WITNESS STATEMENT

Criminal Procedure Rules, r27.2; Criminal Justice Act 1967, s.9; Magistrates' Courts Act 1980, s.5b

Statement of: HARRISON, JAMES

Age if under 18: Over 18 (if over 18 insert 'over 18') Occupation: HEAD OF OPERATIONS

This statement (consisting of 11 page(s) each signed by me) is true to the best of my knowledge and belief and I make it knowing that, if it is tendered in evidence, I shall be liable to prosecution if I have wilfully stated in it anything which I know to be false, or do not believe to be true.

Signature: JAMES HARRISON Date: 29/06/2018

Tick if witness evidence is visually recorded ☐ (*supply witness details on rear*)

Dated: 29 June 2018

1. I am the Head of Operations for the London network which is one of the four gas networks operated by Cadent Gas Ltd ("Cadent").

2. This is the second witness statement I have made in relation to the Grenfell Tower fire which took place on 14 June 2017. I have previously made a statement to the police on 30 January 2018 and I provided my consent to that witness statement being shared with the Grenfell Tower Public Inquiry ("the Inquiry"). I am equally content for this statement to be shared with the Inquiry.

3. A number of my colleagues who attended Grenfell Tower ("the Tower") on the night of the fire have also been assisting the Metropolitan Police Services ("MPS") with its investigation. I understand from Cadent's legal advisers that during some of those interviews and in subsequent correspondence with Cadent, the MPS have requested information, supported by any maps that might exist, about the location of isolation valves at the Tower. The request for information from the MPS can be summarised as follows:

3.1 Where the isolation valves at the Tower should have been;

3.2 Where the isolation valves at the Tower were; and

Signature: James HARRISON Signature witnessed by:
2018

3.3 The location of any other isolation valves in the vicinity of the Tower.

This second witness statement is provided to answer those questions.

Background - the supply of gas into Grenfell Tower

4. When the Tower was constructed in 1974, gas was supplied from the gas distribution main on the east side of the Tower via pipes referred to as "Service Pipe(s)". The Tower originally had two supplies of gas. The first, a 10" steel service, supplied a communal heating and hot water system in the basement of the Tower. The second, a 4" steel service, supplied gas for cooking in residential flats on the 4th to 23rd floors via four gas vertical riser pipes, two of which split making a total of six vertical riser pipes. From each of the vertical gas risers a lateral gas pipe would branch off providing an individual gas supply to each flat. The lateral supply pipe would terminate with an Emergency Control Valve ("ECV") within each flat at the gas meter. The outlet connection of the ECV is defined as the end of Cadent's gas distribution network. Cadent acquired responsibility for the gas supply on 30 September 2016 and in so doing inherited historical plans in relation to gas services in London across its distribution networks dating back many decades. There are no contemporaneous plans in that historical bundle that Cadent holds which show the exact detail of the two original supply pipes.

5. Between October 2016 and June 2017, a new 90mm Polyethylene / 3" steel service pipe and steel gas riser system was installed in the Tower as is described in greater detail in my colleague, Stephen MASON'S witness statement provided to the MPS and available to the Inquiry [CAD00000004]. This new service pipe was also supplied from the gas distribution main on the east side of the Tower.

6. The map at Exhibit JAH1 is a drawing showing all of the mains and supply pipes in the vicinity of the Tower as at 14 June 2017. The three supplies are shown entering the Tower on the East. The three supplies are labelled "4in ST", "90mm PE" and "10in ST". The map at Exhibit JAH2 shows the map of the gas supplies as they currently appear on our system. This shows that there are no gas supplies to the Tower.

7. As to where the valves at the Tower should have been located, the relevant guidance that would have been applicable at the time the Tower was constructed, was the guidance published by the Institution of gas Engineers in 1968, Recommendations for the Laying of Steel Gas Service Pipes ("the 1968

Guidance") and the Gas Safety Regulations 1972 which came into force on 1 December 1972 and IGE/TD/4 Communication No.879 — Recommendations on Transmission and Distribution Practice Laying of Steel and Ductile Iron Gas Service Pipes (1973).

Where should the isolation valves have been located

8. The 1968 Guidance included provision for valves at various points to facilitate isolation for maintenance purposes, network extension(s), or in the event of an emergency, these being:

a. A consumer control (now known as an emergency control valve) within each individual flat: *"Every service pipe should terminate at the meter position with a consumer control of the standard type normally used by the Gas Undertaking.";*

b. A facility provided for the disconnection of each branch pipe (now known as a branch isolation valve): *"Facilities should be provided for the* diconnexion *[sic] of each branch pipe at a position adjacent to the rising service pipe, such position to be readily accessible to the Gas Undertaking's personnel.";*

and

c. 'Service Cock' or 'Valve' (now known as a pipeline isolation valve): *"when, by reason of special circumstances (e.g. in blocks of flats or buildings with a large forecourt), a service cock or valves is fixed within the property boundary, it should be placed outside the building in a readily accessible position*".

9. To assist, we have created schematic layouts of the gas services within the Tower. Exhibit JAH3 shows a schematic layout of the gas service pipes and internal gas riser system installation at the Tower as at construction in 1974, together with gas meter installation, customer's installation pipework and appliances. Exhibit JAH4 shows the same schematic layout as shown in Exhibit JAH3 but using current terminology for valves.

10.The current guidance which would also have been applicable at the time the new supply pipe was installed at the Tower, is IGEM/G/5. IGEM/G/5 is a technical standard that was published by the Institution of Gas Engineers and Managers ("IGEM"). IGEM is a chartered professional body, licensed by the Engineering Council, serving a wide range of professionals in the UK and the international gas industry. The current version of IGEM/G/5, Edition 2, was published in September 2012, with the first version being published in 2006.

11. IGEM/G/5 is described as a standard that "summarises *best practice for the design, installation, operation and maintenance of gas installations for multi-occupancy buildings. It combines well established practices with new advice on aspects of design and construction of such installations. The Standard consolidates best practice and guidance from legislation, and existing gas industry standards and procedures, with the aim of helping to achieve safe designs and installations for gas in the buildings concerned".* The legislation and existing gas industry standards and procedures referred to within IGEM/G/5 are listed in Appendix 2 of the document.

12. According to IGEM/G/5, isolation valves shall be provided to permit the following to be achieved:
a. "stopping of existing gas escapes, thus minimising *the possibility of explosion and fire (or further explosion and fire);*
b. removal of the possibility of gas escapes in circumstances where conditions are unknown;
c. removal of the possibility of other gas-related emergencies, for example carbon monoxide poisoning;
d. removal of the possibility of gas escapes when a building, or a part of it, is unoccupied or ceases to use gas;
e. *carrying out of alterations and maintenance in gas-free conditions".*

13. IGEM/G/5 provides for the following isolation valves to be installed when designing and constructing a gas supply for a multi-occupancy building ("a MOB"). The guidelines of IGEM/G/5 are not retrospective in effect. To assist, an illustration of these valves as referred to in IGEM/G/5 can be found at Exhibit JAH5.

a. Pipeline Isolation Valve ("PIV"): installed below ground outside the building on the service pipe(s). The location of a PIV is usually demarked by a small size valve chamber box, with either 'Gas' or 'G' indicated on it;
b. Inlet Isolation Valve ("IIV"): the IIV shall be located near to the point of entry of a network pipeline into a MOB and shall enable that part of a building complex being fed by an internal pipeline to be isolated for maintenance or safety reasons;
c. Branch Isolation Valve ("BIV"): where there are multiple vertical or horizontal gas risers off a single service pipe (as was the case in the Tower) each riser should have a BIV located as close to the junction with the incoming service pipe as practicable to facilitate maintenance;

d. Lateral Isolation Valve ("LIV"): where a lateral supplies an individual dwelling a LIV is installed before the supply enters the flat, for isolation or maintenance purposes; and

e. Emergency Control Valve: these are generally located inside each dwelling within a MOB and is used by the consumer or gas engineer to isolate the gas supply within their dwelling for the purposes of maintenance, installation, extension, repair of installation pipework, the fitting or replacement of an appliance, or to isolate a gas escape.

14. In terms of where these isolation valves should be located, sections 7.4 to 7.7 of IGEM/G/5 set out the preferred locations of IIVs, BIVs, LIVs and ECVs.

15. Section 7.3.1 deals with the location of PIVs, and states: *"where a network pipeline supplies a multi-occupancy building, a PIV shall be installed outside the building to enable isolation of the building complex". Section 7.3.3 states that "any PIV shall be protected with a valve cover and shall be permanently identified".*

16. In selecting the location of the PIV (section 7.3.4):

a. *"it shall be sited as near as is practicable to the boundary of the property;*
b. *the effect of a building fire on its operability shall be considered;*
c. *it shall not be positioned where vehicles are likely to stop or park".*

17. *IGEM/G/5* further states (section 7.3.5) that *"the PIV should be located in the following order of priority:*
a. *in, or in line with, the footway nearest the building;*
b. *inside the property boundary, but not in planted areas such as borders or hedges;*
c. *elsewhere within the property boundary, preferably at least 5m from the building;*
d. *where the section of pipeline is long and has been laid in a non-standard orientation, in the two most appropriate positions (using the guidelines above) at both ends of the section of pipeline, so as to indicate the line of the pipeline".*

18. The operation of valves poses a number of risks including effects on the wider gas network and the

potential to cause an explosive mixture of gas and air in an unexpected location. As a result, PIVs are designed to be operated by the gas transporter e.g. in this case Cadent, rather than the occupiers of the building or the emergency services, e.g. Fire and Rescue Service. IGEM/G/5 states that *"any PIV shall be of a type that can be operated by a key held by the gas transporter/gas conveyor and the ESP (emergency service providers). The design or position of the valve shall resist efforts by persons who are not competent to restore gas supplied, such as building occupants or members of the public to operate it with standard tools"*. The ESP in this context is the gas emergency service provider, a role normally undertaken by the gas distribution networks

19. Fire services are reminded not to operate external mains or service isolation valves. Such action would be in contravention of the Pipeline Safety Regulations 1996 in respect of competence to work on the Gas Network. I attach as my Exhibit JAH6 a Safety Advice for Emergency Services Attending Gas Escapes leaflet which was created under the auspices of Gas Transporters' Incident Review Panel, a group comprising representatives of all Gas Distribution Networks in the UK. The leaflet makes it clear to all fire services that they should not operate the external mains or service isolation valves.

Where the isolation valves were located at the Tower

Isolation valves inside the flats

20. Each individual flat with a gas supply would have had an ECV. A customer can isolate their own supply of gas by closing the ECV. If a customer reports a smell of gas to the National Gas Emergency Centre, they will be advised to turn off the gas to their property at the meter by operating the ECV. However, the only isolation valves that were capable of isolating the supply of gas to the whole Tower on 14 June 2017 were situated in the basement and outside in the perimeter of the Tower.

The isolation valves inside the basement

21. A number of isolation valves were located inside the basement of the Tower and these can be seen in the photographs at Exhibit JAH7.

22. Each of the four gas vertical riser pipes in the basement, which were supplied by the original 4"

supply, had its own BIV. A photograph of each of these BIVs can be seen at Exhibit JAH7. One of these BIV had already been isolated following a reported gas escape on the 30 September 2016 following an asset survey of the building.

23. The original 10" steel gas service pipe (which supplied the boiler) had an ECV. No photographs of the ECV are available. However, the approximate location of the ECV can be seen at Exhibit JAH7.

24. In terms of the new service pipe installed in 2016/ 2017, an IIV was installed on the new 90 m m Polyethylene gas service pipe, immediately where the service pipe entered the basement, as can be seen from the photograph at Exhibit JAH7.

25. It should be noted that in order to disconnect the whole supply of gas to the Tower from the valves in the basement, it would have been necessary to isolate all of the isolation valves in the basement being the three BIVs on the vertical risers, the ECV on the 10" supply and the IIV on the new 90mm gas service pipe.

The Pipeline Isolation Valves

26. All three would have been located on the east elevation of the Tower, being the elevation of the Tower where all three supply pipes entered the building. All three would have been within close proximity to the Tower, in order to be compliant with the 1968 Guidance and IGEM/G/5.

27. Each Cadent Repair engineer carries a valve key and is equipped to operate PIVs. Once located, the Repair engineer could remove the valve chamber cover and operate the valve by using their valve key to turn the valve spindle. This would isolate the supply of gas to the building supplied by that gas service pipe.

The operation to isolate the supply of gas on 14 June 2017

28. If Cadent attends an emergency incident at a MOB and it is necessary for it to isolate the supply of

gas, this can be achieved by either turning off the valves on the internal pipework within the building, or by operating the PIVs outside the building. The preferred option would be to isolate the nearest valve to any gas escape, if there is one, in order to minimise disruption to other customers within the MOB. If this is not possible, isolation can be achieved by carrying out isolation on the network.

29. The operation of isolating the supply of gas commenced at around 07:45 on the morning of 14 June 2017 when the LFB confirmed to Cadent that it did indeed want Cadent to isolate the supply of gas to the building (although Cadent engineers had been on site since 03:48 and had been formulating a plan to turn off the gas whilst awaiting instructions from the LFB). This operation was successfully completed at 23:30 on the evening of 14 June 2017 when the gas supply to the Tower was completely disconnected.

30. Isolation of the supply of gas to Grenfell Tower on 14 June 2017 was achieved by carrying out three physical isolations to the network by excavating the mains feeding gas into Grenfell Tower and stopping the flow of gas by cutting the mains at three isolation points away from the immediate vicinity of the east elevation of the tower. These isolation points are identified at Exhibit JAH8. It will be seen from this exhibit that these locations were nevertheless still close to the Tower and our engineers were operating within dangerous and unsafe conditions. Isolation of gas to the Tower could only be achieved by this methodology in the circumstances of this fire.

31. In making their decisions as to how to isolate the supply of gas to the Tower as quickly as possible on 14 June 2017, our engineers who were on site had the following information available to them:

a. Many of the engineers who attended are experienced engineers who have been working on the London network for a number of years. Some of the engineers had been carrying out unrelated repair works in one of the neighbouring streets to the Tower during the weeks leading up to the fire and therefore understood how the gas network worked.

b. Cadent, through its contractors tRIIO, had been undertaking riser replacement works at the Tower and a number of colleagues had a general understanding of the gas supply into and within the Tower. I understand that one of our contract managers who had been involved in the riser replacement work rang one of the lead engineers who responded to the incident, Jason ALLDAY, when Jason was on his way to the site to tell him what he knew about the gas supply at the Tower.

c. One of the contractors who had been working in the Tower also sent an email at 08:06am on the

morning of 14 June 2017 to provide information about the gas supplies. This e-mail was sent on to the engineers who were on the ground. A copy of this e-mail is attached at Exhibit JAH9.

d. The engineers also obtained copies of the maps of the gas network around the Tower to help gain an understanding of where the mains were located. Our Emergency Call Operatives carry Go Books to all incidents which is a portable laptop that can be used to accept jobs, liaise with the Dispatch Centre and request further resources. They also have map applications which can be used to view maps of the gas mains. A copy of the map that our engineers would have had on 14 June 2017 is attached at Exhibit JAH10. Although the engineers who attended on 14 June 2017 would have known from the other sources of information that the Tower had three supplies of gas entering the east elevation of the Tower, as is shown in Exhibit JAH1, the map of the gas supplies as it appeared on our system on 14 June 2017 only shows the 10" supply and the location of the PIV on the 10" supply.

32. Notwithstanding the different sources of information available, the decisions that our engineers had to make on 14 June 2017 were governed by what was possible to do under the circumstances. Isolating the gas by operating the PIVs was never considered by any of our engineers to be a viable option. It was plain to our engineers as soon as they arrived on site that disconnecting the supply of gas would have to be achieved by physically isolating the local gas distribution mains in the network and away from the immediate vicinity of the Tower.

33. Although I did not attend the Tower until the afternoon of 14 June 2017, the engineers who were first on site have described to me how the whole Tower was engulfed in flames. Burning pieces of debris were falling from the Tower.

34. The engineers understood that residents were still being rescued and evacuated and that the priority was to get people out of the Tower. There was a real sense amongst everyone on site that the building was at risk of collapse. Members of the public were being kept away and a number of safety cordons were erected to prevent people approaching the Tower. The police had also erected an exclusion zone around the foot of the Tower where huge amounts of burning debris were falling and where our engineers understood victims had tragically perished. Although the Cadent engineers were permitted to pass through some of the safety cordons with the permission of the police, they were not permitted to get close to the Tower and enter the exclusion zone. They were instructed by the LFB to "stand by."

35. No attempt was made by any of our engineers to approach the eastern side of the Tower in an effort to find the exact location of the PIVs with a view to operating them, as it was completely impossible to do so given the nature and intensity of the fire. As I understand has been illustrated by the footage of the fire disclosed by the Inquiry, the ground in the immediate vicinity of the foot of the Tower was covered by fallen debris and burning debris continued to fall from the Tower throughout the course of the day.

36. During the afternoon of 14 June 2017, one of our engineers was asked whether he would be prepared to enter the basement of the Tower and my colleague Jason ALLDAY together with another colleague Patrick KELLY, accompanied by the LFB firefighters, entered the basement of the Tower in an effort to turn off the IIV on the new 90mm supply, the three BIVs located at high level on the 4" supply and the ECV located on the 10" supply.

37. As I understand he has described in his statement to the MPS, Jason ALLDAY and Patrick KELLY entered the basement of the Tower at around 15:50 on the afternoon of 14 June 2017. This was the first opportunity to enter the building. Entering the basement of the Tower was difficult and dangerous. They were protected from the falling debris that was continuing to fall by police riot shields as they made their way into the basement. They were instructed to be very careful where they walked and the firefighters cleared a pathway for them to enter the basement. They understood from what the emergency services told our engineers that the foot of the Tower was a crime scene as victims had perished there under what was a mountain of burning debris. The entrance to the basement was on the east elevation of the Tower, where the gas supplies entered the Tower.

38. Once inside the basement, Jason ALLDAY could see two of the four risers within the basement. The valves were out of his immediate reach. They would have been accessible to engineers in the ordinary course of their duties. However, almost as soon as they had entered the basement, everyone within the Tower had to evacuate the building on the instruction of the LFB due to concerns about its stability. The basement was also flooded and when Jason ALLDAY entered the basement he was knee deep in water and noted that there was still a live electricity supply to the basement. The circumstances that prevailed therefore precluded the Cadent team from making arrangements to access the basement valves with a view to their isolation.

Reflections

39. Before attending my first interview with the MPS, I reflected on whether there was anything I personally, or the operational team could have done differently, or would have done differently when we were asked by the LFB to disconnect the supply had we known everything that we know today. I concluded that we couldn't have done anything different and I would conclude that faced with the intensity of the Grenfell Tower fire, isolating the gas by cutting and capping the gas mains at the three identified points was the only viable option available to the Cadent team. Under the circumstances, it was the most effective way of isolating the gas supply to the Tower.

40. Cadent has also considered whether there was anything that could have been done by our engineers to operate the PIVs had it been physically possible to escape the falling debris. It transpires that operating all three of the PIVs in order to fully isolate the gas supply would never have been an option in any event. On 5 June 2018, members of the Cadent team were afforded a site visit to the exterior of the Tower, and sought out the PIVs in their locations close to the east elevation of the building.

41. The PIV for the new gas 90mm supply that was installed in 2016/2017 is currently buried under a concrete plinth that has been erected since the fire to allow lift access to the Tower from the exterior of the building. The other two PIVs would have been located either side of that 90mm PIV but these were not visible on the site visit. There is much equipment still being used on the site which may explain this, but it appeared that the whole area around the perimeter of the building on all elevations has been paved over. This may have occurred during the refurbishment work to the Tower in 2016 as I understand from Cadent's legal advisors that there is mention in the contract documentation for the refurbishment work to external landscaping work. It seems that paving work to the exterior of the Tower was part of the package of works envisaged[1].

42. We have also checked with our two engineers who visited the Tower in 2016 for the purposes of completing the most recent periodic survey of the gas assets at the Tower. Their survey record simply states that they did not see any PIVs either. This survey took place on 30 September 2016, so after the refurbishment work had been completed. It is therefore likely that apart from inaccessibility due to debris,

the PIVs had been paved over, and where thus rendered inaccessible without local excavation. This likely occurred during the 2016 refurbishment works outside the Tower. I am afraid that this is a common occurrence around the country, with PIVS being built or covered over by construction works.

[1] Inquiry documents RYD00092648: RBK00018809; and RBK00018810