MINUTES
TASK FORCE ON API STD-520
SUBCOMMITTEE ON PRESSURE RELIEVING SYSTEMS
2019 Fall API Refining and Equipment Standards Meeting

8:30 am – 5:00 pm Monday, November 18

I. **Introduction and Registration of Attendance**
   The meeting started at 8:30 am, with introduction of attendees. There were 70 people in attendance.

II. **Appointment of Secretary to Keep Minutes of Meeting**
    James Topp (Provenance Consulting) volunteered to take the meeting minutes.

III. **Approve Minutes of May 2019 Meeting (San Antonio, TX)**
    The Spring 2019 Meeting Minutes were sent to committee members for review a week prior to the meeting. See attached.

   During the meeting several comments were raised. Tom Bevilacqua suggested adding more specific context to the text in the ballot review summaries since the referenced section numbers will change in future editions. Matt Brewer suggested changing “code-agnostic” to “non-code designated.” Other editorial changes were made.

   The meeting minutes were voted on by the task force and accepted as edited.

IV. **Review of Active Inquiries**

   **Check Valve Installation in PRD Inlet and Outlet lines – Koch Industries**

   This Inquiry was previously reviewed at the Spring 2019 meeting. A proposed response was drafted by Phil Henry and was reviewed during this meeting. In short, a question was posed on the use of check valves in the inlet line to the PRV, and specifically the definition of the “inlet line” of a relief device. The proposed response to the Inquiry was as follows:

   **Proposed Response**: API 520 Part II, section 8.3.1 states “Check Valves shall not be installed in PRD inlet or outlet lines since these devices are normally closed and the check valve can become stuck in the closed position or fail in a manner causing an obstruction in the PRD path.” In this context, API 520 Part II is referring to the portion of the inlet line that has no flow in normal operation.

   Tom Bevilacqua stated that while he agreed with the response, he wanted the task force to be aware of concerns for check valves in normally flowing process lines that may
become stuck closed during non-flowing conditions such as during a turnaround/shutdown. These can also separate equipment from their relief if they are installed in the relief path. A specific example is for check valves installed right at the outlet of compressors.

Matt Brewer brought up what would occur if there was a purge present in the “inlet line” which would necessitate a check valve at the inlet. Phil Henry stated the current inquiry response as written would be against a check valve in the inlet during a purge condition.

The proposed response was voted on and approved as written.

V. API 520 Part I Ballot Review

The following attachments are the results of the voting and the comment spreadsheet for the 3rd ballot of API 520 Part I. These documents were reviewed in depth during the meeting.

In reviewing the voting record for the 3rd ballot, issues were discussed where some members of the task force did not get an opportunity to vote. This has been an ongoing problem with API staff not being able to keep voting and task force rosters current. Matt Brewer indicated that this topic would be discussed in more detail during the SCPRS Joint Meeting on Wednesday.

In preparation for the comment resolution discussions, and to save time, Phil Henry stated that he had resolved many of the editorial comments prior to the meeting and the intent was not to review these during the meeting. However, if the commenter or other task force members felt these editorials merited more discussion, this would be accommodated.

The following attachment provides the final documentation of the ballot comment resolutions agreed upon by the Task Force. [This was subsequently sent to API staff on December 16th, 2019.]

The following summarizes some of the key comment resolutions that were made during the meeting. Please reference the MS Excel spreadsheet above for more details and a complete listing of the ballot comment resolutions.

a. Section 4.2.1.4.4 Table 1 (Joe Stevens) – Joe Stevens stated that a clarification should be added in the “dual certified” section of Table 1, to provide guidance on how to specify dual certified valves and provide more details on how the valves are tested and stamped.

Proposed Resolution – An Action item (2019-17) was opened to give more guidance on Dual certified valves and how to specify them. Joe Stevens, Matt Byers, Chris Buxton, Thakor Patel, Sean Croxford, John Burgess, Phong Pham, Dave Fenton, and Ken Shores all volunteered, with Joe Stevens taking the lead.
b. Section 4.2.1.4.4. Table 2 (Don Eure) – Don Eure stated that the “Effect of set medium on the opening characteristics” was confusing and proposed changing it to “relief medium.” Tom Bevilacqua stated that the last column describes the specific medium and the adjective on medium should simply be removed. After further discussion, the wording was revised to “Effect of medium on the opening characteristics”.

Resolution: This was considered an editorial change and approved by the Task Force.

c. Table 2 (Don Eure) – The column heading of “Certified PRV Design” is not descriptive enough. The heading was revised to “PRV Trim”.

Resolution: This was considered an editorial change and approved by the Task Force.

d. Section 4.3.2.4.2 (Justin Phillips) – Justin Phillips addressed his concern that this paragraph provides prescriptive installation guidance on monitoring the space between a RD and a PRV, which rightfully should be covered in Part II, not Part I. Tom Bevilacqua agreed that installation details should not be in Part I. After further discussion, it was decided to leave the text as written, since the paragraph does point of API 520 Part II for further guidance. Justin Phillips indicated that this decision would not cause him to change his vote.

Resolution: No further action was required.

e. Section 4.3.1.4 (Don Griglack and Brandon Nutter) – Comments were made concerning the inconsistency in the ballot for subscripts for the resistance coefficients for rupture disks. The commenters suggested that lower case subscripts should be used. Jay Baker noted that this directly goes against a change proposed and accepted during a review of the 2nd ballot comments at the Spring 2019 TF meeting. Also, to be consistent with ASME’s definitions, the subscripts should be capitalized.

Resolution: The task force agreed that the subscripts should be capitalized and that consistency checks will be made during the page proof review process.

f. Multiple Sections 5.6.3, 5.6.4, 5.8.1.3 (Craig Powers) – It was suggested to modify the definitions for $K_d$ and $A$ for steam, liquid, and vapor service in the legend to be consistent with 5.8.1.3. This would add language regarding certified and preliminary calculations. Paul Frey noted that the comment for “effective discharge area” should be removed for non-preliminary calculations and “effective area” should not be present with required area. Zubin Kumana stated that a distinction may not need to be made between effective and final/actual area in this section. Tom Bevilacqua stated that a team should be assembled to discuss potential changes in detail, but not in this current meeting. Dave Fenton discussed the fact there is a large amount of confusion regarding which coefficients of discharge should be used.

Phil Henry modified the paragraph 5.6.3.1.1 to add a sentence stating that the sizing equations presented in the section could be used for preliminary sizing (using effective coefficients of discharge and effective areas) or for final sizing (using the certified coefficient of discharge and actual orifice areas).
Additionally, the nomenclature definitions for A (Area) and $K_d$ (coefficient of discharge) were modified to remove the word “effective” so that the equations allow usage for both preliminary and final sizing.

**Resolution:** The TF agreed that these were editorial changes and that Phil Henry would make similar modifications to other sizing sections within Part I. Marie Baker, Craig Powers, Roger Wissbaum, Zubin Kumana, Paul Frey, Jerome Gleizes all volunteered to review the modified sections in detail.

g. Annex C 2.1.1.7 (Craig Powers) – Craig Powers, stated “coefficient of discharge” is no longer defined in this standard. Zubin Kumana stated that the reason that the coefficient of discharge was left instead of effective coefficient of discharge was since this was referring to two-phase flow, where there is no certified coefficient of discharge. Dave Fenton stated that since area refers to “effective area”, the coefficient of discharge should be modified to match.

**Resolution:** “Effective” was added to coefficient of discharge in the section.

Georges Melhem stated that the document should be reviewed to re-write the sizing equations based on an ideal nozzle (i.e. eliminate $K_d$) and then select the appropriate value using $K_d$.

**Resolution:** An action item (2019-27) was opened to review whether such changes should be made.

Phil Henry noted that based on the comment resolutions made during the meeting and that only editorial changes were made to the ballot, that this version should be given to API to start the publication process. A request for volunteers to review the page proofs was made.

**Resolution:** Page Proof Review volunteers were Justin Phillips, Don Griglack, Tom Bevilacqua, Roger Wissbaum, Jake Coleman, Casey Houston, Bill Gar, John Burgess, and Kathleen McLaughlin.

VI. API 520 Part II Ballot Review

The following attachments are the results of the voting and the comment spreadsheet for the 2nd ballot of API 520 Part II. These documents were reviewed in depth during the meeting.

Phil Henry noted that this is the 2nd ballot, and there will likely be a third ballot. Phil stated that he resolved some editorial comments prior to the meeting but these could be reviewed by the group if the commenter felt they merited more discussion.

The following summarizes some of the key comment resolutions that were made during the meeting. Please reference the MS Excel spreadsheet above for more details and a complete listing of the ballot comment resolutions. The Negatives were reviewed first.

a. 7.3.6 Negative Vote (Joe Stevens) – Joe Stevens states that the deltaP wave terms in the Simple Force Balance Method are new and poorly understood. An Action Item group reviewed how the terms should be defined but did not
propose changes to the ballot. As a result, the ballot still does not adequately define the terms used in the equations.

Joe Stevens proposed putting the changes on hold until the equations and variables are better defined. Phil Henry noted that a separate Technical Publication is being produced, that readers of API 520 will be directed to, which would describe all the variables and equations. Tom Bevilacqua stated that since the presentation of the equation currently being proposed for the 7th edition was an improvement to the current 6th edition (which only existed in words) it should be published as an equation.

Matt Brewer noted that maybe the force balance method should not be put in if it can be interpreted as the only acceptable engineering analysis.

Resolution: It was agreed that the proposed presentation of the equations would remain (psi basis rather than percent basis), and that work would continue on the Technical Publication. Upon completion of the publication, a reference would be added to the section. If the publication of the TR occurred after the publication of the 6th edition, then a supplement edition could be quickly produced. Joe Stevens and others agreed with the proposed path forward.

b. Section 7.3.6 Negative Vote (David Cobb) – David Cobb stated that the section on the force balance method is not fleshed out in enough detail to merit inclusion in API 520, and recommended deleting the entire section until a more complete section can be written. Phil Henry noted that the section has a work group and that a Technical Publication is being produced to add more definitions and discussions.

Resolution: It was agreed that the Task Force had reached a consensus to refrain from deleting the entire force balance section, as discussed above in the response to Joe Stevens’ Negative vote. Since David Cobb was not in attendance, Phil Henry proposed to email him explaining the agreed upon path forward, to see if David would remove his negative vote. The TF agreed on this approach.

c. Section 7.3.6 Negative Vote (John Burgess) – John Burgess’ negative vote was based on how the force balance assessment is not entirely predictive, and how the Joukowsky pressure wave (deltaPwave term) might not be appropriately being handled in the force balance method. The negative vote is based on Jurgen Schmidt and Smith & Burgess’ research, which they believe shows that the as-written force balance assessment is not predictive. Georges Melhem countered that the method is correct and can be predictive. Dustin Smith stated that the negative vote is based on putting in a method that is potentially inaccurate that regulatory bodies might use to evaluate users. Matt Brewer stated that until additional research comes up with a new methodology, the current methodology should be included in the section.

Paul Frey expressed a concern regarding why this section is present in the main body if there are doubts regarding the equation, and whether this section should be moved to an Annex.

Resolution: Phil Henry created an action item (2019-28) to review section 7.3.6 to make sure there is enough leeway provided to the users that permits other
methods to be used to predict PRV instability. No changes were made to the ballot as a result of this discussion. John Burgess withdrew his negative vote.

d. Section 6.3.1 – Paragraph 4 (Muhammad Al Khaldi) – Muhammad Al Khaldi stated that the discharge calculations paragraph should have additional verbiage to clarify that this section is for pressure drop calculations.

Resolution: The statement “For pressure drop calculations...” was added to the beginning of the paragraph and was approved as an editorial change.

e. Section 6.3.1 -Paragraph 4 (John Burgess) – John Burgess proposed changing the verbiage of a few sentences in the paragraph. Freeman agreed with the points as written but noted that with the term “static” added, stagnation pressure should be included as well. A discussion ensued on whether stagnation pressure or static pressure should be used. Static pressure was used.

Resolution: The proposed changes were approved as editorial changes.

f. Section 7.3.6.d.i (David Cobb) – David Cobb discussed how the valve stability equations are presented for balanced bellows valves and a factor of 0.1 is presented. David Cobb wonders if this has been correlated with actual test data. Tom Bevilacqua stated that no testing has been conducted on bellows devices. Matt Brewer commented that any statement regarding testing for bellows valves should be qualified with a comment that bellows valves have not be tested for stability analysis.

Resolution : A statement was added that states that the 0.1 factor used in the force balance equation for balances valves has not been supported by any stability testing.

Phil Henry noted that due to the technical nature of some of the comment resolutions made during the meeting, a 3rd ballot would be sent out for Committee review.

VII. API 520 Part I Action Items

a. Al 2014-17: Guidance for High Blowdown expected when vapor passes thru liquid certified valves (F. Self)

Freeman Self discussed how modifications to Table 1 and 2 were included with minor feedback from others.

Resolution: Work on this action item will continue.

b. Al 2017-06: Pilot valve guidance for back flow prevention (D. Pulis)

Dan Pulis was not present so this action item was not discussed in detail. Chris Buxton, Thakor Patel, and Zubin Kumana are members of this work group.

Resolution: Work on this action item will continue. A. Aldeeb and B. Burkhart volunteered to join the work group.

c. Al 2019-01: Improve definition of “Modulating” (M. Byers)
Matt Byers discussed the progress of the action item. “Modulating” refers to relief devices that flow in proportion to the inlet pressure and the valve lift. The current document suggests that if the valve has “some” modulating characteristics, that require relief capacity can be used for pressure drop calculations. The use of the word “some” was unclear in the standard, particularly in discussions owner/operators might have with valve manufacturers. Several considerations were discussed as items that needed to be clarified for the definition of “Modulating.” Matt Byers asked if there were any additional considerations that should be included and stated that the biggest contentious point is regarding liquid valves and whether they should be considered as modulating devices. Phil Henry suggested the possibility of changing the discussion to simply define when relief devices will only relieve the required rate per the manufacturer.

**Resolution:** Work on this action item will continue. David Miller, Joe Stevens, Dustin Smith, Jeff Gillam, Shahar Yoram, and Ken Shores volunteered to be included in the AI team moving forward.

d. **Proposed API 520 Part I Action Item on Subcritical $K_b$ (Z. Kumana)**

Zubin Kumana proposed modifications to adding an equation for the calculation of $K_b$ for sub-critical flow. This comes from ISO 4126:7 and would be added below the chart for $K_b$ (Figure 36).

**Resolution:** The TF agreed to continue work on this and an action item (2019-20) was opened up.

e. **Proposed API 520 Part I Action Item on Using Bellows $K_b$ with Direct Integration (Z. Kumana)**

Zubin Kumana discussed an issue when using direct integration for bellows valves. Both the HDI method and the $K_b$ factor includes a correction for sub-critical flow. To eliminate this conservative “double counting”, the recommendation is to filter out the subcritical correction in the $K_b$ factor.

**Resolution:** New Action item (2019-21) was opened to be led by Zubin Kumana. Craig Powers, Shahar Yoram, Phong Pham, Matt Byers, Thakor Patel, Chris Buxton, and Ken Shores all volunteered to assist.

f. Matt Byers discussed that the current 520 guidance is to use a $K_b$ of 1.0 for sizing of all pilot relief devices, while the $K_b$ is actually less than 1 for certain applications.
Resolution: Action item (2014–19) led by Matt Byers has been opened. Zubin Kumana, Shahar Yoram, Thakor Patel, Chris Buxton, and Sean Croxford all volunteered to assist.

g. Proposed API 520 Part I Action Item on Use of $K_p$ For Subcooled Liquid in Annex B and C (Z. Kumana)

Zubin Kumana discussed the appropriate use of the $K_p$ for non-certified valves in subcooled liquid applications. It depends on whether the liquid is flashing in the installation. Dave Miller asked whether this work item would provide recommendations as to where to use the $K_p$.

Resolution: New Action Item (2019-22) led by Zubin Kumana was opened up. Sean Croxford, Freeman Self, Chris Buxton, Casey Houston, John Germany, Marie Baker, Jake Coleman, Georges Melhem, and Matt Byers volunteered to assist.

VIII. Presentation

Need for changing heat trace requirement in API 520 to ensure proper performance of PRV’s? (E. Johansen)

Eli Vatland Johansen gave a presentation regarding heat tracing in PRVs. An incident occurred at the Snøhvit facility in the southern Barents Sea off the north coast of Norway, where heat tracing had been installed on the PRV inlet and outlet lines to prevent hydrate formation. No heat tracing was installed on the relief device itself and hydrates and evidence of hydrates were detected in the inlet nozzle. Eli provided photographs and anecdotes of hydrates and associated problems.

Hydrates form as aqueous solids at temperatures up to 20°C, especially in non-flowing “dead legs,” such as PRV inlet lines. A specific hydrate formation curve was presented, but it was clarified that this curve would be specific to the fluid. The installation was constructed per API 520 part 2, 4th Edition (1994), which only provided guidance for heat tracing the inlet and outlet lines with no mention of the PRV itself. Insulation (not heat tracing) was added to the relief devices as a measure to move below the hydrate curve.

Eli Vatland Johansen proposed a modification to API 520 Part 2, 6th Edition (2015) section 13.9 Heat Tracing and Insulation to evaluate the need for insulation or heat tracing on the PRV or any associated piping. Matt Brewer asked whether there were risks in covering the bonnet vents. Sean Croxford replied that you would need to be able to see the bonnet vent to determine if the bellows had failed. Matt Brewer discussed that considerations should be made for soft goods and potential modifications to set pressure based on temperature modifications.
Resolution: A new Action item (2019-29) was created to discuss insulation/heat tracing and hydrate formation lead by Eli Vatland Johansen. Tom Bevilacqua, Sean Croxford, Jerome Gleizes, Chris Buxton, Joe Stevens, Jake Coleman, James Dean, and John Burgess volunteered to assist.

IX. API 520 Part II Action Items


John Germany presented an update on the work group regarding editorial comments and redlines for an API Technical Report on Force Balance and Critical Line Length. Matt Brewer stated that since it is a new API Technical Report the entire document would be balloted. The goal is to ballot the document in time for the Spring Meeting.

b. Proposed API 520 Part II Action Item on Incremental Pressure Loss (Z. Kumana)

Zubin Kumana discussed issues with the technical Inquiry on definition of inlet line length when accounting for the non-flowing portion of the piping and the incremental pressure loss through the process piping and the language between “pressure relief piping” and “inlet line length.” Dave Fenton commented that the group needs to keep in mind whether this is regarding valve stability or de-rating capacity. Eli Vatland Johansen asked when the pressure losses should be considered when calculating the pressure loss in a wellhead system. The TF created a new Action item (2019-23) led by Zubin Kumana. Eli Vatland Johansen, Don Griglack, Craig Powers, Jerome Gleizes, James Dean, Jake Coleman, Anthony Graley, Casey Houston, Dave Fenton and Jeremy Grace volunteered to assist.

X. Old Business

Status of Remaining Action Item List

The Action item Spreadsheet (see attached) was reviewed to get a status update on remaining open action items that were not specifically discussed during the meeting.

- 2012-07 – Discussion on superimposed or built-up backpressure. Craig Powers volunteered to lead the group.
- 2012-13 – Addition to Part II on vortex shedding. Freeman Self volunteered to be added to the work group.
- 2014-11 – Phong Pham and Jerome Gleizes volunteered to be added to the work group.
- 2014-17 – Issue to address high blowdown. Victor Quiroga volunteered to be added to the work group.
2014-20 – Part II Annex C needs to provide equations for speed of sound. Jake Coleman volunteered to be added to the work group.

2015-01 – This item was combined with AI 2014-17. Matt Byers was added to the group to the work group.

2015-12 – Review the use of shall and should in API 520 parts I and II. Work is progressing, leave the item open.

2016-07 – Add limitations on the Omega 2-point method. Jake Coleman volunteered to be added to the work group.

2016-11 – Add to Part II annex C acoustic line length. Victor Quiroga volunteered to be added to the work group.

2016-15 – Need to show method for sizing rupture disk with $K_d$. Jay Baker to check with Dean Miller to determine if this action can be closed.

2016-16 – Update contents of Tables 1 and 2. Work is progressing, leave the item open.

2017-03 – Free-draining of inlet lines should discuss sloping in Part II. Jerome Glezies and Darren Sanders volunteered to be added to the work group.

2017-06 – Pilot valve backflow prevention. Brian Burkhart volunteered to be added to the work group.

2017-07 – Constant diameter on the force balance assessment. Jake Coleman and Victor Quiroga volunteered to be added to the work group.

2017-16 – Guidance when PRV is located downstream of control valve. Hisao Izuchi gave a presentation later in meeting. Eli Vatland Johansen volunteered to be added to the work group.

2017-17 – Rupture disc installations on non-sch. 40 piping. Jay Baker commented that ASME does not address using piping other that schedule 40 thickness. Victor Quiroga and Jay Baker volunteered to be added to the work group.

2018-03 – Define “Engineering Judgement.” Barry Weber noted that ASME contains a definition. Paul Frey and Barry Weber volunteered to be added to the work group.

2018-04 – Is there enough caution against knife blades? Jay Baker to take up issue. David Fair volunteered to be added to the work group.

2018-06 – Discussion on PRV at discharge of compressor/turbine and work with API Rotating Equipment. Jeffrey Gillham, Eli Vatland Johansen, and John Burgess volunteered to be added to the work group.

2018-08 - Identify locations in Part I and Part II to caution Users about piping design when PRV sizing methods are conservative. Bruce Maskell volunteered to be added to the work group.

2018-09 – Add an example problem to Part I regarding non-ideal gas. Action Item was deleted.
• 2018-10 – Revise liquid certified column in Table 1 of Part I to address manufacturer referral regarding vapor relief through liquid valve. This item was combined with 2014-11. Sean Croxford, Freeman Self, and Don Griglack volunteered to be added to the work group.

• 2018-13 – This item was combined with 2018-10.

• 2019-02 – Information on steam valve internals. This action item was closed.

• 2019-03 – Definition of effective capacity. Zubin Kumana discussed that the workgroup had previously decided not to include a definition of effective capacity. This action item was closed.

• 2019-04 – Explore restoring subscript α’s and the notes for the estimated fluid property values in Table 9 of Part I. Although there have been no volunteers to work this item, the TF agreed to leave this open.

• 2019-09 – Clarify the use of the term “inlet line.” John Burgess was made leader of the group. Don Griglack, Marie Baker, and Eli Vatland Johansen volunteered to be added.

• 2019-10 – Provide better definitions for “area” terms such as bore area, nozzle area and throat area. David Fenton is leading this item.

• 2019-12 – Redesigned datasheets for Appendix D. Matt Brewer stated that the API datasheets should be sent to API as a group. Closed action item.

• 2019-13 – Consider revisions to inlet stability requirements. It was noted that this recommendation came from the presentation given by Georges Melhem at the previous meeting in San Antonio and more information on the subject can be found in the last meeting minutes. This item remains open.

• 2019-15 – Guidance on Operating Margins for pressure relief valves. Phil Henry noted that there was not really a discussion in the document currently on how to set operating margins for different types of devices. Matt Byers noted that it would differ between manufacturers. Matt Brewer suggested that a list of items that could be added for the user to consider when determining the operating margin. Sean Crawford volunteer to assist Phil in this effort.

• 2019-16 – Need to add guidance on PSV datasheet in regard to auto-refrigeration and cold temperatures. Chris Ewasko to lead and Paul Frey volunteered to be added.

• 2019-18 – Guidance for Kd for two-phase flow applications. Freeman Self discussed whether this should be added to another existing action item. This item was closed and added to 2019-22.

XI. New Business

a. Hisao Izuchi Presentation re Simulated PRV Stability Downstream of a Control Valve

Izuchi-san discussed results from a Chiyoda dynamic simulation (not test data) of PRV stability downstream of a control valve. Stability was examined based on
PRV inlet pipe length (distance) from the control valve. Phil Henry asked if there was piping downstream of the takeoff in the simulation. Phil Henry stated that the consensus was that the pressure losses normally would only be calculated for the takeoff (non-flowing) section of the piping. The main result per the dynamic simulation was that inlet piping losses have no relation to PRV stability and that instabilities are due to the acoustic interaction. Paul Frey stated that considerations should be made regarding the blocked outlet scenario. David Fenton stated that this presentation raises other issues around pressure losses specifications and does not lead to a clear conclusion. Dustin Smith asked how 50% flow was modeled and what the pressure of the “small volume” upstream was. Izuchi-san stated that the table he presented (with “valve pressure drop” at the top) was in terms of the flow across the control valve. Dustin Smith concluded that the low valve pressure drops were un-choked flow, which Izuchi-san confirmed. Izuchi-san stated that he would like these results to be experimentally verified. Izuchi-san stated that the outlet pressure is constant when he was asked about atmospheric discharge. Dustin Smith asked whether the control valve and the relief valve inlet had the same piping, which Izuchi-san confirmed to be 1” piping. Izuchi-san presented potential results of when the 3% rules should be applied based on the ratio of the pressure drop across the control valve when compared to the set pressure and 10% of the set pressure. Phil Henry stated that this issue could not be resolved today, and it does not determine that the piping losses only need to be considered on the non-flowing takeoff piping. **Phil Henry additionally stated that Izuchi-san’s work should go back to the work group to be reviewed.**

b. **Collaboration with ISO**

Alaine Bucher sought interest and volunteers to assist in working groups to develop standards for ISO via facilitation by IOGP (International Oil and Gas Producers). The IOGP does not require contributors to be registered with ISO (register with IOGP instead). Matt Brewer stated the idea would be discussed in depth at SCPRS Joint Meeting.

XII. **Adjournment**

The meeting was adjourned at 5:23 pm