
From: David Taylor
Sent: Thursday, February 17, 2011 7:35 AM
To: Evan Vokes
Cc: Robert Lazor
Subject: RE: Weld Procedures - NPS 16 and above

Hi Evan,

I am glad Ron and Jim like talking to us!! We need the welding team to be aligned with the project requirements on these things. If we can make the case for shop fabrication to the project that is great, but if they decide to field weld with SMAW we should be fine with that as well.

Dave

From: Evan Vokes
Sent: Wednesday, February 16, 2011 8:20 PM
To: David Taylor
Cc: Robert Lazor
Subject: RE: Weld Procedures - NPS 16 and above

Nothing wrong with them having SAW on site, I just did not know anyone did it. We had influenced the last three compression projects with John and Richard to fabricate in the shop were practicable. Trent took care of this when he first started with our group. Things went really smooth by way of comparison to Paul Lake.

Actually Bens lake was the first of this group and it worked out very well, station (I believe this is when we got Abraxus) 1703 was a bit of problem with Comstock but other than that things have gone much better. Wooden house, Mickle projects worked very well even though Academy wanted to weld Meikle in a shop that had no subarc (DL Flange was on this compressed schedule)

Officially compression projects have not revised the spec to reflect this but I keep trying to convince them to put it in the contract. Just happy Ron and Jim like talking to us

From: David Taylor
Sent: Tuesday, February 15, 2011 9:34 AM
To: Evan Vokes
Cc: Robert Lazor
Subject: RE: Weld Procedures - NPS 16 and above

Evan,
I need to understand what direction we are setting for the compressor station welding and inspection. I believe the welding specifications and the welding procedure datasheets we have allow for the contractors to use GMAW/SAW/FCAW and SMAW processes in the shop or the field. Does the specification now state that we shall weld pipe to components in the shop? We used to restrict the final tie-ins to pipe to pipe, but I have read the specification lately.

Just trying to understand where we are going and I want us all singing from the same song sheet!

Thx
Dave

From: Evan Vokes
Sent: Monday, February 14, 2011 7:23 PM
To: Jim Platt
Cc: David Taylor; Ron Wong
Subject: RE: Weld Procedures - NPS 16 and above

I am often accused of giving too much information but there is pretty good reason for this one. Your schedule cannot afford any errors or hard times. Art was at Paul Lake and can give you some insight on some of the construction problems he used to phone about. Fred was there too but he had to go to a different project before things got fully in swing. The second compressor station
If your prime does not have fabrication capacity, let them use our resources and give them a very short list of approved fabricators. If we coordinate this with Harry, he know project loading of the approved shops so we can make this as efficient as possible. Under that capacity, we can reduce inspection cost as we can leverage Frank Tse as well. The key to this is designing the pipe spools to maximize construction efficiency and make sure you will not have any really difficult pipe to component welds.
We can help with this especially if we compare the schematics to the stress. It might not be perfect but it is better than no plan.

From: Jim Platt
Sent: Monday, February 14, 2011 7:08 PM
To: Evan Vokes
Cc: David Taylor; Ron Wong
Subject: RE: Weld Procedures - NPS 16 and above

Thanks Evan

I'll try to digest all of this. I agree that I'd prefer to use SAW on all of the pipe spools, and SMAW in the field, but some of the contractors we have qualified as Prime do not have the capacity to do SAW in their fab shops (I wanted to make sure this wasn't a reason to exclude them).

Jim

From: Evan Vokes
Sent: Monday, February 14, 2011 5:31 PM
To: Jim Platt
Cc: David Taylor; Ron Wong
Subject: RE: Weld Procedures - NPS 16 and above

Hello Jim

Not a dumb question at all and certainly one that it took me a while to understand the implications of. Contractually we would like you to have the most cost effective method so under our specifications, it is permissible to do all the welding in the field as a SMAW process. (stick welding) Since you are on the shortest ever construction schedule it would pay you to read the lengthy explanation below.

So Stick welding is acceptable but conversely, it has been documented that schedule improves if you use a fabshop with higher productivity methods of welding. Submerged Arc welding is a very high productivity process that is limited to fabrication shops; similarly labor saving welding positioners are not typically found in the field. The Achilles heel of this field welding philosophy is that some of the welds can be technically very hard to do in the field and even for general fabrication some of the welds that would take a couple hours with SAW in the shop can take a "day" in the field. There is more than one argument of how compressor station fabrication under ASME should be performed but the best quality, time and schedule generally comes from using the fab shop with SAW and welding positioners. If we consider the economics a SMAW vertical up weld is a slow thing to accomplish in the field and if your alignment is less than perfect because you have a tee or elbow creating an alignment problem, it is a long day.

The best practice that we borrow from pipeline is that we prefer pipe to pipe welds in the field as they are a lot easier to deal with. Large diameter fittings such as tees are very stiff when we are using external clamps and we can never

backweld these when we are on site. In the fab shop the welders get a lot more done in a day especially in a camp situation and with site weather conditions always being a factor. In the fab shop most welds can be rolled for speed and quality and it is pretty easy to backweld in the shop if they have a program for this.

Things are more complicated on a compressor site than on a pipeline and even when you fabricate in the shop, you will always have some pipe to component welds that you need in the field. You will likely have pups that have to be installed that are less than a meter long. What we had Richard Coglon and John Riley write into their contracts is that understanding the difficulties of field fabrication; the preference is for shop welded pipe to pipe welds where practicable and all valves greater than NPS 12 will be rolled. Large valves have been successfully position welded in the past but cutting out a position weld on a valve is a really big deal. I was cautioned before on where the functional cost and quality overruns are on compressor stations.

Best practice is to have most assemblies prewelded so there is mostly large diameter pipe to pipe as and a few pipe to component welded would do a lot for your schedule especially when you have a compressed timeline as Gold Creek does, I would lean towards prefabricated pieces for all the NPS 12 and larger. While our inspectors cannot tell you the commercial impact, they can tell you about schedule. Art Harris has been on both prefabricated and pieced together large inch compressor station and he can tell you on a day to day basis why you would want prefabricated assemblies in your compressor station. His contact info is 780 208 3655. Fred Kubke has some opinion on this subject as well as it becomes a real chore to keep heat in with propane torches when you weld pipe to component. His number is 780 554 9261.

Below is what I sent John Riley in 2008 after the vortex breaker issue. Since the header is fabricated before hand, you might want to look at some of these past problems related to the vortex breaker. It is really important where the seam on the can is located on the header. Additionally Tom Thrall had written his valve fab and welding instructions since 2008 but I cannot remember the name of the document. If you have the contractor use approved fab shops, Harry Fenton and Frank Tse should be brought in as it will really help your project schedule.

Another thing that makes me glad is that when we build assemblies in the shop, we can RT most of them by a method called single wall single image for good quality images. In the field they generally limit the radiography to Double Wall Double Image which comes at the price of resolution and cost, as it is slower. If we were allowed direct control of the NDE, we could possibly implement Phased Array S scan ultrasonics as it is acceptable to ASME. There are some limitations but if most of the welding is held to pipe to pipe welds, we can gain an immense production gain as we do not have to tie up the site to inspect welds. You should only put this option out if we are directly involved as we have not written a specification for this method of ultrasonic yet. This would cut down the number of welds that need to be inspected with radiography.

Technically if you are fabricating in a shop, you could skip the hydrotest in the shop as you will have to do it for most of your site anyways but most fabricators will not release the pipe unless it is hydrotested. Make sure that the closure weld procedure is only used on welds where it is absolutely required such as when you would have to hydro against a valve. This will save you time later.

Have a good day
Evan

Technical welding details to consider in a contract

Pipe to Component field welds with large diameter, HSLA piping materials, through experience, has been determined to be a technically poor practice.

Contractor should consider the possible problems and schedule implications that may arise from such fabrications. All proposed field welding of Pipe to Component or Component to Component will be accompanied by a detailed welding plan which as a minimum will include instructions for:

- a) Management of Heat input, preheat, interpass temp and cooling rate of weld under field conditions (implementation only not details covered by weld procedure)
- b) Necessity for back-welding (TCPL will not accept high/low beyond the permissible range)
- c) External stress minimization (support, pipefitting etc)
- d) NDE

Contractor should consider using a TCPL approved fabrication shop or submit a fabrication shop for approval. Unapproved fabricators will be subjected to full time inspection rather than surveillance.

Welders shall be qualified to pressure weld within the jurisdiction that pressure welding is taking place. Contractor will be obligated to produce proof of welder qualification

Additional good practice considerations

It is forbidden to perform temporarily weldments on transmission pipe (for purposes of jiggling, rigging etc)

It is forbidden to place a weld parallel to an existing weld on transmission pipe due to stress affect on heat affected zones. Parallel welds must be separated by at least 50mm between weld caps.

- 1) The location of a long seam shall be considered when Vortex spoilers are to be installed. Ensure Vortex spoiler details are complied with while project is in the pipefitting stage.
- 2) The location of a long seam shall be considered when Contoured Insert Fittings (CIF) are to be installed. The orientation of the CIF compared to the long seam should not be overlooked when project is in the pipefitting stage.

Valves balls and seats shall be physically protected from debris while welding (plywood is good for this)

Valves will be pressure tested with all extensions on

Valves greater than NPS 16 and less than NPS 24 should be roll welded

Valves greater than NPS 24 will be roll welded

From: Jim Platt

Sent: Monday, February 14, 2011 9:24 AM

To: Evan Vokes

Cc: David Taylor; Ron Wong

Subject: Weld Procedures - NPS 16 and above

Evan

This may fall under the dumb question category, but does the attached document permit the contractor to "stick" weld the piping for a compressor facility either in the fab shop or on site. I was under the impression that to use a SAW procedure, you needed a welding machine?

I want to make sure we don't include anything in the contract erroneously and have the correct expectations of our prime contractors.

Thanks

Jim Platt

Project Manager, Compression Projects

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