DEPARTMENT OF TRANSPORTATION

Research and Special Programs Administration

49 CFR Parts 192 and 195

[Docket No. RSPA-98-4733; Amdt. 192-88; 195-68]

RIN 2137-AD25

Pipeline Safety: Gas and Hazardous Liquid Pipeline Repair

AGENCY: Research and Special Programs Administration (RSPA), DOT.

ACTION: Final rule.

SUMMARY: We are adopting a safety performance standard for the repair of corroded or damaged steel pipe in gas or hazardous liquid pipelines. Because present safety standards specify particular methods of repair, operators must get approval from government regulators to use innovative repair technologies. The performance standard is likely to encourage technological innovations and reduce repair costs without reducing safety.

EFFECTIVE DATE: This final rule takes effect January 13, 2000.

FOR FURTHER INFORMATION CONTACT: L. M. Furrow at (202) 366-4559 or furrowl@rspa.dot.gov. You can read comments and other material in the docket at this internet web address: http://dms.dot.gov. General information about our pipeline safety program can be obtained at http://ops.dot.gov.

SUPPLEMENTARY INFORMATION:

Background

Listed below are safety standards in 49 CFR part 192 for gas transmission and distribution lines and 49 CFR part 195 for hazardous liquid pipelines that specify methods of repairing corrosion and other defects in metallic pipe.

Section	Pipe	Defect	Repair Method
§ 192.309(b)	Certain steel transmission lines or mains.	Dent of particular characteristic.	Remove by cutting out length of pipe
§ 192.485(a)	Metallic transmission lines.	Large area of general corrosion does not support maximum allowable operating pressure (MAOP).	Remove by cutting out length of pipe, unless operating pressure is reduced
§ 192.487(a)	Metallic distribution lines (except cast or ductile iron).	Large area of general corrosion does not support MAOP or has more than 70% wall loss.	Remove by cutting out length of pipe
§ 192.713	High-stress steel transmission lines.	Imperfection or damage impairs serviceability.	Remove by cutting out length of pipe, or install full- encirclement split sleeve
§ 192.717	Steel transmission lines.	Leaking defect.	Remove by cutting out length of pipe, install full- encirclement welded split sleeve, or apply other specified repair methods
§ 195.416(f)	Steel pipeline.	Large area of general corrosion reduces wall thickness below minimum in pipe specification.	Replace with coated pipe, unless operating pressure is reduced

Because these standards prescribe methods of repair rather than what the repair should accomplish, the standards lack sleeves, such as composite pipe wraps, grinding, hot tapping, and weld deposition, to repair corroded or damaged pipe. For ex- 192.485(a) and 192.713 so operators could use a new repair system called Clock Spring® wrap to simplify and reduce the average

system permanently restores the pressure containing capability of the pipe (D.R. Stephens, Summary of Validation of Clock Spring for Permanent Repair of Pipeline Corrosion Defects, GRI-98/0227, Gas Research Institute, Chicago, Illinois, October 1998).

Notice of Proposed Rulemaking

Recognizing the need for flexibility in §§ 192.309(b), 192.485(a), 192.487(a), 192.713, and 195.416(f), we published a notice of proposed rulemaking (NPRM) to amend these rules to permit operators to use repair methods that meet a performance standard (64 FR 16882; April 7, 1999). The standard we proposed was that the repair method be able to "permanently restore the serviceability of the pipe," a result comparable to that expected from replacing damaged pipe or installing a full-encirclement split sleeve. We explained that such restoration would be permanent if the repair were expected to last as long as the pipe under normal operating and maintenance conditions.

For assurance that a repair method indeed meets the performance standard, we further proposed that the method must have undergone "reliable engineering tests and analyses." Although no guidelines for these tests and analyses were proposed, we said "the tests and analyses need only be what a reasonable and prudent professional engineer would consider adequate to demonstrate

greater design strength" than the pipe being replaced. We think this requirement is overly conservative, and the safety of replacement pipe is otherwise governed by the material, design, construction, and testing requirements of Part 192.

Discussion of Comments

We received comments from the following sources in response to the NPRM:

Trade association: American Gas Association
Interstate gas pipeline operators: Colorado Interstate Gas Company, CMS Energy Corporation, Duke Energy Corporation, Enron Gas Pipeline Group, Paiute Pipeline Company, and Southern Natural Gas Company
Gas distribution operators: Southwest Gas Corporation and Consumers Energy Company
Manufacturer: Clock Spring Company, L.P.
Engineering firm: Stress Engineering Services, Inc.
Engineering consultant: Foy Milton, PE

Of the 12 commenters, four (Consumers Energy Company, Paiute Pipeline Company, Southern Natural Gas Company, and Southwest Gas Corporation) supported the proposed rules without change; one (Foy Milton) opposed use of a performance standard for pipe repairs; one (American Gas Association) supported the proposals but suggested a minor editorial change, which is included in

Asserting advantages of the existing specification-type standards (uniformity of application, ease of understanding, voluntary standards committee backing, and disallowance of unacceptable repair methods), Foy Milton urged us not to go forward with the proposed rule changes. While we agree that specification-type standards may be appropriate in some instances, they are not the standards of choice for mechanisms undergoing advancements in technology. Specification-type standards deny operators the flexibility to choose the most cost-effective technology to do a particular job, in this case repairing corroded or other damaged pipe. They also create a disincentive for operators to invest in the development of new technology. Moreover, properly crafted performance standards can bar the use of unacceptable technology. Therefore, we did not adopt this commenter's suggestion.

Clarity of Proposal

As discussed above, we proposed to widen operators' choices of repair methods by allowing pipe to be "repaired by a method that can permanently restore the serviceability of the pipe, as shown by reliable engineering tests and analyses." The Colorado Interstate Gas Company thought this wording could be misinterpreted to require tests and analyses of completed repairs. This commenter suggested we use the following alternative wording to

requirement to be misconstrued to apply to completed repairs rather than repair methods. Therefore, in the final rules, we revised the wording of the proposal as follows to better indicate the purpose of the tests and analyses: “repaired by a method that reliable engineering tests and analyses show can permanently restore the serviceability of the pipe.” We did not adopt the commenter's suggested rewrite because we believe it would, perhaps inadvertently, regulate completed repairs in addition to repair methods, a result not intended by the proposal.

Test Criteria

The Clock Spring Company was concerned that operators' freedom of interpretation under the proposed rules might threaten the integrity of repairs made by non-traditional methods. This commenter suggested we augment the proposal by including minimum test criteria, such as long term strength, environmental compatibility, and dynamic forces, and require that testing be consistent with ASTM D2992-96, Standard Practice for Obtaining Hydrostatic or Pressure Design Basis for “Fiberglass**”** (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings. Alternatively, the company recommended that we devise testing criteria based on the years of engineering experience in developing Clock Spring wrap. Similarly, Stress Engineering Services, Inc., a participant in proving the integrity of two com-

posed testing and analyses requirement is unnecessary. As support for this position, Enron cited performance standards, such as §195.422, as having satisfactorily controlled safety problems without requiring tests and analyses to demonstrate compliance. Enron also contended that performance standards implicitly require operators to prove that methods used to achieve compliance will indeed do so, and that requiring tests and analyses would hinder operators' freedom to use innovative technologies.

Our position, like the proposal, lies between these two different views. We are not persuaded that the proposed testing requirement needs strengthening. By and large, the pipeline industry's repair practices have been very conservative and slow to incorporate non-traditional methods. For example, the industry did not use Clock Spring or Armor Plate until after ample hard evidence was produced to prove the lasting integrity of pipe repaired by these methods. And the quality of these repairs, a great many of which have been done without the need for a waiver of Part 192 or 195 standards, is shown by the lack of reports of incidents or near-incidents attributable to faulty repairs. We think the industry is unlikely to take any less conservative approach to new repair technologies that may become available for use in the future.

At the same time, we still believe that a requirement for tests and analyses is needed. Given that

reason to drop a proposed requirement intended to assure the integrity of innovative repair alternatives. Enron did not explain why the proposed requirement, which is consistent with current industry practices, would hinder future innovation. Although we agree with Enron that without such a requirement operators would still have to demonstrate the validity of their compliance efforts, the nature of such demonstrations would be discretionary and could have less probative value than reliable engineering tests and analyses.

Furthermore, a majority of commenters apparently support our position. Except for Foy Milton, who advised us not to change the existing rules, seven of the remaining eleven commenters supported the proposed rules in general and expressed no specific opinion on the proposed requirement for reliable engineering tests and analyses. Also, as discussed below, our two pipeline safety advisory committees approved the proposed rules without recommending any change to this requirement.

In the NPRM, we described the “reliable engineering tests and analyses” that would be necessary to show that a particular repair method will perform as required. We said the tests and analyses need only be what a reasonable and prudent professional engineer would consider adequate to demonstrate compliance with the performance standard. We recognize that licensed professional engi-

our inspections for compliance with the final rule. In this regard, we would welcome opportunities to preview new pipeline repair technologies in the development stage to avert possible compliance issues later on when the technologies are marketed.

With the growth of repair technology, we expect that voluntary efforts will respond to any possible demand for uniform testing criteria. As mentioned above, Stress Engineering has already moved in this direction for certain composite wraps. And other firms and organizations may develop additional criteria for different repair techniques. Such criteria could be incorporated in voluntary standards, such as ASME B31.4 or B31.8, or in publications such as GPTC/ANSI Z380.1, Guide for Gas Transmission and Distribution Piping Systems. We now use these documents as a guide to acceptable practices in judging compliance with many performance standards in Parts 192 and 195.

Repair by Replacement

Duke Energy, CMS Energy, and Enron suggested that because pipe replacement is one of several methods that could be used under proposed §§ 192.485(a), 192.487(a), and 192.713(a) to repair corroded or damaged pipe, these rules would be clearer if they referred only to repair rather than to both replacement and repair. Although the premise of this comment is correct, the proposed

pair. Giving special emphasis to replacement in repair rules highlights the need for replacement pipe to meet these additional safety requirements. So we do not think the commenters' suggestion would necessarily contribute to overall clarity.

Corrosion Repairs

Duke Energy, CMS Energy, and Enron suggested that including the proposed performance standard under §§ 192.485(a) and 192.487(a) was redundant, because corrosion repairs would be subject to the same standard under proposed §192.713(a). But this observation is only partially correct, because §192.713(a) applies only to certain high-stress steel transmission lines, while §§ 192.485(a) and 192.487(a) apply to all metallic transmission or distribution lines. If the proposed performance standard were not included under §§ 192.485(a) and 192.487(a), corrosion repairs on pipelines not covered by §192.713(a) would not be subject to the proposed standard. So we have left the proposed performance standard in final §§ 192.485(a) and 192.487(a).

Leak Repairs

Duke Energy, CMS Energy, and Enron further suggested that the proposed performance standard under §192.713(a) for non-leaking defects should apply to leaking defects as well. This change, they said, would be con-

as explained in the NPRM, the purpose of this rulemaking is to make the pipe repair regulations more flexible so that operators have incentives to innovate and greater freedom in selecting repair methods. And, as the commenters indicated, achieving this goal does not depend on whether the defect to be repaired is leaking nor on the availability of a non-traditional leak repair method that qualifies under the proposed performance standard. In fact, adopting the proposed performance standard to authorize alternative leak repair methods is likely to foster the development of new methods of leak repair. Therefore, since the proposed performance standard is suitable for both non-leaking and leaking defects and applying the standard to the repair of leaking defects furthers the purpose of the NPRM, we have added the proposed performance standard to §192.717 to cover the permanent repair of leaks on transmission lines. As discussed below, our gas pipeline safety advisory committee supported this action.

Contrary to the commenters' suggestion, however, merely extending §192.713 to cover leaking defects would not enable removal of §192.717. Section 192.717 is broader in scope; it applies to all steel transmission lines, not just those that come under §192.713.

Reducing Operating Pressure

Duke Energy, CMS Energy, and Enron asked that we amend

of the corroded pipe (e.g., ASME B31.G-1991). After the MAOP is reduced to a safe level, the corrosion no longer impairs the serviceability of the pipe, making the repair requirement of §192.713 inapplicable. But we are not aware of comparable engineering guidelines for determining the safe operating pressure of steel pipe that has defects other than corrosion, such as scratches, gouges, or dents. Although operators may reduce operating pressure as a temporary protective measure under §192.711, in the absence of such guidelines, there is no accepted way to judge what amount of pressure reduction will restore the serviceability of the defective pipe and make removal or repair unnecessary. Therefore, we have not included the suggested amendment in final §192.713.

Both the existing and proposed §192.713 call for a reduction in operating pressure to a safe level during repairs. But Duke Energy, CMS Energy, and Enron pointed out that such a reduction is unnecessary if the operating pressure is already at a level safe for repairs. These commenters suggested that the rule merely provide that the operating pressure be at a safe level during repairs. We believe this interpretation is a reasonable application of the current rule, so we have included the suggested change in the final rule.

Dents Found During Construction

Existing §192.309(b) requires

among the commenters, it said the existing removal requirement is reasonable because, during construction, the dented pipe is accessible and not yet in service, and machinery and labor are on site or readily available. We are not swayed by this reasoning, however. Although we agree the burden of removal may be lessened somewhat by the circumstances of construction, we find it more reasonable to adopt a regulation that permits remedial options that can provide equivalent safety at possibly less cost. Final §192.309(b) is, therefore, adopted as proposed.

Advisory Committee Consideration

We presented the NPRM for consideration by the Technical Pipeline Safety Standards Committee (TPSSC) and the Technical Hazardous Liquid Pipeline Safety Standards Committee (THLPSSC) at a meeting in Washington, DC on May 4, 1999. The TPSSC is RSPA's statutory advisory committee for gas pipeline safety and the THLPSSC is RSPA's statutory advisory committee for hazardous liquid pipeline safety. Each committee has 15 members, representing industry, government, and the public, who are qualified to consider the technical feasibility, reasonableness, cost-effectiveness, and practicability of proposed pipeline safety standards. Both committees voted unanimously to approve the proposed rules and to approve the associated risk assessment information contained in

that is found to be generally corroded so that the remaining wall thickness is less than the minimum thickness required by the pipe specification tolerances must be replaced with coated pipe that meets the requirements of this part.**"** The member suggested that revising this requirement to refer to pipe that has "general corrosion" would clarify the meaning. In considering this suggestion, we found that the terms "generally corroded**"** and "general corrosion**"** are used in §§ 192.485(a), 192.487(a), 195.416(f), and 195.418(d) to refer to areas of corrosion other than corrosion pitting. Indeed, the two terms are used interchangeably in §192.487(a). Given the common intended meaning of both terms, which our experience indicates is universally understood and applied in the pipeline industry, and the lack of any compliance difficulty caused by the term "generally corroded,**"** we decided not to adopt the member's suggested change to §195.416(f).

As discussed above under Leak Repairs, Duke Energy, CMS Energy, and Enron suggested that the proposed performance standard is suitable for leaking as well as non-leaking defects. To help us assess this comment, at the November 4, 1999, TPSSC meeting in Washington, DC, we asked the TPSSC for advice on whether we should add the performance standard to §192.717, which prescribes repair methods for leaks on gas transmission lines. The TPSSC voted, with one absten-

A. Executive Order 12866 and DOT Regulatory Policies and Procedures

DOT does not consider this rulemaking to be a significant regulatory action under Section 3(f) of Executive Order 12866 (58 FR 51735; October 4, 1993), and the Office of Management and Budget (OMB) has not reviewed this rulemaking document. Also, DOT does not consider this rulemaking significant under its regulatory policies and procedures (44 FR 11034; February 26, 1979).

The final rules provide operators flexibility to choose the most cost-effective method of repairing pipe, while maintaining public safety. Thus, the rules will not add costs to industry, government, or the public. In fact, the rules should reduce operators' costs of transporting oil and gas, and perhaps the price consumers pay for these products. In comments on a proposed waiver to the Panhandle Eastern Corporation (58 FR 13823; March 15, 1993), the American Gas Association estimated that industry could save $6.5 million a year by using composite wrap to repair corroded or damaged pipe. Although part of the gas pipeline industry is already realizing these savings because of the Panhandle and other waivers, the final rules will create a similar opportunity for savings by the entire oil and gas pipeline industry. And still more savings could possibly result from the use of innovative technologies not

This rulemaking will not impose additional requirements on pipeline operators, including small entities that operate regulated pipelines. Rather, the rules offer operators the opportunity to use more economical methods of repairing corroded or damaged pipe. Thus, this rulemaking may reduce costs to operators, including small entities. Based on the facts available about the expected impact of this rulemaking, I certify, under section 605 of the Regulatory Flexibility Act (5 U.S.C. 605), that this rulemaking will not have a significant economic impact on a substantial number of small entities.

C. Executive Order 12612

This rulemaking will not have substantial direct effects on states, on the relationship between the Federal Government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612 (52 FR 41685; October 30, 1987), RSPA has determined that the final rules do not have sufficient federalism implications to warrant preparation of a Federalism Assessment.

D. Executive Order 13084

The final rules have been analyzed in accordance with the principles and criteria contained in Executive Order 13084, "Consultation and Coordination with Indian Tribal Governments." Be-

This rulemaking contains no information collection that is subject to review by OMB under the Paperwork Reduction Act of 1995.

F. Unfunded Mandates Reform Act of 1995

This rulemaking will not impose unfunded mandates under the Unfunded Mandates Reform Act of 1995. It will not result in costs of $100 million or more to either state, local, or tribal governments, in the aggregate, or to the private sector, and is the least burdensome alternative that achieves the objective of the rulemaking.

G. National Environmental Policy Act

We have analyzed the final rules for purposes of the National Environmental Policy Act (42 U.S.C. 4321 et seq.). We prepared an Environmental Assessment (64 FR 16884; April 7, 1999) in which we concluded that the proposed action would not significantly affect the human environment because alternative repair methods would have to be as reliable as those the pipeline safety regulations currently allow. Thus any alternative method would provide the same level of pipe protection that the current repair methods provide. Based on this Environmental Assessment and no receipt of information showing otherwise, we have prepared a Finding of No Significant Impact (FONSI). This FONSI has been made part of the docket.

erroneous data. The Year 2000 problem poses a threat to the global economy in which Americans live and work. With the help of the President's Council on Year 2000 Conversion, federal agencies are reaching out to increase awareness of the problem and to offer support. We do not want to impose new requirements that would mandate business process changes when the resources necessary to implement those requirements would otherwise be applied to the Year 2000 Problem.

This rulemaking does not require business process changes or require modifications to computer systems. Because this rulemaking does not affect the ability of organizations to respond to the Year 2000 problem, we have not delayed the effectiveness of the final rules.

List of Subjects

49 CFR Part 192

Natural gas, Pipeline safety, Reporting and recordkeeping requirements.

49 CFR Part 195

Ammonia, Carbon dioxide, Petroleum, Pipeline safety, Reporting and recordkeeping requirements.

In consideration of the foregoing, 49 CFR parts 192 and 195 are amended as follows:

PART 192--[AMENDED]

2. In §192.309, paragraph (b) introductory text is revised to read as follows:

§192.309 Repair of steel pipe.

* * * * *

(b) Each of the following dents must be removed from steel pipe to be operated at a pressure that produces a hoop stress of 20 percent, or more, of SMYS, unless the dent is repaired by a method that reliable engineering tests and analyses show can permanently restore the serviceability of the pipe:

* * * * *

3. Section 192.485(a) is revised to read as follows:

§192.485 Remedial measures: Transmission lines.

(a) General corrosion. Each segment of transmission line with general corrosion and with a remaining wall thickness less than that required for the MAOP of the pipeline must be replaced or the operating pressure reduced commensurate with the strength of the pipe based on actual remaining wall thickness. However, corroded pipe may be repaired by a method that reliable engineering tests and analyses show can permanently restore the serviceability of the pipe. Corrosion pitting so closely grouped as to affect the overall strength of the pipe is considered general corrosion for the purpose of this paragraph.

each segment of generally corroded distribution line pipe with a remaining wall thickness less than that required for the MAOP of the pipeline, or a remaining wall thickness less than 30 percent of the nominal wall thickness, must be replaced. However, corroded pipe may be repaired by a method that reliable engineering tests and analyses show can permanently restore the serviceability of the pipe. Corrosion pitting so closely grouped as to affect the overall strength of the pipe is considered general corrosion for the purpose of this paragraph.

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§192.711 [Amended]

5. In §192.711(b), remove "§192.717(a)(3)**"** and add "§192.717(b)(3)**"** in its place.

6. Section 192.713 is revised to read as follows:

§192.713 Transmission lines: Permanent field repair of imperfections and damages.

(a) Each imperfection or damage that impairs the serviceability of pipe in a steel transmission line operating at or above 40 percent of SMYS must be--

(1) Removed by cutting out and replacing a cylindrical piece of pipe; or

(2) Repaired by a method that reliable engineering tests and analyses show can permanently restore the serviceability of the

Each permanent field repair of a leak on a transmission line must be made by--

(a) Removing the leak by cutting out and replacing a cylindrical piece of pipe; or

(b) Repairing the leak by one of the following methods:

(1) Install a full encirclement welded split sleeve of appropriate design, unless the transmission line is joined by mechanical couplings and operates at less than 40 percent of SMYS.

(2) If the leak is due to a corrosion pit, install a properly designed bolt-on-leak clamp.

(3) If the leak is due to a corrosion pit and on pipe of not more than 40,000 psi (267 Mpa) SMYS, fillet weld over the pitted area a steel plate patch with rounded corners, of the same or greater thickness than the pipe, and not more than one-half of the diameter of the pipe in size.

(4) If the leak is on a submerged offshore pipeline or submerged pipeline in inland navigable waters, mechanically apply a full encirclement split sleeve of appropriate design.

(5) Apply a method that reliable engineering tests and analyses show can permanently restore the serviceability of the pipe.

PART 195--[AMENDED]

8. The authority citation for part 195 continues to read as follows:

Authority: 49 U.S.C. 5103,

(f) Any pipe that is found to be generally corroded so that the remaining wall thickness is less than the minimum thickness required by the pipe specification tolerances must be replaced with coated pipe that meets the requirements of this part. However, generally corroded pipe need not be replaced if--

(1) The operating pressure is reduced to be commensurate with the limits on operating pressure specified in this subpart, based on the actual remaining wall thickness; or

(2) The pipe is repaired by a method that reliable engineering tests and analyses show can permanently restore the serviceability of the pipe.

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Issued in Washington, DC on December 8, 1999.

Kelley S. Coyner,
Administrator.

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