

June 17, 1981

Operator Design of Valves

Signed

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The attached interpretation responds to your memorandum of March 17, 1981, regarding the meaning of ?195.406.

Attachment

DEPARTMENT OF TRANSPORTATION
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION
MATERIALS TRANSPORTATION BUREAU

PIPELINE SAFETY REGULATORY INTERPRETATION

No
te: A pipeline safety regulatory interpretation applies a particular rule to a particular set of facts and circumstances, and, as such, may be relied upon only by those persons to whom the interpretation is specifically addressed.

SECTION: ?195.406

SUBJECT: Maximum Operating Pressure of Valves

QUESTION 1.a: For Section 195.406(a)(2), who is responsible for determining the maximum design pressure of components (valves, flanges, fittings, etc.) of a pipeline, the manufacturers of the components, or the pipeline operators?

ANSWER: Part 195 applies to the transportation of hazardous liquids by pipeline in interstate or foreign commerce. (?195.1) The persons who own or operate the pipelines subject to Part 195 ("pipeline operators") are responsible for compliance with the requirements of Part 195 (?195.10 and 49 U.S.C. 2006). Since the term "pipeline" includes "component" (?195.2), pipeline operators must comply with Part 195 provisions governing design pressure of components. A manufacturer of a component normally does not own or operate the component after it is put into service subject to Part 195.

QUESTION 1.b: Does this paragraph allow pipeline operators to act as designers, and by their own calculations or testing, determine that it is safe to exceed the pressure ratings established by the actual designer-manufacturer of the component?

ANSWER: The design pressure of components is not prescribed in specific terms as it is for pipe under ?195.106. However, a few general requirements apply: for valves, "The valve must be of sound engineering design." (?195.116(a)); for fittings, "The fitting must be . . . at least as strong as the pipe" (?195.118(c)); and for flanges, "[A] flange connection . . . must be suitable for

the service in which it is to be used." (?195.126)

These design requirements do not limit the design of a component to the manufacturer's pressure rating. There is no express limitation, and neither the history of Part 195 nor the ordinary usage of terms would support a finding that the pressure rating set by a manufacturer is an implied limitation of the quoted design provisions. Although sound design principles may require that a manufacturer's pressure rating and applicable factors in consensus standards be considered in determining the design pressure of a component, a pipeline operator is free under Part 195 to use equally sound principles to derive an independent design pressure.

To rule otherwise would allow operators to avoid responsibility for improper design in cases where a manufacturer's rating is unsafe, and in cases where a manufacturer's rating is conservative, give an unfair advantage (and perhaps unlawful power) to manufacturers.

The preamble to the final rule adopted in ?195.406(a) supports this conclusion. (35 FR 17184) Under the caption "Section 195.406," the preamble states, "The design pressure criteria are based on the definition of maximum operating pressure proposed in the notice." The definition proposed was: "'Maximum operating pressure' means a pressure not more than the 'internal design pressure' that is the maximum pressure established by the carrier (emphasis added) for the safe operation of a pipeline. . . ." (33 FR 10213) Thus, the intent of ?195.406(a)(2) was to allow the pipeline operator to determine design pressure.

QUESTION 1.c: Before an operator exceeds the manufacturer's maximum working pressure rating of a valve or flange, is it necessary that MTB review the operator's calculations, i.e., is it necessary for an operator to apply for a waiver?

ANSWER: Part 195 does not require that an operator seek or obtain an approval from MTB before placing in operation a pipeline the operator has designed. Therefore, there is no requirement to waive. MTB field personnel may choose to verify an operator's design before a pipeline is placed in operation as a step in the enforcement process.

QUESTION 1.d: If it is allowable for operators to exceed the maximum working pressure rating established by its manufacturer, what specific test or calculations contained in the documents incorporated by reference in Part 195 are allowable to prove that flanges and valves can be safely operated in excess of the manufacturer's rating?

ANSWER: Part 195 does not require the use of referenced

documents to comply with the design requirements for components set forth in answer to Question 1.b above. The appropriateness of particular tests or calculations to determine a safe design above a manufacturer's rating would be judged by sound engineering principles and practices. Inclusion of particular principles or practices in a generally recognized consensus standard, regardless of whether the document is referenced in Part 195, would be a heavy factor to weigh in making a judgment about the appropriateness of an operator's tests or calculations.

QUESTION 2: For Section 195.406(a)(4), does this paragraph allow the operating pressure of valves to be 80 percent of the factory test pressure or the prototype test pressure? The ANSI rating is lower than 80 percent of a prototype pressure test on a valve.

ANSWER: Section 195.406(a)(4) provides one of four criteria, the lowest value of which determines the maximum operating pressure of a pipeline. Thus, a valve excepted under ?195.304 could be operated at 80 percent of its actual or prototype factory test pressure, provided that pressure does not exceed any of the pressures determined by the other three criteria. The lower ANSI rating would not be a consideration in determining compliance with ?195.406(a) unless the ANSI rating were used as the design pressure under ?195.406(a)(2).

QUESTION 3: For Section 203(d) of the Hazardous Liquid Pipeline Safety Act, will the "grandfather" provision of the HLPSA exempt valves installed prior to the adoption of Part 195 from the requirements of Part 195, including Section 195.406?

ANSWER: The "grandfather" provision of the HLPSA is set forth in Section 203(c). It reads: "Any standard issued under this section affecting the design, installation, construction, initial inspection, and initial testing shall not be applicable to pipeline facilities in existence on the date such standard is adopted." This provision, together with the savings provision of Section 218(a) of the HLPSA, would prohibit the application of design and construction standards to valves in existence before Part 195 was adopted. Such valves would not be exempt from compliance with ?195.406, however, since this section is an operating rule that does not fall under the "grandfather" provision.

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Materials Transportation Bureau

March 17, 1981

Subject: ACTION: Request for Interpretation
Section 195.406(a)(2) & (4)

From: Robert L. Paullin
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To: Melvin A Judah
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A number of liquid pipeline operators have components (valves, flanges, and fittings) installed in pipelines which operate at pressures exceeding the maximum working pressure specified by the ANSI class rating, or maximum working pressure marked on the component by its manufacturer. The pipelines have been operating at pressures exceeding the components maximum working pressure rating, which was established by its manufacturer, since before Part 195 became effective. These operators feel they are not in violation of Section 195.406, however, compliance actions have been initiated by OOE. In order for these compliance cases to be concluded in a timely manner, we need a prompt response to the questions included in this memo. Your cooperation in expediting this request would be appreciated.

The operator's support for their position is based on the following rationale:

By using formulas and testing procedures contained in standards incorporated by reference in Part 195, these operators have acted as designers and have justified to their own satisfaction that the components can be safely operated at pressures exceeding the manufacturer's maximum working pressure rating. The operators have not physically changed the manufacturer's design of the components but have relied solely on their own tests or calculations to justify the increase in the maximum pressure rating. For examples of operator justification of their action see Appendix A.

The OOE contends that the design pressure referenced in Section 195.406(a)(2) is the pressure established by the manufacturer of the valve and that Section 195.406(a)(4) applies to components that otherwise do not have a standard specification under which they were

manufactured.

In order to determine the enforceability of this regulation, OOE needs to have OPSR answer the following questions.

1. For Section 195.406(a)(2):

- a. Who is responsible for determining the maximum design pressure of components (valves, flanges, fittings, etc.) of a pipeline, the manufacturers of the components, or the pipeline operators?
- b. Does this paragraph allow pipeline operators to act as designers, and by their own calculations or testing, determine that it is safe to exceed the pressure ratings established by the actual designer-manufacturer of the component?
- c. Before an operator exceeds the manufacturer's maximum working pressure rating of a valve or flange, is it necessary that MTB review the operator's calculations, i.e., is it necessary for an operator to apply for a waiver?
- d. If it is allowable for operators to exceed the maximum working pressure rating established by its manufacture, what specific tests or calculations contained in the documents incorporated by reference in Part 195 are allowable to prove that flanges and valves can be safely operated in excess of the manufacturer's rating?

2. For Section 195.406(a)(4):

Does this paragraph allow the operating pressure of valves to be 80 percent of the factory test pressure or the prototype test pressure? The ANSI rating is lower than 80 percent of a prototype pressure test on a valve.

3. For Section 203(d) of the Hazardous Liquid Pipeline Safety Act:

Will the "grandfather" provision of the HLPSA exempt valves installed prior to the adoption of Part 195 from the requirements of Part 195,

including Section 195.406?

APPENDIX A

Operator Justification

1. Phillips Petroleum Co. (CPFs 3520 & 5506-1)

Operator's justifications are:

- a. Section 400(e) of ANSI B31.4-1974 gives them the authority to act as a designer and, by complete and rigorous calculations, uprate the pressure ratings established by the valve manufacturer.
- b. By their own calculations based on the formulas in ANSI B16.5, Section 6.1; ASME Boiler and Pressure Vessel Code, Section VIII, Appendix 2; and ASME Boiler and Pressure Code, Section VIII, Division I, the operator has proven to their own satisfaction that these valves are safe to operate at pressures greater than their current operating pressures. The above standards are all incorporated in Part 195.
- c. The valves in the pipeline cited were manufactured under API 600. These valves have thicker walls than valves manufactured on API 6D.
- d. Operating history proves that these valves are capable of operating at their current pressures. Some of these valves have operated at these pressures for over 30 years.
- e. ANSI B16.5, "Steel Pipe Flanges and Flanged Fittings," is conservative and needs updating.

As a matter of company policy, manufacturer's pressure ratings are no longer exceeded when new valves are installed or old valves are replaced.

2. Williams Pipe Line Co. (CPFs 3521 & 3523)

Operator's justifications are:

- a. Operator believes that Section 195.406(a)(4) allows the operating pressure of valves to be 80 percent of the factory test pressure of valves for any individually installed component which is excepted from testing under Section 195.304.

- b. Operator believes that safety factors for valves and flanges, as provided by industry standards such as API 6D and ANSI B16.5, is out of proportion to the criteria provided by Section 195.406 for pipe and components.
 - c. Operator has had a long operating history with no problems with the valves in question. Two of the pipelines involved were constructed in the early 1930's.
 - d. The pipelines are now being operated at pressures lower than they were operated prior to the advent of the pipeline safety regulations of Part 195.
3. Mid-America Pipe Line System (CPF 3522)

Operator's justification are:

- a. When operator now orders valves, they request manufacturer to test valve body to 1.5 times the working pressure of MAPCO's pipeline. MAPCO also requested that the valve seats be tested to 1.1 times the pipeline working pressure. MAPCO believes that based on Section 6 of API 6D (Ratings for Special Valves), that this testing and their own hydrostatic field testing would allow the valves to operate at higher pressures.
 - b. MAPCO believes that since the valves are operated below 80 percent of their field test pressures and 60 percent below of the factory design pressure test, they are in compliance with Sections 195.406 and 195.116(d).
 - c. Operator feels that they are the designer of the pipeline and they accept total design responsibility for the pipeline. Therefore, they can determine what the safe design pressure of the pipeline is.
 - d. Operator does not believe in "cookbook engineering." They believe both the ANSI B16.5 and API 6D are conservative and out of date.
 - e. Operator also believes that their operating history proves that these valves can be safely operated at these pressures.
4. National Cooperative Refinery Association (NCRA) (No

CPF)

The question of pressure ratings with NCRA is different from the other companies because this case involves valves that do not carry ANSI or API ratings, but are marked as "2000 test - 1000 CWP" or "1000 OWG." Some manufacturers make valves with this rating. There is no directly equivalent ANSI or API rating for the 1000 OWG or CWP rating.

Operator's justifications are:

- a. Valves marked as 1000 OWG were tested at time of manufacture to 2000 psig. Based on most industry codes, this would establish a working pressure of 1333 psig.
- b. Operator believes that since these valves are in a products line where there is no internal corrosion, then can take into consideration the valve's "corrosion allowance." This is recognized in ASME Code, Section VIII and is commonly used in all industry. NCRA claims that valve manufacturers use a corrosion allowance of about 1/4 inch for a 6-inch valve with a wall thickness of 7/8 inch. NCRA by using 1/8 inch for the corrosion allowance would pressure uprate these valves 16.79 percent (1333 psig to 1555 psig).
- c. The valves in question are Wescott Valves. Walworth Valve Co. purchased the Wescott Valve Co. and was selling the Wescott pipeline valve under the Walworth name. NCRA has a Walworth Co. drawing of this valve which shows the working pressure to be 1440 WOG at 100 degrees Fahrenheit for a ring joint faced flange. The Wescott valves have the same dimensions as the Walworth valves in the drawing. It is unknown why the valve body is marked 1000 OWG when the drawing shows 1440 psig.
- d. All of the valves which have been cited as bearing the 1000 OWG or CWP were manufactured prior to 1945. It is known that in 1950, the ASME, Section VIII code for unfired pressure vessels changed from allowable stresses reflecting a factor of safety of 5 over to allowable stresses reflecting a factor of safety of 4, thus uprating objects with the same thickness to a higher pressure rating. They believe that these valves would be qualified for this consideration.

- e. Operator has no failure problem with either the valves or flanges during their operating history.
- f. NCRA has offered to test the valves by the hydrostatic brittle coating test in ASME, Section VIII, paragraph UG-101 to prove to us that they can operate at their present pressures.