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A Candid Discussion On LNG With An Internationally Recognized Safety Expert

■ By Tyler Reeb
Editor

Jerry Havens has made a career out of principled number crunching and analysis, earning him international recognition as an expert in atmospheric dispersion of hazardous gases and fire/explosion phenomena. He oversees multi-million dollar research projects, he has been enlisted to provide council for an impressive roster of national and international projects – including serving as the principal expert reporting to the Office of Special Counsel John C. Danforth (a 19-year Republican Senator from Missouri, who chaired the Senate Committee on Commerce, Science and Transportation) regarding the fire that destroyed the Branch Davidian Complex near Waco, Texas, April 19, 1993. (If you want to read more about his background, read the related sidebar at the end of this article.)

Havens' efforts have not gone unnoticed. That's why he was presented the Merit Award for 2004 by the Mary Kay O'Connor Center for Process Safety at Texas A&M University along with other impressive academic accolades. And that's why agencies like the California Public Utilities Commission and other equivalent agencies have enlisted his services in recent years to provide risk assessments on proposed liquefied natural gas (LNG) terminals.

To gain further perspective on the proposed LNG terminal that Mitsubishi subsidiary Sound Energy Solutions seeks to build in conjunction with ConocoPhillips on the Port of Long Beach's Pier T this reporter caught up with Havens to explore this issue that will likely impact national policy on LNG.

Jerry Havens Q&A

LBBJ: To start off, I think it would be useful for our readers to understand your thoughts on LNG generally as a transitional fuel in the years ahead.

Havens: With my remarks restricted to safety issues or more general?

LBBJ: Generally.

Havens: It surely is my position that we need increased supplies of natural gas. Natural gas is one of our premium fuels. It has all kinds of uses . . . It's a very important chemical feedstock for the manufacturing of everything, and in the environmental area, it is becoming increasingly important because it is looked at as a fuel of choice that mitigates environmental problems many of which we have that are associated with burning heavy fuel oils, coal, and so forth . . . I certainly understand the need for

natural gas and I also understand and support the position that we have limited supplies of natural gas in this country and that if we want to expand the use of natural gas in very large amounts then one of the best ways to do that is imported LNG. I guess at the end of the day all I'm trying to say is that I'm not anti LNG. I understand the importance of it and I know that – if we're going to meet those [projected future] requirements – we need to have increased importation. My issues with it are really very simple. If we have alternatives that we can look at, then we should do everything we can do minimize the safety impact on the general public in considering the siting of these terminals. That's where I enter the picture because I think that . . . we do have several alternatives . . . I'm primarily interested in the question of choosing that alternative, which is the best that is directed to the public safety issue . . . If I had the chance, I would put the terminal where it wouldn't have the potential to endanger the population around it.

LBBJ: Are you advocating offshore facilities?

Havens: Well, I am talking about the fact that, for example, in California the only projects I know of that are being considered right now are either Long Beach or several other sites, all of which to my understanding are offshore. Now, I have already testified to the CPUC that I do not believe that there should be a prohibition against LNG terminals onshore. I'm just simply saying that when you consider putting one onshore, you should evaluate them on a case-by-case basis to see if they have proper consideration for the public safety in the area surrounding it. And that's why I have said that for a terminal like the one [proposed] in Long Beach . . . my recommendation would be that you wouldn't put a terminal like that – with ship traffic like the ones that are going to come in there – closer than about 3 miles or so from the terminal because inside that distance I think there is the potential for accidents or events that might be somehow caused by terrorists or whatever to affect the public out to those distances. So, there may be some sites onshore that meet those kinds of requirements. But in my view, Long Beach does not.

LBBJ: I spoke at length with some folks back in Mobile, Alabama, and they told me about a proposed LNG site there, that ended up not going through. At the time, there was a document that FERC [Federal Energy Regulatory Commission] was using, which was put together by Quest Consultants, that ended up, by and large, being discredited and is no longer used by FERC. Can you please explain your role in examining that document?

Havens: Yes, I think you're referring to a document that was prepared by Quest for the [U.S.] Department of Energy. It was prepared shortly after 9/11, and it was directed to a consideration of the risks of LNG tanker incidents that might occur in Boston Harbor . . . I don't know too much about the details of why it was done. Although I do know that it was done by Quest at the request of the department of energy . . . Quest made some assessments of what they considered the consequences might be of a big spill of LNG onto the water that might either be followed by a fire or a vapor cloud. And in making those estimates, they had a specific technical issue that I objected to. And it was largely the fact that they said that nobody had ever taken into account the effects of waves – water waves – that would reduce the size of the LNG pool on the water. Now, if you could keep the LNG pool from growing to bigger sizes, it would mitigate the problem. In other words, the fire would be smaller, the vapor cloud would grow smaller, etc. So, they came up with distances for both pool fire exposure and vapor cloud distances, which were shorter than had been suggested by several other people including myself. And I objected, as did others, to the fact that no one had demonstrated what their assumptions were [regarding how] the water waves would mitigate this problem. And, after a lot of roundabout about this, I think that Quest essentially admitted that, number one, this was a study which was only applicable to Boston Harbor and . . . they said that they had never intended that it be used for general purposes. So it was sort of withdrawn. I don't know what else you want to know about it but that is what my

understanding of what the whole thing is. They made a suggestion that the distances would be mitigated or decreased by the consideration of the effects on the spreading of the liquid of water waves. I objected to that and said, "I don't know whether that's true. But I what I am convinced of is that nobody's ever demonstrated it. So therefore we cannot assume that that is a basis for proceeding." . . . When you say it was discredited, I think it was as much as anything else just withdrawn. You hear almost nothing about it these days as far as I know.

LBBJ: Quest also did the proposed risk assessments for the EIR for the proposed LNG terminal at the Port of Long Beach. What would you say your most critical questions are regarding the hazard assessment of the proposed terminal on Pier T put out by FERC and the Port of Long Beach, with the assistance of Quest Consultants?

Havens: I suppose the foremost problem that I have is that there appear to me to be very important inconsistencies in the findings of the Quest report and the findings that are put out in the EIS. In particular, the FERC people say that they do not believe, or they do not support the idea that you can assign a probability to a terrorist attack and then Quest does [just] that . . . That is a glaring inconsistency it seems to me. Furthermore, it is the position in the [draft] EIS that Quest goes straight to the question of trying to define what the worst-case consequences might be – independent of any probability. So, they end up talking about events like the total collapse of both of the tanks and they calculate distances for vapor cloud travel and fire based on those worst cases. They come up with distances – in the case of vapor clouds – that are longer than the ones that I had sited. In one case, I believe they calculate a 6.5-mile distance. On the other hand, FERC chooses not to consider those worst-case events, but rather to base their analysis on things that they consider more likely. In other words, it's the same question that one always faces. If it is a major consequence, you still may not worry too much about it if you think it is so unlikely that you can go ahead and not worry about it.

LBBJ: Do you feel FERC's current LNG regulations are adequate?

Havens: Well, first I should clarify that it is my understanding . . . that FERC actually does not write the regulations that are being enforced in the siting of this terminal. There are LNG safety regulations that we will talk about in more detail I'm sure. But those are promulgated by the department of transportation (DOT).

LBBJ: Doesn't the EPA (Environmental Protection Agency) have related LNG regulations?

Havens: Yes, the EPA as well, but the safety related factors are almost wholly – at least the ones I'm talking about – within the DOT framework. The EPA would have regulations that would apply but they would be more likely to be in the environmental assessment area.

LBBJ: Even more generally, do you believe current domestic LNG regulations are adequate in ensuring public safety?

Havens: No I do not. And there are two primary reasons where I think they fail to do that. The first is that the current regulatory framework does not, at the moment, regulate the hazards that could extend from spills on the water. Now, primarily that has to do with the ship itself rather than the land-based part of the terminal. In other words, [with] the DOT regulations basically their applications stop at the shoreline. So, if you follow the siting regulations, what you have to do is to plan for some events or spills in the terminal and you have to ensure that those things will not endanger the public by calculating exclusion zones distances [that don't] extend off of the site or otherwise you don't build the terminal unless you get a waiver or something. But the problem that I'm focusing on is that there are no such

requirements for spills that would occur from the tanker onto the water. Since there is at least as much if not more potential for the hazards to be far reaching if you had a big tanker spill. In my opinion, this is a loophole in the regulations where a principal thing that the public safety would depend on is not required to be addressed. So, in a nutshell, the present regulations do not apply to spills of LNG from the ship either by accident or by terrorist event. There is another area that I take issue with the regulations – and I testified to all of these, too. On shore, they are required to meet certain requirements . . . to determine exclusion zones for fire radiation damage and vapor cloud travel. And the regulation[s] prescribe the kinds of events that must be considered and . . . the methods for calculating those vapor cloud distances and the fire radiation distances. There is a serious problem with each of those provisions. First, on vapor cloud dispersion, it is my belief that the FERC is approving calculation measures for determining the vapor cloud exclusion zones incorrectly. And the result of that incorrect method, which they are using, is to downplay the hazard. In other words, they are coming up with results that say that the vapor cloud won't get off the site; and I take issue with that. I think if they just simply calculated the answer to the problem with accepted methods that are correct, then they would get a different answer. So I feel like the intent of the regulations is not being followed in the application of the regulations even on shore. On the case of pool fire radiation, which is the other exclusion distance, basically what you're required to do is to calculate the distance out to some thermal level . . . what we're talking about here is some distance at which somebody would be burned. Now, in that particular instance, the answer to the question depends on that end-point criteria that I mentioned. For example, currently the regulations require you to specify a certain size fire . . . and then you have to calculate the distance out to which you could have a thermal flux, which is a measure of thermal exposure of five kilowatts per square meter. If your distance that you calculate out to that level doesn't go offsite then you meet the regulations. The thing that I take issue with is that if somebody receives five kilowatts per square meter of thermal radiation to their unprotected skin, they will get second-degree burns in about 20-30 seconds. So, it is not correct to assume that a person at that distance is safe. Actually, unless that person can seek shelter, he's gonna get burned. And so what I have said is that they should change that end point to a thermal flux level that would ensure that people would not be burned. And it is already established that that flux level would be somewhere around 1.5 kilowatts per square meter. If you do the same calculations they're doing right now to the different end point, then the distances are increased markedly . . . Those are the principal issues that I have with the current application of the regulations in the case of Long Beach.

LBBJ: I've read recent reports on an Australian firm, Woodside Energy Ltd., that purports to have come up with a new form of LNG importation, whereby a tanker would take a large amount of LNG to a point offshore where they would link up to some kind of pipeline facility and transmit natural gas that is regasified from its LNG form using technology stored aboard the ship. Have you reviewed what Woodside is proposing and do you feel the technology is a feasible and good option for an area such as Long Beach?

Havens: I am aware of the project but the only things that I know are associated with press reports. What I understand is that the system that they are proposing is what's called a regasification system on the ship. In other words, the tanker would bring LNG just like any other tanker. But it would hook up to an undersea pipeline and it would gasify the liquid on the ship and put it, as a gas, into the pipeline. And it would go through the pipeline to the shore. Now, do I think that's feasible? I do . . . . The idea has already been demonstrated . . . The only [LNG] importation facility that has been built since the '70s is based on that principal and it's already operational in the Gulf of Mexico.

LBBJ: Do think a technology like that is worth exploring?

Havens: Yes sir. I'm not enough of an expert to know whether it's cheaper or more expensive to do it that way but my interest in it is, number one, it appears that it is an alternative. In fact, it's an alternative

that's already being demonstrated in the Gulf of Mexico. And it is important to me because it provides an alternative to keep the public out of the way.

LBBJ: How do you feel the proposed LNG facility at the Port of Long Beach stacks up against other current or planned LNG terminals around the country?

Havens: Well, there are two factors here. One is that there seems to be no question that there is a high population density around this terminal; admittedly on one side and not the other because the other side is the ocean . . . But according to the state agencies who have looked into these things, there are within say three miles, which is the distance that I suggested should be considered over 100,000 people I recall. So this is surely an urban siting issue that we're talking about. I don't know of any other terminal in the U.S. that is even close to that kind of density except Boston, which may even exceed it. But the point is that the other operating terminals in the U.S. right now are far more remotely sited than Long Beach.

LBBJ: Aside from Long Beach, have any other LNG terminals been proposed near densely populated urban areas after 9/11?

Havens: There have been some proposals. There is currently a very contentious issue going on about the siting of an LNG terminal at Fall River, Massachusetts. Now, Fall River, Massachusetts, doesn't have the density and population – I don't think – that Long Beach does but it is a city of several hundred thousand people and in that city the tanker would basically [travel] into the middle of town and through the Taunton River to unload. So, I would say that right now there are two I guess what I'd think may turn out to be the test cases right now on urban siting of [LNG] terminals . . . Now there are proposals out there to put terminals in other highly densely populated areas. There are more than one . . . being proposed up in the Delaware River, one of which is right up in Philadelphia. And there are recent proposals for one in Baltimore Harbor. But none of these are as far along as [Long Beach and Fall River].

LBBJ: I've heard it said before and it seems that you are implying it right now – it looks like Fall River and Long Beach could end up determining the way the LNG industry could proceed in the country in the years ahead.
Havens: It seems to me that that is the case.

LBBJ: What do you think the odds are that one or both of those proposed projects could end up in court?

Havens: I am a consultant to the parties that are fighting . . . the terminal in Fall River. And within the last two weeks FERC ruled against the appeals filed by the City of Fall River and the states of Massachusetts and Rhode Island to turn that terminal down; and the states of Massachusetts and Rhode Island, in turn, have already filed suit with the appeals court in Boston. So, it's already happening.

LBBJ: How would you compare the process in Fall River to the process unfolding in Long Beach?

Havens: Fall River is further along. We've only completed the draft environmental impact statement in Long Beach. In Fall River, the draft environmental impact statement was issued, the final environmental impact statement was issued, there were requests from a number of authorities for reconsideration and request for hearing and a whole bunch of legal things but the decision came out within the last two weeks that all of those requests were denied by FERC. So that left [the] terminal still on track . . . and as a result of that decision, there have been lawsuits filed in the court of appeals . . . We are not that far

along in Long Beach because the final environmental impact statement has yet to be released. I don't know when that will be.

LBBJ: Did you review the Fall River EIR/EIS?

Havens: Yes.

LBBJ: Did you find similar inconsistencies between the Long Beach and Fall River documents?

Havens: I did.

LBBJ: Do you think it would be wise for folks in Long Beach who are tracking the proposed terminal at the port to also track what is happening in Fall River?

Havens: I agree that the issues that I've described to you are essentially the same in both cases. Now I will say one thing because I have compared Fall River and Long Beach a little bit . . . The public exposure may not be that dissimilar. I don't think we ought to start talking about whether there's a big difference between 75,000 people and 125,000 if we're talking about somebody that could get hurt. But there is a difference in Long Beach that to me is extremely important. Unlike Fall River, Long Beach, in my view, has strategic national importance. This is a port where a very large percentage – from what I read is upwards of 40 percent or so – of the container traffic coming into the [U.S.] comes through the combined Long Beach-L.A. port [complex]. And there are all kinds of things that happen in that port, which I am concerned would heighten the attractiveness of that [site] as a target for anyone who wanted to make a big mess. And so, beyond the public exposure, I just feel like that there are serious questions about increasing the vulnerability of such strategically important facilities to the possibility of a terrorist attack if you have an alternative. That's what it comes down to. If we had no alternatives, I would be forced to say well, "Well, we have to think this through." But my entire position on this is based on the fact that unless somebody tells me something that directly contradicts what I feel like I know, there are alternatives – and there are alternatives that are acceptable [to companies] that would build them and so forth. So, I just say that we ought to think very carefully about whether there is actually a need to put a facility like this in a crowded port.