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Reverse flow condition for Water injection Pumps

Priyanka Ferrao
at

We are designing two water injection pumps (2x100%) with a delta P of 140 - 175 bar (variable speed drive pump).

We have been advised to include reverse flow PSV's on the suction piping of the pumps and to provide two dissimilar check valves on the discharge piping (one of them being a non-slam type)
To size the PSV I am using the API-521 criteria of 1/10th of the check valve area - this gives me a really high flow rate which results in a 'M' size PSV.
Tthe suction piping of the pump is 150# and the discharge is 1500#.

Another option that we could propose to eliminate the PSV is to rate the suction pipe 1500# upto the suction isolation valves and provide dual NRVs in the suction side as well (i.e. just d/s of the suction isolation valves).

Has anyone come across any of these arrangements?
Are there any alternate design options to counter the reverse flow?
What is the preffered option from a safety/ HAZOP standpoint?

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Mojtaba

Mojtaba Habibi
Process Engineer at Petroleum Engineering and Development Company (PEDEC)
Top Contributor

Dear Priyanka,

We had similar discussion about check valve failure but for gas service and you can read the complete discussion at:

http://lnkd.in/6xN_dV

The main lessons learnt from that discussion:

1. If Hazop concern is equipment protection, the single discharge check valve can be regarded as good protection and will prevent major back flow.

1. If Hazop concern is protection of suction side against overpressure, you can follow the API 521 guidelines that you described.

1. For liquid service, non-slam check valve mainly help to minimize effects of water hammer. But if the concern is suction side overpressure then there is no credit proposed by API for this type of check valve.

For your specific case, based on my limited expereince the usual design is to rate suction side same as discharge side design pressure. In this case you can have single check valve at discharge and there is no need for check valve at suction side.

Best,
Mojtaba

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Saeid R. Mofrad
Principal Process Engineer at Petrofac (P.E.)
Top Contributor

Make sure that reservoir can pressurize the injection pipe when pump stops. Back flow from reservoir doesnot necessarily happen in all injection systems.

You don't need non-slam check valve in this service. You need two check valves ON PUMP DISCHARGE SIDE which are working based on two different mechanisms, for example "Swing" and "Dual Plate" types. This is to reduce the possibility of simultaneous failure of both of them because of common cause.

Providing relief valve (sized for leakage through check valve) may not be a viable solution because finding a proper destination for relief valve discharge line is not so easy because:

• Sending water to the flare header creates lots of problems. Flare KOD may overflow.
• Drain drum capacity is not adequate.
• The rating of pump suction vessel is not sufficient.
• Releasing produced water to atmosphere may be not acceptable from the safety and environmental view point.

The solution is to extend the pump discharge rating to the inlet of the pump suction SDV and take either of the following alternatives:

'1. Closing the SDV when pump is tripped (most preferred).
'2. Closing the SDV based on 2oo3 high-high pressure trip on the pump suction side.

Delete • November 29, 2012

Sanaz Norouzi likes this

Mojtaba

Mojtaba Habibi
Process Engineer at Petroleum Engineering and Development Company (PEDEC)
Top Contributor

Dear Saeid,

About this part of your explanation:

" You need two check valves ON PUMP DSCHARGE SIDE which are working based on two different mechanisms, for example "Swing" and "Dual Plate" types. This is to reduce the possibility of simultaneous failure of both of them because of common cause "

1. If the suction side is rated same as discharge side, then do we need two check valves at discharge?

2. In case of demand to dissimilar check valves: Should they be dissimilar in type or similar type with different manufacturer? Because different check valve types are selected based on some major parameters like service and line size. For example based on line size ball and piston type check valve is proposed up to 1.5" size, swing type check valve is proposed up to 24" and dual plate type check valve for line size values higher than 24". So combination of dissimilar check valves in type, may not work properly for some cases.

And about this part of your explanation:
"The solution is to extend the pump discharge rating to the inlet of the pump suction SDV and take either of the following alternatives:

'1. Closing the SDV when pump is tripped (most preferred).
'2. Closing the SDV based on 2oo3 high-high pressure trip on the pump suction side. "

My understanding from above mentioned points is that:

> For pump suction side the protection against overpressure from pump up to and including SDV is passive because of design protection (piping specification break point is SDV upstream)
> For SDV upstream either of these 2 alternatives can be used as active protection against overpressure.

Am I right?

If so:

1. SDV closure time is usually 1 second per line size based on inches. For large size SDV, is this closure time can be considered short enough or there should be conern for suction side (SDV upstream) protection?

2. How about if there is manual isolation valve at suction instead of SDV? Should we rate suction piping design pressure up to suction vessel/tank nozzle and size the suction vessel equipment PSV for check valve failure case?

Many thanks for your time.

Best,
Mojtaba

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Vinay

Vinay Singhal
Process Engineering Manager at McDermott International Inc.

Dear Saeid & Mojtaba, both of you have raised some relevant points as well as initiated some healthy discussion. Based on my prior experience, consider the following:
(1) Use of 2 check valves in series to prevent back flow / back pressure: The exact application is up for debate with varying philosophy amongst major operators. Chevron and Shell do not give any credit to a single check valve, i.e. if a single check valve is installed, you cannot take 10% of check valve area for calculating relief flow. This is due to the fact that check valve failure is "un-revealed" failure, i.e. normal plant maintenance will not detect a failed check valve and other instrumentation will not detect immediate check valve failure. It gets more interesting with 2 check valves in series. The code is concerned about simultaneous failure of 2 check valves. In such instance, in my opinion, the 2 check valves need not necessarily be of different type, but different manufacturers should suffice. However, if your project has an ultra conservative safety engineer, to keep everyone happy, 2 check valves of different type and make will satisfy all. With 2 check valves in series, Shell allows you to use 10% area of one check valve for relief rate calculation. Chevron was of the opinion that no further relief is required with 2 check valves in series. Main point to note: Check Valve prevents reverse "flow" only; it does not prevent "pressure leak". In a liquid fill system, it takes a very small amount of opening/flow to pass on the pressure. Plus, you do need to establish the flow path area to "calculate" the relief rate. Therefore, I would go with Shell: 2 check valves in series, dissimilar type or make, 10% area for failure relief rate calculation.
(2) Pump Suction Piping Rating: Practise is to rate the suction piping same as discharge piping up to the suction isolation valve(s); irrespective whether valve(s) are manual or automated (SDVs). Pump suction piping, up to the isolation valve can get over-pressurized, either from pressure leak through the discharge check valve by the discharge destination source; or by the operating pump when you have 1 operating + 1 standby pump configuration.
(3) For applications like Water Injection, usually have high discharge pressure (1500#) and low suction pressure (150#). One need to determine wheat is the source for high pump discharge pressure. The high discharge pressure may be due to dynamic/friction losses if you are pumping to a long pipeline OR may be due to high well back pressure, if pumping into live wells (some places pump into "dead" wells). Idea is to establish whether the pump discharge pressure is more "dynamic" or more "static". For if it is "static"; the high back pressure risk is always present. If it is more "dynamic", the risk is only for the stand-by pump, with pressure leak coming from the operating pump. Thus depending on your system requirements, you may now put more belts & braces as: closing suction valve as well as the discharge valve (if automated and recommended for such services) to prevent over-pressurization of suction side. You may not need to provide PSV on the suction piping. The PSV on the suction source vessel can be evaluated for this leak pressure. The PSV relief can be piped to Closed or Hazardous Open Drain system; or to an upstream vessel which can accept produced water (say, upstream Inlet Separator). Also note that with 1+1 pump system, with common suction header, the operating pump should be able to take the reverse/leaked flow through the stand-by pump.
Hope, above lengthy explanation suffices.

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Sonia Rai, Mojtaba Habibi and 2 others like this

Mojtaba

Mojtaba Habibi
Process Engineer at Petroleum Engineering and Development Company (PEDEC)
Top Contributor

Dear Vinay,

About this part of your explanation:
"Pump suction piping, up to the isolation valve can get over-pressurized, either from pressure leak through the discharge check valve by the discharge destination source; or by the operating pump when you have 1 operating + 1 standby pump configuration."

As I asked the same question from Saeid, could you please clarify if the piping spec. break point for suction side is up to isolation valve, how the section upstream of the suction isolation valve to be protected? In this case you propose to size the suction source vessel PSV for check valve failure?

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S M Kumar
Process Design Consultant
Top Contributor

S M

Priyanka: I will go with Mojtaba here - rate suction side including first or root suction valve or SDV same as discharge. A single check valve normally used at pump outlets to prevent reverse rotation of pump impeller will do. There is no need for check valve at suction side.

Mojtaba: To respond to your queries (1) what protects lower rate suction piping upstream of suction valve? Usually the source is an atmospheric vessel (Priyanka – please confirm) and it should be able to handle any leak without bursting the source. (2) If the suction side is rated same as discharge side, then we do NOT need two check valves at discharge.

I have the following observations: Saeid and Vinay brought the case of dead wells and live wells – that is the ones that cannot backpressure the injection piping after the pumps stop and others that might do. Interesting thought. Priyanka can check her case from project file – injection reservoir pressure Vs hydraulic head of water over the reservoir to surface level. Usually in injection wells the surface pressure should be low due to the hydraulic head of water in the injection tubing. If that is NOT the case, I doubt though – all it can happen is backflow water leaking past discharge SDV and min flow line can overflow the source tank. Again: Priyanka to check. If the source is not an atmospheric vessel with overflow + backflow from the reservoir is expected, the SDV solution will not work. We need a PSV sized for the backflow or SIL rated SDVs. Again the location of the min flow line is the key.

If the source of overpressure or back flow is the running pump, pressurizing the stand-by pump, then no additional protection is required, other than higher rating of suction line.

Saeid is suggesting closing the suction SDV on pump trip or on high suction PAHH. These pumps will have min flow control valve at pump discharge that are open to source. So back flow can go thru min flow CV, unless each pump has its own min flow CV located upstream of its discharge SDV. In that case closing discharge SDV on pump trip should help.

Saeid's comment: The rating of pump suction vessel is not sufficient. Why assume so. Where is rating coming in. Al that the PSV will do is send back what is drawn from the source like looping back to suction with no net forward flow. Right> Or am I missing something.

I am against any PSV. Priyanka: to get clarity - What is your PSV flowrate. Does it exceed the pump's capacity. It can't happen. I have seen these high pressure pumps provided with a special discharge valve that acts as a PSV recycling back to source. I have forgotten the brand name.

Priyanka: Tell us more about your suction vessel or tank; min flow take-off location and source of overpressure - running pump or reservoir.

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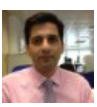

Saeid R. Mofrad
Principal Process Engineer at Petrofac (P.E.)
Top Contributor

1) From the beginning of this discussion, I was worried if this subject is mixed up with extending the pump discharge rating to the pump suction valve due to back flow from the running pump which finally happened and rightly answered by Kumar. I repeat the Kumar's answer below again.

If the source of overpressure is the back flow from the RUNNING PUMP (pressurizing the stand-by pump) then no additional protection, other than higher rating of suction line till pump individual isolation valve (not the SDV/Valve on the common suction line) is required. This is very well known design practice by the way.

The case we are talking about is PUMP TRIP which can result in suction side being over-pressurized by discharge system (vessel/well/etc).

2) Connecting PSV discharge to suction vessel is not recommended because the liquid will be ultimately released through suction vessel's relief valve either to atmosphere, drain vessel, another process vessel or flare which is unacceptable to me,

• Considering the amount water supplied by reservoir which should be much more than the capacity of suction vessel, drain drum, another process vessel or flare KOD. Check valve can leak and fill all mentioned vessels at the worst case.

• Produced water contaminations such as HC and H2S.

3) I guess lots of options were confused. in summary, the following options can be looked into:

• If there is min flow, extending discharge rating to the suction common SDV and closing the suction SDV and min flow SDV based on the pump trip signal.

• If there is no min flow, extending discharge rating to the suction common SDV and closing the suction SDV based on the pump trip signal.

• Adding the second check valve on injection pipeline and sizing the relief valve on low pressure side (most probably suction vessel) for the check valve leakage flow rate. (Nevertheless, I don't like this option as I explained above).

Note that installing PSV on the pump suction common header will not help because it won't detect the pressure unless the whole low pressure system is filled with liquid.

Delete • November 30, 2012

Mojtaba

Mojtaba Habibi
Process Engineer at Petroleum Engineering and Development Company (PEDEC)
Top Contributor

Dear Saeid and Kumar,

Could you please shed some light on my questions that I raised at my previous post:

1. SDV closure time is usually 1 second per line size based on inches. For large size SDV, is this closure time can be considered short enough or there should be conern for suction side (SDV upstream) protection and probably sizing the suction source PSV for this case?

2. How about if there is manual isolation valve at suction instead of SDV? Should we rate suction piping design pressure up to suction vessel/tank nozzle and size the suction vessel equipment PSV for check valve failure case? or we may replace the manual valve with SDV and implement the SDV closure concept.

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S M

S M Kumar
Process Design Consultant
Top Contributor

We are talking on partial info. Let Priyanka come with system details I have asked for to give the right response.

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Priyanka

Priyanka Ferrao
at

Hi All,

I apologize for my disappearance over the weekend.
I did not expect so many useful insights on this particular topic.
Thank you all for the responses - it is starting to give me a more clear picture for my case.

I have not fully digested all the useful information in the above replies but i will do my best to add some details to the above data:

@Saeid, Mojtaba: You are right - the non-slam check valve has been added to limit the water hammer affect. Apologize for the confusion but that detail should not have been added to this discussion.

@ S M Kumar, Vinay: A very valid point raised is the source of overpressure - reservoir or running pump. I will need to check on this and get back.

Clarification on the system:

1. Suction side:
2x100% Produced Water Pumps and 2x100% Water Injection Booster Pumps supply treated produced water/deaerated sea water to the two Water Injection Pumps (depending on the amount of produced water available over the years).
The De-gasser (which is the suction vessel of the PW Pumps) floats on the LP Flare thus its operating pressure is around 0.1 barg.
The Deaerator (which is the suction vessel of the WI Booster Pump) operates under vacuum.
Currently the entire suction of the WI pump is rated 150# (i.e. u/s of the suction flange).

2. Both the PW Pumps and the WI Booster Pumps have actuated ON/OFF valves on the discharge of individual pumps. These are for pump switchover and also close when the respective pump is tripped.

3.The WI Pumps have two actuated ON/OFF valves on the discharge of individual pumps. These are for pump switchover and also close when the respective pump is tripped.

4. The individual Water Injection Risers have ESDVs.
(The closing time of these valves have still to be decided by a water hammer study)

5. The minimum flow control flow transmitter on the discharge of the WI Pump has an action to shut down the pump when a low flow alarm is activated.

6. The suction side reverse flow PSV discharge is currently routed overboard (this is of course metered and analysed for the oil in water content before dumping overboard)
@ SM Kumar: the PSV was sized using the API criteria for 1/10th the check valve area and i have calculated the PSV flow is app. 80% of the rated capacity of the WI pump.

I hope to come back with more clarifications once i am able to digest all the data above.

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S M

S M Kumar
Process Design Consultant
Top Contributor

Priyanka: Tell us the source of overpressure; location of min flow valve (in some projects I have given individual; in high pressure service some clients want a common one controlled by the number of pumps online, preferring to trip pumps on PAHH or FALL) - min flow can flood the source vessel before PSV opens if the source is the destination. Respond with more dtails on your system for us to respond right.

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Priyanka

Priyanka Ferrao
at

Kumar:

1. Source of overpressure:
What I understand in my particular case is that the source of overpressure is the shutdown/ trip of a running WI pump and leakage through the discharge check valves.
Of course as recommended by you in earlier posts I do need to check whether my particular case is a "live" or "dead" injection well and whether this can be an additional case of overpressure.

2. Min. flow valve:
Currently we have given individual min. flow valves for each pump discharge u/s of the check valves.The min. flow valves are dumping water overboard.
The discharge line has a PAHH and an FAL which causes pump trip.
I am unclear on your statement - "in high pressure service some clients want a common one controlled by the number of pumps online"; how would a common min flow control valve help the situation?

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S M

S M Kumar
Process Design Consultant
Top Contributor

Based on the sketch your system the way you have described + no suction SDV on WI Pumps AND assuming the source of overpressure is NOT the destination

(1) My interpretation is as below. Please correct my understanding as I don't have the P&IDs

(a) The standby WI pump may get isolated for its maintenance by closing its manual? suction valve. The running pump can potentially backpresssure the standby pump suction. The suction valve and d/s piping of WI pump should be fully rated to discharge conditions

(b) As long as one of the WI pump is running - that is water being pumped out into the suction of the running WI pump, the discharge piping of u/s PW Pumps and the WI Booster Pumps is unlikely to be pressurized.

(c) what happens if the running pump trips - back flow from the tripped WI pump may pressurize the upstream pump discharge piping. In case of incompressible water, all it takes is a few drops of water. If any of the upstream PW and WI Booster Pumps suction valve is closed for maintenance, then there is a potential to overpressurize the pumps and their suction piping. This may call for fully rating the suction valves, d/s piping, pumps and their discharge pipes. You don't have to rate the piping from the deaerator or degasser as all it takes is a few drops from WI pumps' discharge piping to a settle-our type of pressure. [This should answer Mojtaba's question – as long as the source of overpressure is NOT the discharge with infinite flow capacity, but static water present in the discharge piping, uprating from the first manual valve in suction and d/s is good enough. You don't have to uprate the source vessels PSV for this few drops of water.]

(d) Instead of uprating PW/Booster pumps and their piping, a PSV on the common discharge

header to WI Pump suction should do. Though you may get a high rate due to large differential pressure * 10% area, I wonder how much drops of water it will take to draw from WI Pump discharge piping to bring its pressure down. This is assuming destination is NOT the source of pressure. While the rate is high, the quantity is going to be low. I have not handled such a situation before – to suggest a solution. I will invite the response from other members. We can't take credit for closing action of SDVs – as you require SIL rating to replace a PSV. Giving PSV does not sound right. Perhaps 2 independent sensors, PAHHs at PW/Booster pump outlets AND FALL at WI Injection Pump outlet may be used to trip the PW/Booster Pumps AND WI Pumps; any trip of WI Pumps should close its outlet SDVs and the outlet SDVs of PW/Booster pumps in a SIL 3 rated loop looks like one possible solution.

(2) Common minimum flow control valve. It will not help. It will be outside the domain or d/s WI Pumps outlet SDVs. Before the PSV pops it will open and route the back-flowing water to source vessel over pressurizing it. [Remember: Initial discussions assumed that you might over pressurize the suction vessel via the suction line or via the PSV, if PSV discharge is routed to suction vessel. Now that you have confirmed that min flow is dumped overboard, this is no longer an issue.] In some Hazops I have seen, process engineers forgetting min flow - flowing back to suction vessel, when the destination is the source of over-pressure.

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S M

S M Kumar
Process Design Consultant
Top Contributor

Second thoughts: As I just looked at the sketch I made for your system on my whiteboard, I realize the following:

You mention that u/s PW/Booster pumps have automated on/off valves their discharge. I assume that their suction has only a manual valve. During a relief scenario – you can work out combinations – say only one of the 4 pumps is in service with its suction valve open. The other 3 may have their suction valves open or closed. It does not matter as discussed below. Note: No credit is given to min flow valve that will dump the water overboard as per API RP. This is the first layer of protection and likely case.

Scenario 1: On running WI pump trip and pressure equalization due to backflow, the pressure would be felt up to the 4 PW/Booster pumps discharge check valves

Sub-scenario (1a) Discharge check valves "hold", that is do not pass or internally leak: Enough to uprate the check valves and all d/s piping to WI discharge pressure.

Sub-scenario (1b) If the all the check valves pass, then the backflow water would reach the source vessels – degasser or deaerator – via the still open inlet valve of the just tripped PW/Booster pump. Water taking the path of least resistance will reach degasser or deaerator, without pressurizing the suction of the other 3 pumps off duty. Degasser or deaerator should be able to handle the small quantity of water. No need to uprate the discharge piping of u/s 4 pumps.

Sub-scenario (1c) What if all the check valves pass (internal leak) except the one on just tripped Booster/ PW pump. The other 3 pumps and their suction will get pressurized if their suction valve is closed. [We assume that check valves WILL pass and are forced to look at also "What if they do not pass or leak internally?"

10 years back, when I was not forced to wear a safety hat and prided myself as a practical process engineer, I'd have gone for a 1/8" hole drilled on the flapper of the 4 check valves, with an explanatory note on P&ID. Or provide a RO or LO globe valve across the check valve. You may look at this. These days – I am confused.

Please look at your P&ID. Does it make all sense?. Can you avoid a difficult to size PSV or go for SIL3 valves as the likely case is min flow valve dripping a few droplets to equalize the pressure.

I will let Vinay, Saeid, Mojtaba and others to come to your rescue.

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S M

S M Kumar
Process Design Consultant
Top Contributor

Add missing last line: You may have to still uprate the u/s PW/Booster pumps outlet discharge valves and their d/s piping

Like • Reply privately • Delete • December 8, 2012

Priyanka Ferrao
at

S.M. Kumar

Priyanka

Thank you for the detailed response.
I now find myself faced with many really good alternatives rather than provide a PSV.

1. I agree that the discharge rating should be extended uptill the suction isolation valves of the pumps.

2. I am also inclined to agree with you and extend the discharge rating (1500#) all the way upto the suction pump(s) discharge flange (i.e. suction piping, up till and including the PW pumps and WI Booster Pumps) however this may not be the most economical option as our pipe material is DSS.

3. Currently the option that you have stated in (d) above is exactly what is proposed i.e.
a. PAHH on the WI Pump discharge causes WI Pump shutdown, closure of WI Pump discharge valves, shutdown of PW pump and shutdown of WI Booster Pumps and their respective discharge isolation valves.
b. FAL on the WI pump causes shutdown of the WI Pump but it will cause a cascade affect to close the WI Pump discharge isolation valves.
I am not very sure about the SIL rating of the valves.

This is with reference to your second post:
1. Yes the suction valves of the PW pumps and the WI Booster Pumps have manual valves which will be kept open (running and standby)

2. If my PW pumps and WI Booster pumps are not running (as explained in your scenarios then their respective discharge isolation valves will be closed.
Thus are we assuming leakage OR no-leakage case from the PW Pumps and WI Booster pumps check valves because there may be leakage across the automatic discharge isolation valves? Is this a credible scenario?
If yes then i agree that the uprating should be from the check valves of the PW Pump and the WI Booster pumps all the way downstream.
However just an additional point could be that we need to indicate the suction valves of the PW Pump and WI Booster Pumps as LO valves.

In the end i think the proposal that has ease of operation, less maintenance and most economical option will be selected.
Thank you once again for your valuable recommendations/ suggestions.

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S M

S M Kumar
Process Design Consultant
Top Contributor

If you look at Safety in Design or Designed for Safety concept, then fully rating the suction valve all the way d/s of PW/Booster pumps is a must. Clean solution. Northsea clients would go for it. Cost rise is pea-nuts. Economy should not come in.

"LO" suction of valves of the Booster/WI Pumps will interfere with maintenance if you wish to take out a pump. Then you will have to trip water injection; that means full production as PW can not be stored. Flexibility is blown.

In overpressure protection or relief valve sizing no credit is given to action of shut down or control valves. Here you are trying to avoid a PSV and are going to depend on the action of SDVs. This will call for SIL3.

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Priyanka

Priyanka Ferrao
at

What is the reference for "Safety in Design or Designed for Safety concept"?

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S M

S M Kumar
Process Design Consultant
Top Contributor

It goes out in different names. Perhaps you may know it under “Inherently safe design”. If you google search “safety in design” or “Inherently safe design” you will find it at different UK/ Australia sites. You design out
any hazards rather than go for safeguards or protection - band-aids.

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sharath

sharath krishnan
Mechanical Design Engineer at Saipem

To SM Kumar...

I am sharath working in one of the oil exploration company in india. Similar to the above water injection facility we also facing similar kind of problem. In the existing water injection pump suction there is a suction valve rated at 30" 2500 isolation valve 2500# same as that of discharge. Followed by Tee type strainer. Discharge of the pump got one FCV, SDV and single check valve.

Due to continous strainer maintenance problem company decided to replace the existing strainer by basket filter skid with 1+1 (W+S) with 150# class Location of the skid is proposed after the 2500 isolation valve due to space constraint. Initially it was decided that 2500 to 150 spec break will be after the skid. The existing 2500 isolation valve will be shifted to down stream of the filter skid.

There are four pumps working parallel to this and suction of all these five pumps taken from single common header. Problem is that we cannot shift the existing isolation valve since there is no other primary isolation for that pump except this 2500# valve. Otherwise entire system should go for shutdown which is a big production loss and dont want to carry out.

My question is that do we need an additional 2500 # valve to be kept at the suction downstream of the filter skid. Suppose if any back pressure comes also the isolation valve is going to operate manually meanwhile the whole back pressure will pass in to filter directly. Whether filter skid to be designed for 2500#?

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Vagif

Vagif Gafarov
Sr. Process Engineer at KBR

Dear All,

just one humble addition to this discussion - the water relief shall be routed to a caisson, not the flare system.

Like • Reply privately • Delete • 15 days ago

S M

S M Kumar
Process Design Consultant
Top Contributor

Sharath: The way the system configuration is described - is a bit confusing to me. If you are replacing an existing Tee type with 1+1 Basket type and are planning to locate it downstream of the existing 2500# suction isolation valve, then obviously the Basket type should be 2500# too. The 1+1 configuration will involve additional isolation valves of 2500# for individual basket strainer. Isolation philosophy may call for double block and bleed for such high pressure rated (2500#) services. Too many 2500# valves. A common 1 + 1 basket for all pumps may turn out to be economical. In the absence of info on your company's Isolation Philosophy and space constraints, it is difficult to make any meaningful suggestion. Please study the system and take a call.

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Padmanabha

Padmanabha Gowda
Lead / Senior Process Engineer at PT. Meindo Elang Indah

@ priyanka ..
provide pressure control valve in booster pump discharge side to provide constant suction pressure to water injection pump suction... ..avoids PSV and suction rating

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