Safety Act of 1979 (HLPSPA) (49 U.S.C. 2001 *et seq.*) as follows:

Section 219—Carbon Dioxide

(a) *General Rule.* In addition to hazardous liquids, the Secretary shall regulate under this title carbon dioxide which is transported by pipeline facilities.

(b) *Regulations.* The Secretary, as necessary and appropriate, shall amend regulations issued with respect to hazardous liquids under this title and shall issue new regulations to ensure the safe transportation of carbon dioxide by pipeline facilities.

Discussion of Proposed Revisions

On March 16, 1989, the American Petroleum Institute (API) petitioned the Department to amend part 195 to include the regulation of pipelines that transport CO₂. The recommendations contained in this petition are the product of a task force formed under API auspices, consisting of representatives of nine companies that own or operate CO₂ pipelines. The participating companies were Amerada Hess Corporation, Amoco Pipeline Company, ARCO Pipeline Company, Chevron Pipe Line Company, Enron Corporation, Exxon Pipeline Company, Mobil Pipe Line Company, Production Operators, Inc., and Shell Pipe Line Corporation.

The API recommended that OPS amend existing part 195 rather than attempt to write a new part for CO₂

pipelines only. API felt the addition of a new set of regulations specific to CO₂ pipelines would complicate matters unnecessarily for both pipeline operators and OPS alike. OPS has adopted this approach, noting that it is consistent with the requirements of section 219(b) of the HLPESA.

The API stated that the hazard of CO₂ is significantly different from that of hazardous liquids subject to part 195. The term "hazardous liquid" is defined in part 195 as petroleum, petroleum product, or anhydrous ammonia. All of these substances are flammable or toxic or both, while CO₂ is not flammable, nor is it toxic. The primary hazard of CO₂ is the potential for asphyxiation if a high concentration of CO₂ is accidentally released from a pipeline.

Because of this difference in hazards, API considers it inappropriate to include CO₂ as another substance under the definition of "hazardous liquid." API argued that the two terms should not be confused to prevent the possibility of indiscriminate future application to CO₂ pipelines of regulations suited for hazardous liquid pipelines, and vice versa. OPS has no good reason to dispute this notion, especially since Congress distinguished the terms in the Reauthorization Act. Thus, part 195 would be applied to CO₂ pipelines without calling CO₂ a hazardous liquid.

API recognized that some of the requirements in part 195 are not appropriate for CO₂ pipelines. OPS agrees that CO₂ pipelines need to be exempt from certain parts of the existing regulations. In other instances new regulations need to be applied to CO₂ pipelines, but not to the other pipelines regulated under part 195. In addition, revisions have been proposed to those sections that need to be amended to make those regulations compatible with the pipeline transportation of CO₂.

The following is a discussion of the proposed changes to part 195:

Title

API's petition suggested that the title be changed to "Transportation of Hazardous Liquids and Carbon Dioxide by Pipeline." While OPS agrees that carbon dioxide should not be included in the definition of "hazardous liquids," the current title of part 195 would not be amended to include CO₂, because it would result in an awkward title. Similarly, Congress did not see fit to change the title of the statute which authorizes the regulation of CO₂ pipelines; it remains "Hazardous Liquid Pipeline Safety Act of 1979."

Subpart A—General

Section 195.0 General

This section would be amended to make part 195 applicable to the transportation of carbon dioxide by pipeline.

Section 195.1 Applicability

Section 195.1(a) would be amended to state that part 195 applies to the pipeline transportation of CO₂ in or affecting interstate or foreign commerce (covering both interstate pipelines and intrastate pipelines), with the exceptions noted below.

Section 195.1(b)(5) would be revised to exclude from regulation the transportation of CO₂ in offshore pipelines that are located upstream from the outlet flange of each facility on the Outer Continental Shelf where carbon dioxide is produced. This change is consistent with the existing jurisdictional limit of part 195 regarding offshore pipelines under the jurisdiction of the Department of the Interior.

Sections 195.1(b)(6) and (7) would be revised to exclude from regulation transportation of CO₂ through onshore production, refining, and manufacturing facilities, and transportation by modes of transit other than pipelines. Again, this is consistent with the jurisdictional limits of the HLPESA.

The exemption under § 195.1(b)(6) would exclude from the regulations CO₂ production facilities over reservoirs and other facilities where CO₂ is produced. In these facilities carbon dioxide is prepared for pipeline transportation by removal of water, methane, and other hydrocarbons or elements. This is similar to the exemption that currently applies to petroleum production facilities and other facilities used in the production of hazardous liquids. Also, excluded under this section would be CO₂ recycling systems. These are used to reprocess CO₂ after injection into a petroleum reservoir. They are more in the nature of a petroleum production facility than CO₂ pipeline transportation.

A proposed § 195.1(b)(8) would exclude from regulation the transportation of carbon dioxide through CO₂ distribution systems in petroleum production fields. This exemption would apply downstream from the first flange, or other connection, where carbon dioxide is delivered to a CO₂ distribution system. The CO₂ pipeline facilities that would be included in this exemption typically are located in rural areas away from the general public. The HLPESA exempts onshore petroleum production facilities from regulation, and since CO₂ distribution lines in a

petroleum production field are closely involved with petroleum production, OPS believes the CO₂ distribution systems are exempt from regulation under this statutory provision.

Section 195.2 Definitions

"Carbon dioxide" has been defined to provide a means of distinguishing facilities that transport this fluid from facilities that transport hazardous liquids.

The definition of "production facility" would be changed to include piping or equipment used in the production, extraction, recovery, lifting, stabilization, separation or treating of carbon dioxide, or associated storage or measurement. The revision is needed in order to include those facilities used in the process of extracting carbon dioxide from the ground and preparing it for transportation by pipeline. A provision would be added to specifically include piping between treatment plants that extract carbon dioxide, and facilities utilized for the injection of carbon dioxide for recovery operations.

In addition to the revision to the definition of "production facility," "carbon dioxide" has been added to the definitions of "interstate pipeline," "pipe," "pipeline," and "pipeline facility" to assure that these terms include carbon dioxide as a necessary component of those definitions.

Section 195.4 Compatibility Necessary for Transportation of Hazardous Liquids or Carbon Dioxide

It is important to recognize the importance of the chemical compatibility of carbon dioxide to the pipeline system in which it is being transported. OPS believes the inclusion of carbon dioxide in this paragraph and § 195.418, internal corrosion control, would address any corrosivity questions properly. This paragraph would require that carbon dioxide be chemically compatible with the pipeline, including all components, and any other commodity with which it may come into contact.

Section 195.8 Transportation of Hazardous Liquids or Carbon Dioxide in Pipelines Constructed With Other Than Steel Pipe

This proposed revision would require that the Department be notified before operators transport carbon dioxide in pipelines constructed of material other than steel.

Subpart B—Reporting Accidents and Safety-Related Conditions*Section 195.50 Reporting Accidents*

Accident and safety-related condition reporting for carbon dioxide pipelines would be subject to the same criteria that apply to non-HVL hazardous liquids. An appropriate change would be made to § 195.52 to require the telephonic reporting of certain carbon dioxide releases. Report Form 7000-1, or a facsimile, would be used for reporting CO₂ pipeline accidents, even though the title of the form bears the name hazardous liquid pipelines.

Subpart C—Design Requirements*Section 195.102 Design Temperature*

Low temperatures produced by pressure reduction situations or during the initial fill of the pipeline are important considerations when designing a carbon dioxide pipeline. OPS believes the language of existing § 195.102 should be revised to assure that materials for carbon dioxide are chosen properly for the low temperatures encountered during these situations. The proposed revision is not limited to problems that may arise from the cold nature of carbon dioxide, but recognizes that other commodities may also expose the pipeline to similar problems.

Section 195.111 Fracture Propagation

A new section is proposed to be added to account for the potential problem of a propagating fracture in a carbon dioxide pipeline. Because they operate at such high pressures, CO₂ pipelines contain a great amount of stored energy, much more than in a gas transmission pipeline. Performance language has been chosen for this new requirement to allow the operator of the pipeline system to determine the best method to mitigate a propagating fracture. Available methods include installation of heavy walled pipe or a mechanical device on the exterior of the pipe wall. It should be noted that some carbon dioxide pipelines with line pipe of adequate toughness may not require any additional special methods.

Section 195.118 Valves

Material compatibility of pipeline components and the commodity being transported is always a concern of an operator, regardless of the commodity involved. The proposed addition of carbon dioxide to the scope of this section would clearly indicate this concern for carbon dioxide pipelines.

Subpart D—Construction

API thought that due to the nonpolluting nature of carbon dioxide, valves located on either side of a water crossing should not be required. The OPS does not agree. While CO₂ may not be of a polluting nature, carbon dioxide bubbling through water can result in an asphyxiating cloud formation if carbon dioxide is released in large quantities as shown by the release of carbon dioxide in Lake Nyos in Cameroon, Africa. While it appears that a pipeline could not release sufficient quantities of carbon dioxide under a water crossing to create a problem, there is insufficient evidence to determine the quantity of a carbon dioxide release that would result in an unsafe condition. The OPS believes that placing valves on each side of a water crossing that is more than 100-foot wide is not an onerous requirement. Some current carbon dioxide pipelines have been constructed with valves on each side of major water crossings. If an operator finds this requirement to be significantly burdensome because the pipeline is located in swamps or crosses numerous times in meandering streams, the operator can petition for a finding that valves are not justified (an option that is available under § 195.260(e), and has been used by operators of hazardous liquid pipelines).

Subpart E—Hydrostatic Testing*Section 195.306 Test Medium*

This section is proposed to be revised to allow inert gas or carbon dioxide to be used as a test medium instead of water in carbon dioxide pipelines. This is desirable to reduce the potential for internal corrosion problems caused by the mixing of water and carbon dioxide to form carbonic acid. The use of inert gas or carbon dioxide offers particular advantages to facilities that have areas that are difficult to dry, such as meter stations with several branch connections or fittings.

Subpart F—Operation and Maintenance*Section 195.401 General Requirements*

Revisions are proposed to distinguish between hazardous liquid pipelines and carbon dioxide pipelines regarding the applicability dates of the design and construction requirements.

Section 195.402 Procedural Manual for Operations, Maintenance, and Emergencies

Revisions are proposed to include carbon dioxide pipelines in the requirements for a procedural manual

for operations, maintenance, and emergencies.

Section 195.403 Training

Revisions are proposed to include carbon dioxide pipelines in the requirements for establishing and conducting a continuing training program.

Section 195.410 Line Markers

The term "carbon dioxide pipeline" is proposed for use in carbon dioxide pipeline markers.

Section 195.414 Cathodic Protection

The proposed revisions would require that carbon dioxide pipelines be cathodically protected similarly to hazardous liquid pipelines. Carbon dioxide pipelines must be protected against corrosion to assure the integrity of the pipeline. However, the proposed rules require that the carbon dioxide pipelines be cathodically protected in a shorter period than was provided for the hazardous liquid pipelines because most of the existing CO₂ pipelines are already cathodically protected.

Section 195.418 Internal Corrosion Control

Carbon dioxide pipelines have a unique internal corrosion potential. Water can combine with carbon dioxide to form a compound that may be corrosive under pipeline operating conditions. The addition of the words "carbon dioxide" to this paragraph would require operators to investigate this corrosive effect and take adequate steps to mitigate such corrosion.

Section 195.440 Public Education

Revisions are proposed to require CO₂ pipeline operators to establish a continuing education program to enable the public to recognize a carbon dioxide pipeline emergency.

Paperwork Reduction Act

This proposed rulemaking contains collection of information requirements in §§ 195.5(c), subpart B, 195.266, 195.310, 195.402, and 195.404. These requirements will be submitted to the Office of Management and Budget (OMB) for approval under the Paperwork Reduction Act of 1980 (44 U.S.C. chap. 35) and 5 CFR 1320. Persons desiring to comment on these proposed information collection requirements should submit their comments to: Desk Officer, Research and Special Programs Administration, Office of Regulatory Policy, Office of Management and Budget, 726 Jackson Place NW., Washington, DC 20503.

Persons submitting comments to OMB are also requested to submit a copy of their comments to OPS, as indicated above under **ADDRESS**.

Impact

The proposed rules would extend the part 195 pipeline safety regulations to pipelines that transport CO₂, which are few in number. Pipelines under construction before the effective date of the final rule would be subject only to the accident reporting and operation and maintenance requirements of these regulations. Because almost all the proposals follow industry recommended practices, the fiscal impact of the proposed rules should be small. Therefore, this proposal is considered to be nonmajor under Executive Order 12291, and is not considered significant under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). Since the proposed rule should require minimal compliance expense, it does not warrant preparation of a Draft Evaluation. Also, based on the facts available concerning the impact of this proposal, I certify under section 605 of the Regulatory Flexibility Act that it would not if adopted as final, have a significant economic impact on a substantial number of small entities. This action has been analyzed under the criteria of Executive Order 12612 (52 FR 41685) and found not to warrant preparation of a Federalism Assessment.

List of Subjects in 49 CFR Part 195

Carbon dioxide, Pipe, Pipeline safety.
In consideration of the foregoing, OPS proposes to amend 49 CFR part 195 as follows:

PART 195—[AMENDED]

1. The authority citation for part 195 is revised to read as follows:

Authority: 49 App. U.S.C. 2001 *et seq.*, 49 CFR 1.53.

2. Section 195.0 would be revised to read as follows:

§ 195.0 Scope.

This part prescribes safety standards and reporting requirements for pipeline facilities used in the transportation of hazardous liquids or carbon dioxide.

3. In § 195.1, paragraphs (a) and (b) (5), (6), and (7) would be revised, and paragraph (b)(8) would be added to read as follows:

§ 195.1 Applicability.

(a) Except as provided in paragraph (b) of this section, this part applies to pipeline facilities and the transportation of hazardous liquids or carbon dioxide

associated with those facilities in or affecting interstate or foreign commerce, including pipeline facilities on the Outer Continental Shelf.

(b)

(5) Transportation of a hazardous liquid or carbon dioxide in offshore pipelines which are located upstream from the outlet flange of each facility on the Outer Continental Shelf where hydrocarbons or carbon dioxide is produced or where produced hydrocarbons or carbon dioxide is first separated, dehydrated, or otherwise processed, whichever facility is farther downstream;

(6) Transportation of a hazardous liquid or carbon dioxide through onshore production (including flow lines), refining or manufacturing facilities, or storage or implant piping systems associated with such facilities;

(7) Transportation of a hazardous liquid or carbon dioxide by vessel, aircraft, tank truck, tank car, or other vehicle or terminal facilities used exclusively to transfer hazardous liquids or carbon dioxide between such modes of transportation.

(8) Transportation of carbon dioxide downstream from the first outlet flange or other connection, where carbon dioxide is delivered to a production field distribution system.

4. In § 195.2, a definition of "carbon dioxide" would be added and definitions of the following terms would be revised to read as follows:

§ 195.2 Definitions.

"Carbon dioxide" means a fluid consisting predominately of carbon dioxide molecules compressed to a supercritical state.

"Interstate pipeline" means a pipeline or that part of a pipeline that is used in the transportation of hazardous liquids or carbon dioxide in interstate or foreign commerce.

"Pipe" or "line pipe" means a tube, usually cylindrical, through which a hazardous liquid or carbon dioxide flows from one point to another.

"Pipeline" or "pipeline system" means 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.

"Pipeline facility" means new and existing pipe, rights-of-way and any equipment, facility, or building used in the transportation of hazardous liquids or carbon dioxide.

"Production facility" means piping or equipment used in the production, extraction, recovery, lifting, stabilization, separation or treating of petroleum or carbon dioxide, or associated storage or measurement. (To be a production facility under this definition, piping or equipment must be used in the process of extracting petroleum or carbon dioxide from the ground and preparing it for transportation by pipeline. This includes piping between treatment plants which extract carbon dioxide and facilities utilized for the injection of carbon dioxide for recovery operations.)

5. Section 195.4 would be revised to read as follows:

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

No person may transport any hazardous liquid or carbon dioxide unless the hazardous liquid or carbon dioxide is chemically compatible with both the pipeline, including all components, and any other commodity that it may come into contact with while in the pipeline.

6. Section 195.8 would be revised to read as follows:

§ 195.8 Transportation of hazardous liquid or carbon dioxide in pipeline 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 (the effective date of this regulation) for carbon dioxide of material other than steel unless the person has notified the Secretary in writing at least 90 days before the transportation is to begin. The notice must state the chemical name, common name, properties and characteristics of the hazardous liquid or carbon dioxide to be transported and the material used in construction of the pipeline. If the Secretary 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.

7 The introductory text and paragraph (b) of § 195.50 would be revised to read as follows:

§ 195.50 Reporting accidents.

An accident report is required for each failure in a pipeline system subject to this part in which there is a release of the hazardous liquid or carbon dioxide transported resulting in any of the following:

(b) Loss of 50 or more barrels of hazardous liquid or carbon dioxide.

8. The introductory text of § 195.52(a) would be revised to read as follows:

§ 195.52 Telephonic notice of certain accidents.

(a) At the earliest practical moment following discovery of a release of the hazardous liquid or carbon dioxide transported resulting in an event described in paragraph 195.50, the operator of the system shall give notice, in accordance with paragraph (b) of this section, of any failure that:

9. Section 195.102 would be revised to read as follows:

§ 195.102 Design temperature.

Material for components of the system must be chosen for the temperature environment in which the components will be used so that the pipeline will maintain its structural integrity. Materials for pipelines transporting commodities in a highly pressurized supercritical state must be chosen for the low temperatures that can be produced during rapid reduction of pressure or during the initial fill of the line.

10. A new § 195.111 would be added to read as follows:

§ 195.111 Fracture propagation.

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

11. Section 195.116(c) would be revised to read as follows:

§ 195.116 Valves.

(c) Each part of the valve that will be in contact with the carbon dioxide or hazardous liquid stream must be made of materials that are compatible with carbon dioxide or each hazardous liquid that it is anticipated will flow through the pipeline system.

12. In § 195.306, paragraph (a) would be revised and paragraph (c) would be added to read as follows:

§ 195.306 Test medium.

(a) Except as provided in paragraphs (b) and (c) of this section, water must be used as the test medium.

(c) Carbon dioxide pipelines may use inert gas or carbon dioxide as the test medium if—

(1) The entire pipeline section under test is outside of cities and other populated areas;

(2) Each building within 300 feet of the test section is unoccupied while the test pressure is equal to or greater than a pressure that produces a hoop stress of 50 percent of specified minimum yield strength;

(3) The maximum hoop stress during the test does not exceed 80 percent of specified minimum yield strength;

(4) Continuous communication is maintained along entire test section; and

(5) The pipe involved is new pipe having a longitudinal joint factor of 1.00.

13. Section 195.401(c) would be revised to read as follows:

§ 195.401 General requirements.

(c) Except as provided by § 195.5, no operator may operate any part of any of the following pipelines unless it was designed and constructed as required by this part:

(1) An interstate pipeline, on which construction was begun after March 31, 1970, that transports hazardous liquid.

(2) An interstate offshore gathering line, on which construction was begun after July 31, 1977 that transports hazardous liquid.

(3) An intrastate pipeline, on which construction was begun after October 20, 1985, that transports hazardous liquid.

(4) A pipeline, on which construction was begun after (day before effective date), that transports carbon dioxide.

14. In § 195.402, paragraphs (c) (7), (9), and (12) and (e) (2), (4), (5), and (7) would be revised to read as follows:

§ 195.402 Procedural manual for operations, maintenance, and emergencies.

(c)

(7) Starting up and shutting down any part of the pipeline system in a manner designed to assure operation within the limits prescribed by paragraph 195.406, consider the hazardous liquid or carbon dioxide in transportation, variations in altitude along the pipeline, and pressure monitoring and control devices.

(9) In the case of facilities not equipped to fail safe that are identified under § 195.402(c)(4) or that control receipt and delivery of the hazardous

liquid or carbon dioxide, detecting abnormal operating conditions by monitoring pressure, temperature, flow or other appropriate operational data and transmitting this data to an attended location.

(12) Establishing and maintaining liaison with fire, police, and other appropriate public officials to learn the responsibility and resources of each government organization that may respond to a hazardous liquid or carbon dioxide pipeline emergency and acquaint the officials with the operator's ability in responding to a hazardous liquid or carbon dioxide pipeline emergency and means of communication.

(e)
(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.

(4) Taking necessary action, such as emergency shutdown or pressure reduction, to minimize the volume of hazardous liquid or carbon dioxide that is released from any section of a pipeline system in the event of a failure.

(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.

(7) Notifying fire, police, and other appropriate public officials of hazardous liquid or carbon dioxide pipeline emergencies and coordinating with them preplanned and actual responses during an emergency, including additional precautions necessary for an emergency involving a pipeline system transporting a highly volatile liquid.

15. In § 195.403, paragraphs (a) (2), (3), and (4) would be revised to read as follows:

§ 195.403 Training.

(a)

(2) Know the characteristics and hazards of the hazardous liquids or carbon dioxide transported, including, in the case of flammable HVL, flammability of mixtures with air, odorless vapors, and water reactions;

(3) Recognize conditions that are likely to cause emergencies, predict the

consequences of facility malfunctions or failures and hazardous liquid or carbon dioxide spills, and to take appropriate corrective action;

(4) Take steps necessary to control any accidental release of hazardous liquid or carbon dioxide and to minimize the potential for fire, explosion, toxicity, or environmental damage;

16. Section 195.410(a)(2) would be revised to read as follows:

§ 195.410 Line markers.

(a)

(2) The marker must state at least the following: "Warning" followed by the words "Petroleum (or the name of the hazardous liquid transported) Pipeline" or "Carbon Dioxide Pipeline" (in lettering at least 1 inch high with an approximate stroke of one-quarter inch on a background of sharply contrasting color), the name of the operator and a telephone number (including area code) where the operator can be reached at all times.

17. Section 195.414 would be revised to read as follows:

§ 195.414 Cathodic protection.

(a) No operator may operate a hazardous liquid interstate pipeline after March 31, 1973, a hazardous liquid intrastate pipeline after October 19, 1988, or a carbon dioxide pipeline after (2 years less one day after the effective date of this regulation), that has an effective external surface coating

material, unless that pipeline is cathodically protected. This paragraph does not apply to breakout tank areas and buried pumping station piping. For the purposes of this subpart, a pipeline does not have an effective external coating and shall be considered bare, if its cathodic protection current requirements are substantially the same as if it were bare.

(b) Each operator shall electrically inspect each bare hazardous liquid interstate pipeline before April 1, 1975, each bare hazardous liquid intrastate pipeline before October 20, 1990, and each bare carbon dioxide pipeline before (3 years after the effective date of this regulation) to determine any areas in which active corrosion is taking place. The operator may not increase its established operating pressure on a section of bare pipeline until the section has been so electrically inspected. In any areas where active corrosion is found, the operator shall provide cathodic protection. Section 195.416 (f) and (g) apply to all corroded pipe that is found.

(c) Each operator shall electrically inspect all breakout tank areas and buried pumping station piping on hazardous liquid interstate pipelines before April 1, 1973, on hazardous liquid intrastate pipelines before October 20, 1988, and on carbon dioxide pipelines before (3 years after the effective date of this regulation) as to the need for cathodic protection, and cathodic protection shall be provided where necessary.

18. Section 195.418(a) would be revised to read as follows:

§ 195.418 Internal corrosion control.

(a) No operator may transport any hazardous liquid or carbon dioxide that would corrode the pipe or other components of its pipeline system, unless it has investigated the corrosive effect of the hazardous liquid or carbon dioxide on the system and has taken adequate steps to mitigate corrosion.

19. Section 195.440 would be revised to read as follows:

§ 195.440 Public education.

Each operator shall establish a continuing educational program to enable the public, appropriate government organizations and persons engaged in excavation-related activities to recognize a hazardous liquid or a carbon dioxide pipeline emergency and to report it to the operator or the fire, police, or other appropriate public officials. The program must be conducted in English and in other languages commonly understood by a significant number and concentration of non-English speaking population in the operator's operating areas.

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