U.S. Department
of Transportation
Pipeline and Hazardous Materials Safety Administration

1200 New Jersey Ave., S.E.
Washington, DC 20590

JUL 23 2008

Mr. E.A. Altemos
HMT Associates, L.L.C.
603 King Street
Alexandria, VA 22314-3105

Ref. No.: 08-0157

Dear Mr. Altemos:

This responds to your letter dated May 9, 2008, requesting clarification on the Pipeline and Hazardous Materials Safety Administration's (PHMSA) March 5, 2008 response to Mr. Dave Bailey [Letter Reference No. 07-0147 enclosed] regarding the performance requirements for shear sections on IM101 portable tanks. Specifically, you request clarification of Q3 and A3 of that letter. The letter from Mr. Dave Bailey referenced both IM101 and UN portable tanks, yet the answer to Q3 does not differentiate the two. You correctly assert that the performance requirements for IM101 and UN portable tanks are different, and request that Q3 be revised to reflect those differences. The answer to Q3 of the May 9, 2008 letter is revised to read as follows:

Q3. In a Safety Advisory Notice (62 FR 37638), PHMSA clarified that internal discharge valves and shear sections are safety devices required on the bottom-outlets of IM portable tanks in hazardous material service to prevent significant release of lading when damage is sustained at the filling/discharge connection. Does the performance standard allow for some leakage of the tanks lading?

A3(a). For UN portable tanks, the shear section or sacrificial device must break at no more than 70% of the load that would cause failure of the internal self closing stop valve. Provided the shear section satisfies this performance requirement, some leakage may occur.

A3(b). For IM101 portable tanks, the performance requirement applicable to shear sections was previously specified in § 178.270-12(d) [Removed: 72 FR 55678 (HM-244); October 1, 2007] of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). The requirement specifies that the shear section must break under strain

without affecting the product retention capabilities of the tank and any attachments. Therefore, there may be no leakage of lading from an IM101 portable tank related to the performance of the shear section.

I hope this information is helpful. Please contact us if you require additional assistance.

Sincerely,

Edward T. Mazzullo

Edward T. Mazzullo
Director, Office of Hazardous
Materials Standards

Eichenlaub
§178.270-12
§178.274
Portable Tanks
08-0157

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May 9, 2008

Mr. Edward Mazzullo
Director, Office of Hazardous Materials
Standards (PHH-10)
Pipeline and Hazardous Materials
Safety Administration
Department of Transportation
1200 New Jersey Avenue
SE Building, 2nd Floor
Washington, D.C. 20590-0001

Re: Interpretation letter Ref. No. 07-0147; request for withdrawal or correction

Dear Mr. Mazzullo:

This is to request withdrawal or correction of your interpretation letter Ref. No. 07-0147, written to Mr. Dave Baily of Fort Vale Engineering Ltd., as it relates to the requirements for shear sections on DOT Specification IM101 portable tanks. Your response to this request at the earliest possible time will be greatly appreciated as the subject addressed is at issue in litigation involving the failure of a shear section on an IM101 portable tank to break cleanly under strain, which resulted in damage to the internal discharge valve and loss of contents from the tank - ultimately leading to the evacuation of the neighboring community.

Subject letter refers both to Specification IM 101 portable tanks and DOT Specification UN portable tanks. However, this request for withdrawal or correction is made *only in the context of the shear section requirements for Specification IM 101 portable tanks*. In this regard, I note that the shear section requirements for IM 101 portable tanks are significantly different from those for UN portable tanks, or, for that matter, for DOT specification cargo tanks. Therefore, it is respectfully requested that you consider only the regulatory provisions specifically applicable to shear sections for Specification IM 101 portable tanks in your response owing to the unique requirements applicable under that specification.

Specifically, withdrawal or correction of PHMSA's response to Question 3 in subject letter is hereby requested. In this response, it is stated that "some leakage may occur" when the shear section functions under strain. As explained below, I submit there is no basis whatsoever given the manner in the which the Specification IM 101 shear section requirements are worded, or in the regulatory history of the adoption of these requirements, to interpret the intent of those requirements as permitting *any* leakage from the tank when the shear section functions under strain. In addition, PHMSA's response to Question 3 makes specific reference to the shear section breaking at no more than 70% of the load that would cause failure of the internal self-closing stop valve. However, nowhere in the Specification IM101 shear section requirements is this, or any other specific numerical value cited. Finally, the answer contradicts itself. It states that the device must break at a load lower than that which would cause failure of the internal self-closing stop valve. But then states leakage of lading may occur. If the shear section must break so as to prevent failure of the internal valve, what could possibly be the source of the leakage that the response goes on to state is permissible?

The shear section requirements for Specification IM101 portable tanks were previously codified at § 178.270-12(d) in the Department's Hazardous Materials Regulations (the HMR; 49 CFR Parts 171-180). These requirements read:

> "(d) A shear section must be located outboard of each internal discharge valve seat and within 10.2 cm (4 inches) of the vessel. The shear section *must break under strain without affecting the product retention capabilities of the tank* and any attachments." (emphasis added).

I submit that these requirements are clear and unambiguous. This is a pure performance standard, absolute in its nature. The shear section must break under strain in such a manner that there is no affect on the product retention capabilities of the portable tank. Obviously, any leakage from the tank associated with the functioning of the shear section under strain - in particular a continuous leakage - is irrefutable evidence that the product retention capabilities of the tank have been affected. Equally obviously, any damage to the internal discharge valve associated with the functioning of the shear section under strain - which, for example, results in the valve no longer seating properly thereby allowing leakage - is irrefutable evidence that the product retention capabilities of the tank have been affected.

This being the case, and given that the Specification IM101 shear section requirements are written as a pure performance standard, I submit there is no basis to interpret the requirements, as written, to allow any leakage whatsoever from the tank as a result of the functioning of the shear section under strain. Any leakage resulting from the functioning of the shear section under strain is clearly evidence that the product retention capabilities of the tank have been affected - indeed, adversely affected. Thus, the fundamental condition imposed under the Specification IM101 shear

section performance requirement, that is, that the shear section *must break under strain without affecting the product retention capabilities of the tank* has clearly not been satisfied.

Moreover, in reviewing the preamble to the *Federal Register* notice under which these requirements was adopted [46 FR 9888], there is nothing to substantiate that the intent of the requirement, as worded, was to allow any leakage from the tank when the shear section functions under strain. There is no evidence to suggest that the words were intended to mean anything other than exactly what they say - that is, that the shear section must function under strain in such a manner that the product retention capabilities of the tank are not affected. Again, any leakage through the internal discharge valve as a result of the functioning of the shear section under strain is clearly indicative of an adverse affect on the product retention capability of the tank.

Finally, reference is made in Question 3 to a Safety Advisory Notice that was published in the *Federal Register* [62 FR 37638] relating to bottom outlets on Specification IM101 and IM102 portable tanks. I would not consider that safety advisory notice to constitute an "interpretation" of the applicable requirements of the HMR, and I believe it is doubtful that when PHMSA's predecessor agency drafted the notice the wording was considered in the context of the notice being construed by readers as an interpretation. There is a formal process for publishing interpretations of the HMR in the *Federal Register* - and it is not by means of a safety advisory notice. Nevertheless, the wording of the notice should not necessarily be interpreted, as was suggested by Mr. Baily, as allowing leakage provided that the leakage is not "significant" (whatever that might mean), but rather that the purpose of the shear section is to help prevent the "significant" release of the entire contents of the tank that would otherwise occur absent the installation of a shear section.

To summarize, the shear section requirements for Specification IM101 portable tanks are clear and unambiguous. They provide that the shear section must break under strain without affecting the product retention capabilities of the tank. If owing to the functioning of the shear section leakage from the tank internal discharge valve occurs, the product retention capabilities of the tank have unquestionably been adversely affected. Thus, the applicable shear section requirement has not been satisfied. There is no basis whatsoever given the clear and unambiguous wording of the applicable requirements, or in the regulatory history of their development, that could justify an interpretation that the intent of the requirement was to permit leakage - however significant or insignificant that leakage may be. Accordingly, it is requested that as soon as possible subject interpretation letter be withdrawn or corrected to properly reflect the clear and unambiguous provisions of the Specification IM101 portable tank shear section requirements.

In closing, I would note that for certain hazardous materials allowed to be transported in Specification IM101 portable tanks, for example, materials toxic by inhalation, *any* leakage - including "insignificant" leakage, whatever that may be deemed to be - could be fatal. The recent interpretation of the shear section requirements could give rise to unintended consequences in this

regard by suggesting that leakage is permissible. Therefore, the interpretation should be withdrawn or corrected as requested herein.

Please do not hesitate to contact me if you have questions concerning this matter or if you require additional information.

Sincerely,

E. A. Altemos

U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

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

MAR 5 2008

Mr. Dave Bailey
Chief Engineer
Fort Vale Engineering Ltd
Parkfield Works
Brunswick St
Nelson
Lancs
UK BB9 0SG

Ref. No. 07-0147

Dear Mr. Bailey:

This is in response to your email on July 20, 2007 regarding the Hazardous Materials Regulations (HMR; 49 CFR 171-180) applicable to shear sections on IM101 and UN portable tanks. Your questions are summarized and answered as follows

Q1. You understand that the shear section or sacrificial device on UN portable tanks must break at no more than 70% of the load that would cause failure to the internal self closing stop valve in accordance with § 178.274(e)(1) . You ask if the removal of 30% of the wall section would result in a 70% stress reduction? If so, would this also satisfy the portable tank shear section requirement in § 178.270-12(d)?

A1. Reduction of the wall section by 30% may satisfy the 70% stress requirement specified in § 178.274(e)(1) provided an analysis of the shear section strength and expected performance shows that the shear section would break at no more than 70% of the load that would cause failure to the internal self closing stop valve. Section 178.270-12(d) requires a shear section to be located outboard of each internal discharge valve seat and within 10.2cm (4 inches) of the vessel. The shear section must break under strain without affecting the product retention capabilities of the tank and any attachments. It is the manufacturer's responsibility to perform an analysis of the shear section design, dimensions, and expected performance to determine the orientation of the shear section installation required to meet the minimum requirements of §§ 178.274(e)(1) and 178.270-12(d).

Q2. As far as you can determine the only shear section calculation available is TTMA RP 86-98, "Emergency Valve Shear Section Strength Calculation". Is the use of the TTMA RP 86-98 calculation considered the best practice for calculating the valve shear section strength for portable tanks?

A2. The HMR requirement applicable to portable tank shear sections is a performance standard. Under the HMR, various methods of analysis or test may be used to evaluate the expected

strength and performance of the shear section relative to the strength of internal self closing stop valve, and their configuration on the tank. The HMR do not specifically reference the TTMA RP 86-98 shear section strength calculation. However, it is the opinion of this office that the TTMA RP 86-98 shear section strength calculation is an acceptable method for calculating the expected performance of a shear section for compliance with the HMR.

Q3. In a Safety Advisory Notice (62 FR 37638), PHMSA clarified that internal discharge valves and shear sections are safety devices required on the bottom-outlets of IM portable tanks in hazardous material service to prevent significant release of lading when damage is sustained at the filling/discharge connection. You ask for confirmation that the performance standard does in fact allow for some leakage of the tanks lading, and that the groove is intended to protect the tank.

A3. Provided the shear section or sacrificial device breaks at no more than 70% of the load that would cause failure of the internal self closing stop valve, some leakage of lading may occur. The shear section is intended to protect the tank from catastrophic failure when damage to the filling/discharge connection is sustained.

I hope this satisfies your inquiry. If we can be of further assistance, please contact us.

Sincerely,

John A. Gale,
Chief, Standards Development
Office of Hazardous Materials Standards

Eichenbaub
§173.32
§178.270-12 (d)
§178.274
Portable Tanks
07-0147

Drakeford, Carolyn <PHMSA>

From: Mazzullo, Ed <PHMSA>
Sent: Monday, July 23, 2007 8:37 AM
To: Drakeford, Carolyn <PHMSA>
Cc: Hochman, Charles <PHMSA>; Betts, Charles <PHMSA>; Gale, John <PHMSA>; Gorsky, Susan <PHMSA>; Mazzullo, Ed <PHMSA>; Mitchell, Hattie <PHMSA>
Subject: FW: shear grooves

From: Dave Bailey [mailto:dbailey@fortvale.com]
Sent: Friday, July 20, 2007 2:51 PM
To: Mazzullo, Ed <PHMSA>
Subject: shear grooves

Dear Ed

I have was given your contact details by Charles Hochman with regards to the expectations of the DOT with respect to the design and function of shear sections for IM101 and UN portable tanks chapters CFR 49 chapters 178.270-12 (d) and 178.274 (e) (1) respectively.

My first questions relates to the design of the shear sections.
From discussions with Charles Hochman I understand that the 70 stress requirement for failure notated in 178.274 (e) (1) originates from the DOT 407 road tanks sections 178.345-1 (a) 178.345-8 (a) (4) a extract from these paragraphs regarding the shear section is below

" Shear section means a sacrificial device fabricated in such a manner as to abruptly reduce the wall thickness of the adjacent piping or valve material by at least 30 percent."

Charles intimated that the removal of 30% of the valve body wall section would be sufficient. Can you confirm then in simple terms that the removal the 30% wall section would result in the 70% stress reduction and therefore the groove would conforms to the 178.270-12 (d) and 178.274 (e) (1)

As far as we can determine the only shear section calculation available is.
TTMA RP 86-98 "Emergency Valve Shear Section Strength Calculation".
In lieu of any alternative methods other than the wall reduction above we have used the TTMA RP 86-98 calculation to determine the 70% shear stress reduction. Would you regard the use of this calculation as the best practice to calculate the valve shear section?

My second area is regarding the shear groove performance

I would like to understand the DOT's expected and accepted performance of the shear grooves. Below is a extract from the DOT in which a realistic view of some leakage may occur and that the groove is to protect the tank.

I would like to have conformation that this is the acceptance criteria used by DOT

[Federal Register: August 1, 1997 (Volume 62, Number 148)]

[Notices]
[Page 41481-41482]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr01au97-164]

DEPARTMENT OF TRANSPORTATION

Research and Special Programs Administration
[Notice 97-6]

Safety Advisory: Certified IM 101 and IM 102 Steel Portable Tanks With Bottom Outlets Without Internal Discharge Valves or Shear Sections

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

ACTION: Safety advisory notice; correction.

SUMMARY: RSPA published a safety advisory notice in the Federal Register (62 FR 37638) under notice 97-6 on July 14, 1997. The words ``capable of being closed from a location'' were inadvertently omitted in the advisory notice for material quoted from 49 CFR 173.32c(g)(2). This document corrects this error and, for the convenience of readers, reprints the text of the July 14, 1997 notice in its entirety, as follows:

This is to notify owners and users of DOT specification IM 101 and IM 102 portable tanks with filling or discharge connections below the normal liquid level that these tanks may be used for shipping hazardous materials only if they have internal discharge valves and shear sections. Internal discharge valves and shear sections are safety devices required on the bottom-outlets of IM portable tanks in hazardous material service to prevent significant release of lading when damage is sustained at the filling/discharge connection. Without those safety features, damage to a bottom outlet is far more likely to result in loss of a tank's entire lading.

[[Page 41482]]

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