

Scottish Hospitals Inquiry

Witness Statement of

Ronald Henderson

Introduction

1. My name is Ronald Henderson. I am a Senior Capital Programme Manager for NHS Lothian (NHSL). I have been asked to provide a statement detailing my involvement with the Royal Hospital for Children and Young People and Department of Clinical Neurosciences (RHCYP/DCN) Project (the Project).
2. I have a Higher National Certificate (HNC) in Mechanical Engineering and a Masters in Facilities Management & Asset Maintenance Management (MSc with Distinction) from Heriot Watt University.
3. I joined NHSL in 1995 as a Maintenance Electrician at the Royal Hospital for Sick Children in Edinburgh. That role involved working on all types of plant and equipment whilst gaining appreciation of the work of other trades. I was appointed Maintenance Supervisor in May 1996 resulting in the supervision of all trades with the management of their workload becoming my direct responsibility. This responsibility, coupled with the acquisition of Mechanical Engineering qualifications, further enhanced my understanding and abilities in relation to other trades. I also participated in the estates management on call rota and, whilst employed as supervisor, provided cover for leave and absence of Estates Officers. This resulted in promotion to the post of Estates Officer in June 2002 with overall management responsibility for the estates function at the Royal Victoria Hospital and various sections of the Western General Hospital, both in Edinburgh. In June 2003 I took on additional responsibilities at the Western General Hospital and my areas of responsibility were expanded to include project management, management of minor works and measured term contractors. I also act as Authorised Person (AP) in several disciplines, but not

ventilation or water. An AP is responsible for managing work on the relevant system. This includes, for example, supervising operatives and contractors, updating and issuing documentation such as permits to work, equipment logs etc. I was not the AP for ventilation or water on the Project.

4. My current role in NHSL is a Senior Capital Programme Manager and I have been in that role since May 2021. My focus is on technical project management, in particular providing Mechanical and Electrical support to NHSL programme of major capital works to construct and commission a new National Treatment Centre, a replacement for the Princess Alexandra Eye Pavilion and for the Edinburgh Cancer Centre. Main duties include review of design information for compliance with Guidance, along with a team of technical advisers; participation in design meetings with the design team representing the Principal Supply Chain Partner; Coordination and management of AE input; and full participation in the briefing process. Part of my role is to input and review ventilation and water systems, but I do not have overall responsibility for them.

Role in RHCYP/DCN

5. I was involved with the RHCYP/DCN project from June 2016 to May 2021 on a seconded position of Commissioning Manager, Hard Facilities Management (Hard FM). Hard FM is a term used to describe the areas of maintenance. In the RHCYP & DCN most of the duties that fall under the heading Hard FM are carried out by a third party, namely Bouygues (BYES). BYES duties include maintenance of the building, its engineering infrastructure, and equipment installed by Multiplex as part of the initial build. They are also responsible for specialist sub-contractor management, project management, and minor works. NHSL Hard FM are responsible for elements such as grounds and gardens, soft landscaping maintenance, pest control, and equipment maintenance outwith the responsibility of BYES. In my role on the Project, I managed the interface between NHSL Hard FM and BYES Hard FM.

6. I had no responsibility in the commissioning of the water and ventilation system in the Project, that was the responsibility of Integrated Health Services Lothian (IHSL). As explained below, I did have some input, along with our technical advisors Mott MacDonald Ltd (MML), in witnessing some of the 'building commissioning' activities for ventilation systems carried out by Multiplex (MPX) and their sub-contractors. The commissioning by MPX was also witnessed by the Independent Tester (Arcadis) whose responsibility it was to approve or sign off on commissioning. MPX were responsible for commissioning the building services, including and its engineering systems. My commissioning role was the same as the other NHSL commissioning managers on the project, in that I was responsible to ready both (i) the new hospital for opening (for example by transferring hospital equipment) and (ii) the existing NHSL Estates Team at the old Royal Hospital for Sick Children (RHSC) for the specific areas of responsibility they had at the new site. As noted above, I had a role in liaising with the Hard FM provider (BYES) for the new site in relation to their maintenance activities and where demarcation of responsibility sat as between BYES Hard FM and NHSL Hard FM. This can be summarised as 'commissioning a service'.

7. Accordingly, when I refer to 'commissioning' in the bullet points below, I do not mean commissioning of the water and ventilation systems which IHSL and MPX had responsibility for. None of the bullet points should be taken to indicate NHSL has responsibility for items designed and installed by MPX, including water and ventilation systems. It was the responsibility of MPX and BYES to manage both water and ventilation during construction, commissioning, validation, and setting to work. It was BYES responsibility to manage, continuously validate appropriate systems, and maintain the built environment thereafter. In order that NHSL could be satisfied that BYES were carrying out their responsibilities in compliance with the relevant SHTM's, their systems and procedures were audited by NHSL's appointed Authorising Engineer (AE) for each discipline. As above, I was not the AE or AP for either water or ventilation. Arranging an AE to undertake independent validation of critical ventilation was the limit of my and therefore NHSL's responsibility. All of the other bullet points

relate to commissioning associated with the transfer of the in-house Estates Team and equipment (including procurement), and decommissioning of the old Royal Hospital for Sick Children. I had the following roles and responsibilities relating to the Project:

- Leading the planning and commissioning of Hard FM services for the new hospital to guarantee that the transfer of services to the Hard FM provider (BYES and the installation of equipment took place effectively).
- Leading the redesign of the services, the workforce planning and the development of suitable operational policies for the Hard FM services.
- Ensuring that appropriate levels of staff were in place to facilitate double running during the commissioning of the new hospital, ensuring no interruption to patient care in the existing sites, whilst delivering the services in the new site.
- Planning and implementing the decant and decommissioning process for Hard FM in the old hospital.
- Ensuring that systems and procedures were in place to make certain that the appropriate equipment was transferred, procured, and installed in the new hospital in accordance with the overall programme.
- Co-ordination of all activities around the transfer of assets.
- Co-ordination of Hard FM services between NHSL and Bouygues FM to ensure a seamless service to patients and staff alike.
- Ensuring that a comprehensive plan for the safe relocation of FM services in line with double running arrangements was developed for each area, taking into account any business continuity and resilience issues. Ensuring that the format was comprehensive and could be fed into the master plan for the project for use by all key parties.
- Ensuring existing service contracts were cancelled or amended as appropriate. Working with clinical areas and Soft FM to determine requirements for example, plant and equipment such as beds, hoists and trolleys.
- Participating in justification for proposed equipment on behalf of users to agree an `equipment to be purchased` list with capital planning managers

and procurement and proceed to purchase after completing due diligence within the agreed budget and user requirements.

- Leading on the specification of assets, systems and equipment working with HFS.
- Defining and developing the full training and orientation requirements of users and deliver the plan to meet the needs of the users.
- Ensuring that services and equipment `dovetail` together by critically appraising the Operational Policies of both hard and soft FM services, to ensure that the assets will support the delivery of the policies. This required close links with operational managers within the FM directorate to understand and address issues of a technical nature.
- Pro-actively minimising risk to the FM service delivery by ensuring that there was a robust process to identify risk areas at local level. Ensure such risks were actively addressed and managed.
- Developing a good working relationship with all third party organisations thus enhancing the NHS position throughout the project and in the future.
- Ensuring that clearly defined requirements were formed and agreed with Divisions to inform any necessary proposed change orders or additional works.
- Delivering high quality communication events or communications to support the implementation of the service transfer and equipment element of the project.
- Providing professional advice as appropriate.
- Acting as first aider to project team.

8. I had the following additional roles and responsibilities during the period of the RHCYP/DCN project but that were unrelated to the project:

- Providing out of hours on call cover at existing RHSC/ Princess Alexandra Eye Pavillion (PAEP); Lauriston Building Sites
- Acting as Authorised Person for various services at the Western General Hospital (WGH) including High Voltage (HV) / Low voltage (LV) / Medical Gas Pipeline Systems (MGPS).

Project Groups and Committees

9. In my role as Commissioning Manager throughout the RHCYP/DCN project, I regularly attended the following Groups and Committees. The information below is my own personal recollection of the activities of these groups. It is worth noting that there was at times significant crossover between information shared at each of the groups.

- Project Management Group (PMG). Before Handover in February 2019.
 - Discussion, input and updates on design issues, commissioning, and general progress. This group did not directly work on any of the ventilation issues of interest to the inquiry. This groups' primary role was management of progress although other issues were raised and discussed.
- Operational Management Group (OMG). This group replaced the PMG after February 2019 handover.
 - Discussion, input and updates on design issues, commissioning, and general progress. This group did not directly work on any of the ventilation issues of interest to the inquiry. This groups' primary role was management of progress although issues were raised and discussed.
- Reviewable Design Data (RDD) (Before handover in February 2019).
 - Assist Technical Advisors, MML, in design reviews and technical meetings. MML were the primary reviewers of Reviewable Design Data (RDD), i.e. design items submitted by IHSL / MPX for review, however I would also provide comments on drawings, design info,

documents etc. which MML would then, if relevant, incorporate into the response. NHSL were only responsible for operational functionality. On occasion these comments would be discussed with the clinical commissioning managers if clarification was required. This process did review ventilation items of interest to the inquiry. Relating to the 4 bed rooms issue, the reviews taking place focused entirely on achieving balanced pressure in the rooms that clinicians had identified as being required to cohort patients.

- Project Management Executive (PME). Before and after Feb 2019 handover)
 - Commissioning and decommissioning updates. This group did not directly work on any of the ventilation issues of interest to the inquiry. This groups' primary role was management of progress although issues were raised and discussed.

- Joint Commissioning Group. Before and after Feb 2019 handover
 - Update on progress in relation to commissioning. This group did not directly work on any of the ventilation issues of interest to the inquiry. This groups' primary role was management of NHSL service commissioning progress although issues were raised and discussed.

- Technical Commissioning Group. Before and after Feb 2019 handover
 - Discuss and agree programme for witnessing of technical commissioning and update on commissioning progress. This group did deal with the commissioning of systems of interest to the inquiry, however it is assumed this

commissioning was carried out using design information and values that were later discovered to be non-compliant. This was not identified at the time as commissioning values were not expressed in air change rates per hour.

- Internal Change/Technical Delivery Group. Internal change meeting was superseded by technical delivery group before 2019 handover
 - Input to proposed changes. This group did work on ventilation issues of interest to the inquiry. This groups' primary role was management of the contractors change process particularly in relation to wording of derogations. Issues were also raised and discussed.

- Project Management Team. Before and after Feb 2019 handover.
 - Internal project team matters relating to progress. This group did not directly work on any of the ventilation issues of interest to the inquiry. This groups' primary role was management of progress although issues were raised and discussed.

- Demarcation Meetings. Before and after Feb 2019 handover.
 - Discussing provision of space and infrastructure for turnkey works mostly focused on radiology. This group did not directly work on any of the ventilation issues of interest to the inquiry. This groups' primary role was management of demarcation of responsibilities and identification of service provision for specific rooms in

radiology. Issues were raised and discussed.

- Design Team Meetings. Before and after Feb 2019 handover.
 - Discussion of technical proposals and drawings. This process did review ventilation items of interest to the inquiry. Relating to the 4 bed rooms issue, the reviews taking place focused entirely on achieving balanced pressure in the rooms that clinicians had identified as being required to cohort patients. Intention of the comments raised were in regard to achieving this result.

- Ventilation/Water/Electrical/Medical Gas/Fire/Drainage Groups. After Feb 2019 handover.
 - Managed meetings and workstreams to close out issues identified in NSS Scotland reports. These workstreams were directly involved in the identification and resolution of issues raised in relation to each of the engineering services and as such did deal with ventilation items of interest to the inquiry, including resolution of the non-compliant air change rates in Critical Care.

- High Value Change (HVC) & Medium Value Change (MVC) Remedial Works. After Feb 2019 handover.
 - Within the terms of the Project Agreement, HVC and MVC represented a change within a certain financial threshold. Input to design and progress meetings relating to works to rectify issue with critical care ventilation and to enhancement works in other areas. These workstreams were directly involved in the resolution of issues raised in relation to ventilation items of interest to the inquiry. HVC

107 dealt with the non-compliant air change rates in Critical Care and enhancement works to Haematology Oncology ventilation.

10. I liaised with, and reported to the following individuals and groups either routinely or on an ad hoc basis as part of the RHCYP/DCN project:

- Jackie Sansbury, NHSL, Head of Commissioning (line manager)
- Brian Currie, NHSL, Project Director
- Janice McKenzie, NHSL, Project Clinical Director
- Neil McLennan, NHSL, Project Manager
- Mike Conroy, NHSL, Radiology Equipment Manager
- Dougie Coull, NHSL, Radiology Equipment Manager

- Infection Prevention Control Team (IPCT) on an ad hoc basis:
 - (i) Janette Richards, NHSL, IPC Nurse and HAI Scribe Nurse on Project until late 2018
 - (ii) Sarah Jane Sutherland, NHSL, IPC Nurse and HAI Scribe Nurse on Project from late 2018 onwards
 - (iii) Donald Inverarity, NHSL, Lead IPC Doctor
 - (iv) Lindsay Guthrie, NHSL, Lead IPC Nurse

- NHSL Commissioning Managers:
 - (I) Dorothy Hanley, NHSL, Women and Children
 - (II) Fiona Halcrow, NHSL, DCN
 - (III) Ashley Hull, NHSL, Theatres and Critical Care
 - (IV) Callum Gordon, NHSL, General
 - (V) Margaret DiMascio, NHSL, Radiology and CAMHS
 - (VI) Sharon Rankin, NHSL, IT
 - (VII) David Denholm, NHSL, IT
 - (VIII) Patrick Macaulay, NSS Scotland Equipping Manager

- MML, our Technical Advisors (TA):
 - (I) Graeme Greer, MML, Team Lead
 - (II) Kamil Kolodziejczyk, MML, Project Manager
 - (III) Kelly Bain, MML, Project Manager
 - (IV) Colin Macrae, MML, TA Mechanical
 - (V) Willie Stevenson, MML, TA Electrical
 - (VI) Douglas Anderson, MML, TA Electrical
 - (VII) Ian Brodie, MML, TA Ventilation
 - (VIII) Iain Tinniswood, MML, Project Manager

- Estates and Facilities
 - (I) Phil Christie, NHSL Estates Manager for RHSC
 - (II) Brian Douglas, NHSL Head of Estates
 - (III) George Curley, NHSL Director of Facilities

Expertise

11. I am not an expert or specialist in any area. I am an experienced Maintenance Manager with an electrical background. I also hold Mechanical Engineering qualifications as well as a Masters in Facilities Management. On a day to day basis, I used my experience to prepare the NHSL in house Hard FM Estates team for transfer to the new facility, ensuring that the workspaces were adequate to deliver the service. This included agreeing the workforce required to deliver the transfer of the service. Additionally, on a day to day basis, I used my experience to comment on and challenge issues as/when they arose that I considered were within my competence.

12. My competence in regards to ventilation includes knowledge pertaining to air change rates and pressure cascades as they relate to SHTM 03-01. I do not recall specifically raising any design issues, although I may have, but I was

involved in discussing and challenging items with the MPX design team, specifically:

- a. Haematology Oncology – this led to the meeting with clinicians and IPC on 23 February 2017 to agree if the design proposal, which deviated from SHTM 03-01, would be acceptable in an operational environment. It was concluded that it would be (see paragraph 72 below).
- b. Isolation Room Ventilation – this led to the proposal for a maintenance by-pass for areas where several isolation rooms could lose supply at the same time.
- c. Single & Multi-Bed ventilation – this led to pressure cascade being balanced at the door to the corridor of single bed rooms and balanced within certain multi bed bays (discussed in more detail below).

Commissioning and Validation

13. I participated in commissioning witnessing activities on behalf of the board, along with the Board's technical advisors, MML and the Independent Tester. I would clarify that that the word "commissioning" has two meanings in relation to my role:

- (i) Firstly, the primary purpose of my role as Commissioning Manager Hard FM was to ensure that the transferring team and the spaces they would occupy, as well as documentation relating to the activities they would perform, were ready by the time of occupation, e.g. input to the design of workshop areas, agree workforce plans and budgets, agree planned preventative maintenance activities, manage interface with Soft FM, demonstrate operation of equipment and systems in conjunction with MPX, and assist NHSL Hard FM in the procurement of any specialist sub-contractors. This is similar to the role performed by the clinical and other commissioning managers.
- (ii) Secondly, part of my role as Commissioning Manager Hard FM was to

participate in the building, infrastructure, and systems commissioning carried out by and on behalf of IHSL. This spans the period from November 2016 to March 2021 and involved physical witnessing only of commissioning activities managed by MPX. Participation was on an as needs basis and was initially programmed in a look ahead, however more often than not these would be cancelled by MPX resulting in a build-up of commissioning required as handover approached. As a result, it was impossible to attend all commissioning even with assistance from Stuart Davidson (Contracts Manager) and someone from the MML technical team.

14. I have been asked to explain more fully what commissioning and validation as regards building systems such as ventilation entails. Commissioning and Validation are defined in SHTM 03-01 (2022 interim) (**A43258651 – SHTM 03-01 Part A: Interim Version 3.0 dated 1 February 2022 – Bundle 1, Page 2263**) as follows:

Commissioning

'11.1 Commissioning is the process of advancing a system from physical completion to an operating condition. It will normally be carried out by specialist commissioning contractors working in conjunction with equipment installers. Commissioning of the ventilation system will normally be the responsibility of the main or mechanical contractor who should coordinate the process.

11.2 Commissioning is often subdivided into sections (for example, air handling unit, automatic controls, air side balance, building fabric and fittings). Each section may be commissioned by its specialist installer, and they are often accepted in isolation' (Page 2391)

Validation

“12.2 Validation differs from commissioning in that its purpose is to look at the complete installation from air intake to extract discharge and assess its “fitness for purpose as a whole”. This involves examining the fabric of the building being served by the system and inspecting the ventilation equipment fitted as well as measuring the actual ventilation performance. Validation is not a snagging exercise; see the Note after paragraph 12.30.

12.3 Validation is a process of proving that the system in its entirety is fit for purpose and achieves the operating performance originally specified. It will normally be a condition of contract that “The system will be acceptable to the client if at the time of validation, it is considered fit for purpose and will only require routine maintenance in order to remain so for its projected life.” (Page 2402)

15. In summary, the main distinction between the two is that sub sections of the system can be commissioned and accepted separately, whilst validation deals with fitness for purpose and acceptance of the system as a whole. An example would be the fire alarm system interfaces for closing the fire dampers and shutting down the AHU would be tested commissioned and accepted as part of the Fire Alarm System commissioning but it would not be until validation that it could be checked as part of a complete system.
16. The process followed for commissioning was that MPX commissioning manager would produce a ‘look ahead’ programme which would indicate the dates that certain commissioning activities would take place. It is worth stating here that these were often cancelled at the last minute by MPX resulting in a significant backlog and ultimately parallel, or multiple commissioning tasks being carried out at the same time.
17. The invitees would always include a representative from NHSL, MML, BYES, MPX Commissioning Managers, and the Independent Tester, Arcadis.

NHSL/MML were merely witnessing the tests on behalf of NHSL and the Independent Tester had final sign off or authority to accept. Due to the compressed nature of commissioning as a result of the backlog it was not always possible for a representative of NHSL to attend all commissioning activities, however as I understand, it was a requirement of the IT to attend all commissioning relating to critical systems, a percentage of commissioning of other systems, and to undertake a full review of test results and to sign off or accept these on behalf of NHSL and IHSL. It is my own view and was my understanding at the time that the commissioning should have taken place against the relevant guidance unless there was a specific derogation in place.

18. However, it is relevant to note that the outstanding works to be undertaken post-SA1 handover in February 2019 (see detail on SA1 below) were very disruptive. These works resulted in significant disruption to the fabric of the building, including the ventilation systems, which meant that, although the critical ventilation systems had been commissioned by MPX and signed off by the independent tester in 2018, it was not possible to validate the critical ventilation systems as at January/February 2019. In order to validate critical ventilation systems prior to patient occupation, you need to have a clean environment. As at January 2019, the completion date for the post completion works was unknown and it was therefore not possible to arrange validation for a 'possible' completion date that may not be met. However, as detailed below, we did arrange independent validation by IOM to take place after the post completion works had taken place and before anticipated patient occupation **(A35231006, A35231011, A35231011 and A35231029 – IOM Services Reports dated between 20 and 24 June 2019 – Bundle 6, Pages 202, 227 and 238)**

Supplementary Agreement 1 (SA1) (A32469163 – Settlement Agreement and Supplemental Agreement relating to the Project Agreement for the provision of RHSC and DCN between Lothian HB and IHS Lothian – 22 February 2019, Bundle 4, Page 11)

19. My understanding is that handover of the building from NHSL to IHSL occurred when Supplementary Agreement 1 (SA1) was signed on 22 February 2019. I cannot say how SA1 came about from a commercial or legal perspective. My understanding is that it was a Supplemental Agreement to the Project Agreement to allow a mechanism for resolution through the contract of the various issues that had arisen with the build during the construction period. SA1 provided a resolution for works that remained incomplete, known as the post-completion works or the outstanding works. SA1 also included a “technical schedule” which formally recorded resolutions that had been agreed to issues that had arisen during construction. This included the resolution to the dispute with IHSL as regards the balanced pressure that NHSL wanted in the multi-bedded rooms so as to allow the cohorting of patients with the same infection and the derogation from 6ACH to 4ACH for single bedrooms.
20. My involvement with SA1 was purely technical. I had been involved in some of the issues included in the technical schedule during the construction period. MML were managing the development of the technical schedule and advising NHSL as to the various items on it.
21. SA1 was not signed until February 2019 but some of the works to resolve the issues contained within SA1 were known about for some time; some were in progress prior to signing; and some were already complete. The ventilation system had already been installed and commissioned at the point of signing SA1 in February 2019 and the technical schedule was intended to reflect what had been agreed, and indeed what NHSL understood had been installed, in relation to the ventilation system.

Genesis of SA1 Technical Schedule

22. MML, IHSL and MPX drafted the agreed resolutions to the disputes over ventilation in four-bed and single rooms that are found in the SA1 Technical Schedule. I would estimate that this took around 12 months of ongoing negotiation and revision. The items in relation to ventilation were not particularly time pressured.
23. By way of background, on 20 and 21 February 2018, there was a RHSC + DCN Principals meeting at the Sheraton in Edinburgh (**A33393812 – Note for the Board 27 February 2018 - Bundle 13, Volume 8, Page 2250**). This entailed two days of negotiations between NHSL and MPX, facilitated by IHSL, in an effort to avoid court action by NHSL against IHSL in relation to the multi-bed dispute re pressure. I was at those meetings. Critical care was never specifically mentioned.
24. In advance of the negotiations, Graeme Greer of MML drafted a schedule of non-compliances (**A33393831 – 16 February 2018 – 160218 Confidential DRAFT RHSC + DCN - Bundle 13, Volume 8, Page 2257**) which listed around 25 non-compliances and defects in the Project, including ventilation in single bed and multi-bed rooms, for use at the Principals meeting. This schedule of non-compliances would have been reviewed by NHSL project team, including me, but I don't recall any specific comments in relation to critical care. During and after the Principals meeting at the Sheraton the list was expanded from 25 non-compliances and defects to eventually include 81 items.
25. Negotiations continued between IHSL and NHSL beyond 20 and 21 February 2018 which ultimately resulted in SA1 but I was not involved in the commercial or legal negotiations so cannot comment on that. The technical aspects of SA1 also continued to be tracked through the schedule of non-compliances, which I think eventually became the Disputed Works Schedule, Appendix 1 (**A35004560 - Disputed Works Schedule Appendix 1, Item 13 dated 12**

December 2018 - Bundle 10 Page 69) and then the SA1 Technical Schedule but MML would be better placed to advise on that.

26. MML revised the schedule of non-compliances and the later Disputed Works schedule to reflect any changes or agreements as between IHSL and NHSL. Graeme Greer of MML administered the revisions and is best placed to advise on the various versions. MML continued to circulate the Schedule of non-compliances / Disputed Works Schedule / SA1 Technical Schedule to the NHSL Project Team, including myself, for comment and incorporate any changes. Again, I don't recall any specific comments in relation to critical care.
27. We relied on advice from MML in relation to the agreed resolutions. The advice focused on the pressure issue in multi-bed rooms and that was the key issue we needed to get resolved. I cannot recall anyone from MML (or TUV SUD, MPX or IHSL) ever advising that, other than in isolation rooms, critical care had been designed (and installed) with an air change rate of 4ACH and that was a deviation from Guidance which required 10 ACH.

Item 7 – Multi-bed rooms

28. In relation to the multi-bed rooms, the item in the technical schedule (item 7) ensuring the pressure in multi-bed rooms was balanced, also allowed for a derogation to 4ACH. This was because I thought all the multi-bed rooms we were dealing with were in general wards. There was a clinical need for 14 of the multi-bed rooms to be balanced so as to allow for the cohorting of patients with the same infection. The clinical team decided on the 14 multi-bed rooms that required balanced pressure and my role was to ensure that those 14 rooms were all balanced at 4ACH. The reason I say 4ACH is because the multi-bed rooms were to be treated as if they were a "single bedroom" for ventilation requirements rather than a general ward (following advice from HFS – see paragraphs 38 and 39 below).
29. I was not specifically aware that 4 of 14 multi-bed rooms were in critical care. I

cannot explain why that was not spotted by me or anyone else at the time. I accept that 4 of 14 multi-bed rooms were located in critical care, but I did not appreciate that at the time. I was dealing in numbers rather than locations. At no point during the Project did anyone from MML, IHSL, MPX or TUV SUD ever specifically flag to me that 4 of the 14 multi bed rooms where we were seeking balanced pressure were actually located in critical care and should have had 10ACH and positive pressure and that accordingly item 7 was a derogation from those specific requirements. I was not knowingly derogating from those specific requirements and it was a shock to learn that 4 of the 14 bedrooms in item 7 were located in critical care and as a result were non-compliant with Guidance.

30. To clarify, item 7 refers to an agreement that 14 four-bed rooms be balanced or negative to the corridor at 4 ACH, and to the remaining 6 four-bed rooms remaining as per the environmental matrix (**A46496631 - Appendix 30 - Extracts from SA - Item 07 - G1547 Environmental Matrix Multi Bed Wards - Bundle 13, Volume 1, Page 784**). I have been asked which part of the agreement determined the parameters for the rooms in critical care. Of the 14 four-bed rooms referred to, 4 were located in critical care, as indicated on the First Floor GA Ventilation Mark-up drawing (**A46457204 – Appendix 36 First Floor GA B1 Bedroom Mark up - Bundle 13, Volume 1, Page 835**) referred to. The rooms on this drawing were: 1-B1-065; 1-B1-063; 1-B1-031; and 1-B1-009. As above, I did not recognise these rooms at being located in critical care specifically at the time.

31. I have been asked to comment on an aconex transmission from me to Ken Hall, MPX, dated 18 April 2018 (**A39975863 - NHSL- GC-002953 Dated 18 April 2018, Bundle 13, Volume 7, Page 362**) which states as follows:

“I note the attached schedule rev 05 sill refers to Air Change rates between 2.7 and 3.5, we are seeking design for 4 Air Changes to all 14 rooms. Can you confirm that this is the brief to WW.”

As above, my understanding generally was that we were agreeing to 4ACH for the multi-bed rooms listed in the attachment. I think the attachment is a TUV SUD document called: General Ward – Ventilation Amendment Proposal to Achieve Room Balance (**A36322678 - 4.2.8. General Ward – Ventilation Amendment Proposal to Achieve Room Balance Again - Bundle 13, Volume 8, Page 2263**). I was not specifically aware that 4 of the rooms were located in critical care. What I was focusing on was ensuring we got balanced pressure and 4ACH, rather than anything less than that. I wasn't looking at the room locations specifically on the document. I was working on the (incorrect) assumption that these were all located in general wards. I didn't think any of those rooms required specialist ventilation because I thought we were looking at general wards. I wasn't checking room numbers, I was checking air change rates and pressure.

Item 13 – Single bedrooms

32. In relation to single rooms and the derogation from 6ACH to 4ACH in the technical schedule of SA1 (item 13), I understood this derogation applied to single rooms, but not to single rooms in critical care, which have their own specific requirements in terms of SHTM 03-01. Specifically, single rooms in critical care (indeed all rooms in critical care), require 10 ACH. As with other rooms in critical care, at no point during the Project did anyone from MML, IHSL, MPX or TUV SUD ever specifically flag to me or discuss with me that that single bed rooms in critical care had not been designed or installed to have the 10ACH as required by the Guidance. I did not and do not consider that this item in the technical schedule applies to single rooms in critical care.
33. Item 13 refers to an agreed technical solution being set out in Disputed Works Schedule Appendix 1, Item 13. I have been asked in what way it is said to apply to rooms in critical care. The supporting document for item 13 is Project Co Change 051, which provided for a derogation from 6ACH to 4ACH in the single bedrooms and an increase for single bedrooms WCs from 3ACH to 10ACH. I think it is an important point that single bedrooms in the RHCYP all

had en-suites (WCs). However, the single rooms in critical care did not have en-suites (WCs), which could be said to distinguish them from other standard single bedrooms in the facility. Multi-bed rooms and isolation rooms in critical care do not have WCs either. This is because patients in critical care are catheterised and cannot use the toilet independently.

34. I would add that at no point did IHSL, MPX, TUV SUD or MML advise that, in TUV SUD's view, the only rooms that required 10 ACH in critical care department were isolation cubicles. I disagree with this interpretation of the Guidance. In hindsight, SA1 reflects the approach of TUV SUD at the time, which was simply to treat all rooms in the facility, including critical care, in the same way, rather than distinguishing critical care as its own department with specific requirements in terms of SHTM 03-01. That distinction was clear on the Guidance Note of the EM, where it was specifically stated that critical care required 10 ACH, as per SHTM 03-01, table A, until IHSL changed it that Guidance Note to delete "critical care" and include "isolation rooms" only. They made that change to the Environmental Matrix without flagging it to us or MML. They made that change without flagging it to NHSL or MML even though there was an agreed protocol with them that all changes to the Environmental Matrix would be highlighted in red. MML did not highlight this change to us either. I think this was a key opportunity at which IHSL should have flagged the inconsistency as between the Guidance Notes, which required 10 ACH for all rooms in critical care; and the body of the EM, which contained the error, to NHSL for clarification. That they chose not to flag this inconsistency is very disappointing.

Mixed mode ventilation strategy

35. I thought the derogation at item 13 from 6ACH to 4ACH for single rooms was appropriate based on TUV SUD's mixed mode ventilation strategy, i.e. 4ACH mechanical supplemented by 2ACH natural. That would equate to 6ACH. I did not think that this applied to critical care.

36. On 27 November 2014 TUV SUD produced an Air Movement Report **(A42058268 - DS Enclosure 2 – TUV Sud – Wallace Whittle air movement report for single bedrooms (draft) 27 November 2017, Bundle 13, Volume 8, Page 2265)** with associated marked up drawings in support of this mixed mode ventilation strategy for single bedroom ventilation, circulated to NHSL on the 13th January 2015. The TUV SUD report and drawings specifically reference air movement and pressures in single bedrooms with en suites. I was not part of the Project Team at the time but I was aware of the mixed mode ventilation strategy and did not think it applied to critical care.
37. There are other documents which demonstrate that the focus of discussions in relation to air change rates did not envisage critical care:
- Hulley & Kirkwood Thermal Comfort Analysis Report **(A34225373 – Hulley and Kirkwood Thermal Comfort Analysis Report - Bundle 13, Volume 8, Page 2267)** which expressly excludes Critical Care at page 11 of the document: *“As such, Critical Care and HDU type ward rooms which receive air change rates in the region of 10 ACH have not been analysed in this study.”* **(Page 2277)** I was not involved in the Project at this time but it may be this is where TUV SUD’s ventilation strategy for 4ACH mechanical + 2ACH natural stems from.
 - In this diagram **(A34225605 – 2.7_0117_20170111 SHTM vs PCo diagram (1) – Bundle 13, Volume 8, Page 2301)** there is a comparison of an SHTM 03-01 design against Project Co Design. Both diagrams show the floor plan of rooms, with en suites. This was a diagram prepared by Colin MacRae of MML.
 - In the Compromises Schedule between pages 14 and 17 of the document **(A33329538 – SFT – RHSC/DCN – Programme Board – Agenda and Meeting Papers – 24 July 2014 – Bundle 13, Volume 8, Page 2315)** is that a note that the discussion re “ventilation single bedrooms” expressly relates to single rooms with en suites. Rooms in critical care do not have en suites.

HPS/HFS Advice re multi-bed rooms

38. In June 2017 sought advice from Ian Storrar at HFS by way of telephone call and followed up by an email dated 23 June 2017 re whether multi-bed rooms should be treated as “single bedrooms” or “wards” in terms of ventilation with regards to the pressure issue. HFS advised that the multi-bedded rooms should be treated as one would a single bed ward with respect of ventilation. We posed the question: *What is Health Facilities Scotland’s interpretation of the ventilation pressure requirements for four bed wards?* The answer was contained in an HFS report (incorrectly) dated 19 June 2016 by Iain Storrar **(A40072413 – NonRFI_0080_20160619 IAN STORRAR HV REPORT (+4 Bed) - Bundle 13, Volume 8, Page 2340)**, which dealt with HV issues and also address the question re 4 bed rooms. This was provided to me in an email from Ian Storrar on 23 June 2017. It is stated in the HFS report at paragraph 2.5 as follows: *SHTM 03-01 Part A, Appendix 1, Table A indicates the air change rates and pressure regime for clinical areas within healthcare premises. There is no four bed ward noted in Table A, however it would not be unreasonable to treat this area as one would a single bed ward with respect to ventilation as the measures for infection control would be the same. Therefore the room should be neutral or slightly negative with respect to the corridor.* **(Page 2344)**
39. This is what lead to the dispute as between IHSL and NHSL re whether multi-bedrooms should be treated as single rooms or general wards, and accordingly the required pressure in the room. In a general wards in terms of table A1 of SHTM 03-01 you don’t need any type of pressure regime at all, whereas in a single bedroom it should be balanced at the door.

Communication with Infection Prevention and Control Re Independent Validation

40. With reference to an email from Jackie Sansbury to David Wilson on requirements regarding theatre verification dated 4 January 2019 **(A40979097 – Email from Jackie Sainsbury – head virologist re theatre verification – 4**

January 2019 - Bundle 2, Page 65); an email from Ronnie Henderson to Donald Inverarity et al advising MPX will have carried out all test and validation required in the SHTM by handover dated 11 January 2019 (**A40988937 – Email from Ronnie Henderson to Donald Inverarity et al advising MPX will have carried out all tests and validation required in the SHTM by handover – 11 January 2019 - Bundle 4, Page 6**); and an email regarding theatre validation dated 10 May 2019 (**A40979123 – Email – FW: Theatre Validation – 10 May 2019 - Bundle 2, Page 1394**), and the timing of validation (see above regarding the difference in timing between commissioning and validation), there was ongoing dialogue between myself, Jackie Sansbury, David Wilson (MPX Commissioning Manager) and IPCT, namely Donald Inverarity, Consultant Microbiologist and Lead Infection Control Doctor and Sarah Jane Sutherland, Infection Control Nurse, as to the content of the commissioning and validation information that would be provided by MPX and whether it would be adequate to satisfy the requirements of SHTM 03-01, or if we would also require separate independent validation after handover.

41. When I said that “this is in line with all projects carried out in NHSL”, I meant that we would normally employ a contractor similar or identical to the one used to provide validation and evidence of compliance to MPX. The documentation would not always be in the form of the type of report issued by IOM but it would have the necessary information and a statement of conformity with SHTM 03-01. At RHCYP/DCN we, theoretically at least, had the additional layer of assurance provided by the independent tester review and sign off.

42. The contract to build the RHCYP/DCN was let as an NPD contract meaning the building does not belong to NHSL until the end of a concession period which I believe is 30 years from date of handover. Under that contract the SPV (IHSL) were to provide a fully compliant facility ready to occupy and put to use by NHSL. This, in my opinion, should have included validation to SHTM 03-01 and in this regard by handover MPX provided documentation to evidence that systems were commissioned, in addition this was witnessed and approved by

the Independent Tester.

43. As IHSL are the building owners it could be said that they were responsible for ensuring compliance and indeed they do have that responsibility to carry out verification on an annual basis now that the facility is operational. However, setting that aside, we wanted to ensure that our IPCT were satisfied that the documentation met their requirements and in light of concerns raised that it did not, we proceeded to engage IOM to carry out the validation.
44. To clarify, in my view, the contract had some bearing on who was required to carry out the validation and I had to give due consideration to whether IHSL as building owners should have arranged validation. The documentation provided by MPX and approved by the independent tester may have been deemed to have met the requirements of SHTM 03-01 as it pertained to the contract. The additional layer of approval by the independent tester could be interpreted as the independent element. It was an unusual set of circumstances that we were navigating. However, to ensure all parties were satisfied with the approach to be taken, I began dialogue with IPCT, and it was clear they were not happy with the format of the data from MPX and that we would need to arrange an independent tester in relation to validation.
45. In addition, handover does not necessarily need to occur after validation, and any issues found can be recorded as defects. In any case MPX had stated that they had carried out validation prior to handover and had IT approval of such.

Media Interest

46. I have been asked to comment on an email from Lindsay Guthrie to Annette Rankin regarding a Sunday Herald Article on ventilation issues at QEUH RHCYP dated 5 August 2019 (**A34010959 – Email from Lindsay Guthrie to Annette Rankin regarding a Sunday Herald Article on ventilation issues at QEUH RHCYP 5 August - Bundle 5 Page 27 to 39 inclusive**). By way of

background, on 11 March 2019, Judith MacKay, NHSL Director of Communications, circulated an email in which she outlined that she expected media interest around the involvement of IPC staff in the design of the hospital given concerns arising at the Queen Elizabeth University Hospital (QEUH) in Glasgow. I was not copied into that email or aware of it at the time. We had been liaising with IPC throughout the Project including corresponding on issues relating to validation (**please see A40979097 – Email from Jackie Sainsbury – head virologist re theatre verification – 4 January 2019 - Bundle 2, Page 65 / A40988937 – Email from Ronnie Henderson to Donald Inverarity et al advising MPX will have carried out all tests and validation required in the SHTM by handover – 11 January 2019 - Bundle 4, Page 6 / A40979123 – Email – FW: Theatre Validation – 10 May 2019 - Bundle 2, Page 1394**). I was not aware of the email from Judith MacKay, however I was asked, along with Janice McKenzie, to participate in a site walk round with IPC and Alex McMahon on 20 March 2019 where items raised in the media were to be discussed.

47. The anticipated media interest had absolutely no influence on my involvement with NHSL IPC staff. I would, and did, proceed to arrange independent validation per SHTM 03-01 requirements had there not been this anticipated media interest. The validator and form of information to be provided on conclusion of the validation was an ongoing subject of dialogue with myself, Jackie Sansbury, IPC & MPX, irrespective of media interest.
48. It was felt that the documentation provided by MPX and approved by the IT did not provide the necessary assurance required. Subsequently it was collaboratively agreed with IPCT that additional independent validation should be arranged to provide documentation in a form acceptable to IPCT. It would not be accurate to say that the instruction of an independent tester to undertake validation prior to occupation was because Donald Inverarity insisted upon it, the decision was agreed in collaboration with the project team and IPCT.

Site Walk Round – 20 March 2019

49. As noted above, and with reference to **(A34010959 – Email from Lindsay Guthrie to Annette Rankin regarding a Sunday Herald Article on ventilation issues at QEUH RHCYP 5 August - Bundle 5, Page 27 to 39 inclusive)**, on 20 March 2019, I accompanied IPC staff on a visit to the new site. My recollection is that Janice MacKenzie and I were asked by Brian Currie to accompany Alex McMahon, Executive Director, Nursing, Midwifery and Allied Healthcare Professionals, and IPC on a site walk round to discuss issues highlighted in the press relating to QEUH. In attendance were Janice Mackenzie; Alex McMahon, Donald Inverarity (LICD); Sarah Jane Sutherland (lead HAI Scribe Nurse); and David Gordon (Bouygues).
50. As set out in an email from me to Donald Inverarity providing a summary of main points of discussion and evidence following a site visit of 20 March 2019 addressing concerns raised by IPC dated 21 March 2019 **(A40988839 - Email from Ronnie Henderson to Donald Inverarity providing a summary of main points of discussion and evidence following a site visit of 20 March 2019 addressing concerns raised by IPC – 21 March 2019 - Bundle 5, Page 44)**, during the walk round the general condition of the building was observed and it was evident that there was significant work ongoing. Janice and I explained that although handover had occurred there were still significant ongoing construction works affecting areas that would automatically result in a HAI Scribe failure in terms of NHSL being able to occupy the affected spaces clinically (discussed in more detail below).
51. It is recorded in the email that I explained the sampling process and current status of results and water management. IPC were shown the location of a known outstanding P. Aeruginosa positive and the implications were discussed.
52. It is also recorded in the email that I explained the commissioning that had

taken place for both isolation rooms and theatres and that records were available on the project data storage system. IPC were shown an isolation room, the theatre suite and a ventilation plantroom where David Gordon and I explained the ventilation philosophy for each area. IPC were shown external areas to view pest prevention measures and active measures to prevent ingress of pigeon droppings were demonstrated. IPC were shown room 1-L1-068 (this is not located in critical care) where Dr Inverarity had previously identified an openable window in an isolation room. Janice Mackenzie explained that this had been identified previously by the room review team and as demonstrated had now been resolved. Dr Inverarity was satisfied that this had been addressed.

53. I do not recall agreeing to independent validation of the ventilation system at this walk round in March 2019. MPX had not yet fully provided an example of their final documentation, which may have been in a format acceptable to IPCT, and so there was still ongoing dialogue between Jackie Sansbury, IPC, MPX, and myself at this time.

HAI SCRIBE

54. Dr Inverarity expressed concern during the walk round that this HAI Scribe audit had not taken place before handover, however Janice and I explained that this would have resulted in an automatic fail due to ongoing significant works. To explain further, ongoing works relating to snagging, defects, SA1 agreed works, and significant post completion works meant that building fabric such as ceiling tiles, ceiling hatches, wall panels, doors, and flooring were all removed or in the process of being altered. In addition, various engineering systems were isolated and also in the process of being altered including ventilation AHUs, electrical circuits, fire alarm circuits and equipment, and heating systems. All of this meant it would not have been possible to assess the HAI Scribe against a complete built environment. The same applies to validation, it was not possible to validate the ventilation systems unless there was a complete and clean built

environment. I have been asked whether the building was practically complete at this time. It could be said that the building was practically complete at handover on 22 February 2019 with the exception of prior agreed post completion works as contained in SA1, works to resolve issues contained in the technical schedule of SA1, outstanding works, and snagging & defects

55. In an ideal scenario, it would have been preferable to have carried out the HAI Scribe stage 4 assessment prior to handover of the building but the very nature of SA1 (i.e., dealing with ongoing works) meant that was not possible. Had the HAI Scribe taken place prior to handover it would have served only to highlight ongoing and outstanding works that would still need to be rectified by MPX and revisited. Additionally, any item picked up during the post-handover HAI Scribe visit would still also be required to be rectified by MPX prior to occupation regardless of whether building had been handed over or not.
56. I have been asked why in the circumstances handover was agreed. I had no influence on why handover was agreed, I was in no way a decision maker in that process. However I understand that it was agreed on the basis of all remaining works being included in SA1. I also had no input in to the decision to agree to the certificate of practical completion being issued in respect of SA1.
57. In the circumstances, the HAI Scribe had to be completed post-handover but in advance of patient occupation. In the meantime, all parties took actions to progress HAI Scribe as far as possible as a desktop exercise until it was possible to complete it on site. For example, results of water sampling were to be provided to IPC and IPC were to provide an example of a ventilation validation report that met their requirements.

Multiplex Commissioning Data

58. With reference to an email from Donald Inverarity to Ian Laurenson et al regarding Theatre Validation at RHSC and DCN dated 10 May 2019

(A40980996 – Email chain – RE: Theatre Validation – 10 May 2019 - Bundle 2, Page 1396); an email from Kerryann Little to Tracey Gillies acknowledging the response provided on Theater Validation at RHSC and DCN dated 13 May 2019 **(A40981038 – Email chain – RE: Theatre Validation – 13 May 2019 - Bundle 2, Page 1398)**; an email from Ronnie Henderson to Donald Inverarity regarding Theatre Validation at RHSC and DCN dated 13 May 2019 **(A40981175 - FW: Infection control + Ventilation Issues from Sunday Herald Article on Glasgow QEH-RHCYP - Bundle 13, Volume 8, Page 2346)**; and a Record of General Risk Assessment ventilation combinedrev300118 **(A40981178 - Record of General Risk Assessment ventilation_combinedrev300118 - Bundle 6, Page 14)**, the reports produced by Multiplex were, in my opinion, a collection of documents that could have constituted an acceptable format for validation. This opinion was based on the level of commissioning information available, the experience of the specialist contractors for UCV canopies, the fact that the company used by MPX for commissioning (H&V Commissioning) had previously been used for validation and commissioning by NHSL, and most importantly that the results had been independently verified by the independent tester (Arcadis). However, upon presentation of an example of an MPX validation report to IPC, ongoing e-mail discussions concluded that this was not in a format adequate to comply with SHTM 03-01 for their purposes. Dr Inverarity will be better placed to advise in relation to his view, but as far as I recall it did not contain information on air change rates and pressure cascades in a format recognisable to IPCT as these were held on the project data management system 'Zutec'. The statement of conformity also did not match the suggested concluding wording from SHTM 03-01. A more complete answer may be available from IPCT colleagues.

59. Dr Inverarity's email records some concerns with the MPX documents, including that it did not state what the air pressure or air changes were, and was not clear that, by 'conformity', it meant 'conformity to SHTM 03-01. I have been asked whether or not I agreed with Dr Inverarity's view. At the time, I considered that it might have but subsequently in dialogue with IPCT it was agreed that this did not meet the requirement of SHTM 03-01 in a format acceptable. Indeed, as set

out in my email to Dr Inverarity on 13 May 2019, I was clear that we would not accept anything that IPC were not 100% happy with and I would arrange independent validation through our AE. In terms of the decision to engage IOM, I sought approval from the Project Director, Brian Currie.

60. I have been asked whether, had IPC not indicated that they were unhappy with the validation information, whether the hospital (with the ventilation system that did not comply with SHTM03-01) have been accepted by NHSL. If IPCT had agreed that the information from MPX met their requirements, then that may have happened. In this scenario, it would likely have been discovered as a defect at the first annual verification.
61. The involvement of IPC was part of the consultation process when the project team were reviewing items that may have a bearing on infection control. As previously stated the sample documentation contained all of the results and information that would normally be required of a validation report but not in a report format. Furthermore the statement of conformity did not match the wording in SHTM 03-01.

Instruction of IOM

62. In terms of the engagement of IOM (**A40988908 – Part A 4.2.17 RE Independent Validation - Bundle 13, Volume 8, Page 2367**), they were instructed to validate from SHTM 03-01 as opposed to the contractual specification (as conformed in SA1). At that time, as far as I was aware, there was no approved derogation for Critical Care, it was only when the issue came to light and upon reviewing documentation that it was noted that some of the multi bed bays in Critical Care had inadvertently been included in the derogation for air change rates for multi bed bays. As explained above, it is my opinion that the derogation for single bedrooms did not include Critical Care single rooms as these do not (i) have a starting point of 6ACH and (ii) contain en-suites and all of the supporting documentation for the single room derogation refers to rooms with en-suites.

63. I did not seek input or advice from any other party regarding the requirements of SHTM 03-01 insofar as independent validation was concerned. Once the decision was made that the MPX validation report was inadequate and I became aware our AE would not be available to undertake the audit, I sought advice and recommendations for other suitable qualified organisations from HFS. My recollection is that Ian Storrar from HFS referred me to BSRIA who in turn referred me to Malcolm Thomas, and eventually, through Malcolm I was referred to Jerry Slann of IOM who had availability to undertake the work.

Migration of Services

64. With reference to Meeting notes from the RHCYP & DCN Programme Board dated 13 May 2019 (**A32676909 – Meeting notes from the RHYCP & DCN Programme Board – 13 May 2019 - Bundle 6, Page 24**), I do not recall the particular reasons why the Programme Board considered, as at 13 May 2019, that the migration of services would proceed as planned on 5 July 2019. I did not routinely attend the Programme Board. I do not recall the specific reason for my attendance on 13 May 2019 nor the actual meeting itself. I can only assume I was there for technical support to the Project Director and to update on progress under item 3, Project Dashboard / Post-Handover Activities. However, in my opinion, it may be the reason that the Programme Board considered the migration of services would proceed as planned was based on the fact the works were due to be completed by Multiplex by then and there were no known overarching issues of significance at that time. IOM had not yet been appointed and had therefore not started their validation. There was no reason to think that validation by IOM would identify any significant issues. Generally, it would be expected that validation may pick up a variety of issues such as the need to rebalance the ventilation in some theatres, or minor installation issues, but not usually a significant non-compliance with guidance.

65. I do not know the extent to which the issues raised by IPC staff relating to independent validation and the inclusion of validation on the risk register

factored into the decision to proceed with the migration of services on 5 July 2019. This is for members of Programme Board to answer. In my opinion, on the basis that the decision to instruct an external independent validation was made by 13 May 2019, and that the items described under the residual risks and risk register at item 10 are not specific to the validation works, it would be fair to assume that Programme Board did not anticipate a major issue to be uncovered by the validation exercise.

66. With reference to an email from John Rayner to Jamie Minhinnick advising he is unable to make the meeting on 23 May 2019 to witness the isolation rooms dated 20 May 2019 (**A40981181 – Email from John Rayner to Jamie Minhinnick advising he is unable to make the meeting on 24 May 2019 to witness the isolation rooms – 20 May 2019 - Bundle 6, Page 155**), I was definitely aware that the requirements for independent validation in SHTM 03-01 applied to all critical systems rather than just theatres prior to receipt of this email from Jamie Minhinnick. When referring to “critical systems” it is common to focus discussion on theatres, indeed section 8(a) of SHTM 03-01 part A does that. However, I can confirm that I have always known that the definition is broader and includes critical care as defined in SHTM 03-01, at paragraph 4.7. I specifically included reference to all critical systems in my brief and instruction to IOM by email dated 30 May 2019, which stated: *“As discussed we are looking for independent validation to SHTM 03-01 of 10 theatres (7 of which are UCV but can also be used as conventional), 19 isolation rooms, 1 angiography procedures room, 1 intra-operative MRI, and ITU/HDU/NNU.”*
67. Mr Minhinnick’s email also advises that *“You should also pass any agreed derogations with regards to ventilation systems to the engineers. Without this, they will be measured against the SHTM 03/01 criteria and not the design (which can often be very different).”* I did not pass any derogations to IOM as I was unaware any existed for any of the systems they were validating.

68. The fact Mr. Minhinnick raised this point in his email is of no consequence. Even if he had not, my brief to IOM would have included validation of all critical systems, including critical care, "ITU/HDU/NNU" as set out above. I confirm that ITU/HDU/NNU are all of the areas contained within Critical Care at RHCYP/DCN
69. It has been put to me by the Inquiry that SA1, on one view, derogated from SHTM 03-01 to the extent that derogations to air change rates covered critical care rooms and I've been asked why I would seek independent validation against SHTM03-01 in these circumstances. The simple answer is that I was not aware there were derogations in terms of air change rates in critical care.

Partially Completed HAI Scribe

70. **(A35230420 – SHFN 30 Part B form on Development stage 4 Review of completed project of 1 June 2019 – Bundle 5, Page 95)** is a partially completed HAI Scribe. It is not completed or signed off. As far as I am aware, a stage 4 HAI Scribe was not signed off prior to the delay in July 2019.
71. I am listed as part of the HAI Scribe Review Team, along with Lindsay Guthrie, Sarah Jane Sutherland, Dorothy Hanley and Janice Mackenzie. This HAI Scribe appears to relate to Lochranza (haemato-oncology); PiCU and DCN Acute care. There is a question at 4.26 which states *"Is the ventilation system designed in accordance with the requirements of SHTM 03-01 Ventilation in Healthcare Premises"* There is an asterisks which states: *"with derogation 4 ac/hr – single rm, risk assessed + approved"*. I did not write this but assume it relates to the derogation for single rooms (which did not include single rooms in critical care) or to 4ACH for Lochranza.
72. By way of background, NHSL had agreed a derogation as per Project Co Change 50 **(A35004487 – IHS00000513 - Bundle 13, Volume 8, Page 2373)** and item 4 of SA1 so that rooms in Lochranza had 4ACH **(A32469163 – Settlement Agreement and Supplemental Agreement relating to the**

Project Agreement for the provision of RHSC and DCN between Lothian HB and IHS Lothian – 22 February 2019, Bundle 4, Page 40). My

recollection is that this was agreed in a meeting with IPC and clinicians at RHSC on 23rd of February 2017. It took place in a room at ward 2 at the RHSC. The attendees as far as I can remember were me, Janette Richards, Dr Pota Kalima (consultant microbiologist), Dorothy Hanley, Janice MacKenzie and two clinicians from the ward, Mark Brougham and Ann Cairney. It was agreed there that a standard operating procedure could be put in place to overcome any operational issues that arose as a result of the designed ventilation system, and that the clinical team and IPCN present were content with that solution.

73. Unlike Lochranza, we had not agreed a derogation to 4 air changes for single rooms in critical care and so I would not have said as such to the HAI Scribe review team. In my view, at this point in time, 10 air changes were required to be compliant with SHTM 03-01. IHSL never sought a derogation for single rooms in critical care so we were very shocked to discover that the rooms in critical care were non-compliant with SHTM 03-01.

Instruction of IOM

74. On 17 June 2019, IOM began their testing. The background to their instruction is that upon conclusion of e-mail dialogue with IPC around the suitability of the example report provided by MPX, I took the decision to ask our appointed AE, Turner PES, if they could carry out an audit. The decision was discussed with MML and the project director Brian Currie, as Turner PES were NHSL appointed AE it seemed most reasonable to ask them to carry out the work. Both Turner PES AEs, Jamie Minhinnik and John Rayner, had other commitments and were unable to provide the required time commitment. At this point I sought advice and recommendations for suitably qualified organisations from HFS on the understanding that there would be others on the HFS framework. As set out above, my recollection is that Ian Storrar, HFS, referred me to BSRIA who in turn referred me to Malcolm Thomas, and eventually,

through Malcolm I was referred to Jerry Slann of IOM who had availability to undertake the work.

75. On 30 May 2019 I sent an e-mail (**A40988908 – Part A 4.2.17 RE Independent Validation - Bundle 13, Volume 8, Page 2367**) briefing IOM on the areas that I wanted them to validate, which specifically include critical care. The e-mail is the entirety of the instruction, there would have been an accompanying purchase order with the same text however I cannot locate it. Further correspondence took place in the days following culminating in a site visit by Paul Jameson, AE for IOM, where I briefed him further on the scope of works. An order was subsequently placed to cover the appointment. In my email, I specifically instructed IOM to: *“Carry out independent validation to SHTM 03-01 of 10 theatres (7 of which are UCV but can also be used as conventional), 19 isolation rooms, 1 angiography procedures room, 1 intra-operative MRI, and ITU/HDU/NNU. There are also 3 standard MRI’s, & 2 CT’s, which are non-interventional, if these are required under 03-01”*
76. MML were involved in IOM testing to the extent that they were Technical Advisors to the Board. They were asked to accompany IOM, witness results, and assist where possible with facilitating the validation, but they had no role in the actual testing being carried out.

IOM Discovery of Ventilation Issue

77. I was on annual leave from 7th June 2019 returning to work on Wednesday 26 June 2019 and therefore had no awareness of the ventilation issues discovered by IOM until 26 June 2019. Upon returning to work on 26 June I was briefed by Brian Currie, Project Director, that IOM had produced an issues list (**A40988873 – IOM issues log on RHCYP – 25 June 2019 – Bundle 6, Page 255**) on the 25 June identifying where they were finding issues with ventilation. Brian Currie had requested an urgent meeting with MPX to discuss the issues flagged by IOM. I immediately began work to fully understand the situation.

78. At the time I first became aware of the issue, I did not immediately consider that the results would impede the planned migration date because I had no knowledge or understanding of how serious the issues were. The initial focus was on ventilation issues arising in theatres and we were trying to gauge the level of works required to rectify the issues ready for opening. We also reviewed the critical care ventilation system and were trying to gauge what the issues were and how they could be resolved. As I was just back from leave this was a very intense period of investigation work trying to double check the findings, understand the implications and give consideration to possible engineering solutions.
79. Investigations included additional tests carried out by IOM (and separately by MPX) to verify the original results. In some areas MPX were reporting back different readings to IOM. To resolve that conflict it was agreed that MPX and IOM testing would be carried out at the same time so readings could be verified by both parties on the spot. We were also checking the calibration of the measuring equipment itself to see if that was the problem. We were then triple checking calculations because the results were just so unexpected.
80. While these investigations were underway it was unknown to NHSL if there was a fundamental fault with the system that could be rectified easily to provide the required 10 ach or if there were more significant underlying reason for the issue. The meetings with MPX turned into small, focused workshops with Brian Currie and myself representing NHSL, and Colin Grindlay and Darren Pike representing MPX. I cannot recall if there were other attendees representing either party at specific meetings as the situation was very fluid.
81. The decision to escalate the ventilation issues to the Board's Executive team was not part of my remit. Any decision to escalate was the responsibility of the Project Director, Brian Currie. On the morning of Friday 28th June an escalation meeting took place to discuss IOMs findings with the NHSL Executives including Susan Goldsmith, Tracey Gilles and Alex McMahon and relevant members of the RHCYP team, including Brian Currie. I do not recall being at

this meeting but my understanding is that the main focus was ventilation in theatres. Critical care investigations were still ongoing at this point. It was decided to prioritise remedial actions to theatres pending the result of the Critical Care workshop meetings with MPX.

82. Later on Friday 28th June, there was discussion between IHSL, IOM and the NHSL Executives about the Critical Care air change rates. My recollection is that MPX were asked by NHSL to re-check and re-calculate the absolute maximum ACH that could be achieved by the system over the weekend and advise NHSL accordingly.
83. It is my recollection that on Monday 1 July 2019, IOM confirmed verbally to Brian Currie that in their opinion, the equipment serving critical care was not capable of delivering 10 ACH. IHSL and MPX also confirmed verbally to Brian Currie on 1 July 2019 that the Critical Care ventilation equipment was not capable of delivering 10 ACH. I understand after receipt of this confirmation from IHSL, IOM and MPX, the issue was then escalated by Tracey Gillies, Medical Director, to the NHSL Board (**A40988883 – PART A 4.2.22 20190701 RE Summary email or critical care ventilation - Bundle 13, Volume 8, Page 2376**).
84. On Tuesday 2 July 2019, a meeting was held in the Clinical Management suite which I attended with Brian Currie for NHSL and Darren Pike and Colin Grindlay for MPX. MPX presented a spreadsheet with three options (A, B and C) for utilising the existing system to improve the air change rate in critical care. Later that day a meeting was held by senior Board personnel to discuss the ventilation performance in theatres, to verify the status of the isolation rooms, and to discuss the options proposed by MPX as an interim solution to the critical care ventilation issue. I cannot recall if I was at that second meeting or not.
85. I understand there was also a meeting on Tuesday 2 July 2019 between the Board's Chief Executive in which the NHSL Chair briefed the Director General

of Health & Social Care and the Chief Performance Officer at NHS Scotland on the situation and the options, but I was not there. The outcome of the meeting was that NHSL would develop, as one possible option, a plan for a phased move of services that would take place over coming weeks and months. That included using MPX option A as an interim solution for critical care. The work for option A involved blanking off the air supply to 1no. 4 bed bay and 1no. single bed cubicle and redistributing the air to provide 5ACH to the remaining multi bed bays and 7ACH to the remaining single bed cubicles. This excluded the isolation rooms which were already receiving compliant air change rates and pressures

86. On Wednesday 3 July at 10am, Brian Currie emailed Wallace Weir and Darren Pike at MPX (I was copied in) instructing them to proceed with option A. MPX had indicated that they would complete the works on Saturday 6 July **(A45059063 - 2.7.20 RHCYP+DCN – Little France – Critical Care Ventilation - Bundle 13, Volume 8, Page 2378)**.
87. On the same day, Wednesday 3 July, I understand there was a meeting held between NHSL personnel, Health Facilities Scotland, and the Scottish Government and that major concerns were raised about the risks of doing the permanent works with patients in situ. In addition, scepticism was raised in relation to timeframes and the simplicity of the remediation works proposed by IHSL. Again, I was not at the meeting **(A40988901 - PART A 4.2.27 20190703 FW RHCYP+DCN – Little France – Critical Care Ventilation - Bundle 13, Volume 8, Page 2381)** and **(A40988971 - PART A 4.8.10 20190703 FW RHCYP+DCN – Little France – Critical Care Ventilation, 3 July 2019, Bundle 13, Volume 8, Page 2384)**.
88. On Thursday 4 July, the Scottish Government issued a media release announcing the postponement of the move to RHCYP & DCN.
89. From Thursday 4 July – Saturday 6 July Multiplex carried out the adjustments detailed in the interim solution option A and email instruction of 3rd July

completing works on Saturday 6th July. The works were completed but never fully tested as this solution was superseded by the Cabinet Secretary's decision to postpone the move.

Declaration

90. I believe that the facts stated in this witness statement are true. I understand that this statement may form part of the evidence before the Inquiry and be published on the Inquiry's website.