

Email chain between Matthew Stobart and others  
at CB&I discussing impacts of changes in feed gas  
composition and range of options to address those  
changes  
(3/30/2017)

Message

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**From:** Stobart, Matthew E [Matt.Stobart@cbi.com]  
**Sent:** 3/30/2017 10:32:32 PM  
**To:** Guvelioglu, Galip H [Galip.Guvelioglu@cbi.com]  
**CC:** Mullen, Thomas [Thomas.Mullen@cbi.com]; Redman, Randall W [Randall.Redman@cbi.com]; Nash, Duane L [Duane.Nash@cbi.com]; Robertson, Vincent R [Vince.Robertson@cbi.com]; Miller, Ashley G [Ashley.Miller@cbi.com]; Tsurusaki, Ken [Ken.Tsurusaki@cbi.com]; Yamin, Fereidoun [Fred.Yamin@cbi.com]  
**Subject:** RE: 210140-Tacoma - Feed Gas Composition - Pretreatment

Galip et al,

Thanks for the response. When we called you yesterday we had Duane on the line and his thought was that you were working on it. This is an extremely high profile exercise for this project and extends to the highest levels of both CB&I and PSE (not just regarding the pretreatment system, but for the impact on the entire facility). It's now been 9 days (Mar 21) since this effort was initiated regarding the pretreatment system. I at least want to make sure somebody somewhere in Texas is working on the impacts to the pretreatment system and I'd like to get a status report as soon as you know something. Please let me know when you think that will be. Thanks.

Matt

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**From:** Guvelioglu, Galip H  
**Sent:** Thursday, March 30, 2017 9:05 AM  
**To:** Stobart, Matthew E <Matt.Stobart@cbi.com>  
**Cc:** Mullen, Thomas <Thomas.Mullen@cbi.com>; Redman, Randall W <Randall.Redman@cbi.com>; Nash, Duane L <Duane.Nash@cbi.com>; Robertson, Vincent R <Vince.Robertson@cbi.com>; Miller, Ashley G <Ashley.Miller@cbi.com>; Tsurusaki, Ken <Ken.Tsurusaki@cbi.com>; Yamin, Fereidoun <Fred.Yamin@cbi.com>  
**Subject:** RE: 210140-Tacoma - Feed Gas Composition - Pretreatment

Matt,

I got your voicemail yesterday and discussed it with Duane. Currently Duane is looking into the feed composition impacts on the pretreatment system, primarily amine regenerator column and circulation pumps.

Duane has a plan and he will have the latest information on PSE. We will support him if he needs help.

Regards,

Galip

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**From:** Stobart, Matthew E  
**Sent:** Tuesday, March 21, 2017 5:38 PM  
**To:** Guvelioglu, Galip H <Galip.Guvelioglu@cbi.com>  
**Cc:** Mullen, Thomas <Thomas.Mullen@cbi.com>; Redman, Randall W <Randall.Redman@cbi.com>; Nash, Duane L <Duane.Nash@cbi.com>; Robertson, Vincent R <Vince.Robertson@cbi.com>; Miller, Ashley G <Ashley.Miller@cbi.com>; Tsurusaki, Ken <Ken.Tsurusaki@cbi.com>  
**Subject:** RE: 210140-Tacoma - Feed Gas Composition - Pretreatment

Galip,

Here it is. It's essentially an evaluation of the impact on the "as-sold" facility. There's nothing in this report about the pretreatment system. Your high level assessment comments were passed on to the Client previously in a communication prior to this report (in late February). Since this report was sent to the Client on 13Mar (last Monday), they've reviewed it and given us additional direction yesterday regarding which option they'd like us to investigate further. We're heading down that path now. Summarized as follows:

- PSE wants us to further investigate option 6A and determine what it would take to burn the extra vapor fuel on site while staying under a major emissions source. Obviously a much bigger flare. They will continue to truck away the liquid heavies. The procurement of the current flare is on hold. Everything else is still on full effort based on original design basis. Our immediate task here in Plainfield is to review the emissions calcs and determine if we think we can stay within the 100 ton/yr VOC emission rate that they are wanting. 100 ton/yr of anything (CO, VOC's, NOX, SOX) other than CO2 is the magic number (threshold) to stay under to remain a minor emissions source. But they think they are closest to the threshold on the VOC's. We need to confirm. They are going to deal with the GHG's (ie: CO2) in a different manner. We're currently more than 20,000ton/yr on CO2 (obviously much more than 100 ton/yr).

Galip, please be sure and charge your time to contract number 210142 in addition to using subledger "PCN118" with subledger type "X". Thanks.

Matt

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**From:** Guvelioglu, Galip H  
**Sent:** Tuesday, March 21, 2017 4:17 PM  
**To:** Stobart, Matthew E <[Matt.Stobart@cbi.com](mailto:Matt.Stobart@cbi.com)>  
**Subject:** RE: 210140-Tacoma - Feed Gas Composition - Pretreatment

Matt,

Can you please send the write-up that was sent to the client. I believe it was in the review meeting invite and when I declined the meeting it got deleted.

Best Regards,

Galip

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**From:** Stobart, Matthew E  
**Sent:** Tuesday, March 21, 2017 4:08 PM  
**To:** Robertson, Vincent R <[Vince.Robertson@cbi.com](mailto:Vince.Robertson@cbi.com)>  
**Cc:** Mullen, Thomas <[Thomas.Mullen@cbi.com](mailto:Thomas.Mullen@cbi.com)>; Tsurusaki, Ken <[Ken.Tsurusaki@cbi.com](mailto:Ken.Tsurusaki@cbi.com)>; Nash, Duane L <[Duane.Nash@cbi.com](mailto:Duane.Nash@cbi.com)>; Guvelioglu, Galip H <[Galip.Guvelioglu@cbi.com](mailto:Galip.Guvelioglu@cbi.com)>; Baker, Jeffery J <[Jeffery.Baker@cbi.com](mailto:Jeffery.Baker@cbi.com)>; Wojciechowski, Sam F <[Sam.Wojciechowski@cbi.com](mailto:Sam.Wojciechowski@cbi.com)>; Redman, Randall W <[Randall.Redman@cbi.com](mailto:Randall.Redman@cbi.com)>; Miller, Ashley G <[Ashley.Miller@cbi.com](mailto:Ashley.Miller@cbi.com)>  
**Subject:** FW: 210140-Tacoma - Feed Gas Composition - Pretreatment

Vince,

Thanks for looking into this. I've attached below the communication exchange that took place between Thomas, Duane, and Galip regarding this subject back in February. The bottom of the string contains the new expected gas composition. Much of Galip's and Duane's findings were communicated to the Client at the time to let them know the likely impacts on the pretreatment system and the balance of plant (liquefier, heavies collection, LNG fuel quality, etc.). Since that time, at the direction of the Client we have been further studying the impacts on the balance of plant, but I think we are remiss in not having you look further at the impacts to the pretreatment system. As Duane states, the impact of the extra HHC on the flash drum may already be mitigated with the design of the current draw-off system, but the impact on the still due to lower CO2 content is worrisome and should be evaluated. We don't think it's prudent to redesign just for the new composition. We may need to have a system that can handle both. Please let us know if that's possible or what it would require in the way of modifications if the original feed gas composition should return over time (which our Client is hoping for and working towards with their pipeline supplier).

We don't think the added H2S in the effluent to the flare will be an issue because the flare we have is not just a standard tower flare, but an enclosed ground flare with a residence time high enough to achieve vapor destruction. It will increase the SOX emissions, but we think we can handle higher H2S to the flare. We will not hold you to any kind of H2S removal guarantee. However, you'll need to determine if it affects your amine system design. Please take some time to further evaluate the impact on the amine and the still and let us know ASAP if you think you'll need to modify anything to accommodate the new feed gas. The facility will still be run at full production rate. Don't actually modify anything yet, just let us know what you think it will impact. Work on the original scope should continue at full effort per the original design basis and schedule.

All of your time for this effort should be charged using subledger "PCN118" and subledger type "X". It will all be recovered in a change order with the Client. We can talk further about what you think it will take (whrs and duration) to complete this exercise, but you can get started right away. Let me know if you have any questions or you want to discuss further.

Matt

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**From:** Robertson, Vincent R  
**Sent:** Tuesday, March 21, 2017 2:11 PM  
**To:** Stobart, Matthew E <[Matt.Stobart@cbi.com](mailto:Matt.Stobart@cbi.com)>  
**Cc:** Nash, Duane L <[Duane.Nash@cbi.com](mailto:Duane.Nash@cbi.com)>  
**Subject:** RE: 210140-Tacoma - Feed Gas Composition - Pretreatment

Matt,

It is my understanding Duane has communicated the below concerns with the impact to the Pretreatment Unit to Thomas. I want to follow-up with you in case you were not aware of his concerns.

CO2 concentrations that are anticipated to decrease to 10-25% of our original numbers could require some redesign of the Amine Still. The tower might handle this but we would really prefer a design that matches what the plant will really see. Also, if a different amine is used, it could require an adjustment to more equipment. The H2S concentration being up substantially is an issue also, since a standard flare is not an acceptable thermal destruction device.

We could evaluate further if you could provide what you are realistically expecting the feed to the Pretreatment Unit to be. Based on some of the preliminary values we've heard, with the CO2 content is being reduced substantially, Tyler Process and RGT would need to look at the amine system again.

Duane believes the Dehydrator side is fine. Most likely the amine contact keeps our water concentration the same and there will be no effect there. But the amine can very possibly need adjusting.

Thanks,  
Vince

**From:** Mullen, Thomas  
**Sent:** Wednesday, February 22, 2017 12:56 PM  
**To:** Nash, Duane L <[Duane.Nash@cbi.com](mailto:Duane.Nash@cbi.com)>  
**Cc:** Miller, Ashley G <[Ashley.Miller@cbi.com](mailto:Ashley.Miller@cbi.com)>; Stobart, Matthew E <[Matt.Stobart@cbi.com](mailto:Matt.Stobart@cbi.com)>  
**Subject:** RE: PSE Feed change

Duane,

Thank you for the look. Please don't expend effort or broach any redesign. We were trying to gauge from a high level the implications with a differing feed and will relay to the client. Until and unless we have directive from them we will not alter course or attempt to get into the weeds with design.

Appreciate the effort. We'll relay if we need to progress this further.

-Thomas

**From:** Nash, Duane L  
**Sent:** Wednesday, February 22, 2017 12:49 PM  
**To:** Mullen, Thomas <[Thomas.Mullen@cbi.com](mailto:Thomas.Mullen@cbi.com)>  
**Cc:** Miller, Ashley G <[Ashley.Miller@cbi.com](mailto:Ashley.Miller@cbi.com)>  
**Subject:** FW: PSE Feed change

Thomas,

See the response from our Randall Gas group.

I can see an issue as Galip points out in the Amine Still for vapor traffic. It seems that will be much lower so this should probably be reviewed by Randall or Ineos (amine supplier) or maybe our Dave Nash.

The concern on the Amine Flash Drum is real but I believe we have a satisfactory drawoff arrangement already in place.

Do you have a simulation on your part of the facility to evaluate how this feed change affects your equipment up to the Pretreatment System? If you have that and those results we could update our process information in the Pretreatment UniSim simulation and start to address Galip's concern. Before we begin any rework with Randall I believe we need revised input from your side (unless that is already what you had sent to me).

Duane

**From:** Guvelioglu, Galip H  
**Sent:** Wednesday, February 22, 2017 12:18 PM  
**To:** Nash, Duane L <[Duane.Nash@cbi.com](mailto:Duane.Nash@cbi.com)>; Yamin, Fereidoun <[Fred.Yamin@cbi.com](mailto:Fred.Yamin@cbi.com)>  
**Subject:** RE: PSE Feed change

Duane,

I would say this is a significant change in feed composition. The impacts needs to be accessed.

Some of my quick observations:

- H2S content of 12 ppmv exceeds most pipeline specs, is that correct?
- The amine system was originally designed for CO2 removal and not for H2S removal. Are we now required to meet a H2S in the treated gas?
- H2S content increase and as a result NACE requirements need to be evaluated.
- There is significant change in the C3+ content and most importantly C5+. The heavy hydrocarbon removal capability in the flash vessel needs to be evaluated for increased HHC loading.
- CO2 content is reduced by almost an order of magnitude and that could cause problems in the regenerator due to low vapor traffic.
- H2S/CO2 ratio increased significantly thus the regenerator off-gas would contain significantly higher H2S concentration, disposal of this could be an issue.
- With increase in HHC, we need to make sure that these do not condense at the mole sieve as well as mercury removal bed.

Regards,

Galip

**From:** Nash, Duane L  
**Sent:** Wednesday, February 22, 2017 9:06 AM  
**To:** Guvelioglu, Galip H; Yamin, Fereidoun  
**Subject:** PSE Feed change

Fred / Galip,

I received a note from our folks in Plainfield. The note stated that the client is now seeing a slight change in the feed composition. The question to me was what effect with a higher H2S concentration. The following shows compositions when you set up the simulation and now the current analysis. Red are reductions.

Do you see any issues or concerns? I'm assuming that the amine will pick up all the H2S. CO2 content is lower so that is a slightly less amount of stripping in the Amine Still.

	Original RGT	TLM 2/21/2017	Delta
c1	0.945082	0.910402	0.034680
c2	0.021669	0.061037	-0.039368
C3	0.004730	0.015817	-0.011087
IC4	0.000780	0.002391	-0.001611
NC4	0.000890	0.00255	-0.001660
IC5	0.000240	0.000536	-0.000296
NC5	0.000190	0.000377	-0.000187
NC6	0.000300	0.000244	0.000056
nC7	0.000000	0.000122	-0.000122
nC8	0.000000	0.000041	-0.000041
N2	0.006100	0.003791	0.002309
CO2	0.019998	0.00263	0.017368
H2S	0.000002	0.000012	-0.000010
H2O	0.000021	0.000051	-0.000030
	1.000002	1.000001	

Thank you

*Duane L Nash*  
Principal Process Engineer



Fabrication Services  
3102 East Fifth Street  
Tyler, Texas 75701-5103  
+1 903 595 7962  
[Duane.Nash@cbi.com](mailto:Duane.Nash@cbi.com)