Extracted Emails Mr. Stanley in exchanges with Mr. Rush, OceanGate

2019

On **Thu, Apr 18, 2019** at 11:44 AM [redacted] <[redacted]> wrote:

Stockton,

Thanks again for the amazing opportunity you afforded me yesterday.

While I know we have a special connection running "sister subs" , the quality of the work I did for you in WA was excellent, and you enjoyed reading my exchange with [redacted], I think the main reason I got this opportunity to dive might have the most to do with if there was such a thing as "expert in risk assesment in one-off , uncertifiable deep sea manned vechicles" my resume is hard to beat, and you know we are like minded when it comes to judging how far things can safely be pushed.

As such this is my opinion / analysis of what I have seen here.

While I think your concept of RTA is sound, I am not sure it applies in this case. The sounds we observed yesterday do not seem consistant with glue joints breaking, air cavities breaking, or the random weak fiber breaking. What we heard, in my opinion, and I think after the discussion Joel and I had last night, I can say he shares this opinion, sounded like a flaw/ defect in one area being acted on by the tremendous pressures and being crushed/ damaged. From the intensity of the sounds , the fact that they never totally stopped at depth, and the fact that there were sounds at about 300 feet that indicated a relaxing of stored energy /would indicate that there is an area of the hull that is breaking down/ getting spongy.

I understand you are under enourmous pressure from investors, people that have been waiting to go, people that are literally dying to go and might not be around if you push it another season.

A useful thought exercise here would be to imagine the removal of the variables of the investors, the eager mission scientists, your team hungry for sucess, the press releases already announcing this summers dive schedule. Imagine this project was self funded and on your own schedule. Would you consider taking dozens of other people to the Titantic before you truely knew the source of those sounds ??

I believe in what you are doing. I think the use of composites is long over due for MUVS. You have already shown the idea can work, 95% of that hull is performing great, but that spot is clearly talking to anyone that will listen , saying something is not right there. Even that is a validation of your material choice, it is giving you plenty of warning.

Another way I like to make decisions is by considering worst case senarios. The worst case senario of delaying diving until you have identified the defect making all that noise is some dissapointed customers and financial woes. The worst case senario of pushing ahead and not listening to the hull yelling at you involves [redacted] and some russian oligarch tooling around a russian nesting dolls version of a wreck site in a made for TV special, telling his version of how things went wrong. I hope you see option B as unacceptable as I do.

Karl

On Thu, **May 23, 2019** at 3:30 PM Stockton Rush <[redacted]> wrote:

Karl,

Yes we are shooting for a few more (as many as 5) 4K dives to get added acoustic data and operational experience - especially charging at sea and back to back daily dives.

Our analysis of the past dives shows a definite reduction in acoustic events, but only having data from two full operating depth dives does not make for much of a validating trend.

Are you back to operational or does the government still have you in hand cuffs?

Best regards,

Stockton

From: [redacted] <[redacted]>
Sent: Monday, May 27, 2019 9:31 PM
To: Stockton Rush <[redacted]>
Subject: Re: Deep dives in the Bahamas

Stockton,

Your last email, the Smithsonian article and Oceangate's latest press relase have given me plenty to think about. A few thoughts I wanted to share with you -

A. 2-7 dives to operating depth are too few to launch an expediton selling 6 figure tickets in the middle of the ocean. I think 50 is a good #- it's how many dives I had in C-bug before taking customers, and it's the # of skydives you need for a B license, which allows you to go at night, land on water, try a wingsuit etc .

B. I think that hull has a defect near that flange, that will only get worse. The only question in my mind is will it fail catastrophically or not.

C. The fact that you indirectly told me to not speak about the noises I heard on the dive, to me says alot. As you know, my subs have had many issues and incidents over the years. At no point did I find it neccesary to tell anyone not to speak of what they saw or heard. I have told journalists openly about my most exciting sub sea moments. I feel my customers make a %100 informed consent, or at least have access to all the information to do so if they choose to do the research.

Anyway- Those are my opinions, take them for what they are worth, but I'd say I have more relavant experience than anyone else you could have thought of.

Have you been following the deaths on Everest ? I am surprised at the willingness of people to risk their lives for that .

Hope this finds you well-

Karl

Forwarded message ---------
From: **Stockton Rush** <[redacted]>
Date: **Sun, Jun 2, 2019 at 8:01 PM**
Subject: RE: Deep dives in the Bahamas
To: [redacted]>

Karl,

I made it clear after our dive that I will not take nonessential crew, clients or media in the sub until I am confident that the hull is safe. As I told you before, I cancelled last year's expedition and will cancel this year's, or even shut down the company, before I will operate an unsafe sub.

One experiential data point is not sufficient to determine the integrity of the hull. It certainly calls for more testing which we will carry out in The Bahamas this month, and more data analysis which we have consultants working on now. We have spent millions of dollars over many years, hired several experts in composites, and conducted multiple tests to destruction of carbon fiber pressure vessels in order to generate a body of knowledge which will allow us to accurately assess this hull. Whether the localized acoustic activity we all heard is critical or merely characteristic is yet to be determined.

Your support for 50 dives to MOD citing parachute training is not an apt analogy. You cannot compare experience-based limits, like skydiving, to vehicle testing. I suspect no deep diving sub did 50 MOD dives before non-essential crew were taken. Even the Navy does not have that requirement. The more relevant example would be that the FAA requires only 25 hours of flight testing before passengers are taken in an experimental aircraft. Only one of these flights needs to be to maximum dynamic pressure, the aviation equivalent of MOD. The required hours can be logged in 10 flights or fewer and this holds true for my composite airplane and others that use novel structures, materials and configurations.

In addition, an arbitrary dive number is the wrong approach for structural testing as it can mask cyclic issues, damage and corrosion. Anyone seriously concerned about hull failure should use real time monitoring – strain gauges for metallic structures combined with acoustics for composite or ceramic structures. To operate a composite hull to anything approaching its safety limits without real time acoustic monitoring, no matter how many dives have been conducted, is not rational as the operator must monitor for late cycle micro buckling or undetected structural damage. This is why a functioning acoustic monitoring system is a steadfast "No Go" dive requirement for OceanGate.

I have been clear that we need to obtain more acoustic data to establish a safe trend. That may take 2 dives or 20, we will only know after we get more data.

I applaud you for being open about your challenges and infrequent, less than perfect outcomes. I have done the same by holding 8 webinars over the past several months to educate our clients about our operations and the questions we are addressing in testing the hull and gathering monitoring data. Attached is our liability release that we will go over in person with all participants. You can see that this document fully informs them of the risks involved.

I requested that you keep your opinions to yourself because our analysis is ongoing and you have not reviewed the terabytes of data, analyzed the many hours of scale model testing, or studied composite pressure vessel behavior. Depending on the data we collect over the next series of dives we may choose to postpone the expedition, de-rate the sub, or go forward with full disclosure of our decision-making process and applicable data. As I said at the start of this letter, I cancelled last year's expedition and will cancel this year's, or even shut down the company, before I will operate an unsafe sub.

Your recent emails tell me that we have had two fundamental misunderstandings. The first is regarding your role while visiting us in The Bahamas. I value your experience and advice on many things, but not on assessment of carbon fiber pressure hulls. The second, even more disturbing misunderstanding is your concern that I will either intentionally or unintentionally succumb to pressure and take advantage of our clients. I realize more than anyone that this is the primary pitfall and have taken multiple steps to guard against this.

As someone who has been on the receiving end of uninformed accusations from industry pundits, I hope you of all people will think twice before expressing opinions on subjects in which you are not fully versed.

Stockton

[redacted] <[redacted]>

Jun 3, 2019,
4:11 PM

to Stockton

Dear Stockton,

You needn't worry about me expressing my opinions to anyone other than you , (and a few friends on the island) but, I would not in any way try to put pressure on you from "people in the industry" or anything like that. A. because I see that approach as only making someone as determined as you MORE likely to go ahead with dives, B. I think there is almost no limit to risks people are willing to accept for such an adventure, as evidenced by this year's season on Everest, so even the best argument laid out in the best way would be unlikely to change anyone's mind / the eventual outcome.

I am glad we can have the discussions we are having though, and I genuinely feel my past experiences can be of use to you in thinking about your dive schedule.

You are right, I am in no way an expert on assessing carbon fiber pressure hulls. What I do have relevant experience in is risk management of one-off, uncertifiable, experimental submersibles.

Your statement that " you will not take nonessential crew, clients or media in the sub until you are confident that the hull is safe. " to me is a sort of red flag. The definition of safe is free from risk -https://www.merriam-webster.com/dictionary/safe Obviously , and as evidenced by your waiver, the endeavour you wish to undertake is full of risk, what we are talking about here is risk management and what an acceptable level of risk is.

My 50 dives to MOD is not an arbitrary number. It is based off my own experience. The 1st dive I made in C-BUG with a paying passenger was dive #50. Idabel was a more convoluted path : I took my 1st paying passenger on dive # 9, but only to 1000 feet. I did not take a paying passenger to 1500 feet until dive # 61, and my first dive to 2000 feet (with non paying friends) was my 100th dive. It wasn't until dive 128 that I took my first paying passenger to 2000'.

"Arbitrary" numbers are set on too many activities to list, based on both operator experience and vehicle testing. You cite the FAA letting a plane carry passengers in an experimental aircraft after 25 hours flight time, is that paying passengers ?

In a meeting at UI where alternatives to certification was being discussed, I suggested to the group that 50 dives worth of experience would be a good indicator that an entire system had

been tested enough that major bugs were worked out and that risks had diminished greatly from earlier dives. Everyone in the room felt this was a reasonable number,

[redacted] was particularly encouraging that this was a viable alternative to certification for some purposes.

As a mental exercise, let's assume that by monitoring the noises the hull makes you can know the hull was going to fail in time to react, and let's also assume that your customers will all be OK with the kinds of sounds we were hearing and accept your explanations and be able to quell their sense of panic that will result from hearing breaking sounds 2 miles under water. Do you think that the entire system is dialed in enough, the bugs worked out , that you have a fair chance of even 3 consecutive dives without loosing major systems? That is another measure of being prime time ready, in my experience, when you start racking up consecutive dives without anything failing/ breaking. You are not there yet. Do you want to present that "product" to your customers? at what level of degraded dive experience will you start issuing refunds, or partial refunds, or do you have enough spare days built in to take the same people as many times as it takes to have them "get the full experience" if certain systems fail ?

I also think you are relying too much on all the data, experts, testing etc that you cite. If the hull has a defect (which I believe strongly it does, as indicated by the sounds being concentrated in one area) the value you are placing on your "terabytes of data" goes out the window. If your next dive confirms that the sounds are concentrated in one area, is there any other conclusion than that one area has some sort of defect ?? Short of cutting the hull apart or testing it in a chamber to failure, how will you know what that defect is? If you don't know what the defect is, how can anyone predict how the hull will behave?

I don't see any scenario where you " are taking advantage of your customers" if anything, you are responding to market forces and trying your best to meet their demands. More than that I think you are determined to push the manned submersible technology forward and have invested a huge amount of your time and financial resources to do so. I think you are right there, you have already proven the concept of a carbon fiber cylindrical pressure hull for deeper than anyone had previously thought possible, I don't think if you push forward with dives to the Titanic this season it will be succumbing to financial pressures, I think it will be succumbing to pressures of your own creation in some part dictated by ego to do what people said couldn't be done. I see similarities between you and me in our motivations. I have an idea what kind of determination it took on your part to be alone, hearing those noises and keep descending, but there comes a time logic has to overrule impatience. The evidence suggests there is an issue/ defect in one area. Without knowing what that defect or issue is, your models and experts cannot say how it will affect the performance of the hull. Once you accept those two facts, I think the rest of the decisions fall into place.

Thanks for taking the time to consider my concerns

Your friend,

Karl