U.S. Department
of Transportation

Pipeline and Hazardous Materials Safety Administration

1200 New Jersey Avenue, SE
Washington, D.C. 20590

JUL 18 2016

Mr. Nate Chandler
Mechanical Engineer
Bureau Veritas North America, Inc.
Industry, Power and Utilities Group
180 Promenade Circle, Suite 150
Sacramento, CA 95834

Dear Mr. Chandler:

In a letter to the Pipeline and Hazardous Materials Safety Administration (PHMSA) dated January 11, 2016, you requested an interpretation of 49 CFR Part 192. You asked what the value for the longitudinal joint factor (E) in 49 CFR 192.113 should be in determining the yield strength (S) for steel pipe in 49 CFR 192.107.

You stated that Part 192 Subpart C – Pipe Design requires that the yield strength to be used in the design formula in 49 CFR192.105 is 24,000 psi if a pipe's specification or tensile properties are unknown. Also, you stated the longitudinal joint factor (E) should be employed in the yield strength calculation because the quality of the material properties, and the quality of joint are two separate and distinct items required to be accounted for the calculation.

You stated that your understanding of §§ 192.107 and 192.113 is that for unknown pipe material with unknown seam, the specified minimum yield strength value used in the denominator of the percent specified minimum yield strength calculation should be 14,400 psi (24,000 x 0.6) using the E value of 0.6. Therefore, you asked if your understanding of the yield strength determination is correct.

In addition, PHMSA asked you to provide us with an example of the numerator and denominator values for yield strength calculations. You responded to our follow up questions on April 4, 2016, as follows:

1. You assumed SMYS to be 30,000 psi (no tensile data available) because the operator thinks this is what it should be based on inconclusive records, from 30's, 40's, 50's or 60's or 70's, and has "no tensile," data for these vintages to support 30ksi.
2. You stated that the operator is unsure about wall thickness or seam joint of this vintage pipe based on lack of records.
3. You asked if the calculation for percentage SMYS is equal to = 30,000/(30,000*0.6) x 100 using the 30,000 psi and E factor of 0.6 in the denominator, or equal to = 30,000/(24,000*0.6) x 100 using 24,000 psi and E factor of 0.6 in the denominator, or equal to = 30,000/24,000 x 100 using 24,000 psi in the denominator and without E factor?

Our responses to your April 4, 2016, email are as follows:

1) It is incorrect to assume 30,000 psi for a pipeline without proper records and your calculations would increase the percentage SMYS than decrease it. Per § 192.107(b)(2), a yield strength of 24,000 psi should be used for a steel pipeline with unknown yield strength.

2) When a pipe's wall thickness is unknown, the wall thickness is determined by the method used in § 192.109. If a pipe's longitudinal seam type is not known, it is determined using the information in § 192.113.

3) Your values chosen for yield strength and related calculations are incorrect. Under § 192.105, an accurate yield strength is required to determine the design pressure of a pipeline. Your calculations are therefore incorrect, as you use an estimated, and inaccurate, SMYS within these calculations.

If you chose to use the §§ 192.107 and 192.113 requirements instead of tensile testing, for unknown pipe material, you must use 24,000 psi yield strength to determine the design pressure in § 192.105. Pipe mechanical properties of diameter, wall thickness, pipe grade (strength) and longitudinal seam type are then used in the design pressure formula of § 192.105, along with any derating based upon operational temperatures and derating factors in § 192.115. If we can be of further assistance, please contact Tewabe Asebe at 202-366-5523.

Sincerely,

John A. Gale
Director, Office of Standards
and Rulemaking

January 11, 2016

49 CFR 192 Request for Interpretation
Subparts C & L
%SMYS Calculations for Unknown
Pipe Material & Unknown Seam

Mr. John Gale, Director
Standards and Rulemaking
Pipeline and Hazardous Materials Safety Administration (PHP-30)
U.S. Department of Transportation
1200 New Jersey Avenue S.E.
Washington, DC 20590-0001
Email: John.Gale@dot.gov

Re: Prior Emails on 12/17/2015, attached PDF file

Dear Mr. Gale:

At the request of one of your staff members, I have captured the essence of my earlier e-mail requests for interpretation, in this abbreviated letter. But first, a little about BV, in the event you have not heard of us before now.

Founded in 1828, Bureau Veritas has developed a worldwide network to help businesses, agencies and organizations assess, attain and demonstrate compliance with standards and regulations in the fields of Quality, Health & Safety, Environmental and Social Accountability (QHSE-SA). The company's focus is on protecting its clients' brands, assets and business. Our services have set the standard for comprehensive, client focused solutions to environmental liabilities, structural integrity, employee health and safety concerns as well as regulatory compliance issues. Bureau Veritas has served the quality assurance, testing and expediting needs of the power generation and distribution industry worldwide. Working in concert with agencies, vendors, owners and program managers, we have developed and tailored our procedures to meet the stringent needs of our clients.

During one of our reviews related to an NGL (natural gas line) and regulations 49 CFR 192 specifically, we have discovered a point of concern and request a formal interpretation of the applicable sections of the code.

Our clarification is specifically addressed to the recommended calculations for %SMYS. This is usually some calculated hoop stress at a particular pressure (numerator) divided by SMYS (demoninator) in terms resoled in terms of percent. The specific concern is what value to use for the denominator of the %SMYS calculation as it applies to "unknown pipe material with unknown seam type."

Subpart C-Pipe Design, is very clear that 24,000 psi and a joint factor, E, are to be employed in the absence of tensile data (49 CFR 192.107 & 113). It is clear that the code, in this section, considers the quality of the material properties and the quality of joint to be two separate and distinct items that are required to be accounted for. However, when calculating %SMYS values for pre-1970 unknown existing pipe material with unknown joint factor for strength testing, the code is not clear specific to the demominator.

Conservative engineering judgement, and implications of Subpart C, would indicate that for unknown pipe material with unknown seam, the SMYS value, used in the denominator of the %SMYS calculation would be

24,000 psi x 0.6 = 14,400 psi. Typically, the joint factor, E, is ignored in the denominator. As such, 14,400 psi would be used in the denominator of the %SMYS calculation for unknown pipe material having an unknown seam weld. The percent difference in %SMYS calculations, between 24,000 psi or 14,400 psi, keeping all other valuables constant, would be 66.7%. Such a difference could put the pipe line over a 30% of SMYS threshold for strength testing 1 hour versus 8 hours, in isolated instances, depending on the MAOP the operator is attempting to qualify the line to.

In summary, Subpart-C regulations indicates that "unknown" pipe has two unknown factors, material quality and seam weld quality. In the absence of tensile data or quality control records, from the factory, which, if available, should include the seam weld of the "unknown," pipe in question, the most conservative of both factors should be employed (e.g; 24,000 psi and E=0.6). In contrast, new pipe is tensile tested across the seam weld and therefore, SMYS for new pipe would include the seam weld joint quality and the joint factor, E, would not be required or would be E=1. However, it is the presumption that this is not the case for, "unknown," pipe produced decades earlier, and SMYS' = SMYS x 0.6 = 24,000 x 0.6 =14.400 psi would be the conservative engineering approach to take since the maximum %SMYS is at the minimum denominator and maximum numerator.

[Note: It is understood that the operator, can determine the minimum and maximum strength test parameters. Therefore, final MAOP will be determined by test. It is also known that this may be a gap in the CFR code, and therefore, an industry wide concern. However, it is noted here as a code interpretation concern only.]

Based on where the NGL industry has come from and the direction the DOT and NGL operators wish to go, it would be helpful to have an interpretation in this matter.

Sincerely,

Nate Chandler, PE
Mechanical Engineer
Industry, Power & Utilities Group
Bureau Veritas North America, Inc.
www.us.BureauVeritas.com
www.BureauVeritas.com

cc: Tewabe Asebe, DOT

Request for Formal Interpretation -Revision

Nate Chandler to: infocntr 12/17/2015 11:44 AM

From: Nate Chandler/USA/VERITAS
To: infocntr@dot.gov

Revised to change P (stress) to S (stress).

To Whom it May Concern:

After calling the PHMSA Information line, I was directed to address my request, for interpretation, to this email. If by mistake I have reached the incorrect email, please reply and help me redirect my request as needed.

This email may be forward, as required, among PHMSA personnel only, at this time. I would request it remain confidential between PHMSA and BV, and not be posted on the PHMSA interpretation website until receipt of the interpretation, followed by a review and approval of the text to be shared with the public, be obtained. I hope this request is acceptable. Corporate intellectual property and contract confidentiality requirements should be honored.

During an engineering review of documentation, authorized by one of our clients, our engineer raised a point of concern. Since then engineers on the technical staff have been in debate about this point. We are now looking for a formal interpretation of the engineer's findings. It has to do with the correct way to calculate %SMYS for "unknown," pre-1970 pipe, or just unknown pipe. Considering that the engineer's presumptions have a significant effect on %SMYS results which can change from below 30% to above above 40%, it's important for the operator to have a clear classification based on accurate %SMYS calculations for their Integrity Management Program (IMP).

Without further wording, to confuse the issue, let me copy and place the findings of the engineer below:

Quoted Findings:

"Per 49 CFR 192.107 and 49 CFR 192.113 clearly state that both a SMYS value of 24,000 "and" a longitudinal joint factor of E=0.6 (E=JF for this discussion) should be used for "unknown" or "pre-1970," pipe in calculating Design Pressures and %SMYS. SMYS and Joint Factor, E, represent two independent factors. One for unknown material quality and the other for unknown seam joint quality, as the old pipe was produced from the factory and lays in the ground today.. Therefore, a conservative engineering approach to the %SMYS calculation would factor both into the denominator of the %SMYS calculation as %SMYS = [S/(24,000 x 0.6)] x 100 = [S/14,400] x 100, versus %SMYS = [S/24,000] x100.

In summary, the code indicates that "unknown" pipe has two unknown factors, material quality and seam weld quality. In the absence of tensile data or quality control records, from the factory, which, if available, should include the seam weld of the "unknown," pipe in question, the most conservative of both factors should be employed (e.g; 24,000 psi and E=0.6). In contrast, new pipe is tensile tested across the seam weld and therefore, SMYS for new pipe would include the seam weld joint quality and the joint factor, E, would not be required or would be E=1. However, it is the engineers presumption that this is not the case for, "unknown," pipe and SMYS' = SMYS x 0.6 = 24,000 x 0.6 =14.400 psi.

Note: It is understood that the operator, can determine the minimum and maximum strength test parameters. Therefore, final MAOP will be determined by test. It is also known that this may be an gap in the CFR code, and therefore, industry wide, however, it is noted here as a code interpretation concern only. "

.....End of Quoted Findings

Although the regulations are clear with respect to new pipe and pressure calculations for such pipe, it is not explicit as to the precise form of calculating %SMYS for "unknown," pipe. The engineer's concern is specifically related to "unknown," pipe "as specified by the operator," per CFR guidelines. The concern is that material and seam welding flaws produced from the factory in the 30's, 40's and 50's may not be reliable, especially for operator proclaimed "unknown," or non-tensile tested pipe. The "intent," and "spirit," of the code appear to be that operators, and engineers, should take the most conservative approach for questionable conditions not precisely or explicitly covered in the code. Operators, do not always take such an approach since they are driven to optimize and maximize existing infrastructure, thereby minimizing costs.

As all good, conservative engineers do, when in doubt, they take the most conservative approach. As such, it is expected the operator will question the finding, since they historically have not employed the Joint Factor, E, in their denominator for %SMYS calculations relative to "unknown," pipe. We are hoping to get an interpretation from PHMSA as supporting basis to our finding, or to remove the concern depending on the PHMSA interpretation received. Typically, the operator only uses the SMYS value of the unknown pipe for %SMYS calculations that ultimately, get placed into the IMP systems with respect to "unknown," pipe. In most cases 24,000 psi is used and no joint factor is applied, or E=1 is employed, even for "unknown," seam welded pipe.

Thank you for your time and effort in this matter. I hope I have made our question and request clear for PHMSA to render a technical review and interpretation. Please call or email for further clarification., as needed. An estimated time frame to render an interpretation would be helpful if it can be provided.

Thank you,

Nate Chandler , P.E.
Mechanical Engineer **-** Industry / Power & Utilities
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Management Systems Global Certifications:
ISO 9001:2008 – Quality ● ISO 14001:2004 – Environmental ● OHSAS 18001:2007 – Health & Safety

Chandler_Nate.vcf

----- Forwarded by Nate Chandler/USA/VERITAS on 12/17/2015 11:42 AM -----

From: Nate Chandler/USA/VERITAS
To: infocntr@dot.gov
Date: 12/16/2015 01:57 PM
Subject: Request for Formal Interpretation

Revised for spelling, punctuation and grammar 1:55pm, 12/16/2015.

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