



Distribution Date:
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Meeting Minutes
Joint Session
API Committee on Refinery Equipment
Subcommittee on Pressure Relieving Systems
Spring 2006 Meeting

8:00 A.M. - 12:00 P.M.
Wednesday, May 3, 2006

Hyatt Regency
Dallas, Texas

Mohammad Ali – Chairman

I. Introductions and registration of attendance

Chairman Mohammad Ali called the Subcommittee meeting to order at 8:00 and distributed copies of the agenda and of the minutes of the Fall 2005 meeting in Chicago. The attendees introduced themselves and registered their attendance on a sign-in sheet ([Attachment 1](#)). There were 25 attendees at the beginning of the meeting.

II. Appointment of Secretary to record minutes

Tom Bevilacqua was appointed secretary for the meeting.

III. Approval of minutes from the Fall 2005 meeting

Brad Otis was noted that the minutes of the Fall 2005 meeting refer to his discussion of results of a survey concerning liquid droplets passing through flare knockout drums and exiting flare tips. He noted that he would send a copy of these survey results for inclusion with the minutes of the current meeting ([Attachment 2](#)).

IV. Task Force reports

- Document Status Summary

API Document	Current Published Year	Due	Current Status	Target First Ballot	Target Published Year
520 Part I	2000	2005	Balloting	1Q2006	2006
520 Part II	2003	2008	Published		
521	1997	2002	Proofreading		2006
526	2002	2007	Published	2Q2006	2007
527	2002	2007	Published	2Q2006	2007
2000	1998	2003	Ballot	2Q2006	2006

- RP 520 TF Chairman Phil Henry reported that the 3rd ballot will go out within a few weeks, and that the 8th edition will be published in 2006
- RP 521 TF Chairman Ed Zamejc reported that ISO 23251 will be published in 2006, and that the 5th edition of API RP 521 will not be published independently of ISO 23251. Rather, a ballot will be circulated on the question of adopting ISO 23251 as the 5th edition of RP 521, once 23251 has been published in final form
- Standard 526 TF Chairman Roger Danzy reported that the goal of a ballot during second quarter 2006 would not be met, and that a task force has been formed to finalize the presentation of inlet and outlet pressure limits in the document tables
- Standard 527 TF Chairman Roger Danzy reported that the Task Force was currently addressing some questions concerning testing methods, and that 527 would not be sent for a ballot until this work has been completed
- Standard 2000 TF Chairman Denis DeMichael was not present to report. Subcommittee Chairman Mohammad Ali expressed his understanding that a ballot would likely be sent in the third quarter of 2006, with changes in one table and some additional text concerning the use of flame arrestors in series with pressure or vacuum vent valves

- **TF 520 - Phil Henry**

Chair Phil Henry noted that the Task Force had met for roughly four and a half hours on Monday and two hours on Tuesday, with approximately 29 participants. Minutes from the meeting can be found in [Attachment 3](#).

- 1) Significant time was spent addressing one Technical Inquiry concerning evaluation of PRV inlet pressure drop when only piping is being protected against overpressure. The inquiry presented the typical example of piping downstream of a pressure let-down valve. Phil noted that the group agreed that all piping downstream of the control valve, from the spec break to the PRV inlet, needs to be included in the calculation. It was decided that a discussion of small volume systems (typically piping) should be added to RP 520, Part II. A response to the TI has been approved.
- 2) Phil noted that he had received an additional inquiry concerning the issue of the use of “K” (ratio of specific heats) and/or “n” (isentropic expansion coefficient) following the Task Force meetings. Aubry Shackelford will draft a response to this inquiry.
- 3) Comments received during the second ballot for the 8th edition of RP 520, Part I were reviewed and addressed. Comments on four

issues were deemed to be technical in nature and would therefore need to be included in a 3rd ballot:

- a. Metric units for the flow coefficient C
- b. Further modifications of Appendix D, allowing for the use of *either* two-phase or subcooled liquid methods for the case of a saturated liquid entering a PRV
- c. The deletion of Figure D-1
- d. Revision of Equations D-8 and D-9 to make them consistent with the recommended values for discharge coefficient k_d for liquid and two-phase streams.

Phil noted that ballots should be sent out a few weeks following the meeting, with a request for a quick turn-around to meet the goal of publishing the 8th edition in 2006.

- 4) Phil noted that he has a list of action items for the next edition of Part II. He will send the list out to all of the Task Force members who volunteered to address the items.
 - 5) Phil noted that he had recently received a paper on the issue of discharge thrust forces from Robert D'Alessandro of Degussa. He will invite Mr. D'Alessandro to present his results at the Fall meeting in San Francisco.
- **TF-521 - Ed Zamejc**

Chair Ed Zamejc reported 29 attendees at Tuesdays joint meeting of the Task Force for API RP 521 and the Working Group for ISO 23251. The meeting minutes are included in [Attachment 4](#).

- 1) The Task Force approved responses to three RP 521 Technical Inquiries
- 2) The group decided not to pursue publication of the current draft 5th edition of RP 521, noting that it differs from the FDIS (Final Draft International Standard) 23251 not only in format, but also on a few technical points, and that many errors were found in the proof copy of RP 521. The current expectation is that ISO 23251 will be published in September. Following this publication, a ballot will be circulated to API members to adopt the published ISO document as the 5th edition of RP 521. Ed pointed out that Roland Goodman of API has approved posting the "publication draft" of the intended 5th edition of RP 521 in the Task Force's electronic drop box to assist anyone interested in comparing it with the published ISO 23251. There was some discussion of methods for hastening publication of RP 521, including circulation of the current FDIS 23251 for adoption as the 5th edition of RP 521. It was decided this would not be a desirable path, because of the possibility of slight differences between the published standards.

- 3) Work is commencing on the next edition of ISO 23251/API RP 521, with the same leadership personnel (Brad Otis as ISO Project Convenor and Ed Zamejc as Working Group Leader). Ed has a working list of topics to be addressed for the next edition. The list will remain open for approximately one year, after which it will be closed until publication of the next edition. All new topics will then be added to a list to be addressed in subsequent editions. To stay on the standard five year cycle, the next edition will need to be published late in 2011.
- **TF 2000 – Denis DeMichael**
In the absence of Task Force Chair Denis DeMichael, Mohammad Ali summarized the group's activities at its meeting on Monday. He noted that the next edition of Std 2000 would involve limited changes. The group had decided to proceed with pursuing the publication of an ISO version of Std 2000 immediately, in much the same manner as followed for RP 521. In parallel with this effort, a major re-write of Std 2000 will be started, with a goal of making it an analog of RP 521 whose scope is equipment with design pressures less than 15 psig.
 - **PRV Inlet Loss/Stability - Ed Zamejc**
Project Chair Ed Zamejc reported that not much activity has taken place since the Fall 2005 meeting. The current plan is for Prof. Darby to try to fit the PRV performance data currently in hand (which does not include the effects of piping). When this is completed, the project will proceed to run experiments on piping configurations expected to cause chattering. The Committee on Refining Equipment has agreed to provide additional funding for the project, and have requested copies of the project reports to date.
 - **TF 526/527 - Roger Danzy**
Chair Roger Danzy reported that there were 24 members and 6 guests present at the meeting Monday morning.
 - 1) The group addressed two Technical Inquiries concerning Std 526.
 - a. The first was about the change in the 5th edition providing temperature ranges in the column headings. Roger explained that there was no intention to prevent interpolation of inlet pressure limits as a function of coincident temperature.
 - b. The second concerned the limitations on outlet pressure at temperatures other than 100 °F. Can the temperature/pressure relationships provided in ASME B16.34 be used in the tables – for both inlet and outlet limitations? A sub-group has been formed to evaluate the need for such guidance. The group includes Aubry

Shackelford, Hari Attal, Freeman Self, Mike Porter, Chester Brooke, Ying Lai, along with Roger Danzy.

- 2) There were no Technical Inquiries concerning Std 527, but the group discussed the potential need to include other seat tightness testing methods in the document, including one involving the deflection of a soap film.

V. Status Updates on Other Ongoing Business

- **ASME/API task force: Fire exposure of vapor vessels – Brad Otis**
- **Proposed ASME Code language (incorporation of Case 2211 like concepts) – What further work is required - Brad Otis.**

Brad Otis reported that a meeting of the ASME/API Joint Task Force scheduled for January was postponed due to a snowstorm. It has been rescheduled for August.

- **PRV Backpressure Issue Raised by the Dossena Paper – Agreed text for RP 520, Roger Danzy/ Phil Henry.**

Brad Otis, Roger Danzy, and Phil Henry reviewed revised wording for the RP 520 ballot draft intended to address questions raised by the Dossena publication, which has been discussed in detail over the last several years. This text focuses on the interactions among set pressure, flow capacity, and blowdown of balanced bellows PRVs.

- **Pressure Vacuum Vent Flame Arresting Capabilities Issue – Brad Otis/Denis DeMichael**

Brad Otis presented draft text for addition to Std 2000 to address potential need for a flame arrester in series with a tank vent valve. It was agreed that this would constitute a technical change to be included in the next ballot of Std 2000. Brad will circulate the text via e-mail for any additional comments or revisions.

- **ISO Standard Activities – Alan West**

Alan West reported that ISO 4126-9 on installation of relief devices has been voted through to the stage of an FDIS (Final Draft International Standard).

Committee Draft 4126-10 on two-phase flow in pressure relief valves is currently out for ballot for adoption as a Draft International Standard. The US will vote negative on this question, with comments supplied by both DIERS and API committee members. Particularly within the DIERS community there is a strong negative opinion of the current draft.

VI. Old Business

- **Pressure relief issues in other API documents – Draft list of topics that SC PRS should address in other API documents – Tom Bevilacqua.**

Several related issues were discussed under this topic, most of which involved potential recommendations to other Subcommittees and Task Forces concerning language in their RPs and Stds on the subject of pressure relief requirements:

- 1) References to PRS documents should be updated and standardized. Very often documents in the scope of other subcommittees refer to RP 520 only, when the intended subject matter actually seems to be that of RP 521. In many cases, the reference should probably be to all of RP 520, 521, and Std 526
- 2) Documents whose scope includes specification of vendor-supplied packages (e.g., pumps, compressors, dehydration systems, etc.) should require that the vendor supply PRV sizing calculation details in the same way they are typically required to specify set pressure, relief capacity, etc
- 3) It was agreed the PRS Subcommittee should consider preparing some specific phrasing it would like to see included in any document that raises the issue of pressure relief requirements

It was agreed that Subcommittee Chair Mohammad Ali will raise this issue at the next meeting of the Committee on Refining Equipment.

- **Voter vs. Non-Voters – Report from Task Force (520, 521, 526, 527, 2000) Chairmen ensuring that only one company representative is listed for each**

Roland Goodman of the API staff noted that there was only one basic rule concerning voting on adoption of drafts as API documents – each member company gets one and only one vote on each draft. Ballots are typically distributed to registered members of both the Subcommittees and the Task Forces, but this practice can be decided by each Subcommittee. Generally there is one voting member on each subcommittee and one on each Task Force. Roland noted that this could be two separate individuals -- and only one of them will be entitled to vote on a given document.

Roland also discussed options available for publishing the 5th edition of RP 521.

- a) He confirmed that the latest proof draft of RP 521 can be posted on the internet “drop box.”
- b) When ISO 23251 is published, Roland will issue to the API membership a ballot for adoption of ISO 23251 as the 5th edition. This will be conducted via the usual API ballot process, and is expected to occur in 3rd quarter 2006

VII. New Business

- **Flare mist combustion issue – John Straitz, Bob Schwartz & Ed Zamejc to report on literature search.**

Bob Schwartz gave a brief presentation on the subject. He noted that the first edition of RP 521 specified a design criterion of 150 μm for the largest droplet size transmitted beyond a flare knockout drum. This was changed in the 2nd through 4th editions to “300 to 600 μm .” The basis for this change was unknown to the members in attendance. It was noted that some member companies may have minutes of meetings in the 1970s at which this topic was addressed. Members in attendance agreed to investigate this possibility.

Bob noted that deposition of bulk liquid on elbows downstream of the knockout drum or at the inlet to the flare stack can lead to significant liquid droplets entering the flare stack.

- **Inter-stage relief issues with reciprocating compressors – Brad Otis.**

Brad Otis raised a question concerning common practice with respect to identification of potential overpressure scenarios in multi-stage reciprocating compressors. His presentation is provided in [Attachment 5](#).

- **Performance and sizing issues with single (vapor or liquid) certified and dual certified relief valves- Brad Otis.**

Brad’s presentation file on this topic is provided in [Attachment 6](#).

- **Acoustic vs. turbulence induced fatigue of piping – Ed Zamejc.**

Ed Zamejc gave a presentation on acoustic-induced fatigue failures of piping. The presentation file is provided in [Attachment 7](#).

- **Use of “Internals” (baffles, demister mesh pads, vane packs, etc.) in flare knockout drums. Discussion in light of a recent accident in the Norwegian sector of the North Sea – Discussion led by Tom Bevilacqua.**

Tom Bevilacqua reviewed the guidance currently provided in RP 521 concerning the design of internal elements in flare knockout drums, and Håkon Løvåsen summarized a recent incident traced to a failure of an internal baffle plate in a flare drum. Their presentation files are provided in [Attachment 8](#) and [Attachment 9](#) respectively.

VIII. Adjourn