Question 78 For HF alkylation units, have you changed your criteria for materials given the low availability of low carbon/non-recycled steel? Are you heat treating welds? Can you control Brinell Hardness with welding procedures? For small bore pipe, do you recommend using flanges or threaded pipe?

KAISER (Delek Refining Ltd.)

Again, just to re-emphasize, I'm not currently on an HF unit so part of this response will rely on some former colleagues of mine. I would not make a blanket recommendation to change the material specification for carbon steel in HF alkylation units. To me, the risk is too great. I understand that there are certain times when things are tight and you might need immediate material delivery and there's no other option, but I would not make a blanket relaxation in the material specifications. I would only relax the material specifications in very particular circumstances, with a conscious and informed choice by everyone in the refinery, and only with an inspection and maintenance program that has been thought out in advance and allowing for the response plan developed to be able to handle leaks if they do happen to occur.

The second part of the question, API RP 751 does recommend post-weld heat treat for all welds, and they specify a limit of 200 Brinell hardness for the welds. Welding procedures can be adapted to provide you with a lower hardness weld, but they, in and of themselves, are not sufficient always to provide you with that. So you should probably plan to post-weld heat-treat all of the welds that are made during your turnarounds or during your projects.

The third part of the question: We believe small bore piping should be flanged. Not only does this provide more consistent material selection for the refinery for the purchasing agents, but it also provides a more consistent maintenance program and inspection program for those departments inside the refinery. Again, RP 751 does have provisions in there to use screwed connections and inspection procedures, if those are existing, but it would be our recommendation to make all new connections be flanged. There are some addition references in a couple of NACE papers: NACE 03651, "Specification for Carbon Steel Materials for HF Acid Alkylation Units," and NACE 5A171, "Materials for Receiving, Handling, and Storing Hydrofluoric Acid." Both contain good references for materials selection in HF alkylation units.

DARYL DUNHAM (UOP LLC)

As we mentioned earlier, ConocoPhillips sold their HF alkylation technology to UOP. I used to work for ConocoPhillips; now I work for UOP. When UOP took over that technology, they retained their existing HF technology and gained this technology that they bought from ConocoPhillips so they have two sets of specifications now that we're dealing with. So some of these issues about how you fabricate equipment and how you do small bore piping can be addressed by two sets of recommendations: historical UOP recommendations and the historical ConocoPhillips or Phillips recommendations. So if you're operating an HF alky and you have any questions about that, you might want to contact us and we can work those issues out. There's a little more flexibility than it used to be on how you do that.

We do have a team working to get the one set of specifications in the future. Right now, we are trying not to isolate anybody. If your existing specifications are fine, we're not going to ban anything; but, we're going to try and merge these into one consistent set of recommendations where we have a main

recommendation and acceptable backup position in a lot of places, like screwed piping versus socket weld and four-bolt flanges versus eight-bolt flanges, things like that.
MIKE FACKER (Western Refining Company)
We're having a little trouble in our same KOH treaters, a little carryover with the KOH. The question is: Is there a good way to stop that carryover and/or is there a good way to wash it before you get your product tunics?
HAZLE (NRPA)
Michael, are you looking at me like you want to respond? I didn't think so.
NEWTON (Roddey Engineering Services, Inc.)
I'm looking to see what Allen says. [laughter]
KAISER (Delek Refining Ltd.)
I've seen this exact same problem before. Unfortunately, I wish I had the true answer because I never found out truly what it was or if it's been fully fixed. So maybe we can get together with some of the Coffeyville guys and chat about it a little bit later on. I do know that that's a problem out there and we had talked with UOP about the KOH treater design. There was some maybe thought about caustic carryover, the dilute KOH carryover, in some downstream lines, may be related to the particular velocity that we were sending through there. There was also some talk about some organic fluorides that might be carrying through and causing some issues, so maybe we can chat about it a little later on.
DARYL DUNHAM (UOP LLC)
You guys, come on up to the suite tonight and we'll talk about this. [laughter]
I do want to make one comment on the solid bed KOH treaters on the LPG; I assume that's what you're talking about. Like I said earlier, the LPG stream is wet going to the treater. The solid KOH will absorb the water. You form a sludge and it falls off. Now historically, the ConocoPhillips KOH treaters were up-flow and the UOP treaters are down-flow. There's a little bit of difference in how the sludge is handling in those two. One issue I've seen is in the down-flow there's a baffle in the bottom. If you've had problems with that baffle, you're more likely to carryover some of that sludge downstream. So that's probably the first thing you'll look at is if that baffle is in good shape in the bottom. And then, the second one would be if you running too high velocities in that bottom and can you be lifting some of that sludge and taking it out with the product stream.
RICHARD DOSS (CITGO Petroleum Corporation)
It's been a long time since I worked with that type unit; but also in that bottom, there's an interface level that has to stay working or that bottom starts carrying over very badly.

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