Fukushima one year later – making sure we learn the right lessons

On March 11 it was the first anniversary of the great Tohoku earthquake and tsunami that devastated Japan and, of course, the accident that resulted at the Fukushima Daiichi Nuclear Power Station. And as can be imagined, there were many many articles in the press to commemorate this event.

As I read and read and read, I found that most of the discussion to date has deteriorated into a form of public relations war. There are those that are confident the accident demonstrates that nuclear power plants are fundamentally safe and those that are equally sure the accident demonstrates that nuclear power is far too dangerous for the world and must be stopped.

The week immediately after the 11th I was in Brazil teaching for the WNU at our annual course "Key Issues in the World Nuclear Industry Today". As can be imagined, the discussion this year was very focused on Fukushima. Following an excellent presentation on the technical events throughout the accident and a good discussion of the lessons learned there was an important question from the audience. A former senior nuclear regulator simply asked – so what is new here? Are there new lessons to be learned? And that is when the light bulb went off.

Yes, we understand the technical lessons – ensure cooling is available, translating into making sure emergency power is available, improved venting and hydrogen control and better emergency planning – and so on…… So look at these and ask yourself, what is actually new here? Yes, the events highlighted a number of shortcomings, both at the plant level

and in the Japanese infrastructure to deal with such an accident. And of course, these things should and will all be made better.

But this is where the discussion really got interesting. It became clear to us all that as an industry, we have yet to see the real lessons to be learned from this event and certainly have not communicated them to the public.

I started the discussion on this issue in a previous blog when I noted that many people believe the industry is safely managing doomsday machines. And now I feel more strongly than ever that this is the critical issue that needs to be addressed by the industry.

So looking at what we discussed before, let's revisit it again with more rigour. Take Germany for example. With probably one of the most robust and safest nuclear programs in the world – with no risk of the type of initiating event we saw in Japan, and noting that the Fukushima accident killed no one and there are no long term health impacts anticipated from radiation, we saw their Chancellor state that ***"We have seen the risks in a highly developed industrial country, risks which we considered impossible," she said in a video interview posted on the government's website. "It convinced me that we had to speed up the nuclear phase out."*** – and with that the Germans turned their back on nuclear power. This was all at great inconvenience and enormous cost to them as they immediately shut down 8 units and committed to shut the rest by the end of the decade. Clearly not a decision to be taken lightly.

And yet, when they had a severe contamination event at an organic farm growing bean sprouts – that killed 50 and hospitalized 4,000 throughout Europe, there was no outcry – no call to review organic farming methods or study food safety – the problem was found, corrected and Germany and Europe moved on (as happens following most accidents such as plane crashes,

mine collapses, off shore oil spills, the current gas leak in the British North Sea, and so on).

How can this happen? Well, finally the answer is becoming clear.

When it comes to organic farming, the public fundamentally believes it is safe – and that organic farming is important to society to bring safe healthy food, even healthier than food farmed the traditional non-organic way. This event is then considered a onetime event that can be addressed as such, with no long term consequences to food safety.

On the other hand, the public fundamentally believes that nuclear power is dangerous with the potential to destroy life as we know it (yes – doomsday machines), and as such, the accident at Fukushima is proof that it indeed it is. A lot of that thinking emanates from nuclear beginnings- nuclear weapons. You don't hear of gas terrorists but you do hear about nuclear terrorists – the subject of great discussion by President Obama and other country leaders in Seoul this past week.

The above is a good example of "confirmation bias". I have seen much discussion on this topic recently in books and at conferences. In other words, the majority of people already have a set of beliefs instilled in them and then look to find evidence to support these beliefs. Most actually have no interest in learning they may be wrong and actually changing their point of view. This goes directly against the scientific view prevalent in the nuclear industry that if we just explain things better (i.e. better educate the public) – they will come around. Well, unfortunately this is just not so.

And as discussed in the previous blog, to make things even worse, who taught the public that nuclear power is dangerous? Well, we did! Not intentionally but we did.

The message has always been quite clear. Nuclear power plants are safe because a serious accident can't happen. And we ensure it can't happen with extraordinary robust designs, because we all assume that the potential consequences of an accident can be so severe that we must do anything and everything possible to avoid one. Even those in the industry have believed that if there was ever another severe accident following Chernobyl, then the industry could not recover. The concept of very low probability high consequence events is a hard sell. Why? Because, even though the industry may be safe most of the time (i.e. low risk), the belief that an accident can be so catastrophic that it kills thousands, makes huge amounts of land uninhabitable and then causes thousands more long term deaths through cancer is just too great for most people to imagine. Therefore as long as people believe a catastrophic accident of this magnitude can indeed happen, the probability becomes irrelevant.

So to get to the point, I would like to challenge this belief and state that it is unequivocally wrong. And how do we know it is wrong? Because this is what we have actually learned from the major accidents to date.

What have we learned? First of all, nuclear power plants are safe and are getting safer all the time. But even when an accident does indeed happen, the consequences are NOT so great as to be the end of the world as we know it. We have proven with Fukushima that we can indeed protect the public and that even after very severe accidents; the impact on public health is manageable. We are in the enviable position of knowing that after our very worst accidents, the impact on public health has been far smaller than almost any other type of industrial accident.

And yet, people don't believe us. They remain afraid. The biggest hurdle that we have is fear – and this fear comes from the unknown and the belief we don't understand the long term impacts of radiation releases to their lives. But we do. We

know that the levels of radiation that people have been exposed to are not going to cause measureable health impacts and that in fact, the worst consequences of a terrible nuclear accident are actually better than many other disasters that we live with on a daily basis. With over 100,000 people evacuated from their homes, the consequences of the Fukushima accident are not to be taken lightly. But to put it in perspective, according to the Economist, over 42 MILLION people were displaced from their homes in Asia last year alone due to natural disasters related to extreme weather events.

So what are the lessons we need to learn from Fukushima? We need a new paradigm for nuclear power. I suggest the following:

1. While the probability is low, **accidents happen** – and to suggest that we can ensure that there is never another accident with releases is absurd. We can reduce the risk and make plants better, but we cannot guarantee that an accident never happens again. To argue that there must never be another accident is a fool's game (just imagine if the aircraft industry said all it will take is one more crash and the industry is finished – remember most plane crashes kill more people than have been killed by the nuclear industry in the last 50 years!).
2. When an accident does happen, **we can and will mitigate the consequences** – and most of all we will **protect people**. The so called "doomsday accident" is a fallacy and should not be what we fear. Severe accidents will not happen very often and even less often based on what we learned from Fukushima. However, we have also shown that when there are accidents, the impact to human health can be managed and we will strive to improve so that it is even less in the future. A nuclear accident WILL NOT kill thousands and wipe a country or region off the map. Changing this belief will take years and most

of all; it must start with those of us in the industry. Comments from the industry such as we must never again have an accident with Cesium releases is a laudable goal, but cannot be guaranteed and in fact just fuels the fear.

3. We must improve **international cooperation** when it comes to nuclear safety. Fukushima clearly taught us that an accident somewhere is an accident everywhere so we need to ensure that the industry is focused on working with EVERY nuclear plant operator in the world to ensure nuclear safety. It is good to see organizations such as WANO taking this on and stating that when any plant shows deficiencies following a review, that the international community will take action and not just leave it to the local authorities. Pressure must be used to ensure that all who operate nuclear plants do so to the highest standards.

These lessons are what we need to communicate to demonstrate to the public that nuclear power is safe. We need to stop scaring people and focus on the many benefits of nuclear power. Only then will they understand it offers safe, secure, reliable and economic electricity in the large quantities needed by society and to truly believe, as we do, that ***Nuclear Power is the best, not least worst way to generate electricity***.