

Environmental Audit Committee

Oral evidence: Toxic chemicals, HC 1805

Tuesday 23 April 2019

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[Watch the meeting](#)

Members present: Mary Creagh (Chair); Geraint Davies; James Gray; Kerry McCarthy; John McNally; Dr Matthew Offord; Alex Sobel.

Questions 1 - 118

Witnesses

I: Professor Michael Depledge, Emeritus Professor, University of Exeter Medical School; Professor Andrew Johnson, Research Scientist, Centre for Ecology and Hydrology; Professor Tamara Galloway, Professor of Ecotoxicology, University of Exeter; and Professor John Sumpter, Professor of Ecotoxicology, Brunel University London.

II: Terry Edge, Former Civil Servant; and Gareth Simkins, Journalist.

Written evidence from witnesses:

- [Mr Terry Edge - written evidence](#) | [PDF version \(114 KB\)](#)
- [Mr Gareth Simkins - written evidence](#) | [PDF version \(427 KB\)](#)

Examination of witnesses

Witnesses: Professor Michael Depledge, Professor Andrew Johnson, Professor Tamara Galloway, and Professor John Sumpter.

Q1 **Chair:** This is the first session in our inquiry into toxic chemicals in everyday life. I have to say that just reading our brief has made me want to crawl into a hole and never come out and be exposed to anything again. We have a very eminent panel of scientists with us here today. Could our academics could introduce themselves, starting with those on my left, please?

Professor Depledge: I am Professor Michael Depledge. I have recently retired from the University of Exeter Medical School but I still have a link there.

Professor Johnson: I am Andrew Johnson. I am from the Centre for Ecology and Hydrology. We are a public sector research establishment and my specialism is chemicals in the environment.

Professor Galloway: I am Tamara Galloway. I am Professor of Ecotoxicology at the University of Exeter and I have an honorary chair at the medical school there.

Professor Sumpter: John Sumpter from Brunel University London. I am also an ecotoxicologist.

Chair: Can I ask you to put your chairs forward and speak clearly into the microphones, because we have windows open and we have noises off? I apologise in advance that we have Greta Thunberg speaking and a couple of our colleagues will be leaving and then coming back, so there will be a bit of to-ing and fro-ing during the Committee. Thank you all very much indeed for coming and for your written submissions.

James Gray: For the sake of the record, just to let everybody know that Dr Duncan Depledge has for three years been in my paid employment as the chap who looks after my Arctic and Antarctic interests. He has now left but is still working two days a week and he is Professor Michael Depledge's son. There is no financial connection but just for the sake of the record.

Chair: That is very helpful. Like father like son then, good to know. We are going to start with a question from Alex.

Q2 **Alex Sobel:** This is a set of questions to establish the extent of chemical pollution in the environment and how it affects us. Which ecosystems and species are most at risk from chemical pollution in the environment? Maybe Professor Sumpter or Professor Galloway would like to start with that one.

Professor Galloway: It will depend a great deal on what chemicals you are talking about because different chemicals will have different effects on different parts of the ecosystem. For example, if you are looking at a



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persistent organic pollutant, one that cannot be broken down, it is more likely to magnify itself up the food chain and become apparent in a top predator, whereas if you are looking at something like a pesticide that is designed to attack pests and insects, it is more likely to affect other non-target invertebrates near the bottom of the food chain. Hence, if you have a contaminated environment that has many different contaminants, it will affect the whole food chain.

Q3 **Alex Sobel:** It has a cumulative effect?

Professor Galloway: A cumulative effect, yes. The more different chemicals you have in a particular location, the higher the likelihood that you are going to be causing an effect.

Q4 **Alex Sobel:** Do you think that legacy chemicals, chemicals that have now been banned such as PCBs, or chemicals currently in use pose the greatest threat to the environment? Which ones should we be concentrating on?

Professor Sumpter: There is a huge number of chemicals in use. Most of them are in the environment and many of them are in you and me, to start there. As far as which chemicals should we be most concerned about, the simple answer is we don't really know. To give you a very simple example, you may know that a pharmaceutical used in veterinary practice pretty much wiped out three species of vulture, killed about 40 million vultures in Asia just a few years ago. It is a human pharmaceutical. Nobody predicted it, nobody thought that vultures would even get exposed to it, and we still don't understand why they were very sensitive to it and you and I are not. It was diclofenac. We should always keep in mind that there is a lot that we don't know.

Then we try to regulate things like PCBs but while we are regulating those, you might think that perhaps with these persistent chemicals new ones are not appearing, but they are and I will give you a quick example. If you use a frying pan today, it is probably coated with Teflon. It is a chemical, a so-called PFA. It is one of the toughest chemicals ever produced. It does not degrade in the environment, it is absolutely everywhere, albatrosses are full of it and that sort of thing. We are trying to restrict that but in the meantime over 1,000 other similar chemicals have been patented and many of them are still in use. We are still putting into the environment large numbers of pretty much unidentified, highly persistent chemicals. That is where we are, which makes it almost impossible to answer questions like: what should we be most concerned about? I wish I could.

Chair: Professor Sumpter, I am finding it really hard to hear you. Can you turn that microphone towards you, please, so it is a bit directional? I don't know if that is allowed. I think that might help us. Thank you. Let's carry on.

Q5 **Alex Sobel:** I imagine that we will get a similar response to this question. Not being able to tell exactly the threat that chemicals pose,



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can environmental damage caused by chemicals, chemicals that are currently in use and legacy chemicals, be reversed? You might want to use an example. Maybe we can just look at one thing, because it is obviously a very broad question: for instance PCB use. They were banned in 2004, I believe. Is the damage from PCB now in remission or is there a long tail and is it likely to be eroded?

Professor Sumpter: It is a very long tail, is the simple answer. There is a real expert in London who works on PCBs in the cetaceans—whales, porpoises and things like that—and if you want to see the highest PCB levels in the world you would probably go to killer whales. Some killer whales contain a kilogram of PCBs and according to the most recent evidence there is a single pod of killer whales currently up in northern Scotland that has not bred for over 20 years and scientists don't think it is going to because of the levels of PCBs. They are high, higher than in other animals, but in a recent paper published, they think that about half of all populations of killer whales across the world will become extinct due to a lack of breeding.

We have regulated them, levels are very slowly falling, but some animals, particularly the top predators, still contain an awful lot of PCBs and they will be having some effect on those animals.

Professor Galloway: Regulation does have an effect because although, as Professor Sumpter has said, the concentrations are very slowly falling, they are falling. The concentration of PCBs in seafood across the world is gradually declining. It is also possible if you do remediation activities. There is a very contaminated harbour in America called New Bedford Harbor, which was highly contaminated with PCBs, where they have been doing a remediation activity. They have been taking contaminated sediments away and incinerating them and cleaning up the harbour area. They have managed to reduce the PCB concentrations in the wildlife from, I think, 40 milligrams per kilogram, which is a toxic level, to below the level at which we regulate, which is 0.2 milligrams per kilogram. You can make a difference if you do focused remediation.

Professor Depledge: I wanted to make the point that when we frame these questions in ways of thinking about specific chemicals and which are the most dangerous, as has been mentioned already, I think we should try to avoid that. It is the integrated impact of the chemicals that we need to get to grips with. By that I mean there is something of the order of 80,000 chemicals in common use. We tend to think of them, when we are talking about environmental toxicology, in terms of things like metals or organic pollutants or pesticides, neglecting the fact that now we have an array of pharmaceuticals in the environment, nanomaterials and a whole range of other things out in the environment. When you start talking about something like PCB, we have heard the story and it is absolutely accurate, but PCB accumulating in organisms affects their ability to deal with other chemicals. It is rather difficult just to plot one thing out. Even if the levels of PCBs are falling, even if they



are present at all, they still induce enzymes that affect the ability of an organism to detoxify other chemicals that it may be exposed to. I think it is the integrated mix that is of greatest concern.

Professor Johnson: The way I would expand on that is I think you are asking the right sort of questions—where are the greatest risks in the environment from chemicals or to what organisms—and what we are drawing attention to is if the chemical of concern is a persistent bioaccumulative chemical that would go into the lipid of an organism, those that would be most at risk will be the longest-lived animals. In our environment, it tends to be the dolphins and the whales who are living 30, 40 or 50 years. You could say that the marine environment has among our longest-lived wildlife and they will be the ones that will manifest the greatest damage from these lipophilic chemicals. If we look at other environments, freshwater or terrestrial, a lot of the invertebrates have a lot shorter life scale and so they are struggling with other types of chemicals, things that are more acutely toxic. But which environment we should focus on as being of most concern is a good question to ask.

Q6 **Alex Sobel:** It is clear that we have a cocktail of chemicals that affect different species differently and, as Professor Sumpter said, we are getting more patents, new chemicals coming in for use in industrial processes. The Government have produced their 25-year environment plan. Do you think that that plan understands that issue sufficiently and takes regard of it and comes up with sufficient solutions or is it literally looking at my question—we looked at PCBs, what effect, we will remediate—without looking at it in the round? Do you feel that the 25-year environment plan is looking at it in the round or do you feel that it is picking and choosing things and will not be effective?

Professor Depledge: We are all members of the Hazardous Substance Advisory Committee of DEFRA and that is one of the issues that we have debated: what is the right sort of strategy? One of the things that emerged from our discussions is the fact that since 1950 there has been a fiftyfold increase in global chemical production and by 2050 we think there will be another threefold increase, which is huge. If you wanted to think of it in terms of the climate change hockey stick graph, you get a similar sort of graph for chemical production, so things are getting out there in very large amounts.

The kind of question that we might pose is what kind of chemical environment are we willing to live in in the coming years, by 2030, by 2040. At the moment we all have a vast array of chemicals in our blood and our tissues, as do organisms in the environment. Evidence emerges that these are giving rise to all kinds of problems with different chemicals, different mixes for different species in different environments. It is a very complex area, but if you were to say that we wanted to do something about it one of the challenges is to try to define a chemical environment that we would find acceptable to live in. Once we have done that, we need to develop policies that will take us to that place.



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At the moment it is firefighting. We try to make a regulation for each chemical that comes along—and we have about 2,000 new chemicals a year—but we can't get through them all. We have toxicity tested only a small proportion, a few per cent of the total amount, and we don't know how they interact in mixtures. Taking one chemical after another and saying, "This is hazardous, this is less hazardous, this is very hazardous" is useful at some level but it is not going to address the problem that we pose, which is what kind of chemical environment is acceptable to live in in the future.

Q7 Alex Sobel: It sounds like we are failing to address the issue rather than addressing the issue. Should the approach in the environment plan say, "This is the chemical environment we would like to live in. This is the extent to which our specie and other species can survive" and then regulate to that environment? Isn't that the approach we should take?

Professor Depledge: I think that is what we have been recommending. We have come up with a draft idea of a "do no harm" approach, which mirrors the medical approach. Medical treatments do some harm but effort is put in to try to minimise that harm and I think the same kind of approach with chemicals would be sensible.

Professor Sumpter: I thought it might come up so I read the 25-year environment plan yesterday and I had a rough idea of it. At a positive level, it is good that we have one, so we are trying to think into the future and what sort of environment we would like, but the plan is extremely aspirational and has absolutely nothing in it that says how we are going to get to those aspirations. I think that is the issue: how do you translate these wonderful aspirations? For example, we are going to have 200,000 extra hectares of forest and 500,000 extra hectares of national park. This is what it says but it does not say a word about how we are going to achieve that, and that is true of the chemicals. It is true of everything in the plan. It is an extremely aspirational plan but reaching it will be jolly tough and one wants to have some better idea of how we are going to do so.

Q8 Alex Sobel: We need a road map?

Professor Sumpter: Yes.

Chair: That is what we have said in our various reports on that. We have another one coming out this week on the Environment Bill, which is supposed to legislate for those outcomes and institute the precautionary principle, which is one of the EU principles that is not available to us in UK domestic law.

Q9 Kerry McCarthy: This follows on quite nicely from that in terms of the impact on human health. We have already got to the point where we are talking about the cumulative problem as opposed to individual products. Is there enough being done or is there much being done at all to protect human health from these chemicals or is it just a question of wait and exposure?



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Professor Johnson: Perhaps you would like to elaborate on “these chemicals”. Are there any chemicals you are concerned about specifically?

Kerry McCarthy: I suppose products that are in the home as opposed to things that we automatically know are a problem. We are more interested in the hidden sources that people might find. We have already talked about the Teflon coating of pans and things like that. It is not the obvious pollutants that you know you are exposing yourself to in certain workplace environments, for example, but just things that people would find in everyday living but wouldn’t—

Chair: Flame retardants, endocrine disruptors.

Kerry McCarthy: Yes, and things that in small doses might not be considered a problem but are overall.

Professor Galloway: I was going to address your question with a statement of what some researchers are doing to address that question. They are trying to work at a global level on how those particular chemicals might compare with, say, industrial chemicals that are produced for other reasons. A researcher called Philippe Grandjean has produced a toxicological risk map. He is trying to work out how different environmental chemicals contribute to the global burden of disease and this is something that the World Bank and the WHO have done on a global basis because it enables you to try to compare the effects of different things with each other.

What they have found out is that when you do that you can work out something called the disability-adjusted life year. You can say that this is the disability-adjusted life year caused by a particular chemical. They have managed to include those more recently. In the past this whole process has relied on lead in petrol and air pollution and big toxic threats to the environment. They have worked out a way of also including the chemicals in everyday use, things like endocrine disruptors and things that might potentially be neurotoxic like brominated flame retardants and other chemicals. They have ranked them and tried to work out how they compare to others.

To cut a very long story short, although they have the whole process of how they have done this, they worked out that environmental chemical exposure takes 6.5% of global domestic product. It costs the globe 6.5% of its domestic product every year and of that 0.5% could be attributed to those endocrine-disrupting everyday chemicals that are in everyday use. That was one way of trying to be able to compare them to each other because it is so hard to do that otherwise with things that you are continuously exposed to. They are not overtly toxic but they are none the less—

Kerry McCarthy: I think that is the phrase I was looking for, not overtly toxic.



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Professor Galloway: But they are having, none the less, chronic cumulative effects, especially if you are exposed to very many of them.

Professor Depledge: To add to that, if you look at the scientific literature over the last maybe 15 or 20 years, there is a huge number of papers there relating to the change in the incidence of a particular disease to the presence in the body, in blood, hair and urine, of a particular kind of chemical. These associations—and they are associations—are being made again and again and again. We are in a kind of epidemiological phase making these associations and they are becoming very obvious. That allows you to pose the question: are environmental chemicals changing the global pattern of disease?

For example, Professor Galloway led some work on bisphenol A, BPA, that showed there was about a twofold to threefold increase in the risk of diabetes, heart attacks, strokes and liver disease. Other chemicals, as we have heard about PFOA, the perfluorinated compounds, seem to be associated with an increased risk of kidney cancer and thyroid disease. We are seeing that there are many chemicals that are being tied to particular changes in patterns of disease and particular disease incidences.

The problem that we have is to try to get to mechanism. Until we have identified the specific mechanisms by which these chemicals cause those diseases, we are always faced with taking a weight-of-evidence approach and that is just about where we are at the moment, but if you were going to take the precautionary principle, for example, I think that is rather interesting with these perfluorinated compounds. Linda Birnbaum, who is the head of the US National Institute for Environmental Health Sciences, recently was talking about perfluorinated compounds and mentioned there are about 5,000 of them and they have tested only a handful of them. These are the ones that are being related to kidney cancer and thyroid disease. There is now some evidence that the presence of them in the body influences how effective vaccines are, influences immune response to vaccination and so on.

All these bits of evidence are accumulating and yet these chemicals are now widely used, they are out there being used every single day and these concerns are mounting all the time. This seems to me, at least, somewhat the wrong way round. It would have been nice to know what the dangers were before we decided to use them in widescale endeavour.

Q10 **Chair:** Is kidney disease and thyroid the flame retardants?

Professor Depledge: That is the PFAS, not the flame retardants.

Professor Johnson: I would caution you about the stage that we are at in the science with understanding the true impact of chemicals. We cannot do the experiments on people and it is difficult to get an appropriate analogy with animals. There is a perennial problem of association or causation to the various health outcomes and whether that



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is linked to a specific chemical. Having said that, when we deal with human health we accept a lower level of evidence before we react, but you do have to be careful in this area of science not being as fully equipped and mature as we would like as to what the true impacts are on health of some of these chemicals that we accumulate.

- Q11 **Kerry McCarthy:** We have a question here about how can the Government better educate people and support greater understanding of the health risks from exposure to chemicals, but it sounds like we are quite some way from going down that path.

Professor Depledge: I think that is a hugely important point. One of the things that we have neglected is the public education of people to make them aware of what the risks really are. We have made a rather poor job of making people aware of what chemicals they are exposed to, what the risks are, how they can minimise those risks and so on. This is one of the areas on our committee where we feel that there needs to be really strong action because most people are not aware of what they are exposed to. They are not aware that when they are sitting on the sofa they may be exposed to brominated flame retardants in the sofa or whatever it happens to be and whether or not they should be worried about it.

- Q12 **Kerry McCarthy:** Isn't that because they trust people not to sell them things that are going to harm their health?

Professor Depledge: They do. I think, and it is a personal view, they believe it has all been taken care of. It would not be there unless it had been tested, unless it was safe.

Professor Sumpter: I agree with Mike completely, but probably the sweater that you are wearing at the moment has been treated with a perfluorinated chemical, because they treat most clothing with that. The idea is that you don't develop sweat patches under your arms because the sweat is repelled by it.

Kerry McCarthy: Not that I would do that anyway but—

Professor Sumpter: The problem is what do you tell the public. Educating people must be the right way to go in almost anything in life, but I don't know what clear messages you could give other than to say that almost everything they do exposes them to chemicals.

- Q13 **Kerry McCarthy:** Is there a chemically safe alternative? You can understand why people don't want their sofas bursting into flames but is there a safe alternative? You can't sell highly flammable sofas these days, as far as I know. Is that the case?

Chair: We are the only country in Europe that does the flame retardant thing, so that is for a whole other session later.

Professor Sumpter: In general the answer would often be no. If you are going to try to cook an egg and you don't want it sticking to the frying



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pan, which it used to do when I was a student, you want something coating your frying pan that repels everything, including the egg that you put in. It has to do so at a high temperature, so you have to make a very tough chemical. You don't want a chemical that is going to collapse and fall to bits in two seconds flat or be washed out when you wash your frying pan, because it is not going to do the job. To do the job, you end up developing very tough chemicals, very resistant to degradation, inevitably out there in the environment that are going to be there for a long time. But if you want a frying pan that your egg will not stick to or if you want to wear a shirt where you will not have sweat patches underneath, you are stuck with perfluorinating chemicals at the moment.

Q14 Kerry McCarthy: As someone who considers herself quite bright about these things, I just brought new pans at the weekend and it is like, "Oh dear". Professor Galloway, you wanted to come in.

Professor Galloway: We conducted an experiment in Exeter and with environmental chemicals you can't ask volunteers to take things because it is not ethical, even for students, but you can ask them not to do something. We got some funding from the Wellcome Trust. We have been studying a chemical called bisphenol A that can be released by plastic bottles. We set up a scheme where we got 120 students from local schools and they designed their own diet that would not involve packaging and they followed the Government's guidance, which is on all the Government websites, on how to reduce your exposure to bisphenol A from plastics. It meant not heating up things, not drinking out of plastic or packaged food and an array of other things.

The students and their families designed their diets and then stayed on them for seven days, which was the time we thought would allow concentrations to drop. We took samples from the students before and afterwards and although all of them were hugely enthusiastic and did everything that they were supposed to do, they found it almost impossible to do that for seven days because you could not follow the packaging. The packaging was not labelled so they did not know what kind of plastics things were packaged in. They could not find things that were unprocessed. Even if they tried to cook something themselves, it would be from other things that were processed. At the end of the trial, we saw a teeny tiny drop in their bisphenol A levels but not a significant drop.

The moral of the story was that our lack of labelling, our lack of transparency in where things are made it impossible for people to follow the guidelines. Perhaps there is a story there about better labelling and packaging so people can make informed choices.

Q15 Kerry McCarthy: How much of a threat are chemical additives in microplastics?

Professor Galloway: Microplastics are fragments of plastic and most plastics contain additives. Certain kinds of plastic contain a lot more



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additives than others. If you have something made out of PVC, up to 80% of the weight of it is not plastic but is the additive itself. Those additives can leach out into surrounding tissues or the environment. Microplastics will leach their contents out into surrounding tissues as well.

Q16 Kerry McCarthy: But I suppose the difference is that microplastics end up inside all sorts of other things and get to places where solid—

Professor Galloway: They get to places where they might not otherwise go and we still have very little appreciation of how much of the plastics additives that you will find in all of us—they are there at very low levels—might have come from drinking from a plastic bottle or might have come from ingesting tiny, tiny pieces of plastic in your food. At the moment our best estimate is that if you were to ingest tiny bits of plastic in your food, as it is almost certain that all of us are doing, it will probably add a small amount to our overall exposure but may not be the main source. It is very much guesswork because we are only just developing the methods to be able to do all of that analysis and to be able to make that—

Q17 Kerry McCarthy: If you are talking about tiny amounts, are they harmful to human health or should—

Professor Galloway: The microplastics themselves will have the same additives as the larger items that they broke down from.

Q18 Kerry McCarthy: But the difference is they could be inside your body.

Professor Galloway: They could be inside your body, yes, and as things break down to a smaller size, you are exposing more and more of the surface area so there is more surface area for the—

Q19 Kerry McCarthy: But you can't say categorically at the moment that that is a threat to human health?

Professor Galloway: We don't have enough data to be able to tell you.

Professor Depledge: We can't say that it is not a threat to human health. If you visualise all the microplastics that we have in our bodies and then imagine that you visualised all the array of environmental chemicals associated with those plastics and other ones we have accumulated, you would see a vast amount more of these different environmental chemicals than you would of the microplastics. It is invisible and we apparently don't get so anxious about it. The sort of things you have to think about here is that if we have got body burdens of environmental chemicals, which we know we have, it is a very difficult task to sort out whether it is impacting on our health, whether it is influencing the issue of different diseases, whether there are compensating factors that may be coming in to help us to live longer and live healthier.

At the moment, the evidence I think is that people are living longer but they are developing diseases earlier as they move into old age, as a rough generalisation. If you looked at the level of dioxin in your body



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across your entire life course, you would find that it gradually goes up and up and up, and there are many other organic pollutants and metals that do that. As we are now living longer, we are accumulating levels in our bodies that are much higher than ever before, so there is a much larger number of people with higher levels of these chemical mixtures than ever before and we do not know what the implications are of it.

- Q20 **Chair:** Before we move on to the next question, I want to challenge you a bit on your previous replies. You talked about we don't know what the effects of these chemicals are, but in answer to the first question you said the longer the cetaceans live the more you see. Given that we live in some cases to 100 years old, we would be the ones where you would see the highest accumulation, as you have just said. You said we are at the epidemiological phase, so causation not correlation and we don't really know the mechanisms of causation. In answer to the first question you said it is the mixture, so one chemical might affect the ability to reject the impact of another chemical. There is a cumulative effect, so there is an accumulation and an interaction potentially. This sounds to me like a recipe for status quo. It is a recipe for the companies to say, "It is related but it is not linked". Isn't that the biggest problem, because there will always be a question mark over whether this thing is related or not?

Professor Depledge: There will be. When we were talking about whales earlier, we were talking specifically about PCBs and things like mercury and we know that they predominantly accumulate those things and there is some mechanistic information about them. I think that is a bit different to—

- Q21 **Chair:** We don't have the mechanism information for humans?

Professor Depledge: Exactly, and certainly not for the vast array of things that—

- Q22 **Chair:** Can I ask all of you, do you have Teflon pans in your home?

Professor Depledge: Not now, no. I used to but don't now.

- Q23 **Chair:** That is because of this risk from Teflon?

Professor Depledge: Yes.

- Q24 **Chair:** Professor Johnson?

Professor Johnson: Yes.

Professor Galloway: No.

Professor Sumpter: Yes.

Chair: Fifty:fifty, okay. We will move on to the next question now that Kerry is going to be taking them back to the shop. Let's hope you kept the receipt, Kerry.

- Q25 **John McNally:** I think we are already hearing that toxic chemicals are so



important in everyday life. We have just heard from Kerry and we are more aware of that and from the exercises that you have carried out with students. It is like there is a planned confusion out there. You are buying something and you don't actually know what is involved in it.

I would like to move you on to the actual risk from regrettable substitutions and how the Health and Safety Executive should approach the regulation of the chemicals. For example, could you tell us what risk you think regrettable substitution poses and how it can be avoided?

Professor Galloway: I could do that by going back to the example of bisphenol A. We identified that there were harmful health consequences of being exposed to bisphenol A sufficient to warrant a reduction in the tolerable daily limit that you are allowed to be exposed to. Lots of companies switched from bisphenol A to a highly related compound called bisphenol S to satisfy that this is a bisphenol A-free item, but bisphenol S has very similar toxicological properties to bisphenol A. One of the difficulties there was it had been substituted. As you say, it was a regrettable substitution before the full toxicological profile could be assessed. One of the ways of trying to avoid that is to institute everything that you can by way of green chemistry approaches and sustainable frameworks for developing safer chemicals in the future and trying to institute them and working together with manufacturers to try to reduce the risks of any substituted chemicals.

Q26 **John McNally:** Do you think that is beginning to happen at the moment? Are people working better together?

Professor Galloway: I would like to think it is happening at the moment. We are certainly developing better methods for doing that. We are starting to know what it is about different toxic chemicals that we want to avoid, using different minerals or metals that are not found in nature, using very highly persistent chemicals, using chemicals that you have to destroy a whole forest or something to make a small amount of, so they are causing a big environmental damage. We have got pretty good frameworks to be able to do that, but I think it is a case of with the chemical manufacturers, the people who are then using those items and a consideration of where they go when they are finished—all of those together—you can make a difference.

Professor Johnson: We are sort of doomed to go through this cycle of there are chemical uses we need and value—the flame retardants, the plasticisers and so on—and we discover there are some toxic effects from these chemicals, as opposed to being highly toxic. Then we wish to substitute or replace them with another chemical, which we inevitably have a lot less data on. We go and do the replacement and we find later on down the line that that may also have some toxic consequences. I don't see an easy way out of the cycle. As Tamara said, we have learnt more about persistence in bioaccumulation to nudge away from that, but essentially we can't escape. We will need a continual vigilance to address the issues of new chemicals that come along and we should not be naive



to say that banning a chemical is the solution because the replacement may not be benign. It may be worse than the original.

Professor Sumpter: I will give you an actual example I brought along. It is a very common shampoo and on the front—I noticed it a few days ago—it says “0% parabens”. Parabens were the most widely used biocide and antibacterial and antifungal in the world in everything—not only in shampoos, in all domestic products, pharmaceuticals, the whole lot. Then my group discovered that they are extremely weakly estrogenic. They mimic estrogen but they are a quarter of a million times less potent. They were labelled as an endocrine disruptor. The response of industry straightaway—and if I was in industry I would have made this response too—was if we can stop using that chemical it would be jolly sensible to do so. It might even be a good marketing ploy. This is a marketing ploy, of course. They just take it out straightaway and replace it either with another existing one or a new one where they have tweaked the structure very briefly, very simply. As Andrew says, it is a rapid response, a marketing response.

It is almost inevitable, perhaps absolutely inevitable, that you will not know the toxicological profile of the substitute because it will take years and years before you get that information. That is the problem. Parabens had been on the market for about 70 years before we discovered that they were extremely weak estrogen. To get the toxicological information that you want—what sort of properties does the chemical have, are they harmful, to what degree, to whom and all this sort of thing—takes an awfully long time, if you ever get it. Meanwhile, companies will do this and if I was working for those companies it is what I would do as well.

Q27 **Chair:** You could have something that is marketed as BPA free but it has got BPS or BHPF or BPF and you are merrily giving that in your baby’s bottle and they are sucking happily away on that bottle and you are leaching the same sort of brother or sister chemicals into your child. How do we know? Is what it is made of labelled on the bottle? It isn’t, is it? It is not like an ingredients list that you can see in shampoos, polyethylene, PE, you know it is a microplastic. You don’t have that on a baby’s bottle. Would better labelling help consumers?

Professor Johnson: I don’t know if it would help consumers because they would be struggling with the information, as many of us are, on what are the relative risks of the other or different chemicals. A related question of transparency is a good one. If all of us know the list of chemicals in products that we might use on ourselves, it enables the scientists and so on to have a better idea. If all the data that goes into the regulatory process is also available and transparent that may help us assess the risk, but we are still some way to being able to give you guarantees of safety of any of these chemicals that we are discussing.

Professor Depledge: This process seems to be repeated endlessly. I used to be a member of the Royal Commission on Environmental Pollution and I will give you one example of a report we did. We looked at



novel materials and that was largely nanomaterials. The first line of the report was something like, "There is no evidence that nanomaterials cause any problem in the environment or to human health". That did not mean to say it had been tested and we had not found a problem. What it meant was there was no evidence, literally no evidence at all, and yet they were being incredibly widely used, as they are today. I think that principle, that process, let's say, is repeated again and again and again. If industry comes up with a new chemical tomorrow and we pose the question is it safe, they would say, "There is no evidence it is not safe. Let's get them and use them".

Q28 **Chair:** The regulatory approach is a whack-a-mole. One pops up, whack it; another one pops up, the same thing.

Professor Depledge: Exactly, which is why I was saying at the beginning that I don't think we should go chasing one chemical at a time. We could give you a list: benzene, parabens, PFAS, and so on. We could keep going through this list and if there are 84,000 of them out there—there are probably an awful lot more chemicals used overall—we are not going to be able to go through and test each one and regulate each one and then have any clue how they are going to interact with all the other ones that are out there or look at people who are particularly vulnerable or organisms that are particularly vulnerable. We have talked a lot about mammals and so on but 95% of animal species are invertebrates and we know very little about the impact of these chemicals on very many of them.

Q29 **John McNally:** Maybe I can move on a bit further. That was extremely interesting but I think what we are hearing is that we are going to have to have these difficult conversations sooner rather than later. I think the labelling idea is probably an indicator of we start looking at that as a solution to when people make up their minds. I would say that there has never been a better moment in time with Mr Attenborough and what is essentially going on and what you are using in your everyday life.

But if I can move you on to my second question. Why has ECHA chosen not to consider groups of structurally similar substances extensively to date?

Professor Sumpter: Sometimes I can look at the structure of a chemical and pretty much guess that bisphenol S will do the same as bisphenol A. It did not need a great intellect to do that. It would be extremely sensible if, for chemicals that were structurally similar, the first starting point were to be, "They are likely to have the same properties, give or take a bit". That would be very sensible.

It gets back also to Mike's answer here. Somehow we need to progress from the situation we have now, where we test one chemical—over decades sometimes—and then another one, so that the number of chemicals piling up is much greater than the number we are actually managing to test. The only sensible strategy, probably, is to say that we need to be using many less chemicals. That is probably the only way to



drive down exposure to you or me, or to the environment. We need to utilise many less chemicals—we are going in the opposite direction at the moment—and we need to ensure that they are more readily biodegradable than some of the current ones. I would put those principles at the top, almost, before I started tweaking the structure of anything.

Even with the shampoo, it tells you that there are no parabens in there but it does not tell you what biocide is there. You have to be a real expert to work through the ingredients to find out. It took me about an hour to figure out which one was the biocide.

Q30 **John McNally:** I agree with you. The marketing is very misleading.

Professor Sumpter: Yes, it is very misleading.

Q31 **John McNally:** There is a list of ingredients on all products. You would not even know what they begin to mean.

Professor Sumpter: No.

Q32 **John McNally:** Does anybody else want to comment?

Professor Johnson: I would just add that we are behind with testing on the ecotoxicological side and we will probably never get up to speed. As Mike was saying, there are 80,000 or 100,000 products out there. We are nowhere near being able to test them all to the degree we would like, with the range of endpoints we would like, with the range of animals we might like, and groups like ECHA have to try to risk-rank and prioritise the things that they are most concerned about at the start. If you are faced with such a long list, it is very difficult with the staff and time available to do the sort of testing we would all like to see.

Perhaps, as Mike and John were implying, we might need to look at the problem from different angles than that of routine, one-by-one testing, either by having a different philosophy of how we use or what we allow to be produced as chemicals, or to look at it from the other point of view and say, "Well, let us allow the chemicals to go on being used but spend more time testing and monitoring human health, or animals and animal health, with respect to their chemical burden". It might be that humans are getting better, older and healthier with the burden of chemicals, we do not know, but you need an additional step to reassure us because we are struggling to keep up with the amount of toxicological testing you might want us to do to ensure the safety that we cannot guarantee at the moment.

Q33 **John McNally:** What approach should the Health and Safety Executive take to regulating groups of chemicals after the UK leaves the EU? I am obviously concerned about Scotland. I know it is a reserved matter to Westminster and I do not know if you can comment on the political state but it certainly concerns me in Scotland. We have committed to maintaining EU standards. Could you comment on that, please?



Professor Depledge: From my point of view, to follow the EU standards is probably an extremely wise idea for the UK to continue to do. I will say some more perhaps later about other things that we could do on top of that, but if the UK were to try to set up a similar organisation to ECHA or the European Environment Agency on that scale, I think we would struggle tremendously.

One of the things that I think we are all agreed on is that the amount of expertise that is available in the UK, the number of academics and students produced through universities, educated in toxicology and ecotoxicology, is very small indeed. There has been a tremendous lack of funding over many years, as I think John would particularly testify, from the research councils for training students in ecotoxicology, toxicology, environmental chemistry and these other areas. There used to be several major groups in British universities and now there are very few indeed.

Q34 **Chair:** Could you write us a separate note about that, please?

Professor Depledge: Yes.

Chair: That would be very helpful.

Professor Depledge: Absolutely. I am happy to do that.

Professor Sumpter: I would agree on that. We are almost, the four of us, the expertise in the UK on chemicals in the environment.

Professor Johnson: We are a large chunk of it, yes.

Professor Sumpter: Yes. It is a desperate situation. It sounds arrogant but I think I am the most highly cited environmental scientist in the world and my success rate for getting money out of any RC has been abysmal, truly abysmal. It has not been a topic that the funding agencies have been interested in in the slightest.

Q35 **Chair:** Could you draw us a map of where the expertise needs to be and then the funding map as well? If we could have a picture, that would be very helpful to our inquiry.

Professor Sumpter: Yes. Just to answer your question, we do not have the expertise in the UK. The EU obviously has many problems but its chemical regulations are still the strictest in the world, significantly so. There is not a hope in hell, I don't think, that we have the expertise in the UK to replace them. Sticking with the EU would be, in my opinion, like Mike's, by far the wisest thing we could do.

Professor Galloway: I would agree with that completely.

Professor Johnson: I would add to that in a way that it would be alarming to lose a lot of the collaboration, expertise and benefits that we get from ECHA should we be put in that position. At the same time, I think it would be valuable for the UK to be able to review its approach to how we do chemical regulation. We should not be afraid of getting the



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best knowledge and expertise from around the world, learning from previous experience maybe quite far back—

- Q36 **John McNally:** I am just wondering something. If you cannot get the money or the funding, do you not have attractors for other people to come here and give you that knowledge?

Professor Johnson: It is a chicken and the egg situation there. If the subject area has not been resourced for a long time then we are denuded of a lot of the people we might need, so we would struggle. We would need to learn as much as we could from other countries, like the EU, but there are many ways in which we should manage that in a wise way, particularly around issues of transparency, openness and the philosophy of how such a body would operate.

- Q37 **Chair:** Can you point us to an example of another country that you think is a good example?

Professor Johnson: Other than ECHA, which we know, I can only give you examples of the way things can, in a way, retrench, in that an organisation might feel threatened, might restrict the information it gets, might be not as open or not use as much expertise as is possible. I could imagine that there might be a danger of such an organisation being quite tightly managed.

- Q38 **Chair:** The proposed new agency in the UK?

Professor Johnson: Correct.

- Q39 **Kerry McCarthy:** My questions follow directly on. They are about what resources are required to understand the cumulative risk to human health and the environment of chemical mixtures. You have already said that we face what is akin to climate change, almost exponential growth in the amount of chemicals. You have mentioned that they are not tested, in the main, and you have also mentioned that they may be dangerous in isolation but also in combination. You have said that we need more resources, but what are we actually talking about here? How much should be spent on this sort of environmental-chemical interaction in relation to human health, in terms of focus? Could you give us some sort of idea? Do you think, incidentally, that there will be a resistance from the chemical industry, which is a massive export, of course, in Britain?

Professor Depledge: From my perspective, to start with your last point, yes, I think there will be a huge resistance from the chemical industry to raising concerns about chemicals that are being used if it is going to influence their ability to market various products and so on.

One of the things I have been involved with over a number of years has been this Human Biomonitoring for Europe programme, which really was kicked off a little bit by the European Environment Agency with other people joining in, funded by Horizon 2020. The idea with that is to monitor the chemicals in people in 28 countries across Europe in relation



to their health and wellbeing. The programme mimics, in a way, the NHANES study—the National Health and Nutrition Survey—in the USA, where they have been conducting these sorts of analyses for years. That is a way of getting some sort of handle on what mixtures of chemicals different groups in society are exposed to.

One of the studies that we did at the European Centre for Environment and Human Health was to look at people from different socioeconomic groups within the NHANES study, let us just say from wealthy people to very poor people. We looked at the body burden of chemicals that they had and they were very different. Wealthy people tended to have more mercury, probably from the consumption of shellfish, shrimps and things like that, and more pesticides from the golf course, whereas poorer people had more chemicals, say, from landfill sites and from air pollution. They end up with a different spectrum of diseases. We are only beginning to see how socioeconomic conditions interact with body burdens of environmental chemicals.

The other thing that has become evident from this work, and again it is early days, is that not all mixtures are equally common. You often find in a particular area that there will be a certain set of environmental chemicals that are in higher amounts that people are likely to accumulate, but in another circumstance there may be a different set. I do not know if that is going some way to answer your question.

Q40 Geraint Davies: Coming back to the question of what resources are needed, obviously we are interested as a Committee in making recommendations. It seems to me it might be helpful to have suggestions of what areas of research are required and what resources would be required to make that research real.

I may have I misunderstood this but I always thought that before you could put a chemical on the market you had to prove it was safe, basically, in isolation and indeed in combination, but what you are saying is that you could just manufacture these chemicals, put them out there and hope for the best, and it is only after the event that they are banned. Is that basically the situation?

Professor Johnson: It is only the newly registered chemicals that have to go through this process. We have many tens of thousands that have been on the market before REACH came along and so there is a massive backlog of chemicals that we have not tested.

The REACH testing is, if you like, limited to the basics of toxicity: different types of toxicity, their persistence and bioaccumulation. We have a basic first screen of whether it would conform to existing knowledge of a bioaccumulative, persistent toxic chemical, but we do not have the time and resources to test it against every animal and every endpoint. It is only at a beginning stage but it is very important that the onus is on the industry to demonstrate the product is safe whereas previously the onus was on the environmental—



Q41 **Geraint Davies:** If I may come back to the resources then, I think what you are saying is that if we have this huge bulk of existing chemicals that have not been tested, we need the resources to come forward to test those chemicals because we do not know what they are doing.

Professor Johnson: Or imaginative ways of reviewing the relative risk now. I think we would really struggle, as John and Mike have said, to step-wise go through each one individually.

Professor Sumpter: The knowledge you would want would almost be impossible to get and also unethical these days. What you want to know is: is there or is there not any risk to humans or the environment of chronic, low-level exposure over a long period of time? We do not have any testing regime that can do that. If you try to do something apparently very simple, like a two-generation study in rats in which you treated rats and waited for them to give birth, that will take you about two and a half years, it would be in the region probably of \$5 million to do that, and most people would consider it unethical as well.

There is not a hope in hell, even with new chemicals coming on the market, that we will know the information that we would like to know to be able to predict what that chemical might do, if anything, when you and I have a very low concentration, pass it to our offspring and we have it for 50 years or 70 years. I do not know of any testing regime that can answer those questions.

Professor Galloway: But there are lots of computational approaches that have been developed that could help us to come to some understanding of that. What I would say we need is some funding to go into things like human biomonitoring and wildlife biomonitoring, because if you want to know what something is doing you have to know how much is in there. You have to know how much is in people and you have to know how much is in wildlife. Based on that, if you then have some understanding of what the mechanism is, you have some computational approaches to try to compare different kinds of chemicals and you have some screened approaches to be able to test them—would you agree, George?—you can move toward an understanding of—

Professor Sumpter: There are some things that you can do but I would never want anybody to assume that we will ever know the total toxicological profile of every chemical on the market. It is just a non-starter.

Q42 **Geraint Davies:** We have this forthcoming chemical strategy. I have a particular interest in air quality, as it happens. People basically spend 90% of their time indoors. One interesting question, of course, is how the cocktail of chemicals indoors—whether it is cleaning agents, candles or personal products—and outdoor air pollution coming through the window conflate and cocktail up into health problems. I was going to ask what you think about that, what resources should be available to evaluate it and whether that perhaps should be part of the Environment Bill as well.



Professor Depledge: The point has been made about biomonitoring and that is a way you would be able to get some idea about what is in the house, what is outside the house and people spending different amounts of time indoors and outdoors, but really what matters is the integrated mess of chemicals that people have on board and relating that to particular kinds of diseases and so on. I do think biomonitoring is hugely important to be able to know what the trends are, what chemicals people are accumulating, how rapidly they are accumulating and what they may be doing in terms of illness, disease and affecting people's physical and mental health, because there is plenty of evidence for that as well.

Q43 **Geraint Davies:** That biomonitoring that you have just mentioned should be part of the forthcoming Chemical Strategy?

Professor Depledge: I absolutely think so, yes.

Q44 **Geraint Davies:** An integral part, both indoor and outdoor?

Professor Depledge: Absolutely, yes.

Professor Sumpter: Yes. In some ways, things like biomonitoring have been seemingly less exciting to receive funding. It seems a rather dull and routine thing to be doing, and yet biomonitoring—and, I would also argue, wildlife monitoring—is really our eyes and ears. It gives us another angle to see to what degree our chemical exposure is changing, increasing or decreasing, and how that may or may not be associated with health. Without that monitoring exercise, for many of our aspirations such as those mentioned in the 25-year environment plan, we would have no idea whether we would be achieving them.

Q45 **Geraint Davies:** Would that biomonitoring be able to isolate particular products or particular chemical ingredients that were causing particular problems, with a view probably to banning them? I know it has been pointed out you can put a label on it saying, "We have gotten rid of this", but in fact then they have added something else, or whatever. Given the complexity of this, we cannot assume that the consumer or the person should be responsible for their own wellbeing when they are faced with so many chemicals. I do not know whether people agree that we should evaluate and then ban dangerous chemicals, basically.

Professor Depledge: Given sufficient resources, with analytical chemistry being what it is today, they could certainly find chemical signatures of all kinds of different products accumulating in people. That might give you the evidence to go back to companies and say, "You have too much of this particular ingredient and you need to remove it or the product itself".

Professor Johnson: It will not solve all the questions you wish to ask but it would be a vital part of the evidence you would need to come to those sorts of decisions.

Professor Galloway: Yes. Completely, yes.



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Q46 **Geraint Davies:** Biomonitoring would enable you to isolate some of these things and take action?

Professor Johnson: Not on its own, perhaps.

Professor Sumpter: It does not tell you anything about toxicology.

Professor Galloway: No, but it tells you what—

Professor Sumpter: It simply tells you what is in you, your cat or a killer whale or something like that. It tells you the burden of whatever chemicals you decide to measure. That is completely different from whether those chemicals are causing any adverse effects, what they might be and to what degree.

Q47 **Geraint Davies:** If you are in your home, you are doing the shampoo and inhaling this, you have microplastics being pumped out of your washing machine and you are inhaling that, you are on the gas cooker and do not have the extractor fan on, you have a romantic candle and you have opened a window to the traffic outside—the dream life—and then you become ill in various ways and die prematurely, it is quite difficult then to break that down into the “whodunnit” type thing and start banning things?

Professor Sumpter: Yes. You might find that the biomonitoring produces a group of people who have very high levels of microplastics and that group also has a tenfold higher instance of emphysema or something like that. That can sometimes lead you to, “There could be a link between these two. We need to follow it up”. However, what will happen with biomonitoring is that there are an almost infinite number of chemicals you could monitor. Do you monitor 10, 100 or 1,000? Even 1,000 is probably 1% of what is around. Once you have all that—it takes you 10 or 20 years to get that sort of information and it is very costly as analytical chemistry is not cheap—it still has not told you what you really want to know, which is, “Which chemicals cause adverse effects to what?” That is what we all want to know.

Professor Depledge: If I might add to that, what John has said is exactly right. When you are doing monitoring you only detect what you measure unless you start using the most sophisticated chemical analyses, which can measure kind of everything and see all sorts of molecules cropping up. With the advent of genetic technologies as well, you might be able to see patterns in which genes are switched on and off in different people exposed to different things, but this is future technology that is coming down the line.

In all the questions I think we have been asked today, we have perhaps been a little bit evasive in the sense that we have not given you direct answers to what the HSE should do or what we should monitor and so on. That is not because we are being evasive, I think it is just that we do not quite know what to do in that context.



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What we have been coming up with as a group discussing this are things like restricting the flow of persistent organic chemicals like PCBs into the environment, the recycling and reuse of chemicals, green chemistry and the way that we can avoid producing toxic chemicals in the first place, monitoring, the 'polluter pays' principle and the precautionary principle; all of those things. We had a big discussion about this and came up with all those things, and then we said, "But we are doing that already. We are doing nearly all of those things already and still the situation seems to be getting worse because there are just so many new chemicals entering the environment and so many things that we do not know".

That drove us to really focus even more on the intensification of all of those things I have just mentioned. At the moment, with recycling we are doing this much but we need to do this much. That is one of the places that we got to with our discussions. We just need a massive intensification of recycling and green chemistry. If you want to put resources into something, all of those areas would start to make a difference.

- Q48 **Chair:** Great. We are going to have to close it there, I am afraid. I have one final question. We are running over time. About the Health and Safety Executive, you talked just then about expert advice. You were part of the Royal Commission on Environmental Pollution, which was abolished. Do you think that was a mistake?

Professor Depledge: I think it was a monumental, huge mistake.

Professor Sumpter: Yes, you are right.

- Q49 **Chair:** What do you think the Royal Commission was telling Government that they no longer wanted to hear?

Professor Depledge: I think we summed it up by saying that the Government did not know what it did not know, and that was what the Royal Commission was able to do. It was pulling in evidence, ideas and information from an incredibly broad array of sources and I think Government at the time became overconfident that they had a handle on everything, that they knew about chemical pollution and the marine environment, air pollution and all the nanomaterials. They had Departments and groups that knew about that and yet I do not think they appreciated fully the extent of the problems that those issues were raising.

The other thing I think was excellent about the Royal Commission and which I advocate for any future agency is to have it highly interdisciplinary, even transdisciplinary. The Royal Commission had a number of medical toxicologists, ecologists, philosophers, lawyers, social scientists, representatives from industry, just an enormous array of expertise. It was not an expert committee, it was a committee of experts.

Professor Sumpter: I will just give you another quick example before we go. Yes, utilise the expertise that is out there. To give you an



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example, myself and Andrew sit on a science advisory committee in the Environment Agency. To my absolute astonishment, I learned once we started up that we are the only science advisory committee in the Agency. There is only one and it is only there because Andrew pushed very hard to get it established. In other words, the Agency is not utilising the knowledge, skills and expertise of the external world. That is what the Royal Commission did and that is what we need more of, despite the fact it causes problems for Government.

Q50 Chair: What is your scientific advisory committee to the EA looking at? Everything?

Professor Johnson: No, it has been tasked specifically to what is called the Strategic Monitoring Review, which is a re-examination as to what extent we monitor the natural environment for a range of threats like chemicals, with a view to restructuring it.

Q51 Chair: Thank you. In terms of the HSE, which would be the new chemicals regulator, this Committee was concerned that there would be a number of management and technical committees that would not be replicated in the way that they are under the REACH thing and no accredited stakeholders, NGOs or trade unions would be able to attend. The Commission's role is taken over by the Secretary of State, it is officials advising the Minister and then it is essentially ministerial fiat regulating chemicals, and obviously given that the Secretary of State does not know what he does not know—I will not make a cheap joke. Where do you think the potential weaknesses are in the Government's proposed framework for post-Brexit regulation, if we do? Andrew?

Professor Johnson: You mentioned something that is really very important in that any new organisation must be credible from the start and must have as much popular support as possible at the beginning. I would perhaps take a view similar to yourselves that as much influence as possible from external bodies and a range of experts who are allowed to play a role is really important. We do not want to get off to the wrong start should such an agency be formed. It should be as open as possible, as transparent as possible and take as much advice as possible.

Q52 Chair: Professor Depledge, are you on the Hazardous Substances Advisory Committee?

Professor Depledge: Yes.

Q53 Chair: Your committee has already said that you might need to become a decision-making body as the UK withdraws from the EU. That was in your annual report in 2016. Do you still think that is the case?

Professor Depledge: I actually do not think it should be a decision-making body but I think it should be a body that looks at the decisions in great detail and makes substantial recommendations about those decisions.



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Q54 **Chair:** A statutory adviser?

Professor Depledge: Exactly, yes.

Q55 **Chair:** Is that enough?

Professor Depledge: That would be a valuable start.

Q56 **Chair:** A start? What about the voices of workers, consumers?

Professor Depledge: I see what you mean. These committees all need reconstituting, frankly, to have a much broader array of voices on them. We get many members coming from outside the committee to listen to our discussions and they are allowed to contribute. That is, on a day-to-day basis, what we do at our committee meetings, even though the bulk of the work is by the members of HSAC.

Yes, I do think it would be worth expanding to include a much broader range of voices, but on the other hand it has to be clearly evidence-based. We cannot have a hysteria that comes in and we do not want hysterical voices about things that are not evidence-based. I did not mean that to sound patronising but some of the groups that are out there who are making strong complaints about some particular chemical or other, when you look at the evidence it just is not there.

Q57 **Chair:** Do you regret the fact that the statutory instrument which sets up the new UK chemicals agency does not have a statutory scientific advisory committee on it?

Professor Depledge: Yes.

Q58 **Chair:** Yes. You think that is a mistake?

Professor Depledge: Yes.

Q59 **Chair:** In terms of your biomonitoring, what is the substance that you are most concerned about or that you are seeing most of now in the European context?

Professor Depledge: I am still struggling to pick one, to be honest, but the perfluorinated compounds are very high on my list at the moment.

Q60 **Chair:** Because they are appearing more in humans?

Professor Depledge: They are used in such a broad range of products and we know so little about them, and there is evidence that they are having health effects and that they can affect different key systems in human health.

Q61 **Chair:** That is waterproof clothing, non-stick pans and toys?

Professor Depledge: Yes.

Chair: Stick away from the non-stick pans.

Professor Depledge: Yes.



Chair: That is the lesson for today.

Professor Sumpter: Lots of flame retardants widely used in airports and the military, superb flame retardants, are the same—

Q62 **Chair:** Why do you think the Government's review into the flame retardant regulations has gone on for so many years?

Professor Sumpter: It is a difficult one in the sense that most people would probably say they do not want their sofa to catch fire. "We want to put out this fire on this moor once it starts up". To do that using chemicals you need jolly tough chemicals, jolly tough. You end up with chemicals that are non-biodegradable and do the job fantastically—the PFOS chemicals are by far the best chemicals that have been developed so far to do some of these sorts of jobs—but we are making the same mistake that we made with the PCBs. They are going to be there with our children, your children and your grandchildren. They are going to be full of perfluorinated chemicals. I cannot see any other possibility at all.

Professor Johnson: There are a range of other flame retardants now being put forward because of the concerns with the fluorinated fire retardants. In theory, they are less persistent and perhaps less bioaccumulative, but they no doubt will bring their own issues in time and perhaps cause other forms of contamination. We nudge towards a future where we are perhaps getting slightly less persistent, bioaccumulative chemicals but the problems and issues will not change, particularly if we use the replacements in very large quantities. You will need the experts to try to judge this relative risk question.

Professor Depledge: I want to make one small point. Again, we are taking a more conventional approach to chemicals when we talk about flame retardants and these sort of things, but do bear in mind that there are antibiotics and antibacterial agents that are used in people's homes, as well as all kinds of over-the-counter pharmaceuticals, and the patterns of use of these things are all going to change with climate change as people start experiencing hotter summers, milder winters, spend more or less time outdoors, when patterns of insects and so on change, insect bites. There is an enormous amount of change going on constantly that will be driven by things like climate change as well. It is very difficult to continue with our same old, same old approach.

Q63 **Chair:** Okay. We are doing our report into planetary health as well.

Professor Depledge: You are and I will be writing to you.

Q64 **Chair:** We will have to leave your evidence there. Thank you all very much indeed.

Examination of witnesses

Witnesses: Terry Edge and Gareth Simkins.

Q65 **Chair:** I welcome our second panel. Could you introduce yourselves,



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starting on my left with Mr Edge?

Terry Edge: My name is Terry Edge. I was, from 2004 to December 2015, the lead official at the Department for Business on the Furniture and Furnishings (Fire) (Safety) Regulations and the Nightwear (Safety) Regulations.

Gareth Simkins: My name is Gareth Simkins. I am an environmental journalist. I have written for ENDS for more than a decade although I am here in a personal capacity. I am also qualified as an environmental consultant and that is how I came to be an environmental journalist.

Chair: Thank you both very much for coming and for your evidence to the Committee. We are going to start with a question from Geraint.

Q66 **Geraint Davies:** Mr Edge, can I start by asking you to explain how the UK furniture is currently tested to comply with the Furniture and Furnishings Regulations and why you believe those tests do not work?

Terry Edge: Yes. Currently there are three flammability tests. There are two for cover fabrics, a cigarette smoulder test and a match open flame test, and for the fillings there are two or three different tests there are two or three different tests. I am very happy to talk about the history but we would also like to first state the current situation, if you do not mind.

Chair: We have questions. At the end you will be able to tell us anything we have not covered in our questions but it is structured in a way that enables us to—

Terry Edge: Okay. All right.

Q67 **Geraint Davies:** Can you explain these tests are inadequate or do not work?

Terry Edge: Yes. Originally, the cigarette smoulder test was seen to be the most important. It still is the most important. The first set of furniture regulations were for a voluntary cigarette test. The reason that that was seen as and is the most important test is because somebody could drop a cigarette on the sofa, they could go to bed, they could fall asleep and it could be an hour before the fire begins. Then they are trapped upstairs, basically.

Gareth Simkins: Essentially it is an insidious threat, one that you do not notice, rather than an open flame. If your sofa is on fire you are going to notice immediately, if it is set alight by an open fire. If the fire is caused by smouldering, it could be hours before you notice or indeed you may never notice because the smoke could kill you.

Terry Edge: Yes. By far most of the deaths caused by smoker's materials are from cigarette smoulder fires. That is why the USA, for example, reverted to just a smoulder test a few years ago. They dropped their open flame test. It is also why Europe only, in effect, uses the smoulder



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test. We are the only country pretty much in the world that has in practice an open flame test and a fillings test.

Gareth Simkins: It is grossly outdated now. We are dealing with regulations that have been essentially unamended for 30 years and even those are based on earlier regulations.

Q68 **Geraint Davies:** Your view then is that the balance of risk is not right, namely that the risk from the chemicals is greater than the risk of an open flame because people do not have open fires anywhere, but that there should still be the smouldering cigarette test?

Terry Edge: Yes. It is not really my view, it is the evidence that is on the Government's own website, the Department for Business website.

Gareth Simkins: That has only been compounded over the years as research has improved.

Q69 **Geraint Davies:** Should there be other tests on furniture? Obviously there has been some publicity about formaldehyde in MDF furniture causing enormous medical problems to people just installing it, let alone—

Terry Edge: Yes. That is outside—

Gareth Simkins: That is not concerning upholstery.

Q70 **Geraint Davies:** Okay, so your focus is about smouldering and flame. Is it the case then that in the EU the standards have changed in the way you would like them to in the UK? Is that right?

Terry Edge: They have not really changed. The history was that the UK, as I said, had a voluntary cigarette test. Then we had a compulsory cigarette test and a voluntary match test. Then in 1988 we brought in three tests, as I mentioned earlier. For many years, the European Commission wanted the same level of tests in Europe. They started by putting in place two standards, a cigarette standard and a match standard, which are very similar to the UK's, but they did not bring in a fillings test because there was growing opposition to flame retardants in Europe. They have never used their match test. It exists as a standard but it is never used by manufacturers in Europe. The most they would use is a cigarette test.

Gareth Simkins: One thing we should explain is that it is perfectly simple to make furniture comply with the cigarette test without using flame retardants. It is the match test that causes flame retardants to be in furniture. For that matter, it is possible to meet the furniture regulations without using flame retardants at all, although to our knowledge it is only done by two companies.

Terry Edge: We know a couple of companies that definitely make furniture without flame retardant.



Gareth Simkins: But that is a very small niche.

Q71 **Geraint Davies:** The Department for Business, Innovation and Skills has decided to do a review of furniture and furnishing regulations. When and why has it done that and what should be in that review, in your view?

Terry Edge: Well, we started the review in 2009. It is still ongoing. The review in 2009 was purely because the regulations had not been reviewed since 1988 and everybody agreed they needed updating, but it is important to bear in mind at that time we all believed, including myself, that the regulations actually worked, that they did save a certain number of lives per year.

The review started properly in about 2010 and went on for a couple of years. We looked at all of the grey areas in the regulations that needed updating. We looked at all sorts of things that had not been thought of. Around about 2012, the issue of flame retardants and the damage they may cause began to come more into my consciousness. To cut a long story short, we did an awful lot of testing research, we consulted hundreds of stakeholders, we did two informal consultations and in 2014 we put out a consultation for a new match test. The idea behind that was to reduce the amount of flame retardant used in cover fabrics but without compromising fire safety.

However, the research we did, back up by the findings of Trading Standards in the field, showed that the current match test fails in around 90% of cases. In other words, 90% of sofas in this country right now are flammable when they should not be. What that means—Gareth and I have done a very rough estimate as it is difficult to get the figures out of the chemical industry—is that there is something like 45kg of flame retardant in each UK home purely to meet the requirements of the regulations. That equates to about 1,000,000 tonnes in the UK.

Gareth Simkins: This is in households.

Terry Edge: In households, yes.

Gareth Simkins: It is a ballpark figure but—

Q72 **Geraint Davies:** In a nutshell, what you are saying is that there is 45kg of this toxic flame retardant that is impacting on people's health, in particular in double-glazed houses and the like, that 90% of the time could not stop a flame in any case?

Terry Edge: It does not.

Q73 **Geraint Davies:** The reason this is going to continue is because of the profit interests of the chemical industry—

Terry Edge: Yes. There are four industries—

Geraint Davies: —and that the Government should have a duty to act to protect the public but in fact, against this is this huge financial lobby?



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Terry Edge: It is huge. In that 2000¹ consultation we came up with a new match test that would put right the faults of the current one. In other words, it would be fire-safe. Having said that—you talk about the net benefit of flame retardants against fire safety—there is so much evidence now that the net benefit is not there. In other words, the number of lives possibly saved by the open flame test were very, very small, single digits.

Q74 **Geraint Davies:** People are being poisoned in their own homes in order to pay for the profit of the chemical industry and the Government is not acting?

Terry Edge: Yes, and there is no fire safety benefit because, as Gareth said, the cigarette test or smoulder test is the most important one and that works without the use of any flame retardant chemicals. That 1,000,000 tonnes of chemicals is virtually doing nothing for fire safety. They also make fires more toxic, by the way.

Gareth Simkins: That is actually one of my key concerns. You would think that the very concept of a flame retardant would improve fire safety but as was shown by Professor Richard Hull and his team from UCLAN, the University of Central Lancashire, who is a world-renowned expert in fire safety, when flame retardants are actually in furniture as you would expect them to be, a piece of furniture you buy on the High Street, they make smoke more toxic. The toxicity of smoke is related to how much it is likely to knock you out, and if you are knocked out in a fire you will die unless somebody pulls you out.

Terry Edge: The testing research behind Richard Hull's paper showed that the peak release rate of hydrogen cyanide from a furniture fire is about six or seven minutes.

Q75 **Geraint Davies:** In other words, these retardants should presumably be banned straight away then, the flame retardants as opposed to the smoulder ones?

Terry Edge: If the Department for Business followed the rest of the world, ie the USA and the EU, and just kept a slightly modified smoulder test, that would eliminate all flame retardants from furniture. That would mean 100,000 tonnes a year and over eight or nine years we should get rid of them altogether, and our sofas and mattresses will actually be safer.

Gareth Simkins: It is not like that research is particularly obscure. Originally it derived from a Master's thesis from a senior firefighter called Bob Birtles of Greater Manchester Fire Service. He was concerned about what the effect of the furniture regulations actually was. Then Professor Hull wrote up that paper and published it in *Chemosphere*, which is a renowned chemical journal. I had known about this research for some

¹ The witness later noted that this should read: '2014 consultation'.



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time before it was published and they had it under embargo. That research was broadcast on—it was “Newsnight”, wasn’t it?

Terry Edge: Yes, last year.

Gareth Simkins: “Newsnight” last year. No, the year before. It was 2017.

Q76 **Geraint Davies:** The only reason it was not banned is because of the chemical industry lobby?

Gareth Simkins: It takes a long time to ban any substance under REACH. First of all, there are the basics of data. There is this principle that—

Chair: We are not going to get into the detail of that. We have questions and we are running late. You mentioned there were four industries that were involved in this. What are they? Chemicals, furniture—

Terry Edge: There are four industries that make large profits. There is the furniture industry, which makes large profits because of the trade barrier.

Q77 **Chair:** Yes, the non-regulatory barrier. What are the other three?

Terry Edge: The flame retardant industry, which we think might be about £300 million a year just in furniture, but that is a rough estimate. The chemical treatment industry, they are the people who actually put the treatments onto sofas. Also the foam industry because combustion modified foam, as it is called, is only really used in UK furniture.

Chair: Right. That is helpful, thank you.

Terry Edge: The testing industry also benefits but not to such a huge degree.

Q78 **John McNally:** Can I move you on to the Department for Business, Innovation and Skills, which you have just spoken about a bit? I noted in its statement it said that the regulations are ineffective, consumers are absolutely being misled that the furniture they buy is match-resistant when it is not in its final form. As you have already said, there are a lot of misconceptions about what is right here and should be allowed in your home, as Geraint said earlier. Why did the stakeholders disagree with the proposals included in the 2014 Business, Innovation and Skills consultation? Why did they do that?

Terry Edge: Why did they disagree?

John McNally: Yes.

Terry Edge: They did not give any reasoning or evidence for why they disagreed. There were 113 responses. Over half of those were positive, particularly from individual fire services, which were universally pleased that furniture should be fire safer, and from the enforcement authority,



but from the chemical industry and its supporters all they really said to the questions we asked was, “No”. Will it make furniture greener? “No”. Will it make it safer? “No”. Will it increase profits for the furniture industry on the basis of not having so much?² “No”. There was no actual evidence to back up any of those claims and we have a situation today where, five years on, no evidence at all has been produced to show that the work that BIS did and the conclusions it came up with were in any way wrong.

Q79 John McNally: Would you like to add to that?

Gareth Simkins: Essentially I can only agree. I have looked through all of the consultation responses myself. One thing we have not mentioned is baby products like changing mats, prams, and mattresses, which are also covered by the regulations. I have never seen any reason really why they should be.

John McNally: I find that quite interesting.

Terry Edge: Also, children are particularly vulnerable. They are sleeping on mattresses, they are breathing in, they are absorbing through the skin—

John McNally: Exactly. My wife is a health visitor.

Gareth Simkins: My toddler daughter has never slept on a mattress with flame retardants because I bought one based on coir, for somewhat obvious reasons.

Q80 Chair: Did you say that these flame retardants are absorbed through the skin?

Terry Edge: Yes.

Gareth Simkins: There is plenty of research to back that up.

Terry Edge: Professor Stuart Harrad published a paper last year, I think, which showed that. He has also shown that UK homes contain the highest levels of flame retardant dust in the world and also that UK mothers’ breast milk contains the highest levels of flame retardants in the world.

Gareth Simkins: There is also a strong association between the likelihood of contracting thyroid cancer and concentrations of deca-BDE, which is a recently banned polybrominated flame retardant, and one variety of organophosphate. There is a whole class called chlorinated tris.

Q81 John McNally: I was reading about organophosphate—it took me a while to be able to say it—and halogenated fire retardant from goods other than furniture. There is a strong consumer and member state lobby to restrict the use of flame retardants further than they are being used at the

² The witness later noted that this should read: “Will it increase profits for the furniture industry on the basis that they will not have to pay for so many flame retardants?”



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moment. Is that basically what you are saying to me?

Gareth Simkins: Yes, essentially. ECHA has proposed a restriction on the use of certain flame retardants in furniture. I believe it is organophosphates though my memory fails me on that.

Q82 **John McNally:** It is quite staggering. What we are saying here, Mary, is that we could be poisoning babies and people are not even aware of it.

Gareth Simkins: Yes. It is not an exaggeration. It is not melodramatic, it is just factual.

Q83 **John McNally:** It is fact, yes.

Terry Edge: If you take deca-BDE, for example, that has all but been banned now but it still exists in millions of UK sofas and mattresses because they were made while it was still legal.

Gareth Simkins: Yes. I have a prop here, if you do not mind. This is what we are actually talking about in terms of polybrominated flame retardants and their chemical cousins. We have deca-BDE up here. We have penta-BDE, which is a very similar substance, just less bromine. We have decabromodiphenyl ethane, which is very similar except it has two carbons here. This is completely legal. That is mentioned in the H & C Whitehead submissions to the inquiry as justification, saying, "There is nothing to worry about with flame retardants. Look at this, there is nothing in its safety data sheet". It is actually suspected to be persistent, bioaccumulative and toxic, so give it 10 years and it will probably be regulated under the Stockholm Convention, it will be banned and we will have another instance, as John said earlier, of regrettable substitution.

Of course, they are not a million miles away, all of these substances, from dioxins and furans, and indeed they engage in the same bodily process, known as the aryl hydrocarbon receptor, which is intended to pick up toxic substances like this. The aryl hydrocarbon receptor is also involved in various cellular pathways, including cellular differentiation and something else as well, I cannot remember. There is so much to remember about these things it is almost frightening.

Chair: We are going to keep to the questions.

Q84 **John McNally:** Can you tell me why there was a delay in publishing the stakeholder responses to the 2014 Department for Business consultation? Back to that point, why would they try to hide something? I think that is what I am trying to get to here.

Terry Edge: Okay. I will have to give you my view. I wanted to publish the consultation responses because it is good Government practice to do so and also because I knew that they would show that the nature of the responses³ did not have any evidence behind them, but my management

³ The witness later noted that this should read: "...they would show that the nature of negative responses..."



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did not want to publish them. This was because they were going up a path of trying to delay the changes coming in and they knew that if people saw those responses they would know there was no problem with going ahead.

In fact, CHEM Trust called the shots on that by putting in a freedom of information request to BIS to say, "Please publish the consultation returns", which they did. CHEM Trust then went through them, wrote to Anna Soubry, the Minister at the time, and said, "We can find no evidence at all in these responses to explain why you have not gone ahead with these changes. By the way, the UK is obviously guilty of maintaining an unjustified barrier to trade because you have just proved these regulations do not work and yet they are a barrier to trade".

This caused absolute panic in my Department. One of the things they did was put me on enforced stress leave for three weeks, even though I had a note from my doctor to say I was not stressed, because they wanted to be able to—

John McNally: There is a new form of gardening leave.

Terry Edge: Yes. I do not think Anna Soubry ever saw the letter. She certainly did not draft the reply. All the reply said was, "I would not endorse a barrier to trade". That was it.

If you are asking why those changes still have not gone ahead it is because there are lots of interests in them not going ahead, business interests, but the problem, I think, now with the Department is that there are officials there who delayed for various reasons, including, I believe, corruption in one case, and—

Gareth Simkins: Although loads of people have moved on to DExEU now.

Terry Edge: And of course the longer it goes on, the harder it is. The new match test that was come up with was bulletproof. It has stood the test of time. Even though we now think we do not need a match test at all, if the country wanted a match test that would work. It will provide a good open flame test. By the way, there is an outstanding consultation at the moment, a 2016 consultation, which was forced really by the press on BEIS, and in that consultation they included exactly the same proposed new match test. Again, we are now nearly three years on from that and they still have not responded but the longer it goes on the harder it is for them to do that, obviously, because if they come out now and say, "Right, we are changing the match test", the obvious thing would be, "Why did you wait five years with 100,000 tonnes of chemicals every year, more sickness, illness and so on?"

Gareth Simkins: The whole point of the 2016 consultation, it looked like, was to first justify the intervening period since the 2014 consultation, and secondly to provide an excuse for further delay. Of



course, just at the time it closed the two persons we have mentioned earlier had left BEIS, leaving essentially nobody in the Department who had any particular knowledge of the regulations to look through all of the consultation responses. There were so many individual instances of delay, strange, suspicious behaviour that individually, if it was one thing, I would think, "Oh, I'm sure there's a perfectly reasonable explanation for that. Maybe they had some reason to be on holiday and therefore it was shifted back another six months", but there is an overall pattern here that I think would be of interest to the Crown Prosecution Service.

John McNally: Thank you very much for that.

Q85 **Chair:** Can I move you on to the 2016 consultation? How did the proposals in 2016 differ from those in the 2014 consultation?

Terry Edge: Just a brief bit of background. The 2014 consultation concluded with the Government saying that it was going to do a bit more work with British Standards and the new match test would be implemented, along with the other changes to regulations, in April 2016. That was stated in the Government response.

Q86 **Chair:** Yes. That involved the brominated flame retardant as a substance of very high concern and so on?

Terry Edge: Yes.

Q87 **Chair:** That was all included in the 2014 thing.

Terry Edge: The Government response, yes. However, my managers continued to delay. The work with British Standards was not done. No actual work was ever done.

Q88 **Chair:** When you say it was not done, it was not commissioned, it was not paid for, it just did not exist?

Terry Edge: It did not exist. All of the work was done for the 2014 consultation. To give you an example, we had a meeting of all the country's leading text experts in November 2016.⁴ They had already had our technical annex backup papers and every one of them said, "You have completely proved the case that the current match test does not work and the new one will". There was never any extra work to do. However, extra work was suggested to the Minister at the time, Jo Swinson, by those in support of the chemical industry or being paid by the chemical industry. The work that was suggested was not needed and it has never been done.

Things just dragged on and dragged on and dragged on. We had the green groups pressing BIS in early 2016, saying, "What are you doing? When are you going to do something?" and they said, "We will have another consultation in the spring", but then that never came to pass.

⁴ The witness later noted that this should read: "November 2014".



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Then their hand was forced by *The Sunday Times*. What happened was they were in a difficult position because they had had two Ministers instruct them to bring in the match test alone in April 2016. Now they were faced with having to actually put that into practice. What they did—and this was against ministerial agreement—was put together a consultation that included the same new proposed match test but also included other suggested changes to the rest of the regulations.

Q89 **Chair:** To which regulations?

Terry Edge: The rest of the furniture regulations.

Q90 **Chair:** Not just about flame retardants?

Gareth Simkins: Flame retardants are almost a red herring in this regard because they are not regulated under the furniture regulations.

Terry Edge: No. There is no requirement.

Gareth Simkins: There is no specific requirement to have flame retardants in the furniture regulations. All you need to do is comply with them. The chemical content is regulated under REACH and the whole raft of chemical regulation in general. They are quite separate beasts.

Terry Edge: Yes. I should have mentioned—

Q91 **Chair:** Were sleeping bags included in the 2016 thing? Washable sleeping bags and mattresses, some of the children's stuff and outdoor furniture were excluded from that consultation.

Terry Edge: Yes. That was done without ministerial consent by my management. They were trying to throw a bit of a sop to the baby products industry, who have long campaigned to have prams, buggies, car seats and so on taken out of the scope of the regulations, but no Minister agreed to that and also lots of other things were not put in—

Q92 **Chair:** No Minister agreed to it but the officials went ahead and took those products out anyway. Is that what you are saying?

Terry Edge: They suggested taking them out. They made a proposal to take them out, yes.

Gareth Simkins: The 2014 consultation had a preface from Jo Swinson. The 2016 consultation had no such preface.

Chair: She was not the Minister at that point.

Gareth Simkins: There was no such preface.

Q93 **Chair:** It was not signed off by the Minister. A revised match test, which was the cigarette test.

Terry Edge: The revised match test was exactly the same as the one that had been proposed in 2014, apart from a couple of very minor things.



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Q94 **Chair:** Then traceability and enforcements, technical files, single—

Terry Edge: Yes, which were reasonable suggestions but there were an awful lot of things that were not in there, which would have been in a full review. Just to remind you, two successive Ministers said, “Let’s implement this new match test before we undertake a full review” so it was officials that decided to add some additional—I should say the reason that I think they did that was because BIS lawyers advised we did not need to go out to consultation again on this new match test, in other words BEIS could have implemented that match test in 2016, they could have done it in October 2016 or the following April, so by putting in those extra suggestions they ensured that another consultation was needed.

Q95 **Chair:** These are the same officials?

Terry Edge: Yes.

Q96 **Chair:** Okay, so it was basically to make it legally different?

Terry Edge: Yes, even though their lawyers advised them they did not need to do that.

Q97 **Chair:** Thank you. The responses on this latest consultation have not yet been published.

Terry Edge: No. I have seen some of them.

Q98 **Chair:** Have they been FOI’d?

Terry Edge: No. Is it possible to release responses before consultation?

Gareth Simkins: I have had some difficulties obtaining responses.

Q99 **Chair:** Has anyone put in a Freedom of Information request to BEIS about these consultation documents?

Terry Edge: I have not.

Q100 **Chair:** We will write and ask BEIS for those consultation responses. We have the Office for Product Safety and Standards. What is it doing?

Terry Edge: The Office for Product Safety and Standards is a combination of the team that I used to work with, the product safety team in BEIS. They have also drafted in some ex-Trading Standards people, I think some scientifically-inclined people, but they are dealing with the same areas of product safety that BIS has always—

Q101 **Chair:** But different civil servants?

Terry Edge: Some of them will be; some are the same. Furniture is included in that now.

Gareth Simkins: The Chemicals Stakeholder Forum earlier this year was told that they are essentially going back to square one and are rethinking the balance between fire safety and toxicity. That is all we were really told. I do not know where they have got to.



Terry Edge: One of the problems with the OPSS, in my view, is something similar to what was mentioned earlier, that they do not seem to communicate with any experts. It is all done internally and, to my knowledge since I left, they have not spoken to anybody in the furniture testing field, for example, who knows anything.

Chair: That is helpful. Thank you.

Q102 **Dr Matthew Offord:** I understand that following previous evidence that you submitted to the Committee, this Committee contacted BEIS to find out some information about your allegations and they responded to us saying that no evidence had been found to substantiate this allegation.

Terry Edge: Yes, that is what they told me at the end of my whistle-blowing case.

Gareth Simkins: I had been working on this story for three years or so and when I was looking into it two years ago I put basically the same points, much the same points that you have heard today, to them and BEIS's total response was, "We refute the allegations" without apparently understanding what the word "refute" means. That was it. They just did not engage with it at all. They were just, "No, not listening".

Terry Edge: Yes. For my whistle-blowing case I provided them with 400 documents of evidence, seven hours of testimony and they were going to take 40 working days, they said, but after eight months they had not done anything. It was *The Sunday Times* that forced their hand. After *The Sunday Times* contacted them they gave me their final report three hours later, which was one page of A4 with four bullet points on it. Only two bullet points were relevant and one said what you have just said, "We could find no evidence that Ministers are being misled". I wrote back and said, "Well, I don't think that is good enough" so a couple of days later I got another final report. This was a six-page report, but it was clearly drafted by one of my managers, I could tell that, and had the same conclusion, "We have no evidence that Ministers are being misled".

I did bring a civil service code case and the argument there was—and by the way in that case and in the whistle-blowing case no one has even told me I am wrong—they said, "The Minister was given two sets of", well, they use the word "evidence", "and decided to choose one set above another" and I said, "Well, no, the Minister was given one set of evidence and a set of opinions, basically". But that is their position, that they could find no evidence that Ministers are being misled.

Q103 **Dr Matthew Offord:** They have submitted a response, but we have not published that yet. In addition to your complaint of 2015, there was an internal investigation and a further review. In addition to that, your further complaints were investigated by the Government Internal Audit Agency under the whistle-blowing policy and they also found no evidence to substantiate the allegations.



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Terry Edge: That is slightly misleading. It was the Government's Internal Audit Agency that handled my whistle-blowing case. What happened was the Department wanted to handle the case and my union representative said, "We don't think that is fair" so they asked the Government Internal Audit Agency to provide the case officers, which they did. However, the case officer dropped out of the case after about five or six months, never to be heard from again, and when I received the second final report her name was carefully redacted, because of course it was not really on the report in the first place. That is a bit misleading. I think they are trying to say after I appealed they gave it to—but that is not the case. The Internal Audit Agency was handling it in the first place.

When the 2016 consultation came out, as I said it proposed exactly the same match test that we proposed in 2014. The basis of my whistle-blowing case was that the Government had proved the current test does not work but the new one will. It will make people safer and there is no reason why the Department has not gone ahead with it. When they went ahead in the 2016 consultation I wrote to HR at BIS and said, "Look, this proves my case, surely. You have now gone ahead with exactly the same test that was proposed a couple of years before" and they wrote back and said, "We will send you a substantive response". They never sent me any response, despite reminders.

Q104 **Chair:** You are still waiting for that substantive response from 2016?

Terry Edge: I am not optimistic.

Q105 **Chair:** You have alleged inappropriate behaviour by individuals working in the fire sector and officials at BEIS and you said in your evidence, "There is a long history of fire sector/medical officials accepting large sums of money from the flame retardant industry to support its products". Do you have any specific evidence about that, without naming?

Gareth Simkins: Shall we give you the American example?

Terry Edge: You give that first, and then I will give a UK one.

Q106 **Chair:** Okay. There is the "Newsnight" report one, about a former firefighter in the UK being recruited to lobby. We have that one. Is there a specific one?

Terry Edge: Another specific one, I think it is in the public domain so I can name names, I think.

Q107 **Chair:** What is in the public domain?

Terry Edge: The name of this person and the fact that he is funded by the flame retardant industry.

Q108 **Chair:** You are covered by parliamentary privilege here.

Terry Edge: Okay. It is an ex-firefighter called Mike Hagen and he is very active in several British standards groups, fire safety groups and so



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on. He is quite open about the fact he is funded by the flame retardant industry and their publicity company, Burson-Marsteller, and you can find evidence for that on the internet. He was given a large sum of money just at the time we decided we were going to change our match test. That is on record.

Q109 **Chair:** He was employed as a consultant? Was he still working as a firefighter?

Terry Edge: No.

Q110 **Chair:** Okay, but he was a consultant, so he was given a large sum of money. Consultants might be given large sums of money.

Terry Edge: Yes, but as Bob Graham did in his time, to lobby heavily in Europe for flame retardants in furniture, so I am not quite sure of the consultant role there.

Q111 **Chair:** Do you have any evidence that he lobbied your colleagues at BEIS?

Terry Edge: Not directly, no. I will not mention names but there is an open secret of several people currently in the fire sector who are funded by the flame retardant industry and their actions certainly suggest that too. These are currently-serving fire sector people.

Q112 **Chair:** People who do shift work might often do a second job, fire testing?

Terry Edge: It is not so much a job. I think it is more intentionally, deliberately blocking in the case of two or three of these people who are prominent in blocking changes to the furniture regulations and that is all on record. I have recorded evidence of that. They would say, "Well, we just believe these changes would not result in better fire safety" but the fact is they have blocked those changes and these were the same people, for example, who suggested more work needed to be done but have never followed up on that work and have never explained why it has not been done and what have they done about the fact that, with that work not being done, the current match test is unsafe.

Gareth Simkins: The irony is that the reforms to the Californian flammability standard, which is broadly equivalent to the UK one, are led by firefighters who had seen substantial rises in cancers, particularly breast cancer. So firefighters, together with—

Q113 **Chair:** Breast cancer in firefighters?

Gareth Simkins: Yes, which may or may not be linked to the use of flame retardants and perhaps several other varieties of chemical that one might find in the home as well. They worked together with chemical scientists, toxicologists, to lobby for change and at the same time a countervailing lobby was created called Citizens for Fire Safety.

Terry Edge: That was set up by the three main flame retardant—



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Gareth Simkins: You have spoiled the punchline now. This was an astroturf group and it claimed to be a group of fire experts, concerned citizens, and they would wheel out burns victims to hearings much like we have today, “We cannot risk undermining fire safety. Look what happened to me”, real heart-tugging things. Meanwhile, a journalist at the *Chicago Tribune*, who eventually won a Pulitzer Prize, did a bit of digging to find out who this body was and it claimed to be this very broad-based civil society group. Eventually they found its members and they were three. They were Chemtura, Albemarle and Israel Chemicals, the world’s three largest flame retardant producers. It was not a citizens lobby at all. It was purely an astroturfing organisation lobbying for—

Q114 **Chair:** Is there anything to suggest that there is a similar lobbying organisation in the UK?

Terry Edge: Yes. It is a bit more subtle.

Gareth Simkins: I think the irony is that those reforms were—

Q115 **Chair:** Your allegation is that the civil servants were captured so they did not do this?

Gareth Simkins: Yes.

Terry Edge: I think there were also fire sector people. As I said there were three in particular who paid a huge role in blocking changes to the furniture regulations. Also, it is like you have to put pieces of the puzzle together. If you look at the 2014 consultation responses what is a standout is individual fire services are all saying, “These are great. These are going to help fire safety” and all the rest of it. The responses from the two unions—the Fire Brigades Union and the Chief Fire Officers Association—drafted by two of these individuals I am referring to were extremely negative, without any evidence but very negative, “These changes will not help fire safety, there is nothing wrong with flame retardants” and so on. Both of those officials resigned at the same time last year from their posts.

Q116 **Chair:** Which officials? Are you talking about the Fire Brigades Union?

Terry Edge: One in the Fire Brigades Union, one in the Chief Fire Officers Association. Can we name them?

Chair: You can say who retired, yes.

Terry Edge: One is a chap called Dave Sibert who was the chief safety officer for the FBU. I raised the issue with Matt Wrack, the head of the FBU, about Dave Sibert’s involvement with blocking changes to the furniture regulations. Dave Sibert resigned suddenly last year. Matt Wrack told Anna Stec, who was interested in this, that he had been forced to resign for colluding with the flame retardant industry.



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Gareth Simkins: The funny thing is Dave Sibert himself told me, "Corruption or not, there was something funny going on" when I spoke to him two years ago and I reflect on that remark more and more.

Q117 **Chair:** Gareth, you are a journalist. This has been covered now by an ENDS report, by "Newsnight", by *The Sunday Times*. There is an article by Jonathan Leake and yourself from 2017. Why do you think it has gone quiet over the last two years?

Gareth Simkins: Because nothing much has happened. To be news something new needs to happen and apart from Richard Hull's research—partly it is because there are very few people who understand the totality of what has been going on, other than myself and Terry. I wanted to publish more on this and I have published various aspects. I have published stories on the toxicity of organophosphates linking to eye damage and thyroid cancer, I have written about Richard Hull's research and so on, but I have not been able to publish a story on the corruption allegations, which is ultimately why I brought this to your attention.

Terry Edge: "Newsnight" told me something similar, because they researched heavily into people like Dave Sibert and Sir Ken Knight, I will put his name out there too.

Q118 **Chair:** He is from the Chief Fire Officers?

Terry Edge: No, he was for many years the Government's Chief Fire and Rescue Adviser to DCLG as it was at the time. He played a major role in blocking changes to the furniture regulations, very prominent there, and he was appointed chair of the Independent Expert Advisory Panel at Grenfell. I did write to Sir Ken to remind him that he had agreed in a meeting that the current regulations do not work and he had insisted on extra work being done so that they would work but the extra work was never done and nothing was said about it, but he never replied.

Chair: Okay, we have to finish it there. Thank you very much indeed.