



SCOTTISH HOSPITALS INQUIRY

**Hearings Commencing
19 August 2024**

Day 1
Monday, 19 August 2024
David Watson

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10:03

THE CHAIR: Good morning, and welcome to the beginning of the Scottish Hospital Inquiry's third session of hearings in relation to the Queen Elizabeth University Hospital and Royal Hospital for Children in Glasgow. In saying good morning and welcome, I am speaking to the legal representatives and others who are in the hearing room in Edinburgh, the legal representatives of the core participants, but I am also speaking to those who are following us on the YouTube link.

The hearings which are beginning today are scheduled to continue until 15 November, with a break for a week in the week beginning 14 October. Now, in the first session of the hearings in relation to the Glasgow hospitals, the Inquiry heard from patients and family members of patients about the physical, emotional and other impacts arising from concern over the state of the built environment of the hospital and the relationship which it may have had to the incidence of infections experienced, particularly by the most vulnerable patients. In the second session of hearings, we heard from the clinicians, who are directly concerned in the treatment and care of patients, and also from members of the administrative staff of Greater Glasgow and Clyde Health Board.

In this hearing, we will hear evidence from five groups of witnesses. First, the members of the Estates staff of NHS Greater Glasgow and Clyde, who were involved in the construction and commissioning and subsequent maintenance of the building systems in the Queen Elizabeth, and from those who carried out inspections of these systems. The second group will be clinicians, including clinicians involved in infection prevention and control. The third group will be those who had responsibility for communication with patients. The fourth group will be members of the panel that produced the case notes review in 2021, and finally, we will hear from the independent experts instructed by the Inquiry.

The evidence, as I anticipate it, will be concentrated on the water and ventilation systems of the hospitals. It will examine whether there was evidence of contamination of the water system. It will examine whether there was any instances of non-compliance with relevant regulations and national guidance, and whether that gave rise to risks impacting on patient safety and care, and the Inquiry will also hear evidence on the actions taken to investigate and resolve these issues after the handover of the hospitals in 2015 and the extent of the effectiveness

of these actions.

Therefore, the purpose of this session of hearings is to take forward the themes and questions arising from the evidence of patients and clinicians which the Inquiry has previously heard in order to understand how that evidence may have been linked to the state and condition of the building systems. The hearing will also seek to understand whether the right of patients and their families to be informed and involved in matters relating to their treatment were respected.

I am shortly going to invite counsel to the Inquiry to lead his first witness, but first can I just introduce those who are sitting round the table? In the centre on my right is Mr Fred Mackintosh KC, senior counsel to the Inquiry. Now, he is insisted-- he is assisted by Mr Neil Morrison, who is sitting on his left – Mr Morrison is an advocate – and by Ms Khanna, who is sitting on his right. I am assisted by Drew Fox, who will help me, in particular, with the technology. So, with that by way of introduction, can I invite Mr Mackintosh to lead his first witness?

MR MACKINTOSH: Yes, my Lord. My first witness is Mr David Watson of DMA Canyon.

THE CHAIR: Good morning, Mr Watson.

THE WITNESS Good morning.

THE CHAIR: Now, I believe you are prepared to affirm.

THE WITNESS: Yes.

THE CHAIR: Yes. Sitting where you are, could I ask you to repeat these words after me?

Mr DAVID WATSON

Affirmed

THE CHAIR: Now, Mr Watson, as you probably understand, we-- you are about to be asked questions by Mr Mackintosh. I anticipate that will certainly extend through the morning and may extend into the afternoon.

THE WITNESS: Okay.

THE CHAIR: We usually take a break about half past 11, and I will leave it in the hands of Mr Mackintosh to say when that break should be, but if at any stage you want just to take a break, feel free to just give me an indication and we will break, so feel that you are in control of that situation.

THE WITNESS: Thank you.

THE CHAIR: The final thing, can I say, and I speak as someone whose hearing is not what it was, can I ask you to keep your voice up a little bit beyond-- you should have the assistance of the microphones, but if you could perhaps

speak a little louder, a little more slowly than you might otherwise, and I would make the same request to Mr Mackintosh. Mr Mackintosh?

Questioned by Mr MACKINTOSH KC

MR MACKINTOSH: Thank you, my Lord. Mr Watson, could you give me your full name and your occupation?

A David Watson, and I'm a legionella consultant.

Q And what are your qualifications to be a legionella consultant?

A I've got 25, almost 30 years in-- experience in the industry, and I've done various training courses over that time just to get myself up to the level.

Q Before we go into that in detail, did you provide a statement to the Inquiry?

A I did, yes.

Q And are you willing to adopt that as part of your evidence?

A Yes.

Q Thank you. Now, before we go into your background, I would like to understand a little bit more about DMA Canyon itself.

A Yes.

Q What was your role in the company in the years following 2015?

A My role was-- I'm one of the directors of the company.

Q And are there more than one director?

A There was three directors always, yes. It was myself, Mike Kinghorn and Graeme McCullie.

Q Right. Now, what is the nature of DMA Canyon's business?

A We are water hygiene specialists, and we also have a water-- sorry, a plumbing-- specialist plumbing division, which, when we make recommendations around legionella, they can take those recommendations and alter water systems in order to bring them up to the standards that we advise and----

Q So you can both investigate and assess but also fix things?

Q Yes.

Q Right, and you mentioned that you have done various courses and had 25 years' experience, but you are not a microbiologist?

A No.

Q No, so what is the basis of your skill, knowledge and experience in respect to the management of water systems?

A It's more about looking at how the water systems have been built and do they comply with the guidance like L8 and SHTMs.

Q Right. We will come back to

L8 and SHTMs in a moment, and so I just want to understand where the limits of your experience are – and we might get to that at various points today – which seems a bit of an ungracious way of putting it, but we need to be clear. So, is your experience in respect of water systems limited to particular types of water systems?

A Mostly we look at domestic water systems. We have worked at other cooling towers and that kind of thing, but mostly, in relation particularly to the hospital, we'd be in domestic water systems.

Q So when you say domestic, you don't mean houses? You mean the hot and cold water----

A Hot and cold water systems within the hospital, yes.

Q And the heating systems?

A No.

Q Not heating systems?

A Not heating systems.

Q Not heating systems. Right, and are there any particular types of buildings that you are specialist to, or do you cover almost any type of building?

A We cover pretty much any building which has water in it.

Q So you would cover an office block like this one?

A Office blocks, schools, colleges, hospitals, all the way from the

big hospitals all the way down to little clinics.

Q Right. Now, when it comes to microorganisms, are there a limited number of microorganisms that you would consider you have some skill and experience in respect of?

A Yes.

Q So what are those?

A The main ones we would deal with would be legionella and some pseudomonas. Now, there are-- because of what we've been doing at the hospital, there are some other organisms we're starting to become familiar with, but there's very little in the way of actual guidance for how we treat with them, so we revert back to the guidance which is provided for legionella and pseudomonas.

Q So just to break that down, there is a limited number of microorganisms you have experience of?

A Yes.

Q And that experience is rooted both in the guidance and in your experience?

A Yes.

Q So, if we go back to 2015, you would not have then had experience in the other things that you have just mentioned?

A No.

Q No. So you are really just, at

that point, legionella and pseudomonas?

A Yes.

Q Can you just help us to get us started at this hearing: what is legionella and why does it require to be managed?

A Legionella is an organism which can live in water, and if it grows within the water system and then gets aerosolised, in like a shower or a spray of some description, and then it's inhaled, it can cause an infection in the lungs, so, therefore, it has to be managed. We risk assess and look at these water systems in order to get them to the point where we limit the scope for that bacteria to grow within the water systems by keeping the water system-- making sure the hot water is hot, the cold water is cold.

Q Right, so let us break that down. So there seems to be, from what you were saying, two parts to it: there is whether legionella is in the water, and how it gets out of the water.

A But I think there is always going to be potential for it to be in the water because it's a naturally occurring organism, so I think, therefore, they always assume that there is a potential for the system to be contaminated. So therefore, what we're trying to do is limit the opportunity for that organism to grow so that you don't have the conditions for growth within the water system.

Q And what are the conditions

that legionella would like?

A They like water which is between 20 and 45 degrees, they like stagnant water, and they like water which has got nutrients in it which they can feed off of. So they want to keep water systems-- hot water hot, cold water cold, and they want to keep the system clean.

Q I want to get you to slow down a bit---

A Sorry.

Q -- because there are lots of people. You can hear them tapping.

A Yes.

Q So, the range it would like to be is between 20 and 45 degrees?

A Yes.

Q And so you want to keep cold water under 20----

A Yes.

Q -- and hot water over 45?

A Yes, but the guidance will push it to 50 or 55 degrees to give us that little buffer.

Q Right, so the guidance-- you want to be over 50 or 55?

A Yes.

Q Now, when it comes to pseudomonas, why is the industry interested in regulating pseudomonas?

A Because I think, particularly in high-risk settings, it can become a potential infection, I think, around line infections, but we only really look at that

in the high-risk environment.

Q So what would be a high-risk environment, in your mind?

A Like chemo, oncology or high-dependency units. That can be----

Q So in hospitals?

A Yes. We don't routinely look at pseudomonas outwith the hospital environment.

Q Right, and the thing you mentioned was line infections?

A Yes.

Q Is this the lines that are fitted to patients who are receiving chemotherapy?

A Yes.

Q Right. Now, in the various documents, in addition to yourself, there is another gentleman named, a Mr Alan McRobbie.

A Yes.

Q Who is he or who was he in the company?

A Alan worked for DMA. He left a few years ago. He was our compliance manager at the time of doing the risk assessments that we carried out.

Q Okay, well, we will come back to him. The first document I want to take you to is SHTM-0401, Part B, which is at bundle 15, page 381. Now, obviously, it is a huge document. Are you familiar with this document?

A Yes.

Q Now, is this guidance or regulation? How do you see it as a document?

A I don't know.

Q You do not know?

A It's never been explained clearly in our industry whether this is legal guidance or whether this is just additional guidance over and above. L8 would be the main guidance.

Q So what is L8?

A L8 is the guidance that's put out by the health and safety executive around legionella, and then you have, within the hospital industry, hospital environment-- we have the SHTMs.

THE CHAIR: Mr Watson, I think I heard exactly what you said, but I just want to know----

MR MACKINTOSH: Yes, I was just going to ask you to slow down a bit because one of the things that happens when you give evidence is you get a little bit excited, so if you could slow down. I do it, too, so a little bit slower. So you mentioned SHTM-0401, Part B as a document that you do not-- you are not entirely sure whether it is guidance or regulation.

A I don't know where it would stand legally.

Q But we are going to deal with that with other people.

A Yes.

THE CHAIR: All right. Could I maybe just confirm that I heard correctly? The way you put it was it has never been explained in the industry as to whether it was legal guidance or something else.

A Yes.

Q (After a pause) Thank you. Mr Mackintosh?

MR MACKINTOSH: Yes, and so L8. I think we are going to talk about L8 a lot, so let me just check I understand it. This is produced by the health and safety executive?

A Yes.

Q So it definitely is a regulation?

A Yes.

Q Yes. What is an L8 risk assessment, therefore?

A An L8 risk assessment is where we would look at a water system and we would go through the water system and how it's laid out and how it complies with the guidance provided by L8 and the support documents of HSG 274 and how the water system complies.

Q HSG 274: that is Health and Safety Guidance 274?

A Yes, which is an additional document which links to L8.

Q And that comes from the health and safety executive as well?

A Aye.

Q So, these are the three documents that lie at the heart of your

work?

A Yes.

Q Right. Now, sorry, I interrupted you. What does an L8 risk assessment attempt to do?

A It attempts to look at the water system and see that it complies with all the guidance which has been provided within the various documents. Any areas where it's not applying, we try to make recommendations as to how the system needs to be amended or altered in order to bring it up to standard, but it also looks at the PPM regime.

Q So what is PPM?

A Planned preventative maintenance.

Q Planned preventive maintenance?

A Yes, the tasks that you would need to carry out on a daily, weekly, monthly basis in order to maintain the water in the condition that we'd like it to be in.

Q Right. We are going to come back to what actual L8 risk assessments looked at when we look at yours in a moment. I notice – but I want to check whether this is a correct observation on my part – they are quite a structured document, a sort of formal structure. When we look at your ones, are they a standard structure for the industry, or is it your own particular way of structuring

them?

A I think ours would be built-- designed by us.

Q So it is your format?

A Yes.

Q Now, we are interested in the Queen Elizabeth University Hospital and the Royal Hospital for Children. When a new building is built and is built by, presumably, a contractor, and is supplied to an owner or an occupier, whose responsibility is it to obtain the first, what is called by some people, as I understand it-- a pre-occupation L8 risk assessment?

A I think that would come down to the contractual agreement between the builder and the owner, but, eventually, as the owner takes the building, they would have a responsibility to make sure that they have a risk assessment in place in order for them to manage the water system going forward.

Q Right, so we will ask other people about what this particular arrangement is, but your position is that you would think this would come from the private arrangement between the parties?

A Who would be responsible for having that carried out, I think, so yes.

Q Right, and then you say that the person-- that the organisation running the building would acquire a responsibility to check there had been a risk assessment?

A Yes, and then they would have to have one in place for going forward.

Q Okay. Now, within this SHTM-0401, Part B, I would like to jump to page 418 in the bundle, which is an organogram of some sort. Now, I see this later in your reports, but I would like to just go through who the various duties and parties are in this structure and try and understand who everyone is because it can get a little bit confusing. Looking at this, at the top, this is a template, I am assuming.

A Yes.

Q It describes in this structure that the chief executive of whatever organisation it is is the duty holder. What is the duty holder and what are they responsible for?

A The duty holder is the person who is ultimately responsible for the water safety on site.

Q And why is that? Is that a whim of you, or does it come from somewhere official?

A Sorry?

Q Does it come from somewhere official, that idea?

A I think it's described within L8.

Q In L8? Okay. Now, working down the structure, we have in the middle or to the right-hand side, actually, at the top, an authorising engineer.

A Yes.

Q Who is the authorising engineer?

A Who is it?

Q Or what is the purpose of an authorising engineer?

A I think he provides independent guidance to the board on how to manage the water systems, and he provides technical guidance if required at any point.

Q But would this be for any water system in a hospital?

A Yes.

Q Yes. Second from the bottom, there is a role called "Authorised Person (Water)".

A Yes.

Q In this structure, what are the duties of the "Authorised Person (Water)"?

A I think within the document it actually gives you the duties they have to carry out.

Q Yes?

A But normally the person who's "Authorised (Water)" would be the person who, on a day-to-day basis, would be managing the water----

Q Yes, so it is the day-to-day role?

A Yes.

Q Right, and then if we step up the structure, we then have a "Responsible Person," and above the

"Water Safety Group", which is in blue, we have a "Designated Person."

A Yes.

Q Now, would we find descriptions of their roles in this document?

A I think all the roles are described within the document.

Q Yes, but I want to just simply jump to the Water Safety Group and understand what you understand its duties are. What is the purpose of having a Water Safety Group in a hospital or a health board?

A It's to allow all the different parties who have an interest in the water system to come together so that there's a group who are making the decisions on how to manage the water system so that Infection Control and the clinicians can feed into that group as well as Estates and the likes of ourselves and the authorising engineer. All the people can come together so that all the parties who have an interest in the water system can feed in----

Q So, in practical terms, it is the primary decision-making body?

A Yes.

Q Right. Now, when we look at all these people in this structure, is there any requirement on them to be trained?

A Yes.

Q And how might they obtain

such training?

A Through-- There's various training organisations who specialise in providing training for our industry.

Q Normally external sort of (inaudible)?

A Most of it would be external or, you know, they can maybe contract-- Yes, I think most of it would be external.

Q But if you ran a big organisation, you could run your own training?

A If the hospital had the right people in order to do that training, I'm assuming they could, yes.

Q Now, along this document, as we go on, we are going to meet some other concepts which I want to just check I understand. What is a written scheme in the context of water?

A The written scheme is guidance which is created specific to the water system on site, which again just goes through who's responsible for each of the tasks which have to be carried out and detailing what tasks are required to be carried out for the planned preventative maintenance, when they need to be carried out and who should be carrying those tasks out, and it just lays all of that out----

THE CHAIR: Again Mr Watson, this is entirely familiar. People speak the way that they speak, but in normal

conversation, somebody is not trying to take a note.

A Sorry.

Q Now, I am not looking for a dictation, but I am finding particularly-- I mean, it is really for Mr Mackintosh to establish the pace----

MR MACKINTOSH: Yes, we will slow down a bit more.

THE CHAIR: -- particularly when we come to a matter where the exact answer of the witnesses is important. I think if we could encourage Mr Watson to speak a little bit more slowly. Mr Watson, you are in exactly the same position as almost every witness I have ever heard, because you get into a conversational mode, but this is going a little bit fast for me.

MR MACKINTOSH: Yes, well, let us go back to the written scheme. So, you have described the written scheme as setting out what everyone's responsibilities are.

A Yes.

Q What is it you are trying to avoid by having a written scheme?

A You're trying to avoid the water-- Sorry, how would I put this? I think it's easier to describe what you're trying to achieve rather than----

Q Then happily do that.

A Okay. What you're trying to achieve is that the water system is then

managed and maintained properly so that we keep the water in the conditions we described earlier that we don't have water which is outwith parameters, and the checks are being carried out and the maintenance of the water system is being carried out so that the water system remains in a safe condition.

Q So, in essence, it is an operational sort of guidance plan?

A Yes.

Q So, how does that differ from a water safety plan, which we will look at later this week?

A I think they're very similar.

Q And do you have to have both, or can you just have one? Is there any particular rule?

A I don't think there's any particular rules.

Q Right, and what are you trying to achieve by a water safety plan?

A Same thing.

Q Same thing? All right. Now, we are also going to come across something called authorising engineer annual audits.

A Yes.

Q Is this a thing you come across generally, or is it particularly to this hospital?

A We see them in a lot of hospitals. It tends to be more in a hospital environment we see the

authorising engineering audits being carried out, but we don't see it just in the Queen Elizabeth; we see it across all the buildings we deal with in GG&C.

Q So, from your point of view, what do you see as the objective of an authorising engineer's audit?

A It's an independent review of the water management plan or the water safety plan so that you-- it gives the board a chance to review their documentation and all the works that are being carried out and does it still comply with what they're trying to achieve.

Q Now, when you are doing an L8 risk assessment for any hospital, what are the-- what, if any, issues does it cause when there is no written scheme or water safety plan or authorising engineers' report, from your point of view?

A For us, it just-- it highlights that there's nobody taking responsibility or there's no-- nothing in place to manage the water system so that all the tasks that we expect to be carried out on a daily, weekly, monthly basis are physically being carried out. There's no documented structure in place to ensure that's in place.

Q Okay, right. Now, I want to just understand, if I can – and if it is a matter of practice and it is not an absolute rule then I hope you will tell me

– but I have got four things that I am going to put to you that seem, to me, to be of interest whether they occur.

A Yes.

Q And I would like to understand whether you can tell me whose responsibility it is – other than, I suppose, the duty holder – to do these things as they arise, but if it is a matter of just practice as opposed to-- or even just informal practice, please say that.

A Yes.

Q I do not want you to give the impression that it is a hard and fast rule when it is not.

A Okay.

Q So the four things are this: maintaining a management structure of this sort that we see on the screen in front of us. Ultimately, whose responsibility is to make sure that this happens?

A I think that would fall on the duty holder mostly. Now, they may delegate it down to a designated person----

Q Right.

A -- to ensure that's in place, but I think, ultimately, it should fall on a duty holder to make sure that you have this-- you know, the management structure in place.

Q An organisation might have a water safety plan or something that does

that delegating?

THE CHAIR: Right, so, answer to question one is designated person?

MR MACKINTOSH: No, duty holder.

THE CHAIR: Duty holder, right.

MR MACKINTOSH: But the organisation might have a water safety plan or some such document that sets out those delegations.

A Yes, yes.

Q Right. Obtaining an L8 risk assessment or whatever frequency is required, whose responsibility would that be?

A Normally speaking, it would be somebody around the designated person, or possibly the responsible person who would approach us in order to do the risk assessment.

Q So somewhere in the middle?

A Yes.

Q And is that just practice or is that guidance?

A It gives you guidance within this document as to who is responsible for making sure that's in place.

Q And when it comes to reading and understanding and reacting to a risk assessment, whose, in this sort of structure in general, responsibility would it be?

A Mostly, the responsible person and the authorised person to deal with

the actual physical recommendations.

Q I see, okay. Now, when it comes to ensuring that authorised persons and authorising engineers are appointed, whose responsibility would that be?

A I think, again, this comes up to the duty holder and the designated persons to drive it down. It's the top of the tree.

Q And it might depend on the organisation's safety plan?

A Yes.

Q Right. Now, I would like to start looking at----

THE CHAIR: Sorry, Mr Mackintosh. The last question was-- your question four?

Q Whose responsibility is it to appoint authorising engineers and appoint authorised persons?

THE CHAIR: Thank you.

MR MACKINTOSH: Now, Mr Watson, what I would like to do is to move on to how you became to become involved in this hospital.

A Yes.

Q I wonder if you could be shown the next document, which is in bundle 25, document 40, page 669. So far, this is working. Now, we have received this from your organisation, I understand?

A Yes.

Q Attached to an email.

A Yes.

Q So this letter is-- date there is to be dated 15 December 2014 and it is addressed to a Mr Powrie.

A Yes.

Q And if we look at the next page, we see -- or the third page, actually -- that the author is you.

A Yes.

Q Right. We go back to the beginning. How was it that you came to write this letter?

A We were already carrying out work at the Southern General Hospital, as it was known at the time. We were doing routine checks within the hospital in what's now referred to as the retained estate.

Q The retained estate?

A Yes. We had no input into the new building going up, and Ian approached us as we were the kind of on-site L8 contractor and asked if we could help him with getting a risk assessment carried out for the new building as part of the handover.

Q And this is your quote?

A Yes.

Q Were you actually asked to carry out this work?

A Yes, we completed it.

Q Now, when you were instructed to do the work, were you provided with access to the Zutec

system?

A We were given some limited access to the Zutec. I think they gave us access to just the water files that they thought would be relevant to us.

Q Okay, so I do not need to show you the next letter. That is helpful.

THE CHAIR: Mr Mackintosh, do you want to just explore, so that everyone is keeping up-- I am sure everyone knows all about Zutec, but----

MR MACKINTOSH: That was my next question, my Lord. So what is the Zutec system, as you understand it?

A It was an online records portal for us to access drawings and some of the commissioning records which were put in place that we needed to access in order to carry out the reviews for the risk assessment.

Q So were you able to find commissioning records for all the systems you examined?

A There were some gaps in the commissioning records.

Q Are you able to give an idea of the proportion of gaps in the commissioning records?

A Sorry, it was nine years ago.

Q Fair enough. Did you manage to obtain the information that was not there from elsewhere?

A We enquired through Ian Powrie for some additional records and

some additional drawings, and I think eventually some of the information was provided, but I don't think everything we asked for was provided.

Q Right. Did you ever come across any validations of the water system, as opposed to commissioning?

A In what way?

Q So I understand, and I am sure I will be corrected if I am wrong, that sometimes in the construction of a building the contractor might commission the system but the client might validate it independently. Is that something you have ever come across in water?

A I didn't see it in this site.

Q Is it something you have come across, then, validation texts?

A Not domestic water systems. When I've worked in heating systems and things like that, I've seen that kind of thing, but----

Q So you have seen it more in heating than in domestic hot and cold water?

A Yes.

Q Right, okay. Now, when you were on the site at this point, where would this have been, your first team on site to do this work?

A I believe our very first visit to site was just before Christmas 2014, where I think we went in and we got the site induction and our passes to allow us

to access the site, and then I believe our very first walk round of the site and actually getting into the building was maybe about a week or so after we returned after the Christmas holidays.

Q So in January 2015?

A In January.

Q And so who was providing you with guides on site at that point? Was it---

A The initial walk round was carried out by Mercury Engineering for us.

Q And as far as you understand, who are Mercury Engineering?

A Mercury Engineering were the mechanical contractor who installed the plumbing system.

Q Did you receive any orientation and guidance from GGC staff in those initial visits?

A Not in the initial visits, no. I think one of the GGC staff came with us for part of the walk round, but, as I say, it was nine years ago, so I may be mistaken in that.

A Of course. Now, at this point when you are just being instructed, were you told who the duty holder authorising engineer and authorised persons were at this point?

A No.

Q No. Now, I am going to try and ask you some broad questions about this

system and legionella assessments. What I wanted to understand is you looked at the water system of this hospital, the domestic water system. How was it designed to limit the growth of microorganisms, as you understood it?

A I think it was designed-- We were advised that tap selection was specifically designed to reduce the potential foreign growth by having TMV taps so that we didn't have the TMVs mounted further back within the system.

Q Right, so there is lots of jargon in there, Mr Watson.

A Sorry. The thermostatic mixing, which blends the hot water down to usable temperatures, was the selected taps which blended water right at the tap, rather than blending the water maybe half a metre or a metre back from the tap.

Q So you actually have the hot and cold supplying the tap itself?

A Yes.

Q And in the tap you mix the two?

A You mix it there and it distributes it around 41 degrees at the tap, rather than having the TMV mounted back within-- behind the panels and then coming down the tap, where you maybe have a meter or something like that.

Q At a lower temperature?

A At a lower temperature, which is in the growth range for legionella.

Q Right.

A So there were things like that.

The hot water chlorifiers were designed to run, we were advised, at 60 degrees, which is standard, but they were also designed that the return temperatures coming back to the chlorifier should be at 55 degrees, which is, again, higher than most guidance.

Q And what did you understand to be from the point of view of the design of the system-- to be the primary means of controlling legionella in the building?

A Temperature.

Q Temperature. What sort of other means are there?

A You can dose-- background dosing systems, such as chlorine dioxide, could be installed.

Q We will come back to that later. What other ways?

A You could do that and you-- there is filtration units between the raw water tanks and post-filter tanks, which filter the water and take out particulate, so that stops-- should stop any particulate getting into the post-filter tanks, preventing nutrients getting through the tanks and into the system to provide nutrients for----

Q Okay, we will come back to both of those later on. Do you have any views about whether water in a hospital that is supplied in a domestic system

could ever be sterile?

A I don't think it could be, no.

Q No, okay, and we also read about the concept of wholesome water.

A Yes.

Q What do you understand by "wholesome water"?

A Wholesome water being water that is fit for-- using for drinking, washing and it's not going to cause any harm.

Q Does wholesome mean the same thing in all contexts, or does it mean different things depending on who is using the water?

A I would just assume wholesome is always the same.

Q Because you mention high-risk places in hospital.

A Yes.

Q Is there any extent to which wholesome might impose a higher standard to-- in a high-risk area?

A In the high-risk areas, when we are doing sampling, the thresholds for what would constitute an out-of-specification is tighter, yes.

Q So you are just saying that you are doing-- if you do sampling----

A Yes.

Q -- in a high-risk area, the threshold at which you would consider it to be out of specification would be set at a higher level?

A Yes.

Q Or, in a sense, it is almost a lower level, in that you are more-- you are reacting more promptly.

A Yes, I see what you mean. The control parameters are tighter.

Q Tighter, yes, than you would elsewhere in a hospital?

A Yes.

Q Right, okay. Now, I do not know whether this is going to be important, and if you cannot remember----

THE CHAIR: And just so we can be clear, although I think your answer was clear, Mr Mackintosh introduced the concept of wholesome water and then asked, "Does it depend on context?" You then gave an answer in relation to high-risk areas. In a high-risk area, there would be a lower tolerance of, as I understand it, a concentration of microorganisms?

A Yes.

Q However, going back to the start, do I understand that wholesome water is probably statutorily defined and certainly means the same-- wholesome means the same in every context?

A Yes.

MR MACKINTOSH: That is what you are saying, that wholesome----

A Yes, the definition, when people talk about wholesome water-- they mean standard water.

THE CHAIR: Yes, what comes up

from the mains supply.

A What's supplied by Scottish Water, which would be deemed a fit for drinking.

MR MACKINTOSH: Got that. Thank you, that is really helpful. Look, it may not matter, but do you know whether your staff were on site on 26 January 2015 when the hospital was signed for and handed over?

A I honestly can't remember.

Q But you are in and around the building in that month?

A We were in and around the building at that time, but even if we were on site, we had no-- we played no part in the actual physical handover of the building or----

Q Right, could we ask you to go to bundle 25, document 51, which is at page 755? So this is an email that appears to be from your Mr McRobbie----

A Yes.

Q -- to Mr Powrie, copied to you on 9 January 2015, and you describe-- he describes having a walk around the day before and that he was impressed by the general standard of installation. I just wanted to know, in case I am just being foolish, what is a "PO" in the third sentence?

A Purchase order.

Q Purchase order? Just getting paid? Right, well, in that case, fine --

A Pretty much, yeah.

Q There are so many-- we just wanted to make sure we understood that one. Right. I need to turn to your report itself, which is in bundle 6, page 122. It might be worth you having a copy in front of-- your copy because this is a big document. So that is Bundle 6, page 122. Now----

THE CHAIR: Mr Mackintosh, there is the document and a document number. I have got the page-- I have got the bundle----

MR MACKINTOSH: It is document number 28.

THE CHAIR: 28, thank you.

MR MACKINTOSH: Now----

THE CHAIR: Well, I have got it (inaudible).

MR MACKINTOSH: Sorry, it is 29. 29, I am being corrected.

MR MACKINTOSH: Now, what I was proposing to do from now – for the next sort of 45 minutes – is to walk through this report.

A Okay.

Q I suppose I am going to end up looking at bits that you think are less important than others, and there may be places where I point at something and you think it appears in more detail somewhere else.

A Okay.

Q So I do not want you to

hesitate from saying, "Actually, there is more later on," or, "There is less," because we can obviously read this report, and I am assuming, in a sense, it is for a lay audience.

A Sorry?

Q This is really for a lay audience, the duty holder.

A We try and make it as easy to understand as we can, but there will be jargon in there that (inaudible)----

Q Well, indeed. We are going to have a go at that. So, you have already described what the purpose of an L8 risk assessment is, so I want to just look at the bottom of the front page and understand, because this appears, over your later reports-- might be important. So, on this particular report, you are describing that the site survey was completed on 29 April 2015, and it was issued as a draft document for comment by NHS Estates.

A Yes.

Q And you mention, "Continual review recommended during occupation period." Is there a frequency at which it is considered to be prudent to carry out the reviews of these risk assessments?

A Most risk assessment should live as a live document. It should be, if any changes come up, then you should review your risk assessment. If there's any significant changes to your water

system, review the risk assessment and make any changes to the risk assessment as you go through it as a live thing. But most organisations will put a limit of two years, for example, and say, "Every two years we will come back and we will review the document."

Q But that is practice, not guidance, or----

A It's practice, not guidance. The guidance says it should live more or less as a live document.

Q Okay. Now, what I want to do is go onto page 123. Now, the reason I wanted to go here was a couple of things: firstly, to identify the date of final assessment, which we have as 29 April 2015 a third of the way down, and the names of the people to whom the report was commissioned by, so it is bit further down on this screen. So, it states here that the report was commissioned by Ian Powrie of NHS Estates and issued to him.

A Yes.

Q Now, I am going to come back to how that issuing was done later in detail, but I wanted to just look at the footnote. As a lawyer, this reads like a sort of caveated statement by you that qualifies your opinion by reference to what you have seen, so can you explain the purpose of this footnote?

A Basically, it's saying that we

don't know this building, we're not familiar with the building, and we can only assess what we are shown, is what we're basically saying. If the hospital tell us this is where parts of the water system are and they take us to review that, then that's what we can review. We can't just walk around the entire building, particularly a building of that size, and see absolutely everything that's going on, so it's just us saying, "If you show us something, we can assess it. If you don't show us, if you don't tell us something, there's not really much we can do."

Q So if you are not taken to a particular floor, you cannot assess that floor?

A Or if we're advised there's nothing on that floor, there's no reason for you to go there, then we wouldn't go to that floor and review it.

Q But you should-- You might ask if----

A We might ask, yes.

Q Because you might be suspicious about where the other plant room is, for example.

A Yes.

Q Yes, right, and in this case, you would have been shown all the plant rooms.

A We were, yes.

Q Yes, right. Now, if we go to page 134, because we jumped past your

own certification to qualification-- I think it would be better if we stayed at the whole page just for the moment rather than jumping in. Your structure of your reports, Mr Watson, have a lot of bits that look like executive summaries, and they sort of repeat in structure, so I am always worried that I am not looking at the right page, but----

A Okay.

Q Is this the executive summary from the whole report? Page 134. Now, are you working off your own copy?

A Yes, I'm just taking up the page numbers off the bottom.

Q Right. Have you got the numbers in the top right-hand corner?

A I printed off my own copies.

Q Oh, well, that is great.

A I'm using the reference you've got in the bottom right, which is our documents, which makes sense to me.

Q Page 13 of 18?

A Yes, I've got it.

Q Right. Yes, okay. This is going to be fun, but we will get there. Right. First things first, I want to just check how many water supplies-- water systems are there in domestic? Is there one system for the whole hospital, or is it divided up into sections?

A It's effectively one large system which supplies the entire RHC and the adults' hospital.

Q Do you have any views about whether that is a sensible approach, or-- Is there a view on this?

A I'm-- I don't design water systems, so I----

Q Fair enough, okay. Now, if we go on two pages, we reach another table headed, "Risk assessment summary." Now, I am going to stop here and go through some of this in detail. Fifth line down, you ask the question, "Is building used by potentially at-risk groups?"

A Yes.

Q Then, you answer, "Yes, persons with acute medical conditions."

A Yes.

Q What did you understand to be the at-risk groups that were in this hospital?

A Well, we were aware that, when the building was occupied, it was going to be haemo-oncology(sic), there was going to be high-dependency units, so there were going to be people who had-- who were immunosuppressed and had, basically, underlying health conditions.

Q Then the next section is, "Is there a history of legionella colonisation of the water system on site?" I am assuming this is-- for an old building, this would be more important that you would describe the history of the site.

A Yes.

Q Ah. Now, in the middle of that section, there is a paragraph that begins, "DMA were advised sampling being carried out." Were you given any information about, or would it be normal practice to be given information about, the sampling methodology that was used for these exercises that are described here?

A Normally, we would expect to see, within the written scheme, documentation for a building, the method statements for carrying out the various tasks. So, yes, we would have expected to see that methodology, and with this being carried out as part of the handover, we would have liked to have seen the methodology to see whether they were doing first-flush/post-flush sampling. There's different terminology used.----

Q But you did not see the methodology?

A No, we didn't see it.

Q And there was, in fact, no written scheme?

A No.

Q No. If you go down to the next box----

THE CHAIR: My fault, Mr Mackintosh, can I-- You made the point about the origin scheme. Mr Watson did not see the----

MR MACKINTOSH: Methodology for sampling.

THE CHAIR: Right. Yes, I think it is-- I just do not immediately have in my mind the notion of what a methodology might be to see it.

MR MACKINTOSH: Well, I will-- Yes, so you mentioned, Mr Watson, the concept of "first flush."

A Yes.

Q Can you just explain to us the different ways you might sample a tap?

A Yes. You can either take first-flush samples, which is literally where you don't run the tap whatsoever and you take the first half litre or litre of water into a bottle, and that gets shipped off for analysis, or you can take post-flush samples, which is where you would maybe disinfect the outlet and then flush it for a period, and then take the sample and that gets sent off.

Q And is there a difference between where the water you are sampling is actually coming from when you do these two different methods?

A Yes. The first-flush sample lets you know the water which is effectively living in the tap and the first metre or so back from the tap, and when you do the post-flush sample where you flush it for a period, then you're sampling further back in, and you're actually getting, like, the bulk water within the water system, so there's different reasons for taking the samples.

Q So, in effect, different methodologies for different outlets will collect different types-- different classes of water, effectively?

A Yes.

THE CHAIR: Right, thank you.

MR MACKINTOSH: Now, in the row that we are just displaying on the screen here saying, "Legionella management," you have recorded there was no formal management structure, written scheme or communication protocols, and there were significant communications issues between parties involved.

A Yes.

Q From your recollection, what are the significant communications issues that you are identifying here?

A The things that we picked up on around that were, there was-- we identified a calorifier being offline at one point, we identified there was a bypass system put in place, and when we returned to site, they had been corrected and Estates didn't seem to know who had done the work.

Q So you identified two problems----

A Yes. Those are just examples.

Q -- on an early visit?

A Yes.

Q Then you return and the problems have been corrected, but you

do not know who corrected them?

A When we asked Estates about it, there seemed to be a bit of-- there didn't seem to be any communication around when those were fixed and how they were fixed and what was carried out.

Q So this is more a record-keeping issue, in a sense?

A Essentially, yes, and it's just-- you know, we just-- we were advised that there were times when the different parties weren't talking to each other and they were working to their own schedule.

Q This concept, when you mean different parties, do you mean different people in Estates or different companies?

A The builders and the main contractor and the NHS.

Q Right, and in the absence of a formal management structure, a written scheme or communication protocols, you have assessed this as a high risk?

A Yes.

Q We will come back to what that means in a moment, and section 9 tells us more, I think. Could we go on to page 137, which will be two pages further on-- one page further on? Back one page, please. Thank you. Now, I think, if I do this right, we can avoid looking at a lot more of the document by just drilling in here and, in a sense, take it a little bit quicker. Let us deal with the top box. "CWST" means what?

A Cold water storage tank.

Q So, in this system, the water comes in from the two external sources into a raw water storage tank----

A Sorry?

Q A raw water storage tank.

A Yes.

Q And then it goes to cold water storage tanks?

A No. They're all water-- They're all cold water storage tanks. They're all water-- Essentially, how-- It was the terminology which was provided to us, so we just carried on with the terminology. That's the water which just comes directly from Scottish Water town mains, goes into four water tanks. It then comes out of those, goes through filtration units and then goes into the post-filter water tanks, which at the time they referred to as the "bulk water."

Q So all of the raw water and the bulk water are the cold water storage tanks?

A Yes.

Q So we should read this row as referring to all the tanks?

A Yes.

MR MACKINTOSH: Including the trades tank?

A Yes.

Q Right, and they are all located in the basement tank room?

A Yes.

Q Now, there is a suggestion that one of the tanks is isolated.

A Yes.

Q Why would that be an issue for you as an L8 risk assessor?

A Because what we then end up with is, where the valve-- the mains line to that tank would have been isolated, it then leaves a section of pipework -- maybe 1A would be about 10 metres, 5 metres, something like that, of pipework -- which is now no longer having water drawn through it.

Q It has still got water in it?

A It would probably still have water in it, but then the water, it would stagnate if it's off for a considerable period of time, and the water tank, 1A itself, which is now no longer having water made up to it, the water within that tank could start to stagnate as well.

Q And when you get a tank that has been separate for a period, what is the method to remove any risks caused by it being separated?

A Normally, we would recommend that you drain, clean and disinfect the tank, and then refill it with fresh water and put it back online. Once the problem's been identified, then this tank can actually be put in to use.

Q And when you do that, do you need to record that you have done that?

A Yes.

Q And why is that?

A Just to show that you've carried out the work in the correct way, and that the work has actually been done because if we're reporting that there and nobody recorded him, we have no way of knowing whether we drew stagnant water----

Q I wanted to say that record-keeping seems important in water management.

A Yes, it is.

Q Right. Now, moving on to the section headed, "NB," now, this-- No, no, you have gone too far. "NB" in the top box. You mention this observation that "there is no separate dedicated supply to renal or other medical systems" repeatedly through all your reports.

A Yes.

Q And clearly you feel it is important to mention it. Why is this important to explain?

A It's just when the renal systems are very tightly managed and the water within the renal systems can come into contact with blood-- patient blood, as far as I understand, and so therefore if we don't-- if there was a supply going to the renal systems, which is attached onto the rest of the domestic water system, we need to be very careful if we are introducing any disinfectants into that water system. The renal department

would be well aware of that, and there was no potential for the disinfectant to be drawn through into the renal system without them being aware of it.

Q So it is both that you are worried, potentially, that the disinfectants in the domestic water could get to the renal patients----

A Yes.

Q -- but you are also worried that blood from the renal patients could get back in the domestic waters.

A No, that's less of an issue.

Q No? That is less of an issue? Right, okay.

A No, I don't know that that would be an issue at all. I think----

Q You have not mentioned it, but you just mentioned it briefly then. No, that is fine. Now, in the second box on this page, if we could scroll up, headed, "Calorifiers." Now, from the point of view of us, as domestic users in our own homes, we do not have calorifiers. We probably have a gas boiler.

A Yes.

Q So a calorifier takes hot water and it uses it to heat other water to the necessary temperature?

A Yes.

Q It's a heat exchange?

A Yes, but the way the calorifiers work-- and they're not actually true calorifiers. They're actually storage

vessels where we've got an external plate heat exchanger.

Q Right. Now, that was far too fast.

A Sorry.

Q You are going to have to slow that down.

A The calorifiers on site are actually just large storage vessels for the hot water, but the way the water's heated is there's an external plate heat exchanger attached to each calorifier, which pulls the cold water into it, heats that water and then puts it into the---

Q So, in fact, the heat exchanger and the calorifier together are, in fact, a calorifier system?

A It works as a system as a calorifier.

Q Right, okay. Now, in this section, the second paragraph, you describe there were various issues with the calorifiers.

A Yes.

Q Now, can you explain to me whether-- firstly, what these issues were and whether they were issues that were resolved or whether they remained?

A On the date we referenced on 21 April, there were issues at the energy centre, we understand, and there wasn't enough sufficient heat being provided from the energy centre on site and to the main building, and so the calorifier

temperatures all dropped. I think, if you looked at section 6, you would see a lot of the calorifiers came down to the region of-- in the mid-40s-- was the storage temperatures that we were picking up at that time, so that was a concern for us.

Q So this particular problem has the potential to be an intermittent or occasional or a one-off problem? You do not know?

A We don't know, but, at the time, it could just have been part of the teething problems of opening a new building. I don't know.

Q But you did not know then?

A No, we just highlighted there was an issue. We weren't getting the temperatures, so we highlighted it onto---

Q What would be the way of satisfying yourself that it was just a problem on the day? How would you-- Could you have done that?

A We went back the following week and we checked, and the majority of the calorifiers had all come back up to the temperatures that we would expect to see.

Q Okay, so this particular set of risk calculations in this table are 21 April alone?

A No.

Q No?

A It's a combination of what we saw on the 21st and what we saw on

return visits when the calorifier temperatures were where they seemed to be set at.

Q Sorry, I do not want to-- (Inaudible) I'll provide you with two choices here.

A Mm-hmm.

Q So, choice one, which is the description of risk that you are recording at the bottom of this box, is an aspect of a single moment when something might have gone wrong, which, as far as you can see, was fixed, or something that you observed more than once during your visit and worried you for the future in a sort of persistent way. Is it one of those two things or something else?

A When we actually-- when we get into-- if you look at section 6, you would see we had a couple of calorifiers, which were offline, and some of the calorifiers, even in the energy centre that seemed to be back up and running still weren't achieving the full temperature we would have expected to see. So, therefore, it's the entire assessment that we did on those calorifiers.

Q So it is more than just a one-day thing?

A Yes, it's not just a single snapshot in time.

Q Okay. If we could go on to the next page, please. On the top of the next page, do you see how the third line down:

"The cold water temperatures recorded by DMA vary considerably, with the majority being more than 5 degrees higher than those recorded in the water tanks and the peak temperatures of 30 degrees being noted."

A Yes.

Q Now, I wanted just to check, firstly, is that an observation about the whole inspection or about just this event on 21 April?

A No, that's referring to the cold water temperature, so that wouldn't really have been impacted by the events of 21 April.

Q Okay. What is the problem having peak temperatures of 30 degrees or 5 degrees over?

A There are two things there. The 30 degree temperature is telling us that you've got a lot of heat gain in the system, so the cold water-- In January, we would normally expect to see the cold water temperature coming into the building around 7 or 8 degrees, if not even a little bit colder, and so, all of a sudden, we're going from that and we're recording temperatures at outlets which are 20 degrees higher.

Q Now, I know you do not design water systems.

A Yes.

Q But, in general terms, what are

the sorts of methods by which cold water can gain heat in a building like a hospital?

A Lack of use, be it running within risers beside heating pipework . Just-- If the building's warm and the water's not being used, it'll just come up to the ambient temperature of the building, and it is quite a warm building.

Q So it is a series of different possible causes, some of which are potential design issues, some of which are just operational?

A Yes.

Q But all you are doing is flagging this?

A Yes. All we're doing is flagging that we're seeing there's heat gain on the cold water system, and it's getting up-- when we get to 30 degrees, it's coming up into the range where legionella and other bacteria can grow.

Q The next sentence, "Additional control measures" onwards, I read this as you observing this might be related to the fact that, at this point, the building was not fully occupied.

A Yes.

Q And could it be that this is just a passing thing that goes away?

A Based on my experience of what happened after, when we went back and looked at the building a couple of years later, a lot of the cold water temperatures were within parameters,

and so it could just simply be that the building wasn't in full use, and when it went into use and knew the throughput of water that we needed, it brought the temperatures back into light.

Q Now, we've have discussed a lot about temperatures, both in the hot and the cold water systems. Were you, at this point, shown temperature records from sampling being-- or data collection systems for the hospital that could show you what the temperatures were over days you were not there?

A We-- As a reference at the very top of it, we did see some records from the commissioning phase and by the state staff, and our temperatures appeared, according to my statement. I can't remember, but our statement says that they are in line with what we were saying with the records that were provided to us.

Q Okay, that is helpful. Now, would you take our own temperatures beyond these ones on the day-- I will rephrase that. You obviously took some temperatures.

A Yes.

Q If you see out-of-range temperatures, does that cause you to go back and check again and again and again, or do you just warn people?

A Because of the size of the building, there was no option for us to go

back and redo temperatures over and over and over, so we highlight that we are seeing these temperatures, and if you go to section 7, you'll see the amount of temperatures we took, and therefore we highlight that-- If it was a single temperature, then we would possibly have went back and double checked it, but we were seeing this in multiple areas, and so it wasn't a one-off temperature that we saw out of spec. It was consistently across the building.

Q But, in effect, you are really a warning system here.

A Yes.

Q So you are just saying, "Here is a problem," and somebody else has to fix it.

A Yes.

Q Right. Now, I would like to jump forward to page 141, if that is possible, which is the second page of your section 2, Mr Watson. So I would like to understand a little bit more about your risk categories because we are going to come across them a bit more as we go through this document. Now, firstly, this table here, is this your creation or has it come from somewhere?

A It's been adapted from other documents, but it's our table that we have adapted from other----

Q And what are you trying to achieve by using this sort of language

and these descriptions and providing this detail?

A What we're trying to do here is, when we make a recommendation, we're trying to prioritise for the NHS what are the issues that we've identified that we think we need with in the order and how we prioritise----

Q Okay, so let us look, just because it is at the top, at "Remedial action – Category 1," and obviously we can read that, but when you say, "Senior management action required," who are the senior management, in your mind?

A That would be-- If you go back to the table you had, that would be, like, the responsible person.

Q Responsible person?

A Yes.

Q Right, okay. Now, the next-- In the fourth line of that category-- third line, sorry:

"Recommendations within this category should be carried out immediately/as soon as reasonably practical."

A Mm.

Q What do you mean by "as soon as reasonably practical"?

A As soon as you can physically get to fix that problem.

Q And so you are trying to give an impression of urgency?

A Yes.

Q Right, and indeed that is the title of the second category.

A Yes.

Q From your experience in 25 years, do people ever have any difficulty understanding these risk assessment criteria?

A Not significantly, no.

Q Now, we are going to now walk through the report, and I worry now that you are on the wrong pages, so I think what we might have to do is ask you to stick to the screen----

A Okay.

Q -- unless you feel strongly about it. Could we go, please, to page 146? Now, I picked on this page because it had a lot of red in it, and I wanted to understand what you are saying. I am not particularly going to drill down into which plant room that is and where it is going. It is more to understand the message you are trying to get across. Could we look, perhaps, at the first row? So you have got a narrative here in recommendation, and is this one of those ones that was out of spec on 21 April?

A Yes, it was. You can see it's actually a bank of calorifiers.

Q So it is three in a row?

A It's three calorifiers. The way the calorifiers are set up on site, each of the calorifier-- it's a bank of three

calorifiers feeding an area.

Q Yes.

A They're all set up in the same way, so where we refer to "O1, O2, O3" in that way, it's us really saying that affects that entire calorifier bank.

Q Okay, and so this particular one, you have identified an out-of-temperature issue, you flag it as important and you have explained why, and you have gone back on 27 April?

A Yes.

Q Right, and therefore it still requires action?

A Yes. It's saying-- If you look at the bottom, they're saying the central calorifier, which would be number 2, the temperature was still lower than we would have expected to see.

Q Right, and that is indeed the next row.

A Yes.

Q So you have provided more detail?

A Yes.

Q I get the impression, from reading this, that the remedial action categories are trying to draw the eye, and this is where you find out the detail.

A Yes.

Q Right. Now, if we could just----

A Sorry, can we just explain?

Section 2 of our document is where we collate all the recommendations we make

going through the document, and we try and collate all the recommendations together into this one document---

Q Well, that is why I am going there because I thought that was helpful. What I wanted to do was to go forward to page 146. So this appears to be a repeat. Oh, it has already been there. Sorry, 147. 147. So, effectively, is this you doing the same thing for the next few calorifiers?

A Yes.

Q Right, and what is it you want the man-- the authorised person or the Estates people or the duty holder or the responsible person to do when reading this table?

A We would be looking for them to understand what caused the problem and are they able to put something in place to prevent the problem happening again or, if it does happen again, that it gets automatically flagged to them that there is an issue.

Q Right. Now, there is a few things that seem important which I hopefully do not need to take you to, but it, I think, confused us. We should have asked in your statement, but we did not. You talk about pipe screens at various points.

A Pipe screens?

Q Now, can we go to the foot of page 144? Or screened vents.

A Yes.

Q Second-bottom row. I think if-- Yes, stay out of it. That is probably better. What is a screened vent?

A It's basically just a mesh that you put across the overflow screen or the warning pipe screen which prevents any insects or anything crawling up and getting into the water.

Q And what is a warning pipe?

A It's like a mini overflow which, before the water tank would overflow and flood the area, would just give you a warning that you were getting to the point where the tanks are close to overflowing.

Q I think we probably should have known that without asking you today, but it is helpful to get the answer. Insects crawling in: is that a real risk with pipework in a domestic water system?

A We've seen birds and rats sitting in water tanks, and they'd drowned in the water tanks. Not in a hospital, but we've seen that in----

Q But it is a risk you have to manage?

A It's a risk you have to be aware of, yes.

Q Right, okay. Now, on the same page – and I am not going to take you to the row unless you need it – there is discussion about single-entry expansion vessels.

A Yes.

Q Now, could you explain your concern about single-entry expansion vessels? Because you mention that repeatedly throughout the document.

A Are you able to scroll to it?

Q Yes, I think it is a little bit further up. No, it is the next page, sorry. Page 145, second row. So what is your concern about these expansion vessels? I know it has only been graded a 3, but you do mention it relatively frequently.

A What we're looking for on expansion vessels is the water should enter the bottom of the expansion vessels. It's there to take up the expansion within the water.

Q So as water heats up, it expands?

A Yes. These ones here are relating to the cold water storage tanks, so they would technically be accumulator vessels rather than expansion vessels, but it's just, as the water expands within the system, it just takes up that expansion within the system, and the water should enter through the bottom and exit through the top so that the water's always flowing through it. The way that it's normally done is the expansion vessel sits off on a dead leg to the side, and there's a lot of times where the water stagnates within----

Q So, effectively, your concern is that these ones – both in the hot and cold

systems – were on a side arm----

A Yes.

Q -- and water expanded into them and then comes out or sometimes does not?

A Doesn't generally come out. The one with the accumulator vessels, there's a-- Our plumber, Graeme, would-- he would advise me that it's very, very difficult to fit a flow through accumulator vessel.

Q But it is possible to fit expansion vessels----

A Expansion vessels in the hot (inaudible)----

Q Which is not this section.

A Sorry?

Q Which is not this page. I am on the wrong page for that.

A Yes. On the calorifiers, they were actually swapped out in 2019 to be the flow through vessels.

Q Well, that was going to be my question. So, just to recap this, in the hot system, there were single-entry expansion vessels----

A Yes.

Q -- which have now been, in 2019, swapped out, as far as you understand it.

A Yes.

Q Right, that is very helpful. Now, we want to go to page 155, please, and I want to talk to you about chlorine

dioxide, which you mentioned earlier. Now, you mentioned earlier that the water system's primary means of control was temperature, and I asked you about alternatives and you mentioned dosing systems and you said chlorine dioxide. So, in the third row of this page, you have described-- Or could you read out the recommendation box for the third row?

A

“Due to the temperature deviations from the control parameters noted during the commissioning and handover phase and out-of-specification NHS microbiological sampling results, DMA would recommend fitting supplementary control systems (e.g. background dosing such as chlorine dioxide) in order to maintain microbiological control and/or biofilm monitors (such as BioSense sensors/controller) to assist in focusing remedial actions on to identified areas of microbial activity.”

Q Now, there is a lot in there, and I want to just take you through that before we have a break. Firstly, you are mentioning chlorine dioxide here in this report in 2015. The hospital does not actually fit one until 2019-- '18, sorry.

A Late '18.

Q Late '18, early '19. So,

because you are early, I am going to ask you lots of questions. Firstly, just in passing, what is a BioSense sensor or controller?

A They were sensors that we were being-- we had guys trying to sell us them at the time. I don't think we ever actually fitted them, but they were a way that you could actually install a probe into the system, and they would allow biofilm to form on them and then it could give you an indication as to how much biofilm was going to grow on those sensors and that gave you an idea----

Q So it was almost an electronic means to record biofilm?

A Yes.

Q Now, you didn't buy any, but you were just----

A We never actually installed any; it was just people were advising that these were available on the market, so we said, you know, "These are an option that you could consider."

Q I see, so let us focus on the rest of it, then. It seems, from a lay person, it is unusual to suggest this, so why are you suggesting it at this point?

A Because we were seeing quite a lot of temperature deviation away from what we would hope to see based in the SHTM and the L8 guidance, and therefore we would want to put additional control in place to help prevent

microbiological growth. We've installed chlorine dioxide in a number of buildings, including at the Southern General at the time. There's a couple of other buildings where we had chlorine dioxide installed.

Q So that is in the retained estate?

A Yes, and the results from that were very good, and so therefore we were just saying, "This is an option that you should consider in order to help"----

Q Now, I want to show you a section from SHTM-0401, Part B.

A Yes.

Q This is bundle 15. Do not get rid of this page, but we will stick it in front of it. Bundle 15, page 337, which we were at before. I will make sure I am in the right place. Yes, so this seems to be a section in SHTM-0401, Part A, sorry. Are you familiar with this document? And do you see how 15.1 discusses wholesomeness in water----

A Yes.

Q -- in the first paragraph? And then there is a second paragraph. I wonder if you could read it out and I will ask you about it.

A

"The introduction of chemical treatment to the potable water supply is an admission that the physical installation and/or

management process is incapable of maintaining that water supply in a wholesome condition."

Q Now, to the extent that you have expertise in this – and if you do not, please tell me that you do not – would you agree or disagree with that view expressed in the guidance?

A I wouldn't fully agree with it. Sometimes I think it's good to have it there as a belt-and-braces approach.

Q Right, and so why would you not fully agree with it?

A You can put it in as a precaution to help manage the water system. It doesn't necessarily mean that you have completely lost control, but if you install it-- and actually, if you go later within the document, it talks about that this is an option which could be considered for new buildings.

Q So when you recommended this, were you seeing it as a precaution or as an admission----

A A bit of both. We were already seeing some issues with the water system and, therefore, if this was introduced at that point, then it could help manage the water system.

Q So it was a bit of precaution and a bit of admission, really?

A Yes. We'd already seen some temperatures out of spec, yes.

Q Well, if you could go back,

please, to the bundle 6 page we were on before, I want to just look at the middle row on this page, "Domestic hot water systems," before we have a break. Now, I just want to check: this is not discussion of the 21 April issue? This is a different-- is it a different problem or the same problem repeated?

A It's the distribution temperatures. That's what we're seeing at outlets.

Q So this is where you are measuring the temperature, effectively, at the tap?

A Yes.

Q Or rather at the temperature-mixing element within the tap?

A (Just prior to that.

Q Just prior? How would you get that sample?

A If it's a direct hot tap, you physically just turn the tap on and you can measure the temperature of the water coming out. If it's feeding a thermostatic mixing valve, then we would take the temperature directly from the pipework prior to the mixing valve.

Q So you would actually go and attack-- there will be a sampling point, would there?

A It's just on the pipework, and we've just got contact probes on thermometers.

Q You just measure the

pipework?

A Yes.

Q You do not touch the water at all?

A No.

Q Excellent.

A You need to run the tap in order to get the hot water drawing through to the tap, but we-- and we would have recorded the temperature at the tap because that's how we'd get the cold temperature and the blended temperature, but to get the hot at the TMTs, then there's no way that---

Q Is this another example of an area where method statements are important?

A Can be, yes.

Q Yes, okay. Now, I think probably we can go on a little bit further, I think. Could you go on to page 163 of the bundle?

THE CHAIR: Just before we do that, Mr Mackintosh, we have been looking at the third row----

MR MACKINTOSH: Can we go back to 155, please?

THE CHAIR: Yes, on----

MR MACKINTOSH: 154.

THE CHAIR: 155.

MR MACKINTOSH: 155, sorry.

THE CHAIR:

"Due to temperature deviations from control parameters ... and out

of specification NHS microbiological sampling results...”

Now, it may be that you are going to come back to that.

MR MACKINTOSH: I can deal with it here and I probably should do.

THE CHAIR: My question, really, is what Mr Watson was told or carried out or did.

MR MACKINTOSH: So, Mr Watson, you have explained in terms of temperature readings that you had access to some temperature readings done as part of the commissioning and by Estates.

A Yes.

Q What are these microbiological sampling results that you are just touching on here in this box? So this is page 155, which is page 2 of 41 on your system, and it is the third line of the third box.

A We were advised that the NHS, when they were doing sampling across the building for the different departments being ready to move in-- we were advised that they were recording some samples were coming back out of specification.

Q Okay. Well, there is probably one more thing before we break, which is, when we come back, I am going to ask you about what contamination means in the context of the water system, so while

you are having a cup of tea or a coffee break, have a think about that and we will put them up after a short break.

THE CHAIR: All right. As I said, Mr Watson, we will take a break to allow people to stretch their legs and have a cup of coffee. If we could try to be back by quarter to twelve.

(Short break)

MR MACKINTOSH: Mr Watson, before we stopped for the break, I asked you to think about what it means to say that water is contaminated.

A Yes.

Q And I was thinking about how to structure the question, and it occurred to me that, from your point of view, does the question, "What does it mean that water is contaminated?" have a different meaning in different contexts, or is it always one thing in your own mind?

A It does have a different context for us. When we talk about water being contaminated, we would think of that as something artificially being introduced to the water system. So when we talk about bacterial contamination, we would talk about colonisation of the water system, because these are naturally occurring organisms and they're growing within the water system, so----

Q So you are talking about

quantity?

A Not necessarily, like, if we think about contamination, that would be if a chemical gets drawn into the system.

Q Well, let us go back and start with legionella.

A Yes.

Q So, you have mentioned that legionella is naturally occurring.

A Yes.

Q When is it that you would say, if you ever would, that a water supply was contaminated with legionella?

A We would refer to it as colonised.

Q Colonised?

A Yes.

Q So you would not use "Contaminated" to talk about microbiological things?

A No, but the terms do sort of become interchangeable.

Q Right, well, we will come back to that problem next.

A Yes.

Q Let us talk about when you would use "Contaminated."

A Yes.

Q So would you use "Contaminated" for a chemical that should not be there?

A Yes.

Q And if you-- if someone spilled a chemical into a raw water tank, then it

would be contaminated?

A Yes.

Q Would you use "Contaminated" to deal with solid objects like sponges or pigeons or----

Q I don't think we would use that terminology. If we see something in the water tank, we wouldn't say that it was contaminated. It's not the terminology we would use. We would just describe it as "There are objects in the water tank."

Q So, your world of legionella L8 assessment, "Contaminated" is generally non-biological?

A Yes, but----

Q But "Colonised" is the word you would prefer to use for the biological stuff?

A Yes, but they can sometimes be interchangeable----

Q Right.

A -- but in my head, that's how we normally separate them.

Q Given that you said in your early part of evidence that legionella is naturally occurring----

A Yes.

Q -- when, from your point of view, does a water system become colonised/contaminated with legionella? Is there a threshold in your mind?

A Effectively, we would consider it colonised when we pick up in microbiological sampling in any level, we

would say----

Q At any level?

A -- at that point, we now have legionella in the water system and we should address it.

Q So when it comes to a question that I might ask you, I will ask you a question and I will ask you whether you are the right person to answer it.

A Okay.

Q And if you do not think you are the right person to answer it, I will go and find the right person.

A Okay.

Q So we were just looking at the document we were just looking at, page 155, and we said-- and here, you have used the word, "Out of specification, NHS and microbiological sampling."

A Yes.

Q Now, I am assuming you would not have set the specification?

A No.

Q No, and you are not a microbiologist?

A No.

Q And presumably, those were not legionella pseudomonas samples, as far as you remember?

A From memory, there were----

Q Page 155, my Lord.

A Sorry?

Q Page 155.

THE CHAIR: Yes, I have got 155.

MR MACKINTOSH: Yes, okay.

THE CHAIR: I was just reminding myself whether there was a reference to pseudomonas or legionella and there is not.

MR MACKINTOSH: But from memory, what do you think it was?

A There were samples, I don't remember pseudomonas samples being taken as part of the handover phase, but I remember there were legionella samples and there were also portable water samples taken.

Q Right, but you are just being generic here?

A Generic there, that the NHS had identified to us that they had out-of-specification results.

Q Are you-- So, either would you not do it, or are you the right person to describe what that out-of-specification as "contaminated", or is that just not how you talk?

A We wouldn't say that's a contaminated water system; it's just not the terminology.

Q Not the terminology. We will ask somebody else. That is really helpful. Let us move on to-- could you please go to page 163 of this document? I just want to touch in about the trades system----

A Yes.

Q -- in the fourth-- fifth line down

of this page, where you talk about bib taps, irrigation points and 12th Floor Heli-pad fire suppression system. Now, why would it be necessary to flush and worry about the trade system? It is not going into people or anywhere near them, presumably?

A When you've got bib taps, then you can connect hoses onto them.

Q Sorry, what is a bib tap?

A Bib tap's basically just a-- like a garden tap.

Q Right.

A So if you put a similar type of tap into the plant rooms, people then connect hoses on them, can use that water, and if people spray that water around and it's-- there's legionella in it, then that creates a risk.

Q You were about to say contaminated, were you not?

A Probably was, yes.

Q Right, okay. The-- but the point is this is a-- you are worried about how this might be used, as it were, out of design?

A Just the design of it?

Q Yes.

A This is something that people will use if people are working in plant rooms like us, and if we needed water for any reason, you could go to this bib tap and if there's-- you know, if we have water that's got legionella in it, then that

creates a risk to the trades people working on site.

Q Very helpful. Thank you. Could we go to page 165? This is more to remind you because I think you probably do this from memory. What was your concern about EPDM flexible hoses?

A EPDM hoses, they've kind of got like a rubber inside them. They're generally metal braided hoses with a rubber----

Q And where are they used?

A They're used to make connections on to taps from the hard pipe.

Q So you would see them under a sink often?

A Either under a sink-- yes, you would see them under a sink or, like, under a bath connecting that up. So they used them to connect up some of the fittings on the water system.

Q And your view is they should be replaced?

A It's not just my view, it's-- The NHS put out a guidance note – I can't remember the number of it – but there was a guidance note issued by the NHS to say they shouldn't be fitted unless-- under specific circumstances.

Q And what is it about this rubber lining that is an issue?

A It tends to-- you get

microscopic cracking in it and it allows bacteria to get into the microscopic crack and you can't flush it out, you can't disinfect it out, and it just becomes an area where microorganisms can live and then seep into the water system.

Q Okay. Could you go to page 196, please. Now, I am going to use this page. It may be the wrong place, but to ask you about low turnover-- I am just checking I am on the right place. Low turnover pipework. I mean, there is a lot of discussion in your report. It is in the middle of the-- I think I am in the wrong page, but I think I can ask you the question without going to the page. In the report, you mention concepts of dead legs, and you discuss low turnover pipework, and it is quite a repetitive theme.

A Yes.

Q What was your concern in 2015 about such low turnover pipework/dead legs in the hospital?

A What happens when you've got low turnover like that is the water within that pipework will rise or fall to ambient temperatures, which will generally be mid-20s, and then that goes into the temperature range where microbiological growth can occur, and so therefore that runs the risk of us----

Q And what is the-- other than simply removing-- other than simply

removing those sections of pipe wear, which might not be possible----

A Yes.

Q -- what is the other way of managing that risk?

A Put them onto a flushing regime, where a couple of times a week is a minimum and make sure that the water is pulled through and the water is replaced in that. (Inaudible).

Q And that is literally a member of Estate staff goes to that tap, flushes it for a certain amount of time?

A Yes.

Q Would ward staff do that sometimes or----

A It's within the hospital, they split it across facilities, sometimes clinical, sometimes us acting on behalf of the Estates that we carry out the flushing regime that's required in various different areas.

Q And would that be part of a plan?

A Yes, it's documented that this is required.

Q Is that plan preventive maintenance?

A Yes.

Q It is, right. Can I ask you to look at your-- this is about the bypass, which we have already discussed.

A Yes.

Q So, you gave some evidence

early on about a bypass pipe that you found when you first went to the site----

A Yes.

Q -- and had been removed after a bit, but you did not know who had removed it.

A Yes.

Q In your statement, question 57, which is on page 25 of that bundle, I just did not understand the answer-- you have gone too far. There we are. Third question down.

"Describe the issues, if any, associated with the bypass pipework mechanisms at the Hardgate Road mains."

And you said:

"The bypass was a temporary installation which bypassed the filtration plant, which DMA understands was a control measure for the water system, introducing unfiltered water into the system."

I simply want to know why would you want to do that? What is the reason? Why is it a control mechanism to introduce unfiltered water into the system?

A The filters were put in for a purpose, to take particulate out from the raw water tanks before they're fed to post-filter tanks, which means that we have less particulate coming into the tanks, which can then feed through into

the water system, which reduces the potential for microorganisms having anything to use as a metabolite to grow.

Q Ah, right. I understand that. That is very helpful. Thank you. Right. Now, what I want to do is go back to a flushing regime issue. Could we go to-- did you just supply Mr Powrie with a sample document for a flushing regime as part of this exercise?

A I believe we did.

Q Could we look at bundle 25? It is an email. I have gone and not written down the page number, so-- Sometimes the plans just do not work out. It is from 16 January 2015, page 719, please. No, that is the written scheme one. So I think what we will do is I will pass over that. I might come back to it. I think there is a-- 16 January is a different document. Yes. So what I want to do is ask you about the Horne Optitherm taps. So, these are the taps that had the mixing system inside the tap that you were talking about earlier?

A At the clinical outlets, yes.

Q Yes.

A There's different ones for different outlets.

Q Now, when you visited the site in 2015, were you aware of any requirement to carry out planned preventative maintenance on the taps?

A Yes, TMVs, or TMTs as they

are, should be serviced periodically.

Q Did you see documentation that is set out when that should be done and how frequently?

A I think document DOA and within the SHTM, it gives guidance as to when that should----

Q No, I realise that, but did you actually see a plan?

A No.

Q No?

A Sorry, I misunderstood.

Q Yes. If we can go back to page 748 of the bundle, please. Yes, sorry, this was the thing I was desperately trying to find out. This appears to be an email from you to Mr Powrie on 16 January, providing an example method statement for flushing. I am assuming that that would tend to suggest there was not one at the time, if you were providing a----

A I'm going to guess that would be the case but I can't remember.

Q Yes. Now, were you also asked to provide an example management structure for the hospital?

A We provided that within the previous email you pulled up, there was guidance to the written scheme, and within that, we provided templates for it.

Q So, you provided templates for a flushing regime, for a guidance system, for the written scheme. From your point

of view, as a person who assesses the L8 risk in hospitals, is it usual to be providing these documents to health service organisations?

A It's not unusual.

Q It is not unusual?

A It's not unheard of.

Q Not unheard of, okay.

THE CHAIR: Just for my note, Mr Mackintosh, two templates provided: one for a written statement----

MR MACKINTOSH: A written scheme----

A Sorry, written scheme, yes.

Q -- and a flushing regime and a management structure, Mr Watson, those three.

THE CHAIR: Thank you.

MR MACKINTOSH: The management structure is page 718, and the written scheme page 719. What I want just to check with you at this point is-- We have gone to various emails between you and Mr Powrie. To whom did you report the results of this risk assessment from 2015?

A Ian Powrie.

Q Ian Powrie, and could we look at page 354 of bundle 6? So, this appears to be a table that you have included in the report headed "Additional roles responsibility during the phased occupation period."

A Yes.

Q Why are there so many blank spaces in it?

A Because nobody gave us the names to complete the table.

Q All right. When you reported the report to Mr Powrie, how did you do that?

A What, how did we deliver it?

Q Did you deliver it verbally, by email, post, or----?

A The entire report, or----?

Q Yes, the entire report.

A The entire report was delivered by-- I believe it was Darren Waldron, who worked for us at the time. We printed off a couple of copies of the report and we also burned them onto a CD – how old it was – and they were delivered by hand to Ian.

THE CHAIR: Just so I am following that, so you would have a hand delivery of two paper copies, plus the report burned onto a CD?

A Yes.

Q Right, thank you.

MR MACKINTOSH: If we go to page 706 of bundle 25 – this is why I am trying the patience of my colleagues behind you, I think – this appears to be an email from Allan McRobbie to both you and David Watson (sic) on 6 May 2015 reporting that Darren will deliver a draft copy of the Legionella Risk Assessment and Pseudomonas Report in

two minutes' report to you this afternoon. Do you see the section that heads, "The information and recommendations reflect our recent conversations with you, Jim, and Mel"?

A Yes.

Q So, were you involved in these conversations that Mr McRobbie is referring to?

A As we were on-site doing parts of the risk assessment, we would catch up regularly with, particularly, Ian, to tell him what we had saw on-site that day and if there were any issues, so there were ongoing conversations all the way through.

Q And would Jim be Jim Guthrie?

A Jim Guthrie and Mel McMillan.

Q Mel McMillan. Now, there has been some suggestion, in paperwork we have seen which might come from other witnesses, that Mr Bratney was involved in this process. Is that something you recollect?

A Not in the initial risk assessment, no.

Q No? In 2015?

A 2015. I don't remember dealing with David at that time, no.

Q Now, what response would you have expected to have been given to your risk assessment by the Water Safety Group and Mr Powrie on its receipt?

A Response to us?

Q Well, how should they have reacted to that report?

A They should have read the report and then, ideally, they should have created an action plan to look into and investigate how they would go about correcting any of the recommendations we made. That's what I would have expected to happen.

Q Based on what you know now, did they do that?

A I have no idea.

Q Have you have you ever seen an action plan dated 2015? No? Now, this is obviously, I think, a question you might not be able to answer, but if you are a contractor brought in to carry out legionella and pseudomonas risk assessments, and you become aware of a client not acting on your recommendations, and I am not saying that he did in this case, but just in hypothetical terms, do you feel under any obligation to report that to anyone?

A We would try and encourage the client to act on the recommendations of our risk assessment, is what we would do, and we would escalate that, but at the time, for this report, we carried out this report and then we had no involvement with the adult and kids' hospital. After the report was handed over, we had practically no involvement, and so our

understanding was they were managing that, building the water systems, in-house.

Q So, did you have any further-- We have got some correspondence to show you. Could you look at page 684 of bundled 25? So, this bears to be a letter which I think your company supplied the Inquiry with.

A Yes.

Q I think it is not from you. If we go into-- What?

A I think it was from Allan.

Q From Allan, yes, and it is dated 9 June 2015. That is about a month after you produced your report.

A Yes.

Q What is the purpose of this letter?

A I think if you go to the back of the letter, we did a gap analysis on their management scheme.

Q Yes.

A And so that was Allan.

Q We can see that in the middle of the page, can we not?

"Gap analysis as advised by Estates managers in meeting on 28 May."

A Yes.

Q So, this meeting on 28 May, do you remember this meeting?

A I can't remember if I was at the meeting or not. It might tell you within the document whether I was.

Q We will go and look a little bit further forward, but this appears to be a quote.

A Yes. What Allan did-- We're a business after all, so what Allan did at the end of carrying out the gap analysis and us doing the risk assessment, was we provided costs for the NHS if they wanted to take up our offer of assisting them with managing the water system and carrying out a lot of the PPM tasks which we'd identified were necessary. So, it was us providing a quote to carry out----

Q And this is the plumbing side of your business, is it not?

A No, no, this is-- We do the consultancy, which is the risk assessment, but we also take on-- this would be-- L8 monitoring is probably the best way of describing it. So, it's us carrying out the basic PPMs. The plumbing sits separate and that's physically changing water systems.

Q I see. So, this is not, for example, changing the expansion vessel, this is just flushing them?

A Yes.

Q Right. Could we scroll through this document onto the next page, and you see some of the consultancy fees and the sampling that you are offering to do.

A Yes.

Q Then, plumbing works, some

discussion there, at the bottom of the page, that you are offering to discuss, and then we go to the next page and we have Mr McRobbie's signature. The next page in our bundle appears to be the next page of the document, which is a summary of management tasks, and this is effectively what you are offering to do?

A No, this is the gap analysis that we carried out for-- on the management system and the PPM regime.

Q So, this was carried out on the 28 May meeting?

A Yes, if that's the date Allan referenced, yes.

Q Yes. So, we can see there everything that has not been done that should be done in your company's eyes?

A It wouldn't be just us making that decision. We would have asked, "Can you show us this?" and if they are not able to provide it, or if they physically told us they weren't doing it, we would record that. It's not just us making a decision.

Q So, this sounds like quite a-- I mean, I know you do not remember being there, but just in general terms about gap analysis meetings, this sounds quite an involved dialogue of some sort.

A Yes. It's basically taking all of these questions we have and sitting with the Estates managers and asking them to

explain what they're doing and showing us the records that things are being carried out so that we can see "Is the management system in place, and is the PPMs in place, and therefore is the water safety guide-- plan being actually implemented as it should be?"

Q Okay, so----

THE CHAIR: Right, just so that I am following-- I think it is quite clear from what you have been saying, but you describe this as a "gap analysis." It is a list of things which either you consider have not been done, or you want to know if they have been done, and it is phrased-- I mean, there is a question mark at the top the right-hand side, so it is phrased as a sort of list of questions directed to GGC Estates?

A Yes.

Q Thank you.

MR MACKINTOSH: Indeed, if we go on to page 689, for example-- Oh, something exciting has happened. This may mean we are going to have a-- Oh, it is back. Right, yes-- No. Well, what we will do is I will let my colleagues fight the software and I will ask you a question. Oh no, here we are, I have got it here regularly. Right. So, the second row:

"Daily check the flow and return temperatures on the domestic hot water calorifier systems using the temperature gauges fitted or a suitable surface

temperature probe – required until such times as Estates staff have full access to BEMS system."

What is the BEMS system?

A Building Engineering Management System.

Q Some sort of computerised checking system?

A Yes. It's where they'll have sensors or whatever around the building feeding information back, giving the temperatures of the calorifiers, etc.

A Tends to suggest, on 28 May 2015, they did not have access?

A They didn't have access certainly when we did the initial part of this, but there was a point where they advised us that they did have access, but I can't remember the exact date.

Q I see, but that was not the reason I came to the line, which is-- your entry in the right-hand column is this is being carried out "regularly" by NHS Estates, although no record of this was being maintained. Why is that an issue, that sort of approach to management of the water system?

A We're just not creating a record that we're actually having those calorifiers or temperatures checked on a daily basis, so how would-- We would want to see that that is documented and recorded, because otherwise, how do we know whether somebody had done it

yesterday or the day before and how often it's being done? So, we would expect to see something there to say, "Yes, this has been checked on the day"--

Q Well, I am not going to go through this whole document, but what I will just check is that, if this is attached to Mr McRobbie's letter, this is your business' records of that meeting?

A Yes.

Q All right, thank you. Now, I want to just move on to see what happens after the 2015 risk assessment. So, after 28 May, did you-- Well, we have some understanding that you might have carried out some decontamination work in Ward 4C in 2016.

A I believe it was 4A.

Q 4A. Ah, right. Well, that may be why we are confused. Who asked you to do this?

A I believe it came from Jim Guthrie.

Q Jim Guthrie, okay, and what was the method used?

A We isolated the water supply to 4A and we injected a disinfectant and pulled it through to all the outlets within the ward, left it for a contact time, and then flushed it all back out. We carried it out over a night shift.

Q And this would have been hydrogen peroxide?

A Possibly, yes.

Q Possibly, , but----

A It would be within our records what we used.

Q Right, but you did an exercise in 4A, not 4C. That is why I wanted to check. That is helpful. Now, the next question is, is that that sort of work was required in a new hospital remarkable or not remarkable, or is it something we should just-- Not remarkable?

A No, not especially remarkable.

Q Okay. Now, the next document I would like to look at is bundle 25, document 35, page 678. Now, this document is not word searchable in our system, we just have a flat JPEG of it, which may be why some people have not noticed it until recently.

A Okay.

Q So, this letter appears to be dated 8 November 2016, addressed to Mr "Coling." Could that be "Colin"?

A Colin Purdon.

Q Colin Purdon, and who is the author of this letter?

A It should tell you at the bottom.

Q At the bottom. We can scroll down, we will see who it is.

A -- It's either myself or Allan, here. So, it was myself.

Q Now, what are you being asked-- what are you providing your quote to do here?

A It's to basically review the 2015 risk assessment with a view to seeing what actions have been taken and are there any additional recommendations we would make in relation to the water system.

Q Would it be possible for someone-- Well, firstly, the letter has been copied to Mr Powrie, I see.

A Yes.

Q Do you recollect whether you spoke to Mr Purdon or Mr Powrie about this back in 2016?

A We wouldn't have sent the quote-- as it says, "As per your request," we wouldn't have just sent it without, you know, requesting to send the quote. So we obviously spoke to somebody, and they said they wanted to do an update of the references----

Q This is quite an unfair question, but I think I have to ask it.

A Okay.

Q Would it be possible for someone to receive your 2015 report, attend the gap analysis, receive all those emails about water schemes and flushing regimes, and then request, or be copied into a quote for request, to update the assessment and not know what was in the 2015 assessment, in your eyes? I need to press you because it is your report.

A Sorry?

Q Do you think it is possible for someone to do all this and not know what is in the report?

A If they didn't read the report, then it's possible they didn't, but had they read the report, then-----

Q They would have known?

A They would've.

Q Right. Now, we have come across-- we have a document which is updated written scheme from December 2016, which is bundle 18, volume 2, page 872. Now, this has your logo on the top right hand corner.

A Yes.

THE CHAIR: Sorry, that was bundle 2, document 18----

MR MACKINTOSH: Bundle 18, volume 2, my Lord, page 872.

THE CHAIR: Thank you.

MR MACKINTOSH: And it is document 111. (To the witness) Now, I am not going to go through this in detail. I just want to observe that I notice that there are now names against the standard jobs, and this appears to be dated the month after the quote letter we have just received.

A Yes.

Q When was the work done by DMA Canyon to assist in producing this report? Can you recollect that?

A I have no recollection of this document whatsoever when it was sent

to me and I read through it. I can't remember producing the document, but that wouldn't be unheard of because we produce documents like this on a regular basis and it was unremarkable at the time, but I don't remember producing----

Q So it could have been produced then or it could have been produced before. You just do not know.

A It could have been-- I would assume that if we're calling a 2016 update, it would have been produced in the weeks previous to that, so something like----

Q But you do not know?

A November, December of that year was when we would have done the work. It could have been done by Allan, and I wasn't involved.

Q I now want to move on to the 2017 risk assessment-----

A Okay.

Q -- which is in bundle 6, and it is on page-- it is document 30, 416. Now, looking again at the text below the picture, we have seen some dates. We see the dates of the site survey in September and October '17, and this gap analysis in January '18. Is that the same sort of meeting as we were discussing from 20-----

A It would have been the same process.

Q Same process. Right, and

then you set a recommended review date. Is that to redo the exercise or something else?

A That's when we would say that you should review your risk assessment to say, "Has it been-- Have you actioned the recommendations within the report, and has anything else changed?"

So it's just us saying, "You should review this document."

Q Because that is quite an acceleration. It is to one year, in fact, in this case. You had a report in 15, you were asked to provide a quote in November 16, you do this work in 17, and then you ask for a review within a year.

A Yes.

Q Are we to draw any inference about why you want to do that?

A By the time that this risk assessment was produced, there was already-- the incident happened which-- the incident which happened in 2A.

Q Yes.

A And so we were already aware of that. So we would have been saying that we would be-- for us it would have been more of a priority to make sure that your risk assessments were kept up to date.

Q So in-- I want to understand what you mean by the incident in 2a. So we are going to just check in on the dates here and get a clear understanding of

your understanding. So, are you saying that-- I will ask you what the incident was in a moment, but you are saying the incident that happened in 2A is before, or about the time of, September, October when you are doing the work?

A No. It would have been around the time of the gap analysis when I started to become aware of it, and this document would have been produced and handed over at that point.

Q So sometime-- Well, we can see the date of submission in a moment, but we will look at the date of submission. So that is the next page, or two pages on. Page 417. So, we have an actual submission date of April.

A Yes.

Q So, this knowledge about the incident in 2A, could that have been closer to April than January or-- Do you have a recollection?

A I think it was February, March we started to become aware of it.

Q Right, and how did you become aware of it?

A Because we were asked to assist in doing some disinfections and some sampling work.

Q So you had have been in the hospital in '15?

A Yes.

Q You had no involvement apart from the 2A-- the 4A disinfection we

talked about and then you had come back, and in 2017, you start doing site survey work and then you are in the hospital in the early months of 2018?

A Yes.

Q And that is when you become aware of-- So, what is the incident in 2A to which you refer?

A It's where they identified cupriavitis in the water system, and then we were asked do disinfections, and from that, then we were asked to do sampling around the hospital, and that's what we would refer to as the incident in 2A.

Q So, who was giving you-- Well, firstly, who instructed you to do this report itself?

A This report would have been--

Q It says Tommy Romeo.

A I was going to say it should be Tommy Romeo had done it.

Q Yes.

A Yes.

Q And who asked you to do the other work you have just described?

A Well, that was coming from the Estates department, a combination Tommy and Ian Powery, I believe.

Q Right. Now, at this point, when you carry out this exercise----

THE CHAIR: Sorry, my fault. Combination of Ian Powrie and----

A Tommy Romeo.

THE CHAIR: Thank you.

MR MACKINTOSH: Mr Romeo is giving evidence next week, my Lord. (To the witness) At this point – so that is September/October – what awareness did you have of whether the issues raised in the 2015 report have been actioned?

Q As I say, we had practically no involvement in the building between carrying out the initial risk assessment and the second risk assessment that you described----

Q So, when you go on site for your visits in September and October and you start doing the assessment, how do you then become aware-- Well, are there things that are the same as they were two years before?

A We're just physically seeing that dead legs that we'd identified were still in place and hadn't been removed. So, it's physically seeing issues that we'd identified.

Q Well, let us go and look at the executive summary at page 421. Now, of course, we can read this, and I do not want to go through the stuff we have already read because I see that some of the narrative appears in each report, but not unreasonably. It is the bottom half of this page I want to look at. So, there is a - fifth paragraph on the bottom:

“Whilst DMA were completing the legionary management gap analysis [so

that would have been in January 2018] we were advised that the Hargate main road supply was sat down due to operational issues creating a dead leg on the supply.”

Is that a new dead leg or one you had seen before?

A That would be a new one because that's referring to-- it looks as if we've referred the entire mains supply being shut off for some reason.

Q And the next paragraph, you discuss “A RHS”-- That is right-hand side?

A Yes.

Q

"Trades water tank appears to be isolated for approximately three years."

Is this the same tank that was isolated in the 2015 report?

A Yes.

Q And on page 424, the discussion of calorifiers. Now, when we talked about the calorifiers before, if I understood it correctly, you were describing two sorts of incidents. There was an event on 21 April when there had been a particular problem, and there were some wider issues that you had noticed.

A Yes.

Q Which of those two problems, if any of them, were still around when you back two years later? Or was it a

different problem you came back to find that I misunderstood?

A I think the temperature profile of the calorifiers was generally pretty good----

Q Right.

A -- but we were still seeing that the expansion vessels still hadn't been replaced.

Q These are the hot water expansion vessels?

A The hot water expansion vessels were still on the dead-like type system. They weren't changed to flow through, and some of the hot returns were below 55 degrees, which Brookfield had advised us was a control setting that they had advised.

Q But they are not as low as 40 or 45?

A No. I think they said they were almost always above 50 degrees.

Q Yes. Now, you carried out-- obviously, later on in this document, you have your risk assessment tables, and I want to just jump forward to page 429, the bottom of the page. So, there seemed to me to be fewer high risks than there were.

A Yes.

Q Without going through it line by line, because I don't think that would be a sufficient use of time, what were the sort of changes that you were and that you

weren't seeing between 15 and 17 in this-

A The calorifiers particularly, I was saying-- there were-- I don't believe any of the calorifiers were offline, creating the dead legs. I think the temperature in the stored water within the calorifiers was much better. It was generally 60 degrees and maybe a couple of exceptions. So, therefore, just the control around the calorifiers just seemed to have tightened up.

Q So that had tightened up?

A Yes.

Q Going thinking through all the different topics we went through before, dead legs, had that changed?

A We-- Most of the dead legs that we'd identified in 2015 were still in place.

Q The flushing regime, was that now----

THE CHAIR: Sorry, I just did not hear that. Most dead legs----

A Were still in place.

Q Still in place?

A Yes.

MR MACKINTOSH: Was the flushing regime now in place or----

A I think our gap analysis covers that. I don't believe there was a flushing regime for all those dead legs in place at that time.

Q Did you see a flushing regime

being operated for the Horne Optitherm taps?

A Those are just the taps that are in patient rooms. So, you wouldn't have them on a flushing regime unless the room was put out of use because the natural usage of the patients and the staff----

Q Because I recollect you saying something about how there'd been guidance for the Horne Optitherm taps. They required to be flushed and maintained. I may have misunderstood this morning.

A They were just the standard taps that are in the----

Q It is not an issue that worried you at the time----

A I maybe have mislead you.

Q No, that is fine. If it was not an issue that worried you at the time, that is fine. Can we go up that page to the big block of text? Now, this is this block where you have the historic information.

A Mm-hmm.

Q What I wanted to check in first here, and use this as an opportunity to check, is: were you seeing legionella in the water in this system?

A We were testing it for legionella as part of our risk assessment. Any sampling was carried out in-house by the NHS.

Q And this is where you

discussed the Cupriavidus infection-- test that you were seeing?

A Yes.

Q In terms of the management of the water system – so that is the PPM and the management system – how had your view changed between '15 and '17?

A They obviously started to put some things in place, but I don't think it was documented and in the structured fashion that we would have expected to see at that point.

Q Right. Now, I am going to go to page 428, which is back one. I think that is what you just said, so I probably do not need to go into any detail. If I just clarify that I have got all the points. The calorifiers are closer to being in range.

A Yes.

Q Some of the dead legs are still there.

A Yes.

Q There is not full information about flushing regimes. There is some of the written management documentation but not everything----

A Yes.

Q -- and, although there are still high risks, there are now more medium risks.

A Yes.

THE CHAIR: Can you give me that list again, Mr Mackintosh? I am afraid you were too quick for me.

MR MACKINTOSH: So the calorifiers are generally back in range.

A Yes.

Q The dead legs that were there in 2015 are still there.

A Yes.

Q The flushing regime is not being evidenced.

A No.

Q There is a written scheme and management structure, to some degree.

A Yes.

Q And the PPM-- I did not ask you. Is the PPM system running? Is a PPM regime up and running to a satisfactory standard?

A Again, there were some gaps in the PPM. If you look at the gap analysis, we identified some gaps in that.

Q Now, given that, at this point, they are in the middle of this incident that you have talked about, I think it might be helpful to look at the gap analysis in detail, which is on 597. So this appears to be a note of a meeting on 30 January 2018. So, this would have been before, probably, you knew about the Cupriavidus issue?

A Probably, yes.

Q And you have got-- reporting that Mr Bratley, Mr McAllister, Mr Romeo are present.

A Yes.

Q Would Mr Powrie have been

present, or is that a hint that he was not there and information was provided?

A If he didn't record him as being there, then he wouldn't have been there.

Q I understand that. Now, going through these things, the main issue I want to ask you about is record-keeping. So the second substantive line down, which begins, "Where Estates have advised..." why is not keeping records an issue?

A It doesn't demonstrate that you're managing the water system and keeping records of the systems in control or identifying issues where it's out of control or remedial actions are required and then acting on----

Q Is it possible that you could be managing it properly, you just have not recorded it?

A Yes, it's perfectly possible.

Q If we go further down the page, there's a suggestion – the third paragraph from the bottom – that the written scheme guidance 2015 has not been updated, and there is a general written scheme and the discussion of feedback. When should this all have been done, this written scheme having been completed?

A A written scheme should have been implemented as soon as the water systems were filled. From that point on, you should be managing the water system, so this would go all the way back

to the first water being put in during the construction phase.

Q And is there any reason why it would be acceptable not to do it promptly?

A I can't think of any.

Q Okay. Now, if we think back to 2015 – if you cannot answer this question, please do not answer it if it is outside your experience – to what extent do you think that the domestic water system in the hospital in 2015 complied with relevant regulations, guidance and good practice?

A I think, as we stated in our risk assessment, we highlighted there were some areas where it didn't comply, and we made recommendations in our risk assessment to areas where we thought some changes should be made to that water (inaudible)----

Q And in 2017, to what extent did it comply with relevant regulations, guidance and----

A The same. Obviously, we made recommendations.

Q Okay. Now, you then carried out another risk assessment in 2019.

A Late 2018, early 2019.

Q Yes, which is in bundle 25, document 11 it starts. It is on page 379.

A Sorry, I've got loads of documents here.

Q Well, the main page is 378,

actually. Now, have you had an opportunity to read this document recently?

A I've flicked through it, yes.

Q So what I am going to do----

A Kind of trying to pick out the pertinent points.

Q Yes. In order to be efficient, I am going to try to ask you some general questions. If you feel we need to go to the pages, we will go to them. Do not hesitate to tell me, but I do not want to go through the whole way because I think it takes too long.

A Okay.

Q So this report is issued in January '19, and you said that the work was started in 2018.

A Yes.

Q And in the previous year – that is 2018 – had your company been working in the hospital?

A What we'd started to do was, as I say, we'd carried out some disinfections in ward 2A, we got involved in taking microbiological samples on behalf of the GG&C and taken them to their labs for processing. There were point-of-use filters fitted to what the hospital designated as high-risk areas, and so we were fitting the point-of-use filters and the taps and managing that process of fitting them and replacing them as and when they were due, and

just over the course of 2018, the works that we did on site slowly increased.

Q Were you involved in the fitting of the chlorine dioxide system?

A No.

Q No. Were you involved in the fitting of a third filter?

A No.

Q No. So thinking about this report, who commissioned this report? It is on the second page of it, 379.

A Phyllis Urquhart.

Q So that is a different person?

A She was the compliance manager for the hospital at the time.

Q Right. Now, what I want to do is-- This report, to my eyes – and I may be wrong – seems a longer report with more information in it. Is that just a distortion of my mind as I have been reading?

A No, there is a bit more depth to this document.

Q Why is there more depth?

A Part of the reason is, when we get into the dead legs, one of the conversations we had – I think it was with Ian Powrie, but I may be mistaken – was, rather than us just identifying there's dead legs, for example, in plant room 31, he asked us if we could give real specific detail of exactly where that dead leg was so that it could be managed properly.

Q So removing any doubt?

A Yes, so there were things like that and we were just asked-- and there were some additional points we were asked to incorporate into the risk assessment.

Q So I want just to check what-- things that have changed since the 2017 report at this point. So, obviously, there had been some major changes in ward 2B, 2A after the decant in September '18----

A They did an upgrade of the water system, yes.

Q So the chlorine dioxide system----

A Was in the process of being installed.

Q -- had been done. There was some sort of survey of the drainage system had been done?

A We understand that, yes, there were----

Q But you were not involved in that?

A We weren't involved in that, no.

Q And there had been further disinfection work to wash hand basins and showers and drains. Have you been involved in those?

A We carried out disinfections in wards 2A, 2B. That was the only system disinfections we did. We were asked to assist with dismantling and cleaning

some drains and then disinfecting them, but that's now been taken back in-house by the NHS.

Q Okay. Now, when it comes to the Horne Optitherm taps, I wanted to understand when you first got involved in or became aware of the discussion about removal of flow straighteners.

A That would have been as part of this period. Maybe spring/summer 2018.

Q So if there had been some form of 2014 meeting to discuss the taps which had come up with a suggestion of how they might be managed, you would not have found out about that until----

A We weren't involved in any meetings.

Q No. In terms of the number of dead legs, how does that change between '17 and '19?

A They started to work through taking out some of the dead legs, like the ones to the steam humidifiers, which were never commissioned. I believe they were taken out and removed, but there are some other dead legs which are now just put on a flushing regime.

Q So the number reduced, but they are also flushing some?

A Yes, and I think the likes of the trade system, all the irrigation pipework has now been completely disconnected and the vast majority of the bib taps of

the trade system have gone. There's only a couple left on the 12th floor.

Q But if we go back to 2019?

A That would have been around that time.

Q Around that time?

A Yes.

Q Was there anyone who cleaned and disinfected cold water storage tanks?

A DMA did.

Q You did that?

A We did that.

Q And when did you do that?

A 2018. The summer, I believe.

Q And was that after the photographs taken of stuff that is in the tanks that was there before in '15?

A We took photographs in 2015, 2017, and then as we cleaned them in 2018, there was some debris in the tanks and we took some photographs of that debris.

Q And, from your point of view, was it the same stuff or different stuff?

A I believe it would have been the same stuff because I'm not aware of the tanks being cleaned between 2015 and us cleaning them in 2018, but I may be mistaken.

Q Okay. Now, we have already discussed the calorifier temperature – we do not need to look at that in detail anymore – and we have already

discussed the expansion vessels. Now, I want to just ask: in this report, if we go on 10 pages to page 387-- because I noticed in here this discussion about temperature gain in the cold water system.

A Yes.

Q You had explained to us earlier that, when you were on site in '15, some of that temperature gain might be to do with the unoccupation of the hospital.

A Yes.

Q And some of it might-- I suggest it might be design. By the time you get to 2019, the hospital had been occupied for four years. Are you able to help us about why there was still temperature gain?

A At that point, the reason we would expect to see temperature gain is maybe some areas not having a----

Q Can you say that a bit louder? Because I am----

A So, at that point, we would expect that to be caused by lower use of-- low use of the water systems, not having a high throughput of water, because, generally speaking, what we see is when you run the taps in an area, the temperatures do come down, but if there's areas or certain rooms where we're not seeing the temperatures drop, it generally indicates that the water's not being pulled through.

Q And so, although you do not

design hospitals, if there are places in the hospital where the water is not being used, is that a consequence of who is in those places or whether they are being used at all?

A It could be a combination of the ward, the type of patients there are, and if the person in a particular room is bedbound, they're not going to be using the water services as much.

Q They will not use the en-suite shower, for example?

A Yes.

Q Right. Now, I want to just ask you, because it is going to come up a lot, were you involved in dealing with HAI Scribes as an author at any point?

A (No audible response).

Q No. Were you aware of them being done, as it were, around you?

A Sorry?

Q Was your work subject to HAI Scribe risk assessments?

A If we needed to do anything like removing the IPS panels to get to pipework, then, yes, there was Scribes put in place, which is just a process that we have to follow in order for us to do our job, but we don't write the Scribes.

Q Was there any change in your experience or company's experience of the ability to access behind panels between 2015 and 2019, over that period?

A At 2015, we had free access behind the panels because there were no patients in the building, so we could effectively open anywhere we wanted because they hadn't cleaned the building to the hospital standard at that point.

Q And in 2017 did you open things?

A 2017 we were, again, restricted at that point as to what we could open.

Q So why would you need to take panels off to do your work as a legionella risk assessor?

A As we talked about earlier, the supply pipework to the TMTs is behind the panels.

Q TMT, you will have to help us again.

A Thermostatic mixing tap.

Q Thank you.

A Sorry. As we want to get the hot supply temperature to the actual tap, it's very difficult for us to record that without taking the panel off and getting access to the hot pipe----

Q Because the tap just penetrates the wall, as it were?

A Yes, the pipework comes down and connects in at the back of the tap, behind the panels.

Q So you have to physically remove the panel to take the temperature?

A On the Optitherm taps, yes.

Q Yes, and if there is a reason why you should not do that, because of the nature of the patient groups, you just cannot do it?

A Anywhere we do it, we have to-- we're effectively getting permission. Scribe is effectively our permission to take the panels off so long as we follow the instruction of the Scribe as to what we do and how we clean and put things back.

Q Got it.

A So it's more or less a part of our method statement for how we do the job.

Q If we could go to page 390. So this seems a much smaller version of a previous risk assessment page that we have looked at in earlier reports, and you seem to have given an overall assessment this time. I want to understand why you have assessed the water system control regime as high risk when you have described changes that you have wanted to happen taking place.

A Not all of the changes we would have expected to see. If you look at the gap analysis, etc.----

Q Yes.

A -- not all of the changes that we would have liked to have seen had occurred.

Q So not enough changes have

happened, so it stays high risk?

A Yes.

Q Okay. Could we go on to the next page----

A I'm sorry, and just as I state, there was an ongoing microbiological issue and therefore that would feed into our thinking of what would create a high risk.

Q Now, what I want to do now is to move on to work you have done since 2019.

A Yes.

Q In the year-- well, if we take the pandemic as a sort of major change in everyone's lives in March 2020, between the completion of this assessment – in fact, we can take this off the screen – and the end of February, beginning of March 2020, what work were you doing in the hospital then in 2019?

A There's a continuation of the work I described earlier: fitting and managing the point-of-use filters on the taps. We'd carry out microbiological sampling, we'd carry out tank cleaning and, over time, we assisted the Estates department to create a register of where all the dead legs that we had identified were and getting them onto a flushing regime. So there's a host of things that we do just----

Q So, again, it is about enabling the Estates department to do more?

A Yes.

Q And you have mentioned carrying out biological sampling or water sampling----

A Yes.

Q -- both in '18 and '19.

A Yes.

Q What is the mechanism for you to do that? Let us break it down a bit. So, were you provided with a method statement for each sample to take?

A We-- because of what-- the nature of our work, we generated method statements and submitted them on to the Estates department and that would have been passed to infection control and a microbiologist to see that our method statements met with their requirements.

Q And so let us just-- we will pick an imaginary exercise. You have been told, "Please take some samples from this particular room in this particular ward," in 2018.

A Yes.

Q And you come up with your own suggested method statement----

A Which is based on industry guidance----

Q Indeed, but----

A -- it's not just picked out our heads.

Q Exactly, but you-- let us imagine that you want-- so you might decide to do a pre-- a first flush or you

might wait. You do all the different versions. Would you do multiple ones?

A Sometimes, yes.

Q Yes. Would the method statement be different if you were trying to recover biofilm itself from if you are trying to carry just the water?

A Biofilm is very difficult to recover in a water sample because, by its very nature, it's adherent to the internal surfaces of the pipework and so, therefore, we-- when we sample, it's what's available in the water that we would-- that would be picked up in the analysis, it's not the biofilm.

Q So I was reading somewhere about the biofilm can go planktonic. Have I got that right?

A It can, but----

Q Is that just a bit too dramatic?

A It can do that, but it's very difficult then for us to say, "Well, that's biofilm we've picked up or it's just bacteria." We're only putting it in and they just-- the lab report back to us, "This is the bacteria and the levels that we found in the water," if they found any.

Q So, just to take a hypothetical example, imagine you have got a tap----

A Yes.

Q -- which is-- people are anxious about, so they want you to test it. Can you sample water from a tap without dismantling the whole system to recover

any biofilm there might be on the pipework inside, behind the panel?

A No.

Q No? All you can do is recover the water?

A We can recover the water and if parts of the biofilm slip off and come into that then it may be picked up by the lab, but there's nothing that we can do to say, "This will guarantee that we're sampling the biofilm." If we wanted to do that, we would need to open it up and either swab it or take sections of the pipework out and ship that away.

Q So there is very much a different level of intrusion?

A Yes.

Q Let us go back to microorganisms you know and understand, like legionella.

A Yes.

Q If you wanted to recover legionella for conventional-- your conventional testing that you normally do, what is the method you adopt for sampling a domestic water system?

A Most times for legionella, it's first-flush samples that are taken in the initial instance, which is basically you turn the cold tap-- With the Horne Optitherm, you would put the cold lever on and take the first flush of water.

Q And that is what is in the tap?

A That's what's in the tap in the

first section of pipework behind the tap.

Q Right.

A So we would take a litre of water, and we would then let it run for a few seconds so that we can record the temperature. If we have chlorine dioxide, which we do now, we would then measure the chlorine dioxide at that point after we've collected the sample.

Q Actually next to the sink, as it were?

A In the sink, yes. We've got a machine that we can take that and it takes about a minute and we can test the chlorine dioxide level at that. We would then shut that tap off and then we would repeat the process for-- we would refer to it as the mixed of the hot sample.

Q Which is coming out at 41 degrees?

A Which is coming out-- so it's a blend between the hot and the cold water.

Q Because you cannot actually sample the pure hot?

A No, the only place we can realistically do that is in DSRs----

A That is an acronym. Again, you are going to have to help us.

A Domestic services and cleaners.

Q Cleaners' room?

A The cleaners' room have got direct hot and colds. Staff kitchens have

got a direct hot and cold, and I think it's a clean utilities generally have a direct hot and cold.

Q But if we are just sampling in a particular patient room----

A We can't sample hot.

Q -- you cannot get the hot.

Q Now, we have heard in our reports of the concept of whole-genome sequencing.

A Yes.

Q Have you heard of this?

A You're moving into microbiology.

Q No, no. There is a reason I am asking you, and it is to do with legionella.

A Yes.

Q Have you ever come across a situation where someone has wanted samples of legionella to carry out whole-genome sequencing? I did not give you any notice of this, but it just occurred to me over the weekend.

A No.

Q No. Well, I cannot ask you the questions. That is fine. So, if we go back to the sampling regime, if you want to catch-- To recap, you can catch the cold water through a first-flush sample----

A Yes.

Q -- you can catch the mixed water through another go----

A Yes.

Q -- and you may or may not get

bits of biofilm, but----

A Yes.

Q -- that is fine. Okay, that was very helpful. So, looking at the 2019----

THE CHAIR: Can I just----

A Yes.

Q -- clarify this? I mean, I think it is absolutely clear, but it just has not been spelled out. You have talked about DMA Canyon carrying out the sampling.

A Yes.

Q Now, as I understand it, you would take a quantity of water, as Mr Mackintosh has taken you through, maybe as much as a litre, did you say?

A For legionella samples, it's a litre, yes.

Q Yes, and what I am assuming is that you will then package it in some way and send it off to a lab, am I right?

A Yes. Most of our samples go to the water lab at the Glasgow Royal Infirmary, which is run by the NHS.

Q Right.

A Sometimes, depending on the number of samples and the capacity at the Glasgow Royal, we send other samples off to Intertech on occasion, maybe another independent lab.

Q And a report is provided to you or directly to NHS GGC?

A The GRI lab reports to us and, also, I believe there's an internal mechanism for the microbiologists within

GGC. They get access to the system and they're notified about specs directly as well.

Q Right, and if it is to another lab, it comes in----

A It comes in to us and we then collate the samples and we report them back to the Estates department.

Q When you say collate the samples, presumably by that, it is on a spreadsheet or a----

A Yes.

Q Yes. Okay, thank you.

MR MACKINTOSH: So, on that topic, it might be-- well, I will not take you to the pages, but the case notes-- the case note review panel and our epidemiologist, Mr Mukherjee, both were concerned about the labelling of samples from the hospital, and there is a sort of observation that sometimes the sample locations were less than precise or they varied in confusing ways. What was the system for labelling the locations you were taking the samples from when you started----

A Is this a criticism of our sampling or----

Q I do not know. I do not think so. It is just in general.

A Our sampling-- the way we do it is when we submit it to the lab, we basically put a number on the bottle----

Q Yes.

A -- and that's submitted to the lab.

Q So the lab do not know where came from?

A No, no, sorry, there's another step to that.

Q Right.

A Then our guys on site will fill out a sheet that goes along with all the bottles, which will detail the floor we took it, the ward we took it or the department we took it, the room that we were in, including the door code of the room.

Q Right.

A And then we will identify the actual outlet that we took it from, whether it was the Optitherm, whether it was the Contour tap, whether it was a shower. We'll identify that. We will then record the temperature of the outlet and, after the chlorine dioxide was installed, we would also record the chlorine dioxide level as we took that sample.

Q So, at least from your end of the process, the piece of paper that your team complete has room, individual water point, fully identified.

A Yes.

Q That is fine.

A I don't think there could be any doubt where our samples were taken from.

Q No, no, I just felt it was important to ask.

A Yes. That's fine.

Q When it comes to the results coming back to you, you have just said to his Lordship that you supply them to the Estates department.

A Yes.

Q Would you ever have cause to supply them to microbiologists or infection control doctors directly?

A What we have is-- Suzanne in our office manages this process for us and she's given, for each of the sampling-- samples that we take, depending on where they're taken from, we are given a distribution list of who all the samples should be emailed to, and so Suzanne compiles all the results into a spreadsheet, which just gets bigger and bigger as the year goes on, and Suzanne's got that distribution list, and some of the people on the distribution list will be microbiologists, yes.

Q But that distribution list comes from the hospital?

A Yes.

Q Would you ever add to that list of your own volition?

A No.

Q No. Now, I think probably this is a good place to start, because I am about to turn to-- Actually, there is one more thing I can do before lunch break. In your statement at question 42, at subparagraph A, which is on page 18, you

have a discussion about sampling work done by others. Do you see how you are discussing:

“The main concern at the time of the 2019 report with regards to sampling results were in relation to Cupriavidus (and other organisms) for which there were no guidance documents for the water hygiene industry to follow.”

And that is because, as you explained at the beginning----

A Yes.

Q -- in legionella, you have a guidance, and this, you do not:

“... for which there are no guidance documents. This was covered within section 10 of the 2019 report. DMA did not receive copies of all the sampling results carried out during 2018 as much of this was held internally by GG&C Microbiology and Estates, with the actual analysis carried out by GG&C internal laboratories at the Glasgow Royal Infirmary.”

A Yes.

Q

“You did have access to some of the sampling results from 2018, with the majority of potable and Legionella samples being within specification, with out-of-specification results being

for ‘other’ organisms for which there was no guidance documentation. [And you said] All out-of-specification results were, however, considered by DMA and included within the report.”

What I wanted to ask is, if you did not get all the results, how can you safely reach your conclusions? Because you seem to be describing that you only got some of these results.

A When we were taking the samples in 2018, the microbiologists at the time held the results internally within GG&C and they didn't share absolutely everything with us. Ian Powrie periodically would share some sections of the results with us, and so that was us when we made our assumptions and-- sorry, our recommendations in the risk assessment, it was based purely on the results that we had available to us.

Q So you are just saying that, in effect, you could not-- you did not have all of them?

A Yes.

Q You had quite a lot----

A Yes.

Q -- but not all of them. Right, okay.

A There are significant-- even now, there's still significant gaps in our sample results from 2018.

Q Now, given that your background experience is limited to a

short list of microorganisms, how can you express concern in this report about outer specification or, I suppose, to put a word in your mouth, concerning results when you are not a microbiologist who can assess whether it is worrying that this particular microorganism is in this pipework?

A Because the Estates and the microbiology department issued parameters to us what they considered to be in and out of specification.

Q So when you say in this report, "They are out of specification," those are not your specifications?

A No.

Q They have come through the GG&C system?

A They gave us the parameters when we were taking samples because, as we collate all the samples, we actually give them a summary and we pull out anything that's considered to be out of specification.

Q Right.

A And so we issue that back to them so that you can see all the samples we've taken and what's out of specification, but in order for us to write the macros to pull those results out, they had to give us the parameters that we work to.

Q So the only area where you are contributing to the process is the

method?

A Yes.

Q Everything else is set by the customer, who is GG&C?

A (No audible response).

Q Right, and then you are reacting to their specifications?

A Yes.

Q If it is out of specifications, it is because they chose it to be out of specifications?

A Yes.

Q I think that is a helpful place to break, my Lord.

THE CHAIR: Yes.

MR MACKINTOSH: The next document will be the 2023 report.

THE CHAIR: We will do that, but just-- could I make sure I have followed that last line of questioning? If we are concerned with microorganisms other than pseudomonas and legionella, in order for you to be able to say they are out of specification, you require the parameters provided by a-- to you by Estates? Is that right? It comes from Estates?

A Yes, there's no guidance in our industry for a lot of these other organisms which were being tested for. We had no guidance, so we weren't able to inform the decision as to what was in or out of specification.

Q Right.

A It was given to us.

Q Now, as you have described, you having taken a sample of water, sent it for analysis, you get back the results. Did DMA Canyon sort of carry it out a-- taking the finger down the list of a total viable counts with a view to saying what was out of spec, or does the laboratory give you the information?

A They don't provide notification to us to say, "This is out of specification." Sometimes they will give us a summary sheet to say, "These are your out-of-specification results," and they'll sometimes come in before the full results, but the way that we record our results is we've put it into spreadsheets and I've written a load of macros which sit in the back of those spreadsheets and so we can hit a button and it just automatically pulls out-- Based on the parameters provided to us, it creates a new spread-- a new tab on the spreadsheet, which then highlights everything which is then classed as out of specification.

Q Right. I think I follow that, and the other point of detail is, if I have understood the evidence, your employee who is actually taking the water sample has got some mechanism for checking chlorine dioxide?

A Yes, now we use a Kemio unit. I can't remember what it was called before, but it's a little electronic box about

this size that we take a sample of the water and we put a sensor in it, and it measures the chlorine dioxide for us.

Q Right, okay, and it gives a figure-- not only the presence of chlorine dioxide but some sort of measure?

A Gives us a reading, yes.

Q Right. Thank you very much, Mr Watson. Well, as Mr Mackintosh has flagged up, we will take a lunch break. Could I ask you to be back for two o'clock?

A Sure.

(Adjourned for a short time)

THE CHAIR: Good afternoon. Mr Watson, I think we are ready to resume.

MR MACKINTOSH: Thank you.

THE CHAIR: Mr Mackintosh.

MR MACKINTOSH: Now, Mr Watson, would you ever have had occasion to look at the audits of the authorising engineer?

A No, I've never read the audits but I'm aware of the audits taking place and generally speaking Kerr Clarkson will feed back to me the findings of the audit.

Q Well, I am not going to take you to them, but I noticed that in the '21 and '22 and '23 audits, the authorising engineer flags the absence of a repeated L8 risk assessment as an aspect of high risk. Is that something you were aware

of?

A We were aware that we hadn't carried it out for a number of years, but we only carry them out as instructed by the Health Board.

Q Is there any way that you change the way you carry out assessments based on the amount of time that has passed since the last one?

A Generally speaking, when we go to these assessments, we kind of take a, "Let's start from scratch and walk our way through the process again".

Q Yes.

A If we're familiar with the building, it does make it a bit easier to go through the process, but we don't fundamentally change the process.

Q It is just that I noticed that the 2019 assessment was a bit longer and more detailed than arguably the 2017 assessment, and you have done a subsequent assessment in '23, '24, and before we look at that, is there any way that you changed the way you did that to take account of the fact that there had been a gap, albeit during the pandemic, which might have been explainable?

A There wasn't a fundamental change to how we went about it. Fraser, who did the risk assessment for us, would just have gone through the process of looking at-- Basically what we do is we followed the water from where it enters

the building through all the plant items to the outlets and we follow the same process every time.

Q I mean, this may be sounding a little bit cruel, but it is designed to sort of expose it, possibly. Is it the case that doing it the same way every time in a predictable way is part of-- the sort of solution to monitoring water systems?

A Sorry?

Q Its predictability, its repetition, its systems is what you are looking for?

A Yes. It gives us a mechanism for us repeating the process that we can see what we're doing and working our way through our processes.

Q Now, so Kerr Clarkson would have reported back the authorising engineer's reports in general terms to you, and we can ask Mr Clarkson about that tomorrow, so we will do that. Were you asked to carry out a further risk assessment after 2019?

A Not until 2023.

Q 2023, and this report was produced to us by an RFI in July of this year. So it is in bundle 27, volume 1, document 17. I wonder if we can go to that at page 51. So we see, again, the front page which we are used to now.

A Yes.

Q And the issue date in draft is July '23 and, again, you have inserted a recommended review date, but this time it

is a two-year review window. Any particular reason for that?

A I think now it would be fair to say the water systems on the site are under good control.

Q Right.

A And there are no changes to the water system which are planned, no fundamental changes to the water system that we're aware of coming up and so, therefore, we just revert back to-- It's a live document, we should just be keeping it up. It should just be reviewed as a----

Q So, that is a contrast from the situation in '17-- sorry, in '19 when you talked about a one-year review because there was so much going on?

A Yes.

Q Now, if we can go to page-- the second-- the next page, you see that your risk assessors were Fraser Murray, assisted by you.

A Yes.

Q And the draft was submitted in July '23, and if we keep going on to the next page, which I'll jump, sorry, to page 56. We will go past your certificates. Here we are, the overview. Now, what I wanted just to look at this is, what is your-- this is different in text from the '19 one.

A Yes.

Q So, what are you trying to tell the reader in this section?

A What we're trying to do is

explain to the reader that the summary that we provided in the previous risk assessments was more or less the information that was provided to us by the builders and how the water----

Q Yes.

A -- what the water system was. Over the course of 2018 and 2019, there were quite significant changes in the water system. There was obviously the incident which happened around 2A/2B and the upgrade works which happened there. There were chlorine dioxide installs throughout the site.

Q Yes.

A We now have point of use water filtration right throughout the site. There was changes made to the filtrate-- the bank-- the filter banks down in the basement----

Q So, that was to add a third filter?

A To a third filter and they re-jigged the way-- the pipework.

Q Now, remember what we said earlier on about his Lordship noting this?

A Yes, sorry.

Q So, we will start again.

A Sorry.

Q So, the first change was the reaction to the ward 2A/2B incident in 2018.

A Yes.

Q Second change was chlorine

dioxide.

A Yes.

Q The third change was adding a third filter to the filtration banks.

A Yes, and they also changed, as they installed the third filter bank, they changed the pipeworks so that all the filters fed to a common header, which allowed the water to be distributed to any of the post-filter tanks.

Q So, previously, one filter served half the tanks, the other filter served the other half of the tanks?

A Yes.

Q And why is it a good idea to have all the filters going to a common header?

A If one filter only feeds tanks 1A and B and the other filter feeds tanks 2A and B, the filters go into backwash periodically and if you ever end up with one of the filters going into fault mode, it just means that you can't fill that tank.

Q So, what is backwash?

A It's just a process the filtration units go through to clean themselves.

Q Right.

A It's part of the routine function of the filters.

Q So, if you are backwashing----

A You can't filter the water.

Q You can't filter the water. So you cannot fill the tank?

A Yes. So-- Now, by doing that,

it just means it doesn't matter which filtration unit happens to be on, if any of the tanks call for water, it goes into a common header and gets distributed to the tank that's calling for water.

Q So, having three filters on a common header means you can direct the water to whichever tank needs it?

A Yes.

Q Even if one of the filters is down?

A Yes.

Q Right, and you explained the point of use filters went out to the whole site?

A The point of use filters are-- All filters which click onto the end of taps and they filter the water----

Q A sort of oval, plastic object?

A Yes.

Q Yes.

A And they click on to the end of the taps or the showers and they filter the water to 0.2 micron, which should remove all bacteria in the water. They're fitted in what the hospital have designated as the high-risk areas across the site.

Q So, that is not every ward?

A No.

Q No, and then have there been any other changes that particularly strike you as important? I mean, I will take you to them if necessary.

A There's now quite a thorough

flushing regime for any of the dead legs which remain in place around the plant rooms, and there's just a lot to-- the control around the management of the water system is much tighter now.

Q So, when you say the control and the management, is it now possible to go and look at the records and point at that dead leg or a tap in a particular location that is currently not being used very much and to know when it was last flushed?

A It should be available, yes.

Q And to what level of success of finding the information, do you think?

A That would be covered by the authorising engineer's audits. That's part of the thing he looks at, is have we-- are all the records that are required to demonstrate the management of the system, are they now all in place?

Q So, you feel that there is a system now?

A Yes.

Q Right. I understand there is some-- that the minor injuries unit received a separate water supply. Have I got that right?

A There was a branch taken from-- cold water branch was taken from-- down-- Where is it? I think it's at the back end of the accident-- the adult's accident emergency. There's a cold water line was brought out and then runs

underground and feeds the minor injuries unit, so it's fed from the adult hospital.

Q So, it is not a separate supply--

A It's not a separate mains supply, no.

Q Right. I did not understand. I wanted to get it right.

A Yes.

Q Okay. Now, have the expansion vessels been-- hot water expansion vessels, have they been replaced?

A They were-- All the ones in the calorifiers were replaced in 2019, I believe, and there's now a programme in place, which-- At the time when we did this risk assessment, there was a programme in place of replacing them again, just on lifecycle maintenance, but it hadn't been completed, so we've recorded where they were replaced and where they still had them.

Q So, we should not think that they were being replaced for the first time in 2020?

A No, no.

Q They replaced the first time in 2019?

A Yes.

Q Right.

THE CHAIR: Sorry, my fault. What is being replaced?

MR MACKINTOSH: The hot water

expansion vessels in the calorifier.

THE CHAIR: Right, got that, thank you.

MR MACKINTOSH: And if we go, because I feel we probably ought to, to page 63, which is the overall risk assessment page, someone has helpfully highlighted this, but you are now assessing that water system and the regime as low risk.

A Yes.

Q You have discussed the changes, but, for you, what were the most important changes that caused you to move from high risk in '19 to low risk in '23?

A I think the PPM regimes that are in place are very closely managed, the fact that we have the chlorine dioxide, so we have, like, almost a belt and braces approach for controlling everything that's going on, and there's an extensive microbiological sampling regime right across the adult and kids' hospital, and the vast majority of those samples come back within spec, I'd probably say the vast majority come back with no bacteria detected.

Q And we can ask Mr Clarkson about that, because he organised that process?

A He organised the process in conjunction with us. It's Kerr who controls the processing.

Q You do the work?

A We do the work and we submit it to the labs, and we collate and submit the information back----

Q And we discussed that process before lunch?

A Yes.

Q Right, okay. Now, if we go onto page 66, if we were to work through to page 67, there are very few reds in this report.

A Yes.

Q But since there are two left here, let's just check in with page 67 and the tank supports.

A Yes.

Q Now, would it help to look at a picture at this point?

A Yes.

Q If we could go to page 247, I am hoping I can recognise the tank support. So this is a tank on the left-hand side.

A Yes.

Q Are the vertical members with the blue sign on them, on the top left-hand pictures, are they tank supports?

A Yes, but those are GRP, glass reinforced plastic, so we wouldn't expect to see corrosion on them.

Q Do you actually have pictures of any of the new stainless steel tank supports in these photographs?

A I don't think there's any new

stainless steel supports. They're just the original supports which were installed as part of the construction of the tanks. I mean, I think there will be.

Q So, if you go to the next page, to page 248, these are still glass reinforced----

A Yes.

Q Now, I am going to----

A If you look at-- See, if you look at the bottom of-- That's the raw water tank. If you go back to the previous page----

Q Back to the previous page, yes.

A And if you look at-- see-- You'll see a kind of cross-hatch of thin rods at the bottom of the tanks.

Q Now, let us get sure you are looking at the right picture. So there are six pictures----

A Top left-hand picture.

Q Top left-hand picture, there is almost-- it looks like there is a pattern on the floor of the tank.

A Yes. Those are actually thin rods which run through the tank made of stainless steel, and they tie the tank together and those are the support rods.

Q Ah, so it is not vertical, it is horizontal ties?

A Those are horizontal ties, yes. There are other brackets which run vertically in the tanks, but I don't think

they're support.

Q So, the ones you were talking about when we were back on page 66 are these horizontal ones?

A A combination of them, but they've also got brackets which go over the bolts, between-- The tanks are linked together, and so, internally to the tank, there are supports which go over the top of the bolts.

Q In fact, if we look on that page, on the right-hand side we have the outside of a tank.

A Yes.

Q And there is stainless steel over the bolts on the right-hand side. Were they an equivalent thing on the inside?

A Yes. I think those are galvanised steel on the outside, but on the inside, they're stainless steel.

Q Right, and you want those replaced?

A Well, it's just-- if you look at the rods in the left-hand picture, the ones-- there's other photographs which are actually right in the roof of the tank, above the water line, and they're corroding quite badly, and if you look in the very bottom right-hand corner of the picture, you can see that----

Q If you go on to page 249, on the middle right-hand side, is that some of the corrosion we are seeing on the

floor there, or----

A I think that's the raw water tanks, so, no, we're not seeing the corrosion on these tanks.

Q No, we are not? Okay. The point I want to do is just say that we were trying to work out what the rods are, and they are these horizontal tie rods?

A Yes.

Q Right. Since we are looking at photographs, let us look at some more. If we go back to bundle 6, page 394. Now, I wanted just to understand what we are looking at, because you put the pictures in, but it is not immediately obvious to the lay reader. Are we seeing anything that should not be there in this screen?

A On-- You're seeing some deposits in the base of the tanks, but that's fairly common. These are the raw tanks pre-filtration, and so mains water will always bring in some light debris into the----

Q And on the next page, I am assuming that these are post-filtration?

A Yes.

Q So, that is a little more concerning, but not that much?

A There's a bit more debris than we would expect to see coming through a filter, yes.

Q Okay. Well, that is really helpful. Now, let us go back to bundle 27, page 66, please. Sorry, 67. Yes.

So, those are your two remaining red flags.

A Yes.

Q Now, we also have a written scheme, which is in bundle 27, volume 1, document 18, page 276. Now, have you-- presumably you would have seen this? When it comes up on the screen. Page 276 of that one.

THE CHAIR: Could you give me the bundle number again, Mr Mackintosh?

MR MACKINTOSH: Bundle 27----

THE CHAIR: 27, thank you.

MR MACKINTOSH: Volume 1, document 18, page 276. Is this the written scheme that you would currently have seen at the review, or a similar version of it?

A We don't review these written schemes, but I am familiar with them.

Q Ah, you do not review? Well, in that case, I will not go any further into it. I will ask Mr Smith or Mr Clarkson about it.

A Yes. Any review of those is generally carried out now with the authorising engineer rather than us, so as to remove any potential conflict of interest, because part of what the written scheme and those audits are doing is marking our own homework----

Q I see.

A -- if we were doing the work and then auditing to see if the work's

been done. So that's now been removed from us.

Q So, when you started and there was no authorising engineer as far as you knew, you were proposing written schemes, offering templates, encouraging their production.

A Yes.

Q Having had them been done, it is now the authorising engineer's job to check them?

A In conjunction with the Estates staff, yes.

Q Yes, otherwise you would be marking your own homework?

A Yes.

Q Got it. Now, you mentioned the point of use filters.

A Yes.

Q We will discuss it more with Mr Clarkson when we get to him, but were you involved with the-- well, the first attempt to remove some of them in 2020 that sort of seems to have wound down as a result of the pandemic? Was that something you were involved in, or----

A Yes. We were asked-- As part of removing them, they wanted a process which was robust that they could justify the removal of filters in areas which the Clinical and Infection Control deemed them no longer necessary. So rather than just taking the filters off, they wanted a programme where we would remove

the filter temporarily, sample behind the filter, and then we would replace the filter, and once we had built up the results of all the microbiological sampling, assuming everything was in spec and everybody was happy, then the filters could be permanently removed.

Q But, in 2020, that did not last very long because the pandemic came along?

A It wasn't even so much it wasn't-- last very long, as we were given a very set list of areas where they could be removed, we worked our way through the list, and once we got to the end of it, we weren't given another list.

Q Well, I will ask more about that of somebody else. Now, I want to just talk about the relevance of this to things other than Legionella risk, because at the beginning of your evidence, you explained that your experience is rooted in the guidance and the regulations particularly around Legionella and pseudomonas.

A Yes.

Q Now, clearly that is true for all of your reports. What relevance does an L8 risk assessment and the risks and the observations and the learning lessons and the guidance that you have in it have to the general management of a domestic or hot water system beyond Legionella and pseudomonas?

A The general principles of, if you maintain the water system in a way that prevents-- "prevents" is probably the right word, prevents the conditions for the growth of Legionella and pseudomonas, then kind of by default, almost every other organism likes the same conditions, and therefore you reduce the chance of other organisms being able to grow in the system.

Q So, it is not the purpose, but it is the outcome?

A Yes. It's-- The same process works for pretty much every organism, as far as I understand.

Q So, if we could look at bundle 6, page 141, which was your risk table, the reason I wanted to look at this again was because, when we discussed it, I just asked you questions about-- page 141, just about who you thought should be acting and when they should be acting.

A Yes.

Q But I did not directly ask you about why they needed to act. So, if something is graded 1 or 2, you have got an immediately or a reasonably practical action requirement. If it is graded in a lower category, why is it acceptable to take longer? Because----

A These are just things that we don't see as being as critical to the control and having such an impact on the water quality. Not everything will have

the same impact on the water quality. If your control measures are temperature, if you start to move outwith the temperatures, for us that's a big break in the control regime, whereas if there are other things which are very short dead legs, they'll have much less of an impact than a very long dead leg. So it's us just trying to work our way through all the things that we're seeing and give a priority list to say, if you work through the higher priority, that will have the greatest impact on improving the water system.

Q So----

A Not everything can be done at the same time.

Q No, indeed, and you seem to be-- it is the more serious things need to be done sooner?

A Yes.

Q Yes. When we think to the 2018 water incident in 2A/2B, and you were asked to go and do sampling around Cupriavidus, what relevance, if any, does the existence of risks assessed as high by you in this assessment have to the risks of Cupriavidus or any other bacteria or fungi in this system prospering?

A Our understanding is that bacteria like-- most bacterias like the same conditions. They like water at ambient temperatures, they like water that's stagnant, they like to have nutrients

to feed on, and so therefore it's back to what I said earlier: we're trying to just follow the process that we would for a Legionella risk assessment, and that should bring everything into control.

Q Okay. Now I want to ask you about overall compliance with L8.

A Yes.

Q Now, firstly, is this a reasonable question to ask? Which is, is it reasonable to ask for a water system on a particular date when assessment is done, that it is or is not compliant with L8? Is that a reasonable question to ask, or is it just too simplistic?

A Well, that is the question we are asking as part of the risk assessment.

Q Okay. So, in 2015, when you did that first risk assessment, was the water system in the hospital compliant with L8?

A Well, with the fact that we made recommendations within the risk assessment, I'd say that parts of it weren't compliant with L8.

Q So, the same question for 2017?

A Same answer.

Q Same answer, it was not then compliant, you made recommendations?

A Yes.

Q In 2019, was it compliant?

A It was improving in 2019.

Q I recognise that, but you imply

it is an on/off category----

A Again, there are still areas which weren't fully compliant.

Q So it is not fully compliant, but it is more compliant?

A More compliant, yes.

Q Right. In 2023, was it compliant with L8?

A It's very close to being compliant, but you're always-- I don't think I've ever done a risk assessment where I haven't made some form of recommendation, and so I think it's unfair to say, because we've made a couple of recommendations, that this is not compliant.

Q So, perfection is not possible, but it is the journey that matters?

A It's probably possible, but I've never seen it.

Q You have never seen it, okay. Now, do you actually-- At any point between '15 and now, have you seen any evidence that there are significant amounts of Legionella in the water in the hospital? No?

A Very few positive samples for Legionella that we've identified.

Q That being the case, does that in any way undermine the concern you just expressed, that it might enable other microorganisms to prosper?

A No, because the organisms are opportunistic and therefore the

presence of one organism doesn't automatically mean that you will see other organisms growing. You may just have one being the dominant, or you will get other bacteria. It's not a case of once you get one bacteria you will see all bacteria.

Q Because that is one of the things you said at the very beginning, that in order for Legionella to prosper, you need both a source and an environment.

A Mm-hmm.

Q Thinking about Legionella itself, how does Legionella get into a water supply in a building?

A For the hospital and that, we would expect it to be washed in through the mains water.

Q And pseudomonas, how would they get into a building?

A Pseudomonas can be back fed into the taps from people touching them, cloths being used to clean taps if they're not-- if it's not done correctly.

Q Splash back from the drains?

A Splash back from a drain. So there's a host of ways that we would see pseudomonas back feeding into the system. It's less likely, or I've never heard of it with Legionella.

Q So Legionella is an almost pervasive risk?

A Yes.

Q Now, you have answered that

already. So, were you aware, in 2018, that there were microbiologists and infection control doctors who, when they became aware of your 2015 report, were very concerned about it?

A I only found out about that when the BBC documentary aired.

Q Because we have got statements, and we will hear evidence from a wide range of people, in fact including other doctors, who receive news of your report some date in, I think, early July, late June 2018, and there is what could only be described as a flurry of activity, various reports. We will take evidence from lots of people and, without putting words in their mouth, there seems to be a measure of concern. You were not aware of that at the time?

A It was never brought directly to us. As I say, the first I knew that the microbiologists of infection control were concerned was, there was a BBC documentary about the hospital, and we saw it at that time.

Q So, there was a gentleman, Mr Leiper, carried out a review into what, I suppose, could be described as the non-action of your 2015 report. Were you involved in that review in any way?

A No.

Q You were not asked to supply material to it?

A No.

Q So the documents you supplied to the Inquiry, you would not have supplied to his review?

A No. We weren't asked to directly supply them. They may have got them through the hospital.

Q Yes, of course. So, whoever is----

A But we weren't approached by anyone to provide documentation.

Q Now, I am not going to ask you about what you thought about contamination because you have given me your word-- your views on that already. I suspect you have probably noticed that there are some people who are less than trusting of the way the Health Board is managing its water system than others.

A Yes.

Q Given that you have described a change, almost a journey, in compliance with L8 from '15 to 2023, how would you answer anyone who is sceptical about the suggestion that the system is now frankly almost entirely compliant?

A I don't think it's reasonable to argue with the microbiological results. They are carried out by a UCAS accredited lab. Just the standard of the results coming back, how few out of specifications we get in comparison to the number of samples we take, I don't think

it's reasonable to argue.

Q And that would you say----

THE CHAIR: I wonder if I could ask----

MR MACKINTOSH: Yes, of course.

THE CHAIR: -- Mr Watson to give me this at pretty well dictation speed.

MR MACKINTOSH: (To the witness) So, what would you say to people who are sceptical about your suggestion that it's now in compliance?

A I don't think it's fair to argue with the microbiological results. There are a huge amount of samples taken and very few of those results come back out of specification. The labs who undertake this work are UCAS accredited. So they're externally audited, and so I don't think it's fair to question their results.

Q In terms of the management of the system, how would you respond to the suggestion that if the management of the system was not very good in the beginning, it is difficult to trust the same organisation now when you are, as it were, assessing the management as more effective?

A I don't know how to answer that.

Q You do not know how to answer that?

A No. I work with the guys in the States on a daily basis, and probably daily contact with Kerr Clarkson. The

system and the way that it's managed is very tightly and well managed now.

Q Well, we will ask him more, but that is very helpful. Thank you. Now, the final thing I wanted to ask you about is just looking forward because one of the purposes of this Inquiry is to possibly make recommendations.

A Yes.

Q As we have discussed, your 2015 report does not appear to be an action.

A Mm-hmm.

Q Is there anything you would change in the way either L8 is phrased, or the guidance in SHTM 03-01, Part B is changed, or any other national material or professional practice that you would change about this system, having been through this experience?

A I think there should be a process where the Legionella risk assessment should be carried out and handed over to the organisation taking control of the building. So, I think, rather than the NHS having to do their own risk assessment and then perhaps argue with the builder about snagging and other things, I think what should be done is there should be a handover pack created for the construction industry to say, "As you're building a water system, this is how it should be managed from design through to handover, and all of this

documentation should be in place."

Q And would that enable the material you could not find in '15 to have been available?

A Well, I think it would then maybe focus the minds of the people who are handing it over that the bill-- the client would be within their rights to say, "We're not accepting the building or the water system without all this documentation in place."

Q Would it address the problem of organisation that does not have the systems in place when it takes a building over?

A That may not, no.

Q No. Okay. Is there anything you would change about that?

A I think the guidance is there, and it says you should do all these things. I just-- Maybe tougher policing of it but how you would implement that, I don't know.

Q Is there anything that DMA Canyon and you, do you think, on reflection, should have done differently back in the '15, '16, '17 time?

A I don't know. Honestly, I don't know. We provided the information as honestly as we could, we gave all the recommendations we could. I don't know what else we could have done at the time.

Q I think that may be all the

questions I have, but we have a process just in case any of my colleagues have been very politely watching. Mr Lord may have a question as well.

THE CHAIR: Just before I check with the others in the room whether they have questions, can we go back to when I asked you to essentially dictate your answer to me, which-- remind ourselves of what that question was. Now, Mr Mackintosh asked you, "What would your answer be to anyone who is sceptical about the current state of the Queen Elizabeth and Royal Hospital for Children?"

And the way I noted was-- you said, "It was not fair to argue with the microbiological results. Huge amount of samples taken, very few out of specification. The laboratories are external. Not fair to question their results." So that is what I have got noted down.

Now, first point, I take it that you were thinking of the present moment in time.

A Yes.

Q That is 2024.

A I would say that would go back for the past couple of years. There's been a couple of years now where we've had very, very good-- It's not just suddenly got to that stage.

Q Right. So, when you use the

expression, "A couple of years, DMA prepared a risk assessment in 2019, then in 2023"----

A Yes.

Q Right. So, when you are saying "a couple of years," do you have in mind from-- at least on the basis of the material before you, 2023 or previous to that?

A Even back to 2021/2022.

Q Back to 2022. The reason that you were able to say that is you have access to the----

A We see-- The samples that we take, we submit them to the lab, and we see all the results coming back through our office. We have a process-- Inevitably, there are out of specification results, and we have a process that we've generated between-- with the States. We automatically put remedial actions in place when we get an out of spec result in order to address that result and bring the-- and deal with it and bring the location back into specification.

Q Sorry, you may not be able to answer this question. Who decides what organisms are being tested for?

A In the written scheme that you put up, the care role, version K I think it is----

MR MACKINTOSH: J, I think it was.

A Yes. Within there, at the back

of that, there is a sampling process or sampling regime. Within there, it dictates to us when we sample in these areas or we sample in this ward, "This is what we are sampling for."

Q I think we could see that if we looked on page 397.

THE CHAIR: Thank you. 397.

MR MACKINTOSH: I mean, if you cannot describe this, Mr Watson, do say.

A What that says is we've given these locations, and we sample in all of these locations. I think it's three or four pages----

Q There are, yes.

A -- of similar information, and this tells us of-- if you look at the column analysis, it tells us what we've to submit the samples for when we take any samples in these areas. We have specific paperwork for different analysis that we submit to the laboratory.

THE CHAIR: All right, then. Sorry for being slow but this is the written scheme we are looking at.

A Yes.

Q The written scheme is based on a template that you have provided?

A No.

Q No. Right.

A Well, this is GGC zone.

Q This is a GGC document?

A Yes, this is their own document.

Q Right.

MR MACKINTOSH: Could you go to the next page, please? So, if we just look at the third row up from the bottom, we have Ward-- Royal Hospital for Children, Ward 2A/2B.

A Yes.

Q A weekly frequency, a quarter of that that is sample on a rotational basis, 140 samples, process as the Royal Infirmary, and then there is a list of what is to be analysed.

A Yes.

Q And then you are doing it and the distribution list is written there.

A Yes.

Q And this system is part of the reason you are, as it were, satisfied?

A All of the sampling that's in here-- We undertake I think all of the sampling, and we see all the results coming back. This is why I would say that the system is very tightly managed, and the end product of all the work that's been carried out in the system is I think shown within the microbiological sampling results which are very, very good.

THE CHAIR: All right, and just really to read out what is in front of me, the sampling is for Legionella, E. coli, coliform bacteria, pseudomonas, GNB, gram-negative bacteria, SAB.

A I think that's the agar plate

they use to test yeasts and moulds.

THE CHAIR: Sorry?

(Session ends)

A Yeasts and moulds. I think the SAB refers to the agar plate they use to grow it on.

14:45

Q And then we have AMS water. Is that a----

A Atypical mycobacteria. Sometimes referred to as NTM, non-tuberculosis mycobacteria.

THE CHAIR: Thank you, Mr Watson. I will just check with the room whether there is-- Are there any other questions coming from the room? Right. I think that is a no. So, in that case, if you are complete with your questions, Mr Mackintosh, thank you very much, Mr Watson. Can I just say that I very much appreciate that giving evidence to the Inquiry is not just a question of turning up for a morning and part of an afternoon. There is a lot of work behind what you have done, and I am very appreciative of that work, but you are now free to go.

THE WITNESS: Thank you.

MR MACKINTOSH: My Lord, my next two witnesses are tomorrow, Mr Clarkson, the authorised person in the morning, and Mr Colin Purdon, who was previously in that role, in the afternoon. I have no more witnesses for today.

THE CHAIR: Right. Very well. Well, we will rise now and hope to see each other at ten o'clock tomorrow.