



U.S. Department
of Transportation

Pipeline and Hazardous Materials
Safety Administration

1200 New Jersey Avenue SE
Washington DC 20590

APR 22 2019

Mr. Don Boudreaux
Project Director
IHI E&C International Corporation
15377 Memorial Drive, Suite 300
Houston, TX 77079

Dear Mr. Boudreaux:

In a letter to the Pipeline and Hazardous Materials Safety Administration (PHMSA) dated August 17, 2018, you requested a reconsideration of PHMSA's June 18, 2018, response to your initial March 7, 2018, interpretation request concerning marking with die-stamping of a 24-inch diameter, stainless-steel pipeline with ¼-inch wall thickness to be used as a liquefied natural gas (LNG) vapor line. You stated the process to mark the pipe is done under controlled automated process where low-stress stamping dies are used to emboss markings into flattened stainless steel from coils prior to going through the pipe forming process. In addition, you stated that in the manufacturing process, the pipes are heat treated which relieve any residual stresses created by the embossing and significantly reduces the potential for crack initiation. You believe the National Fire Protection Association (NFPA) 59A-2001 requirement in Section 6.3.5 does not apply to your marking processes because the requirement is for field pipe marking.

At a meeting with PHMSA on October 25, 2018, you provided additional information. You supported your reconsideration request with the following: (1) the structure of Chapter 6 of NFPA 59A-2001, the previous version of Part 193 regulations, evaluation of Section 6.3.5 of NFPA 59A-2001 by IHI's independent expert, and the industry recognizing a difference between stamping and embossing in support of the restriction in use of field die-stamping; (2) the ¼-inch wall thickness restriction is understood by IHI, IHI's independent expert, the impacted suppliers and manufacturers to be a nominal thickness; (3) there is no risk of fatigue failure due to the die-stamping; and (4) PHMSA's interpretation would force a significant change in industry practices. Based on the information you provided, you asked PHMSA to reconsider its June 18, 2018, interpretation to your original request.

Section 6.3.5 of NFPA 59A-2001, Pipe Marking, clearly states that materials less than ¼-inch wall thickness shall not be die-stamped for flammable liquids and flammable gases with service temperatures below -20° F. The NFPA standard does not specifically state nominal thickness. Moreover, PHMSA rejects IHI's suggestion that nominal wall thickness should be "implied" in NFPA 59A. NFPA 59A does not use or apply the term or concept of nominal wall thickness. Therefore, PHMSA cannot read the term into the standard. In this case, IHI is not able to reference specific language in the Part 193 regulations to support its reconsideration effort, and

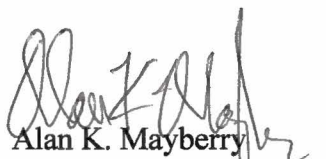
The Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety provides written clarifications of the Regulations (49 CFR Parts 190-199) in the form of interpretation letters. These letters reflect the agency's current application of the regulations to the specific facts presented by the person requesting the clarification. Interpretations do not create legally-enforceable rights or obligations and are provided to help the public understand how to comply with the regulations.

much of its argument is based on previous standards language. For example, IHI argued historically, the standards prohibited marking "in the field" and that although the word "field" was removed from the current language, it should remain implied as to application. This is contrary to the rules of statutory construction. By removing the word "field" from the standard, rather than assuming "field" still applies to the standard, PHMSA interprets the standard to be applied as written - and therefore not being limited to marking in the field only.

After examining your latest information, including your in-person presentation, PHMSA has determined that its June 18, 2018 interpretation should remain as issued. PHMSA's interpretations are based on current applications of the regulations to specific facts presented by the person requesting the clarification. In this case, requirements that are no longer in the current PHMSA regulations are not applicable.

If we can be of further assistance, please contact Tewabe Asebe at 202-366-5523.

Sincerely,



Alan K. Mayberry
Associate Administrator
for Pipeline Safety

August 17, 2018

Elba Liquefaction Project

Mr. John A. Gale
Director Office of Standards and Rulemaking
Pipeline and Hazardous Materials Safety Administration
1200 New Jersey Avenue SE
Washington D.C, 20490

Dear Mr. Gale,

This letter constitutes IHI E&C International Corporation's ("IHI") request to the Pipeline and Hazardous Materials Safety Administration (PHMSA) to reconsider the interpretation of 49 CFR Part 193 and NFPA 59A-2001 set forth in its June 18, 2018 letter to IHI.¹ It is IHI's position that the interpretation set forth in PHMSA's June 18, 2018 is overly broad, inconsistent with the industry understanding of the applicable rules and regulations, and contradictory to long-established industry practices. Accordingly, IHI asks that PHMSA consider the additional information and materials presented herein and reevaluate the interpretation set forth in its June 18, 2018 letter. Further, considering the importance of this matter to the Elba Island Liquefaction Project ("Project") and the potential impacts on the industry as a whole, IHI requests the opportunity to meet with PHMSA after PHMSA has had an opportunity to review this additional information to explain its position in further detail.

I. NFPA 59A-2001 Chapter 6 Subsection 6.3.5.

At issue is the interpretation and application of subsection 6.3.5 of Chapter 6 of NFPA 59A-2001, which states:

6.3.5 Pipe Marking. Markings on pipe shall comply with the following:

(a) Markings shall be made with a material compatible with basic material or with a round-bottom low-stress die.

Exception: Materials less than ¼ in. (6.35 mm) in thickness shall not be die-stamped.

(b) Marking materials that are corrosive to the pipe material shall not be used. Under some conditions, marking materials containing carbon or heavy metals can cause corrosion of aluminum. Marking materials containing chloride or sulfur compounds cause corrosion of some stainless steels. Chalk, wax-based crayons, or marking inks with organic coloring shall be permitted to be used.

In its June 18, 2018 letter, PHMSA stated that subsection 6.3.5 "is applicable for pipe marking when the pipe is used for an LNG Facility under Part 193, which includes pipe manufacturing, installation during original construction or during operations or maintenance activities..." IHI, its independent expert, and the impacted suppliers and manufacturers on the Project believe PHMSA's interpretation is an overly broad application of subsection 6.3.5 and, therefore, in need of reconsideration.

a. The Structure of Chapter 6 of NFPA 59A-2001.

Subsection 6.3.5 appears in Chapter 6 of NFPA 59A-2001, "Piping Systems and Components." Notably, the organization of the sections of Chapter 6 generally coincides with the logical sequence of activities in the design, construction, and operation of piping systems. First, Subsection 6.2, "Materials of Construction," defines what piping and component materials can be utilized in the piping system. Second, Section 6.3, "Installation," addresses the proper installation of those piping and component materials during construction of the piping system. Third, Section 6.4 "Pipe Supports" addresses the pipe

¹ PHMSA's June 18, 2018 letter is attached to this letter as Exhibit "1."

supports needed for the installation of the piping and component materials. Fourth, Section 6.5, "Piping Identification," addresses the identification of piping after installation. Fifth, Section 6.6, "Inspection and Testing of Piping," addresses the subsequent inspection and testing of the installed piping systems. And, finally, Sections 6.7, "Purging of Piping Systems," Section 6.8, "Safety and Relief Valves," and Section 6.9, "Corrosion Control," all address operational needs. Thus, because the sections are logically sequenced and categorized by design, construction, and operational activities, the organization of the Chapter suggests that the requirements set forth in each section are specific to the section in which they appear.

In fact, the subsections to the sections of Chapter 6 further support this contention. For example, Section 6.2, "Materials of Construction," is limited to setting forth requirements imposed on materials that are to be used in the design and construction of pipe systems. Indeed, the subsections therein address the general requirements for materials and the requirements specific to piping, fittings, and valves. Tellingly, despite the fact that subsection 6.2.2, "Piping," restricts the types of pipe welds that can be used in pipe fabrication and limits the types of useable pipe materials, there are no restrictions on pipe marking set forth therein. This is an important and intentional omission.

Subsequently, the subsections to Section 6.3, "Installation," all address the proper installation of the materials defined in Section 6.2. Indeed, subsection 6.3.1 addresses the installation of bolted connections, subsection 6.3.2 addresses the installation of joints, subsection 6.3.3 addresses the required provision and proper installation of valves, subsection 6.3.4 addresses the qualification and performance of welders and the procedures and techniques for welding, and subsection 6.3.5 addresses pipe marking. It should be noted that pipe marking logically follows welding as the marking done during installation is most likely to be performed by welders.

b. The Adoption Of NFPA 59A As The Governing Standard Under 49 CFR 193.

Interpreting the pipe marking restriction set forth in subsection 6.3.5 to be specific to field die-stamping is also appropriate because it maintains consistency in the application of the regulations. In fact, prior to the adoption of NFPA 59A Chapters 1 through 9 pursuant to Docket No. RSPA-97-3002 Amdt. 193-17², 49 CFR 193 (1999 version) set forth a nearly identical pipe marking requirement within Subpart D, "Construction," as the pipe marking requirement now set forth in Section 6.3, "Installation." Section 193.2313 "Pipe Welding" at subsection (d) of 49 CFR 193 (1999 version) stated "[s]urfaces of components that are less than 6.35 mm (0.25 in.) thick may not be **field** die stamped."³ (emphasis supplied.) The word "field" clearly conveyed the intent of restricting such markings during installation due to the imprecise nature of such a field activity. The omission of the word "field" in subsection 6.3.5 of NFPA 59A was not intended to change the application of its content to the markings on pipe at the jobsite. In addition, Section 193.2313, "Pipe welding" included essentially the same topics in the same sequence as are now set forth in subsections 6.3.4, "Welding," and 6.3.5, "Pipe Marking," of Chapter 6 of NFPA 59A-2001.

Further, the first heading in Subpart C, "Design" of the 1999 version of 49 CFR 193 (which appeared before Subpart D, "Construction") was "Materials." Consistent with Section 6.2, "Materials of Construction," of NFPA 59A, the Materials section of Subpart C, "Design," set forth the standards for materials to be used. Notably, the material specifications of Subpart C of 49 CFR 193 (1999 version) applicable to piping did not include any restrictions on pipe marking. Instead, as is also the case in NFPA 59A, Section 6.2, "Materials of Construction," the 1999 version of 49 CFR 193 restricted the type of piping materials that could be used and required piping to meet the standards of ASME B31.3. Indeed, the consistency in content and organization from the previously applicable regulations through to NFPA 59A-2001 and the lack of comment or analysis regarding any need for the expansion of pipe marking restrictions in Docket No RSPA-97-3002 Amdt. 193-17 suggests that there was no intent to expand pipe marking restrictions to a manufacturer's embossing of flat stock through the adoption of NFPA 59A.

c. IHI's Independent Expert's Interpretation Of The Application Of The Pipe Marking Restriction In Subsection 6.3.5.

IHI engaged Becht Engineering Company, a recognized expert in the pipe industry, to evaluate and opine on the intent of subsection 6.3.5 of NFPA 59A-2001. Consistent with the analysis set forth above, Mr. Don Frikken, of Becht Engineering Company, stated in the attached August 1, 2018 letter that, had the NFPA's Technical Committee on Liquefied Natural Gas intended the pipe marking requirement of subsection 6.3.5 to apply to marks added by component manufacturers, it would

² Docket No. RSPA-97-3002 Amdt 193-17 is attached to this letter as Exhibit 2.

³ See 49 CFR 193 (1999 Version) at Section 193.2313 "Pipe welding" attached to this letter as Exhibit 3.

have included that requirement in Section 6.2 “Materials of Construction.”⁴ As confirmed by Mr. Frikken and as detailed above, Section 6.2, “Materials of Construction,” would be the appropriate section for manufacturer’s requirements as it defines the standards for the materials that can be utilized in piping systems; where, Section 6.3, “Installation,” addresses the proper installation of such materials for the design and construction of the piping system.

This interpretation is consistent with and rational when considering the differing risk levels in relation to the potential for crack initiation created by stamping in the field versus manufacturer’s embossing. In his August 1, 2018 letter, Mr. Frikken explained that pipe stamping by welders in the field may be of concern, but a manufacturer’s permanent marking of flat stock is not. Mr. Frikken indicated that the surface deformation caused by stamping can add surface residual stress that, when combined with operations stresses, could result in the initiation of cracks. When the stamping is done by a welder during pipe installation, the process is uncontrolled and the added surface residual stresses will remain present in the installed pipe system. However, when embossing is used to apply markings to flat stock before the pipe is formed (as was done for the pipe at issue in Butting’s manufacturing process), the subsequent pipe treatment that is an inherent part of the pipe manufacturing process relieves the residual stresses imposed by embossing and eliminates the possibility of crack initiation. Indeed, Butting confirmed that the manufacturer processes following embossing are used, in part, to relieve any stress imposed by the marking.⁵ Thus, the inclusion of the restriction on die-stamping in Section 6.3, “Installation,” and the corresponding exclusion of any such restriction in Section 6.2, “Materials of Construction,” indicates that the NFPA Technical Committee recognized that the risk of crack initiation that is created by field stamping is not posed by a manufacturer’s embossing of flat stock prior to pipe fabrication.

d. The Industry Recognizes A Difference Between Stamping And Embossing.

Notably, as set forth in Butting’s “Statement Pipe Marking” attached hereto, the industry recognizes a distinction between “stamping” and “embossing.”⁶ Hard stamping generally means applying a stencil with a sudden impact or force onto the surface to be marked and is done using a press machine or manually by a hammer (i.e. by a welder). In contrast, embossing entails marking using letters and digits through round nose low stress stamps that are rolled into the flat stock material. Thus, the use of the term “die-stamped” in subsection 6.3.5 also indicates that the subsection was intended to be applicable to the stamping of pipe post-fabrication.

II. The 1/4” Restriction Is Most Reasonably Understood To Be A Nominal Thickness.

Even if subsection 6.3.5 applied to the manufacturing of the subject piping, IHI, Becht Engineering Company, and the impacted suppliers and manufacturers all agree that the 1/4 in. thickness requirement set forth therein is a nominal thickness requirement.

In his August 1st letter, Mr. Frikken of Becht Engineering Company explained that when a document refers to piping wall thickness without an adjective it is intended to be nominal wall thickness rather than the measured wall thickness, especially in the case of arbitrary requirements, such as the 1/4 in. requirement at issue. Further, Mr. Frikken sets forth that the application of the relevant code measurement, rounding, and precision requirements results in a finding that any wall thickness greater than or equal to .235 in. would satisfy the 1/4” requirement. Therefore, the pipe at issues here meets the 1/4 in. requirement of subsection 6.3.5.

In addition, Mr. Andrew Kohout, P.E., Chief of LNG Branch 1, Office of Energy Projects, Federal Energy Regulation Commission (“FERC”), has also agreed with IHI’s assertion that the 1/4 in. restriction set forth in subsection 6.3.5 is nominal thickness.⁷ Indeed, as Mr. Frikken implied in his August 1, 2018 letter, Mr. Kohout pointed out that enforcing actual wall thickness would be difficult because actual wall thickness can vary and change over time based on the tolerances applicable to manufacturing, fabrication processes, corrosion rates, and other pertinent allowances. Although Mr. Kohout defers to PHMSA in regard to the interpretation of NFPA 59A in relation to 49 CFR 193, his opinion should be given weight as, in addition to his position with FERC (an agency also having authority over the Project), he is a member of the NFPA Technical Committee on Liquefied Natural Gas.

⁴ Becht Engineering Company’s August 1, 2018 opinion letter is attached to this letter as Exhibit 4.

⁵ See Butting’s “Statement Pipe Marking” attached to this letter as Exhibit 5.

⁶ See Exhibit 5 “Statement Pipe Marking.”

⁷ Mr. Kohout’s 12/26/17 email regarding NFPA 59A die-stamping is attached to this letter as Exhibit 6.

III. There Is No Risk Of Fatigue Failure.

Putting aside the technical interpretations of the regulations discussed above, as set forth in Mr. Frikken's August 1, 2018 letter, the true intent of the regulation is to prevent the creation of a crack initiation site on the outside surface of the piping. Indeed, this interpretation was confirmed by Mr. Kohout and supported by reasoning in Department of Defense publication MIL-STD-792E, "Pipe and Equipment Marking Using Round Bottom Low Stress Dies."⁸ As detailed in his August 1, 2018 letter, Mr. Frikken analyzed the concentrated stress amplitudes applicable to the pipe at issue and found that in all cases they are well below the allowable standard. Accordingly, setting aside the arbitrary 1/4 in. requirement propounded in NPPA 59A subsection 6.3.5, Becht Engineering determined that the 24" pipe supplied by Butting to this project is suitable for service and fatigue failure caused by the embossing of the pipe is extremely unlikely. Thus, in consideration of all the data set forth above and pursuant to NFPA 59A-2001 Section 1.2, "Equivalency," IHI asserts that the Schedule 10S piping at issue meets or exceeds the quality, effectiveness, durability, and safety requirements prescribed by NFPA 59A-2001.

IV. PHMSA Interpretation Would Force A Significant Change In Industry Practices.

As confirmed by the impacted pipe manufacturers on the Project (Butting and Bristol Metals), pipe manufacturers rely on permanent pipe marking to track materials in the production process and are required by applicable code to permanently mark piping. Indeed, in its June 18, 2018 letter, PHMSA recognizes that ASME B31.3 "Process Piping" requires that pipes be marked. However, PHMSA seemingly overlooked the permanent pipe marking requirement imposed by ASTM A358. Butting and Bristol Metals have both noted that permanent pipe marking is necessary to satisfy ASTM A358's requirement that weld radiographs be traceable to the welds that are represented in those radiographs. Indeed, Bristol Metals, when presented with a request to eliminate permanent pipe marking from its manufacturing process for 24" Schedule 10S piping stated that it had "legitimate concerns regarding compliance to the ASTM A358 requirements," because the standards incorporated into ASTM A358 require that "locations shall be permanently marked on the surface of the part being radiographed."⁹ As Bristol Metals set forth, for this Project, each individual pipe is not only required to be traceable back to a radiograph, but, each weld location on each pipe needs to be traceable to two different radiographs. The elimination of permanent pipe marking that would result from the application of PHMSA's June 18, 2018 interpretation could create significant traceability issues in manufacturing and culminate in violations of ASTM A358 by creating the inability to trace welds as required.

Further, Butting produces approximately 20,000 tons of stainless steel pipes per year that are made from coil and marked as flat stock. In fact, Butting has supplied 24" schedule 10S piping as well as many other sizes of stainless steel pipe marked in the same manner to LNG projects around the world including the Freeport, Cameron, and Tacoma projects in the United States and the ICHTHYS project in Australia. In each of these Projects, the pipe has performed as expected without any compromise to the pipes' integrity. Indeed, in the pipe manufacturing industry, there has previously never been any doubt as to the acceptability of embossed stainless steel pipe for use in LNG projects.

I. Conclusion.

In conclusion, IHI requests that, in light of the information presented herein and the materials attached hereto, PHMSA reconsider its June 18, 2018 interpretation of NFPA59A-2001 subsection 6.3.5. IHI also requests a meeting with PHMSA to present, expand upon, and discuss the information set forth in this letter.

Yours sincerely,



Don Boudreaux
Project Director

⁸ See Mr. Kohout's 12/26/17 email at Exhibit 5 and MIL-STD-792E attached as Exhibit 6.

⁹ Edgen Murray Corporation May 31, 2018 Letter setting forth Bristol Materials position is attached to this letter as Exhibit 7.