

## Audio file

[FukuShimaPart2.mp3](#)

## Transcript

It was very quickly apparent that this was a powerful earthquake, and was growing in power. 津波情報台番号現在大津波警報が.

It was a terrifying moment seeing all the devastating power of tsunami.

その日からやはり もう世界から色がなくなったというかですね。

The news on the radio was talking about the Fukushima Reactor.

They said there's been an explosion at the nuclear plant turned a car around and drive south.

でもその時ね、空気が金属の味がしてたんです。

直ちにこう逃げなければならぬっていう。今から逃げても遅い、遅いな、遅いっていうのは感じましたね。

If this were to be a really significant release of radioactivity、 would you have to evacuate Tokyo

On the 11th of March 2011, the largest tsunami to hit Japan for more than a thousand years devastated the East Coast, leaving thousands dead or missing. But few knew that another emergency was brewing at the Fukushima Daiichi nuclear power plant. Professor Kazuto Suzuki investigated the crisis.

Fukushima Daiichi had the six reactors and the four of them were located in a coastal lines. After the earthquake, three operating reactors immediately shut down. So once the reactor was shut down, it was considered safe. But

The tsunami to reach the reactor buildings, leaving the power plant without power. Professor Tom Scott helped with the disaster clear-up.

Part of the damage that was caused by the tsunami, pumping systems were disabled. The problem with light water reactors is that even though you may shut down and stop causing fission, the fuel will generate lots of residual heat. And that it's

essential Once you've turned off a reactor that you continue to take away this residual heat and if you fail to do so the reactor core will get hotter and hotter and hotter

So the plant needed electricity and for an extended period IT couldn't get IT IT couldn't Keep those key parts cool and that's when the crisis was turning into a potential disaster。

The power company and its workers scrambled to avert a nuclear meltdown。

IT was very difficult to bring in offsite emergency response capability because of the debris and destruction caused by the tsunami because roads were physically broken。 So very much it was a situation that the power plant and the people on the power plant were volunteering to go into the plants to turn off key valves or to try and open key valves in some instances to try and make sure that they could keep cooling those reactor calls.Those were very,very brave people.

It was a moment when there were difficulties because of the lack of light and everything.So there were no way that the Fukushima AG will restart the cooling system.And therefore,the fuels are starting to melt down.

We had a situation where the fuel elements started to get very,very hot,started to generate steam,and we got a sort of runaway steam corrosion.What that meant is that lots of hydrogen was quickly produced. And it started to build the insights of the building.

Release of hydrogen from the reactor's made a very combustible mixture in the reactor holes,the wider building around them,temperature started to rise,and the clock began to tick.

The government declared a nuclear emergency.But in the chaos after the tsunami,many were unaware of the crisis of the plant. Including some who fled inland for Tushima district with Mizua Kano to her centuries old farmhouse

たくさんの方が対馬に向かって避難してきました。親戚の友人、その友人の同じアパートの方というように、つながりのない人々が 25 人集まりました。そこの中には乳幼児もいました。やっぱり助け合うということが日常にあったからだなと思います。

Meanwhile,across Japan,thousands were still waiting for news of loved ones caught up in the tsunami.Like Kazuma Robara,now a photo journalist.

In 2011,I was in Kyoto,and I worked as our salesperson and financial company. My best friends,Hometown,is Minami Sonic Town.It's really caused in Miyaki Prefecture.It's like second Hometown for me.I ask him how was your parents?And then he just answered the phone was that.So he couldn't know. They are okay,or not.I totally felt I'm

powerous, but I want to do something. You know, I was in Osaka. So I could buy almost everything, like a fuel, food, water. So I bought the surprise for the this style area. And I picked up my best friends in Tokyo. And slowly and slowly, I moved to the north.

Financial Times Bureau Chief Muer Dickey was already reporting from the area.

Looking around, it's almost impossible to believe that this was a bustling seaside town until that wall of water smashed through turning the wooden houses into magsticks. I don't think anything prepared me for the kind of scenes. I saw when we finally made IT to the actual coast and this absolute devastation of towns and cities along IT も

のすごく大きな音が響きました。遠くで。でもその時はまだ何が起こったかわかりませんでした。

Little spark。 will create the hydrogen explosion. The hydrogen explosion basically blew out the building, and this creates the individual impact that it was sort of a chill novel moment.

I've got a message from my editors in Hong Kong. saying there's been an explosion at the plant. That was the first time I realized that this was more than just worry about a nuclear plant that it was something very, very serious.

Plant worker Yukio Shirahige had fled home off the tsunami and saw the explosion on TV.

そうですね。1号機の爆発したのを見た時にはですね。もうこれは大変なことになったっていうふうに思いました。まあ、当時、一号機は原子炉たちやが屋根ごと吹っ飛んでましたからね。あの炉心溶融も起きてたわけですし、蒸気とか湯気とか、そういう煙が出てましたのでね。

Because within that explosion, the heat that's released, you release radioactive material up into the atmosphere. But at the same time, there was very little information about the spread of radioactivity. And part of the reason for that is this site had 24 static monitors for measuring radiation, but the tsunami took out 23 of those 24.

At her farmhouse, Mizua cano didn't yet know the source of the explosion。

でもその時ね、空気が金属の味がしてたんです。安いスプーンを口に舐めたような。空気がゆらっとして光る。で、こう金属、こうフライパンが空焼けしたような味がする。なんかこれ違うよねって。そして皮膚が本当にチクチクして痛かったです。この爆発音を聞いた後だったので、これはひょっとしたらと思いました。だから、いとこと、とにかくこんだけ人がいるんだから、野菜とか取り入れとこう。私、それから犬を飼ってましたから、絶対外に出さない家に閉じ込めていました。

放射性物質が飛んでいるかというのは、ちょっとその当時は分かりませんでしたけれども、直ちにこう逃げなければならぬっていう、今から逃げても遅いな、遅いっていうのは感じましたね。

The picture that the first reactor building was blown away. That was the time that people recognize the seriousness of the problem. My view was that, oh, this is not the worst case yet.

News of the explosion at Fukushima Daichi spread around the world, but there was little information about the radiation risks. For those on the ground.

Everybody knew there was a very serious crisis at the plant and the population was watching anxiously the updates from the government. But I think it was clear at times that the government itself was struggling to understand the situations about what was happening and the plant. Assurances that such a thing could never happen in the first place had been shown not to be warranted. So there was a great deal of confusion, a lot of great deal of doubt, and a great deal of concern.

The government ordered an evacuation for 20 kilometers around the plant. But in Sushima district, Mizua Kano was 10 kilometers beyond the zone.

そうしたら、家の前に止まっているワゴン車っていうか、ハイエースのような車の中に人が乗っていて、未だ見たこともないガスマスクをして、すごい防護服、もうきっちりとした防護服を着ておりました。ここは危ないんだ。頼む。30キロ超えて逃げてくれって。でも涙声でした。もう必死だったんです。

Missouri had no idea who the people were, but she was scared as were neighbors.

全町避難のために、町を必死になって全町を受け入れてくれるところを探してたんですね。今、当座の着替えだけ持って、それ以上はもう。住めないって。それで犬の居場所を作って逃げました。

While thousands packed up and left, some feared the radiation could be blown south to Tokyo triggering deadly stampedes as 30 million people tried to flee.

If this were to be a really, really significant release of radioactivity were those people genuinely in lots of danger. Would you have to evacuate Tokyo?

People were scared. The Prime Minister was scared. We discovered later that the Prime Minister himself had started to think about the need to evacuate Tokyo, which in itself would have caused huge loss of life. The Prime Minister was thinking in those terms that this could turn into an extraordinary disaster.

Fear of radiation continued to spread. At 100 kilometers north of the plant, the news reached community's hardest hit by the tsunami.

People in the area, including in the disaster zone, were desperate to know what was happening at the plant and also desperate to know what it meant.

Rich at Halbstad was sheltering at Ishina Maki University.

I ended up spending two nights just sleeping at the university with many of the other staff. Our main way of getting news from outside was using battery-driven radios. And so, of course, the news on the radio was talking about the Fukushima Reactor. We knew when it was broadcast that there had been an explosion and so on, which was concerning for us. But ironically, not as concerning as maybe for other people, because we were so busy trying to look after ourselves from the earthquake and tsunami damage.

Just north of Ishino Maki in Minami Sanriku, Kazuma Robara arrived to help search for his friends' relatives. and revealed the devastation to the world.

Since I was 16 years old, I wanted to be a photographer. I wanted to shoot. I wanted to document. There were 30 housing before the tsunami. When we were alive in the town, the only two housing were still there. And by friends' house, wasn't there. From the basement, everything was moving to somewhere. So when my best friends, so that situation, he wasn't stopped crying. His grandfather was missing. And what he could do for him was just visiting the place where someone, so the grandfather at the last moment before the tsunami came and he was just crying and told something to his grandfather. I couldn't do anything for him, and I was just shooting. I was just shooting.

The kind of level of trauma, the wave of trauma and distress that came in with its tsunami is hard to describe. But as a journalist, what you have to do is try to describe, but what you have to do is try to understand what happened and communicate it to the outside world. Soldiers, doctors, firemen, other relief groups are all working hard to try and bring some kind of semblance of normality back to people's lives. But just walking around this town is to sense the scale of the challenge.

A friend came to find me partly to check that I was alive. And also, he gave me information, which included the fact that one of our best friends had lost his life. Everything was so surreal and so completely removed from everyday life that I really didn't have a chance to kind of think about how I felt about anything. One of our other really good friends, who is a hotel owner, had converted the hotel into an evacuation shelter. And so my friends suggested that we go and meet him. So that's what I did. We had no electricity, no water, no gas, and it was cold because March is very, very cold in this area. So in all the clothes that we had 24 hours a day, huddling around little caracine stoves, and like shivering in bed clothes at night.

Meanwhile, Riokoendo was stranded at Aishina Maki City Hall, believing her three children were sheltering across town at their school gym, Nasium.

みんなも大変な状況でしたので、お互い助け合って避難生活を本当に呆然と送るような生活が続きました。していたんですが、その中でもやることがたくさんあって、食料を確保しなければいけなかったり、具合が悪い人をどうにかして医療機関に運んであげなければいけなかったりといっって、いろいろな煩雑な中で、なんとか気を保ってやっていたように思います。あと、子どもも体育館に無事にいるっていうことなら、学校に迎えに行けばいいなということで、それほど深刻に考えていませんでした。

100 kilometers south at Fukushima Daichi, after the explosion at Unit 1, workers were also trying to cool nuclear fuel in Unit 2, 3 and 4.

You have a series of reactors that are in trouble, but one of them blows up. Then your teams that are trying to work on the other reactor buildings are withdrawn because of the danger. And that made it very, very challenging to try and prevent similar hydrogen explosions and those other reactors.

The key thing was to deliver cooling water to the parts of the plant that were getting too hot. And they tried various ways of doing that. The initial priority was just restoring electricity supply. They found flat at one point, the plug and socket didn't fit for an emergency to black.

Around 11 a.m. on the 14th of March, the second explosion blew the roof of reactor building three. On the 15th, there were two further explosions.

Effectively, it was the same mechanism at each time, build up of hydrogen followed by an explosion, starting with unit one, and then with other units as well.

The fourth reactor, which was not in operation, was also brought away because the hydrogen was leaked into the building of the fourth reactor, because the third and fourth are connected.

Three reactor buildings were now open to the elements, risking further radiation leaks into the atmosphere from the reactors or the spent fuel.

Not only is there a requirement to keep the reactor core cooled, but there's also a requirement to keep the spent fuel ponds filled up with water and to keep the fuel pool in that as well.

The spent fuel pools were on the high floors of the reactor. So when the steam explosion happened, then the spent fuel pool was also exposed to the air. If there was no cooling system, there'll be a meltdown of the spent fuel

Cause fires among the uranium spent fuel with the potential for a very large release of radiation.

The explosions that tore open Fukushima Daiichi's reactor buildings unexpectedly helped with the effort to cool overheating fuel, but at a huge cost.

So what happened in the end was they were able to bring in military fire fighting vehicles that could deliver large amounts of water into the cooling pond, and they're also able to flood the lower reactor areas with water. That averted the possibility for a much bigger disaster, but it also created this problem of lots and lots of radioactive contaminated water.

The reactors had lost their integrity, so you can imagine it is each reactor core being like a broken tea cup. You can keep pouring water into the top of the tea cup, but the bottom will keep allowing water to flow out. So what that meant is, as they continued to put water through the reactor cores, they produced more and more radioactively contaminated water that was physically draining to ground or they were having to pump out.

The threat of explosions had passed, but workers at the plant's still risked radiation exposure. Meanwhile, evacuees like Missouri Cano were facing a trauma of their own, the stigma of contamination.

福島お断りというものがあちこちにあって、ガソリンも入れてもらえませんでした。だから、食べ物屋さんも入ることはできませんでした。みんなが不安になるから入ってくれるんだ。どうすることもできず。

It's a really painful moment. their jobs their houses their birthplaces these are all gone so there are a lot of

Scars in the society by this incident many living beyond the 20 kilometer exclusion zone sheltered in their homes。

One thing that I found quite heroic, actually, was for the people that had been displaced, they've been displaced, they've been moved away, but the people that lived just outside the exclusion zone, demonstrably, sometimes they received more radioactive fallout than people inside the fallout zone, and yet they hadn't been relocated.

Despite the risks, plant workers who had been evacuated days earlier were recalled to try and prevent further spread of radiation. including Yukio Shirahige who supported the mission to cover reactor building one。

それからまあ、あのチーフの経験も長いということで、ええ、そこの放射線管理的な仕事をやるようになりました。で、まあ、あのええ仕事、あの一号機のカバーリングって、一号原子炉のええ。建屋の1号機ですから、線量がすごく高いんですね。休憩所とか、それからクレーンのオペレーター室とか、そういうところの汚染

管理ですね。そういうサーベイに入りました。で、あとは車両の汚染管理ですとか、作業者の被ばく管理ですとか。

Presumer Obara arrived in the exclusion zone.

When I was high school student,I already started having the interest to the nuclear industry.So I wanted to do something with Fukushima.No media could go into the nuclear part plant and ask the workers whether it was a condition.

The contact helped Kazuma gain entry to the plant.

So I was afraid,but I decided to visit only one day.So I thought it's maybe it's okay.Most of the workers lived surrounding the area of nuclear plant before the accident,but they had to evacuate it from the zone.So many of the workers I met,lived in temporary housing. And they went to nuclear plant from temporary housing that is so hard.

それがあの当時はそれがもうなんて言うんですか。例えば 48 時間拘束されてて、3 時間ごとに 3 時間やって一時間休むっていうような感じですけども、あの、別に。あの仮眠ベッドがあるわけではないし、通路にダンボールを敷いて防護服着たままちょっと横になるとか、そういう感じですから。まあ、疲労感っていうか、まあまあ無我夢中だったですね。疲労感じる余裕もなかったっていうことなんですかね。

It was so hard to see The worker is facing hard working condition.People thought they are kinds of hero to stop spreading the nuclear elements from the reactor.But at the same time,we didn't care anyone in the zone,especially in the front line.That was so strange I felt Because if they are hero,we want,and we needed to protect them.

100 kilometers north of the nuclear crisis,AIDE was slowly arriving for survivors in areas cut off by the tsunami.

We were getting deliveries of food from the self-defense forces from the city and so on.So it's basically nothing,but kind of like sort of sweet,bread,snacked rolls that you can buy in convenient stores and also the o 握り rice balls,which they heard like gathered from all over the country,and they were passed their sell by date because it took a long time for them to get,make their way to us,but we were just grateful to have anything.And as long as it wasn't really rotten,then,you know,we could eat it to survive.And it wasn't much.We all lost a lot of weight,but we were very grateful to just have that.

For two days、flooding had prevented Riokoendo from trying to locate her Children、but when the water subsided she went to find

Them。歩いて帰った時に、あの、そちらの方面に帰るんだったら希望を捨てないでっていうふうに市役所の人から変な声をかけられて。それで初めてうちの地域って

というのが深刻な状況だっていうことが分かって。ええ、本当に急いで帰ったんですが、あの案の定、途中から道がないような状態で。ええ、線路の上を歩いたり、家をあの乗り越えたりして、夕方近くになって小学校に着きましたが、そこに子どもたちの姿はなくて。ええ、いろいろな人にうちの子どもを見なかったかということを書いて歩いたんですが、誰も分からず。そうしているうちに、遠い親戚の女性の一人が意を決して私に話しかけてくれて、「いいちゃんと聞いてね」ということで、「あなたたちの子どもダメだった」2人は今、近くにある保育所に安置されている1人はまだ見つかってない。送っていくからそこに行きなさいというふうに言われました。そして、男性の人に送られて、小学校から通り一つ離れたところに、やはり瓦礫の状態、ひどい状態のところ道を行くと、焚き火の前に夫がいて、夫が「申し訳ない子どもたちはダメだった」というふうに言って、そこで子どもたちのことを知ったというような形になります。多分これは悪い夢なんだろうということです。そこに長くいることもできませんでしたし。そうですね。信じることもできなかったの。いろいろ食べ物、貴重なものを分けてもらった時も、味も何もしないですし、その日からやはりもう世界から色がなくなったというかですね。

The devastation unleashed on the 11th of March,2011 shocked the world.But tsunamis are a well-known risk in Japan.So why did this one trigger a nuclear disaster?One

Of the phrases that was used a great deal in the days after the tsunami hit is a sought-day guy. which means beyond expectations.And in many,many ways,the tsunami was beyond expectations.That's the core explanation to some people or the excuse to other people for why the tsunami caused this crisis.

One by one, Japan's nuclear plants were shut down until the cause could be established.Kazuto Suzuki consulted on an independent investigation.

I was invited by the chief editor of one of the largest daily paper in Japan,and we set up the first investigation of the accident itself,but also we investigated the responses of the Prime Minister's office and the government.

Three other investigations were launched.All agreed that a critical point of failure was the plant's level of protection against the large tsunami.

The plant was originally designed to handle about the 5 meter tsunami,but the actual tsunami goes up to the 15 meter high.

And once the waves breached the plant,there was another weakness.

When the tsunami hit the Fukushima Daiji,the water flowed into the basement of the Fukushima Daiji 38 reactors.And those reactors had emergency generators in the basement.

The tsunami swamped the diesel generators, which were the main source of backup electrical power.

Because water couldn't be cycled through the reactor to take away the heat. We had a situation where the reactor core, even though they were shut down, they started to get hotter and hotter. What that led to is the buildup of hydrogen. And what that means is you only need to have a spark for that hydrogen to explode. And that's exactly what happened.

The first reactor of the Fukushima Daiichi was made by the American company. The higher risks for the American plants were the tornado. So, you know, they naturally designed the generators to place in the basement where it is much more safer. But in Japan, you know, we don't have much tornado, but we have tsunami. So, putting the generators on the ground was not really the good idea.

The scale of the disaster that followed shattered public confidence in nuclear power.

There was shock in Japan, I think that the system wasn't able to deal more effectively faster with the crisis of the plant. I think people had been reassured by the electricity utilities that their plants wouldn't get into this kind of problem as a result of an earthquake or tsunami. When it did, I think people assumed that there would be an effective emergency plan and an effective backup to that emergency plan, and they were surprised to find that there wasn't really.

The Fukushima cleanup is expected to last for decades. including dealing with vast quantities of contaminated water.

So there are lots of tanks everywhere in the Fukushima Daiichi plant. They are using every inch, every corner of the open spaces to store those tanks, but it comes to the, you know, to the limit.

They quite quickly established a sort of filtration plant, which would take out the majority of all of the radioactive material that dissolved into the water in terms of its radiological danger. It really doesn't present much hazard. So the decision in the end was to start discharging into the sea through a pipeline that would go out off the coast and to let the Pacific Ocean and dilution solve the problem.

Meanwhile, a vast area around the plant has been scraped clean of surface radiation, but residents remain in fear of contamination.

And the thing that struck me most was that there was this lack of understanding of where the radioactivity had gone. So one of the things that I did with my team at the University of Bristol is we got funding to develop a flying robot that could map radiation. And within weeks, we were flying in different parts of the exclusion zone in partnership with the Japan Atomic Energy Authority to understand the distribution of the

fallout material. the forest litter in the back and the moss on the back are very good for holding the radioactive fallout particles. And so by flying over the forest and we go several hundred meters into the forest or over the forest, we can measure the radioactivity without actually having to go in there. We would stay in a hotel near to but not inside the exclusion zone. And on several occasions at the end of our stay, we would go to try and pay our hotel bill. And the manager of the hotel would say your bill, everything's being paid already. And every time it was a local businessman wanted to express his gratitude for you coming to help our country. And this is a small measure of gratitude that we pay all of your costs.

More than a decade later, the so-called difficult to return zone is shrinking. Mizoue Kano is considering moving back. But the decision stirs up traumatic memories.

5 年を仮設住宅で暮らしました。原発を地方に作ることで、私たちは捨てられました。金で飼われた命みたいな。そしてその暮らしを失って、待た捨てられたって思いました。で、そこを助成したから帰って行って言われたことは、あんたたちは人ではないと国は私に言ったのだと思う。多分、彼らは自分の娘や息子にはさせないと思います。

It was so strange feeling when I come back to home from Fukushima region, especially when I come back from the zone to my house you know. in the zone, everything is there, you know, housing, supermarket, and a convenience store, but no one there.

The Japanese government, I think, recorded some night 2,300 lives attributed to Fukushima. None of them to radiation, but a lot of them to induce mental health and suicide. And part of that is caused by, you know, this notion of am I contaminated am I not am I going to die from cancer because of radiation exposure all of the worries that I'm manifest because of the lack of understanding about radiological risk genuinely had a human toll

とても同じように生活できているとは思いませんし、私自身も今、日常生活というか。土地も自然も含めて、元には戻れないと思うんですね。だから、そういう環境の中で、どういうふうに生きていくかっていう課題が残ってるんじゃないでしょうか。

The tsunami that triggered the nuclear disaster claimed almost 20,000 lives with more than 2,500 still missing. A few years later, former lecturer Richard Halbestad became a guide at a ruined school, which serves as a memorial for the disaster.

I felt like I wanted to change even before the disaster, but I didn't really have the courage to leave the job. And ironically, that terrible disaster gave me the courage to actually leave without knowing what I was going to do next because it made me feel if I can live through this disaster, I can I can just leave work and something will happen

While working there、Richard met Riokoendo who lost her three Children to the tsunami。

私も震災の前に、あの本当に災害っていうのは、新聞の向こうの出来事とか、テレビの向こうのことだって思っていたんですけど。ここにいらっしやることで、ただ単なる歴史の一つじゃなくて、実際に自分の身にもね、降りかかるかもしれないことを自分ごととして考えるきっかけにしてもらえたら、私はそれだけで幸せです。

Everything's changed in so many ways because on a more sort of philosophical level when you look at all the people who lost their lives、 then I'm much more appreciative of just life。

It made me think about my mortality.Speaking to so many people who had had their lives overturned and had had loved ones,wake up in the morning and then be taken away by the sea.So many people in the disasters on. dealt with this unspeakable tragedy with dignity and grace that I found that inspiring as well.So it was a and we have privileged to be able to report that.

Supports information for the things raised tonight can be found online at [Channel 4.com/Support](https://www.channel4.com/Support).

New tomorrow night at 10 exploitation in excess of local communities and endangered species that extended look into the case of CSOR,the lion and the dentist.