

The Findings of the Surrey Coroner

The Inquest Touching the death of Zane Ilorie Christopher Yusuf Gbangbola, Factual Findings and Conclusions, is publicly available and is essential background reading in the context of the Council's future decision-making regarding potential site investigations.

The summary from the Coroner can be found here and is also shown below

https://www.surreycc.gov.uk/_data/assets/pdf_file/0004/273262/Z-Gbangbola-Findings-and-Conclusions-07-09-2016.pdf

The question as to whether Zane Gbangbola's death was caused by hydrogen cyanide was considered in detail by the Coroner including by reference to expert evidence that was before him. Page 29 onwards details investigations into the land.

The medical evidence, from page 36 onwards, includes a summary of findings by medical professionals who gave evidence at the inquest, which contributed to the Coroner's findings.

The Actions to Prevent Further Deaths report circulated by the Coroner following the Inquest is published here and included after the Coroner's summary below :

<https://www.judiciary.uk/wp-content/uploads/2017/01/Gbangbola-2016-0328.pdf>



In the Inquest Touching the death of
Zane Ilorie Christopher Yusuf Gbangbola

Factual Findings and Conclusions

Mr Richard Travers

H.M. Senior Coroner for the County of Surrey

Wednesday 7th September 2016

Inquest touching the death of Zane Ilorie Christopher Yusuf GBANGBOLA

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Forward

Before I begin my findings and conclusions I would like to thank all counsel, particularly counsel to the inquest, Miss Hewitt, for their hard work and assistance, which I have very much appreciated and which has enabled the inquest to run smoothly and effectively. I would also like to acknowledge the very real dignity in which both Ms Lawler and Mr Gbangbola have conducted themselves throughout these proceedings, which I know must have been extraordinarily difficult for them. I would also like to pass on to them, the remainder of Zane's family and all the family's friends, some of whom have been here throughout these proceedings to support them, my sincere condolences on Zane's tragic death and I am sure that others in court would want to join me in that regard.

FINDINGS AND CONCLUSIONS

1. Set out below are my findings of fact and conclusions in relation to the death of Zane Gbangbola. Unless otherwise stated, they have been reached on the balance of probabilities.
2. In reaching my findings and conclusions I have taken account of all the evidence I received, both oral and written. However, what is set out below is not intended to be, and is not, a review of all the evidence. Rather, my intention is to explain, by reference to parts only of the evidence, why I have reached my findings of fact and conclusions.

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Zane

3. I am satisfied that the person who died was **Zane Ilorie Christopher Yusuf GBANGBOLA** who was born on the 21st October 2006 at St Peter's Hospital in Chertsey, Surrey. At the time of his death in February 2014 Zane was the only child of his parents Kye Gbangbola and Nicole Lawler. He lived with his parents at their home address at 243 Thameside, Chertsey (referred to below as "the house"). Zane was 7 years old when he died. He was described by his mother as being a child who was generous and kind with empathy and who walked in truth. Naturally, his parents cherished every moment they had with him and it is absolutely clear to me that they were both devoted and loving parents. They told me that Zane had so many good qualities, that he attended St George's School in Weybridge, where he was doing well, and that at school and at the church they attended he was a very popular child.
4. Zane was a healthy child and had visited the family's General Practitioner at the Abbey Medical Practice in Chertsey very rarely in his 7 years. His father, Kye Gbangbola, has sickle cell anaemia and therefore Zane inevitably had a trait for sickle cell, but this had no day to day effect upon him.

The House

5. As I have already mentioned, the house is on Thameside which, as the name suggests, is a road that runs parallel to the River Thames. The property has an area of grass to the front of the house and a garden to its side and rear. Immediately behind the house and its rear garden is

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an area of former landfill, now containing a lake. That area of land is bordered on two sides by properties. On the one side properties on Thameside and on the other properties on Chertsey Bridge Road which lies at a right angle to Thameside.

6. The house is a semi-detached Edwardian property with a “mirror-image” house next door, number 242 Thameside. On its ground floor the main reception room, which has a large bay window, is at the front of the house and immediately behind it there is a dining room. In the rear half of the ground floor there is a study, a large kitchen area and, side by side at the very rear of the house, a utility room and a lavatory (“the lavatory”). There is an internal door between the kitchen area and the area containing the utility room and the lavatory. There is a further internal door between the utility room and the lavatory. The back door of the house is within the utility room.
7. The staircase leading to the first floor of the house is directly in line with the front door. Upstairs there are two bedrooms at the front of the house. The larger main bedroom (“Bedroom 1”) is directly above the main reception room and the smaller bedroom next to it (“Bedroom 2”) is above the front door and hallway. There is a bathroom behind Bedroom 1 and at the rear of the first floor, at a slightly lower level, there are two further bedrooms, the first and smaller of which (“Bedroom 3”) was Zane’s usual bedroom. The final bedroom, Bedroom 4 is situated at the rear of the house.

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8. The house was designed with a flood basement which is several feet deep and has a soil floor. There are two access points to the flood basement, the first being a hatch in the floor of the main reception room and the second being a hatch in the floor of the downstairs lavatory. Mr Gbangbola told me that whilst the flood basement is not physically open to the basement of the mirror-image neighbouring property, it is linked to the extent that there is a transfer of water from one to the other. In other words, if there is water in one there will be water in the other, and if water is pumped out of one, the water level in the other will subside. Both Mr Gbangbola and Ms Lawler told me that prior to 2014 they had never known the basement to flood; indeed, when they bought the house in / or about 2003 they were told there had been no flooding for 63 years. Nevertheless, there was one permanent submersible electric pump in the basement ready to respond to the presence of water.
9. Finally, I find that the house was fitted with an alarm system and that both Mr Gbangbola and Ms Lawler honestly believed that the system included a working carbon monoxide ("CO") monitor which would sound an alarm if CO was present. However, the evidence of Paul Rhodes, which I accept, establishes that, contrary to the belief of Zane's parents, in February 2014 there was no CO monitor operating in the house.

Events of Early 2014

10. I will turn now to the events of the early part of 2014. In the January and February of 2014 there was significant flooding in the Chertsey

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area and this affected the landfill area and the properties on Thameside and Chertsey Bridge Road. The flow of the water was from the landfill area towards the house and other properties. In an effort to divert the water away from their properties, some of the residents from Chertsey Bridge Road used mechanical diggers to dig a ditch and to create a bund running parallel to Chertsey Bridge Road and to the rear of their properties. One result of doing so was to increase the flow of water in the direction of Thameside.

11. The flooding resulted in the land surrounding the House (that is, 243 Thameside) becoming flooded, including the family's garden both to the front and to the rear. The flood basement of the house filled with water but the water did not enter the living areas. I was told, though, that there was a real risk that the presence of water in the basement could mean that the living area of the house would become flooded, not from water entering from outside, that is through the doors, but by surging up from the basement itself.
12. As a result of these exceptional conditions, the family had purchased a number of additional electric pumps and placed them in the flood basement. These pumps were set up so that the pipes taking the water away ran up through one or other of the two hatches and out through open windows in the main reception room and the utility room. I was told that the electric pumps were kept running, if not all the time, pretty much all the time, and I find that the hum or whirring noise referred to as being in the house by witnesses such as the paramedics was the sound of these pumps in operation.

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13. In late January 2014 all three members of the family were unwell. Zane was sent home from school on the 27th January, having been sick, and he was kept at home for a few days. His mother told me he “had a bit of a cold”. However, it is clear that he was fully recovered by Monday 3rd February and that he attended school every day from Monday 3rd to Friday 7th February. Kye Gbangbola was also unwell and in bed over the weekend of the 1st and 2nd February, although he too was feeling better by the early part of the following week. Nicole Lawler was unwell during the week of the 3rd to 7th February, principally with symptoms in her chest. On the afternoon of Friday 7th February she visited her General Practitioner and was prescribed anti-biotics for a chest infection.

Hiring the Petrol Pump

14. At some point during the week before Zane’s death, and the precise time here is not critical, residents in the area were warned that it was likely that there was going to be a significant increase in the flood level over the weekend of the 8th and 9th February 2014. Not unnaturally, Zane’s parents wanted to be prepared for any such increase and to that end they decided to obtain a more powerful and, more importantly, a non-electric pump. Their main concerns were twofold: first, that the increase in water would mean that the living areas of the house would become flooded either from water coming in from outside, or through the basement, and to that extent they wanted to maintain safe water levels in the cellar. Secondly, that although unlike some of their neighbours, they had not at that stage lost their electricity supply, an

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increase in water level could lead to this and to a consequential failure of the electric pumps. A decision was also taken that if the house became flooded, Zane and his mother would move out to alternative accommodation.

15. In an attempt to find an alternative pump, Ms Lawler got in touch with a local plant hire company, Surrey Hire and Sales Ltd ("SHS"), which was situated a few miles away in Addlestone. She had not been there before but had driven past it. The company did have a petrol pump available and so on the morning of the 6th February Zane's mother went to SHS to hire it.
16. It is uncontentious and I find that Ms Lawler hired from SHS a Honda 2" petrol Trash Pump model number WB20XT – 0016 ("the petrol pump") which works by sucking water in through a green inlet pipe that is rigid in construction and discharging it out through a blue outlet pipe that is collapsible. The hire of the petrol pump included hire of the green inlet pipe and one length of blue outlet pipe. Ms Lawler also hired an additional length of blue outlet pipe. After Zane's death the petrol pump and the green inlet pipe were seized and retained by the police. At my request, the green pipe was recently measured and found to be 3.5 metres in length.
17. Although there is no dispute about what was hired, what took place in the hire shop, and what was said, is contentious in a number of respects. Nicole Lawler's account is that when she arrived at the shop she was told by the man who was serving her, Mr Toogood (about

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which there is no dispute) that a petrol pump would be the best and that they had one in stock. She recalled there was some rather jovial discussion about one of her neighbours collecting a similar pump in a canoe. She had the impression that they (Mr Toogood and another male who was also present) were rather dismissive of her by reason of the fact that she was a woman. When the petrol pump was brought out to her and she saw the length of the green intake pipe, she immediately realised that it was not going to work in the way that she had envisaged, namely with the pump outside the back of the house and the intake pipe coming in through the utility room window, and then down into the basement via the hatch in the floor of the lavatory. She said she told Mr Toogood that she needed the inlet pipe to be at least three times longer and explained the reasons why. In response Mr Toogood told her that they did not have a longer intake pipe and that this was the standard size. Ms Lawler told me that Mr Toogood went on to say that the petrol pump could be put inside the house as long as it was ventilated. There was then some discussion, she said, about its smell and potential damage to the flooring (if the pump was used inside). She said she was told that it would only smell for a few minutes and once it was going it would be fine and that it would not damage the floor. She also told me that Mr Toogood commented that the petrol pump would be safer inside as it would not get stolen. She said she was made to feel like a “silly woman” and that they were used to dealing with trade. She said they seemed to get fed up with her because she was asking a lot of questions.

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18. Ms Lawler told me that she was given a copy of the hire contract and the petrol pump was then carried to her car where she asked for a demonstration of how it worked and this was provided. She said the petrol pump had a plastic folder attached to it and she could see that it contained just one piece of paper, folded in half. She was given no safety instructions.
19. I heard evidence from Jerry Toogood, who was the Branch Manager of SHS's Addlestone branch. By way of background he said that he was aware of the potential hazards of petrol pumps and their emission of CO. He was asked whether, routinely, he warned customers of that danger and said that he did not because he considered it "common knowledge" that exhaust gases are potentially fatal. He explained that, before any piece of equipment is hired out, it is inspected to ensure it is working properly and, at the end of the inspection, it was the responsibility of the fitter to place the inspection certificate and a set of safety instructions in a plastic wallet attached to the equipment. It was also the responsibility of the person serving the customer to check that both documents were in the wallet before the equipment is hired out.
20. In giving his account of what happened on the 6th February 2014, Mr. Toogood said that he agreed with parts but not all of what Ms Lawler had said. He said that normally a customer is in the shop for 5 minutes but Ms Lawler was present for 25 or 30 minutes. Initially he recalled that when she arrived she knew that she wanted to hire a petrol pump and he collected the petrol pump from the stores and brought it to the counter. He said the petrol pump had a plastic wallet on it and he

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could see that it contained both an inspection certificate and safety instructions, although he did not take these documents out. He also said that it was standard for a petrol pump to come out of the stores with a full tank of petrol but he did not open the tank to check this.

21. Mr Toogood said that at an early stage, while he was creating the hire contract on the computer, Nicole Lawler asked “out of the blue” whether she could use the petrol pump inside. The shop owner, Mr Dormer, was present and he heard him answer “No”. Mr Toogood told me that he too answered “No”, or words to that effect, and that nothing else was said about using the pump inside. He told me that Ms Lawler acknowledged what they had said by nodding her head and saying “OK”. He did not explain to her why she should not use it inside or the risks of doing so. He denied saying that the petrol pump could be used inside if there was ventilation or the windows were open, or that it would be safer as it would not be stolen.

22. Mr Toogood said that he could not recall mention being made of a similar pump being hired by a neighbour and collected on a canoe, although he was aware of that having happened and it may have been mentioned by him “by way of conversation”. He said that he did recall that something was then said by Ms Lawler about the length of the petrol pump’s hoses. This caused him to collect (and hire to her) extra lengths of the blue outlet pipe. However, he did not recall discussion about the length of the green intake pipe. He was positive that Ms Lawler did not say to him that the green pipe was too short to pass through a window and into the flooded basement. In any event, the

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green pipe was a standard length and the shop did not supply extra lengths.

23. Mr Toogood explained that he completed and printed off the hire contract. He agreed that the hire contract contained a number of specific boxes which were to be completed manually. One of them stated, "Written safety instructions given" and he agreed that he had not ticked the "yes" box to indicate that safety instructions had been provided to Ms Lawler. He gave a number of reasons for this. He said that Ms Lawler had been in the shop for 25 to 30 minutes and he did not want to keep her any longer. He also said that the standard "tick boxes" on the hire contract were a new procedure and in February 2014 he was not yet in the habit of completing them. However, when questioned about this by Mr Thomas, he agreed that the boxes had been present on the hire contract for some time, but said that staff had only recently been required to complete them. He insisted that his failure to tick the "written safety instructions given" box on this occasion was simply "sloppy" and that safety instructions had been provided in the plastic wallet.

24. Mr Toogood told me that after completing the hire contract he carried the hired equipment to Ms Lawler's car and he agreed that he then gave her short demonstration of how to operate the petrol pump.

25. I heard evidence also from Stephen Dormer who is the part owner of SHS. He was present in the Addlestone branch on the 6th February although he was moving between an office area and the serving

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counter during Ms Lawler's visit. By way of background he told me that he expected the tanks of any petrol pump hired out by SHS to be full of fuel. He told me that on the 6th February he recalled being in the vicinity of the serving counter when Nicole Lawler was present and hearing general conversation about the petrol pump and mention being made of Ian Berry collecting a similar pump in his canoe. He was part of that conversation. He said that at some point he heard Ms Lawler ask, "Can it be used inside ?" and that he answered first and said "No". Jerry Toogood then said the same. She said "OK" and nodded her head. He said that the fact that the question was asked did not cause him concern. He said he may then have gone back to his desk in the office area. He said that he did not take part in or hear any conversation about the green inlet pipe being too short, about using the pump inside with ventilation or about it being safer to use the pump inside as it would not get stolen. He could see Ms Lawler being given a demonstration by Mr Toogood outside but could not hear what was being said.

26. Mr Dormer was asked about the written safety instructions, which SHS provided when a petrol pump was hired out. He stated that a few days after Zane's death he had received a visit from the police, in the course of which he was asked to provide a copy of the written safety instructions provided to Ms Lawler. He gave the police a copy of Honda's own "Safety Instruction" document which includes the words:

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“Never run the engine in an enclosed or confined area. Exhaust gas contains poisonous carbon monoxide gas; exposure can cause loss of consciousness and may lead to death”.

However, at the inquest he produced, for the first time, a different document which is an HAE (Hire Association Europe Ltd) document entitled “1402 Centrifugal Pump – Petrol”. This document contains the words :

“To reduce the risk of serious or fatal injury from breathing toxic fumes, do not run the pump indoors unless you have good ventilation. Ensure that you have proper ventilation when working in other confined areas such as trenches.”

Mr Dormer told me that SHS usually provided customers with HAE safety instructions and supplied the Honda document only if they had run out of copies of HAE instructions. He was, though, unable to explain why he did not say this to the police in February 2014 or why he had not produced the HAE document at all until June 2016, after the inquest had started.

27. Insofar as there are differences between the accounts given, on the one hand by Nicole Lawler and, on the other hand, by Mr Toogood and Mr Dormer, I have considered whose evidence I prefer. Having heard all the evidence in this regard, I have no hesitation in saying that I do not accept the accounts of either Mr Dormer or Mr Toogood and to the extent that their evidence differs from that of Ms Lawler, and I prefer her evidence.

I make the following observations and findings :

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- a. Ms Lawler has provided a full and detailed account of what took place in the shop which includes a number of specific conversation topics. Much of her specific account is not disputed. For example, it is agreed that there was jovial reference to a neighbour hiring a similar pump and collecting it on a canoe.
- b. I am also struck that her impression that the men took a dismissive attitude to her as a “silly woman” is supported to an extent by their own evidence. Although Mr Dormer played it down in his oral evidence, in his statement he specifically stated, “I don’t want to sound sexist, but it was the sort of question a woman was more likely to ask because they would be less likely to have used a pump like this”. In a similar vein, Ms Lawler said they seemed to get fed up with her because she was asking a lot of questions. In support of this, I find it noteworthy that Mr Toogood was very conscious of how long it had taken to deal with her, namely 25 to 30 minutes rather than the usual 5 minutes. Indeed, he referred to this as one of the reasons for his failing to indicate on the hire contract that written safety instructions had been provided.
- c. It is common ground that there was discussion about the use of the petrol pump inside and about pipe length. I find that it was Ms Lawler who raised the possibility of using the pump inside, but that she was prompted to do so when she saw the length of the green inlet pipe. I find that the discussion about using the

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pump inside took place in the context of the green hose being too short to reach the basement from outside and that it is likely that she explained this to the two men. I find it unlikely that Ms Lawler would have asked “out of the blue” about using the pump inside without saying more. Further, if she had done so, and if (as they suggest) the two men had wanted to make it clear that she must not do so, I find it extremely unlikely that they would simply have said “No” and left it at that. They would, surely, at least have explained the potential danger of its use in a confined space and explored with her the environment and circumstances in which she was intending to use the pump.

- d. I would have expected Mr Dormer, in particular, to have asked Ms Lawler some relevant questions, not least because it was his own evidence that he would refuse to hire equipment to a customer if he was concerned about its safe use. In his initial written statement to the police he said, “If someone said they intended to use it inside I would refuse the hire”. Mr Dormer told me in his oral evidence that he was satisfied that Ms Lawler acknowledged his indication that she should not use the pump inside by saying “OK” and nodding her head. However, he made no mention at all of this acknowledgment in the statement he made to the police on the 10th February 2014 or the statement he later provided dated the 6th August 2014. I find this surprising if, as he suggests, he took re-assurance from that acknowledgment.

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- e. More generally, I did not find either Jerry Toogood or Stephen Dormer to be impressive or reliable witnesses. For example, in his written account of August 2014 Mr Toogood is categorical that it was his normal practice to check to ensure that a piece of equipment had both the inspection certificate and the safety instructions in its plastic wallet and that he did so in this instance. His evidence in court was also very definite to begin with. He said that he recalled seeing both documents, that he would never let a machine go out without both documents and that 'they were definitely present'. However, when asked specifically whether it was the Honda or HAE sheet that was in the wallet he said that he did not know. He went on to say that in fact he did not see it at the time and simply assumed that as there appeared to be two documents in the wallet, one of them was the safety instructions. That is not at all what he was saying to begin with and I find that sort of change to be undermining of his reliability as a witness. Further, I found the explanations he put forward for failing to indicate on the hire contract that safety instructions had been given to Ms Lawler, namely that he did not wish to keep her waiting and that he was not used to a "new procedure", utterly lacking in credibility.
- f. Mr Dormer's evidence also gave me cause for concern. For example, in his initial statement he is absolutely clear that a safety instruction leaflet is given to all customers and "this customer was given a leaflet with the pump". He stated that he

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had provided to the police a copy of the safety instructions that “...was given to Nicole Lawler”. However, it is now clear to me that he is unable to say with any certainty which of two leaflets may be provided, and he had no means of knowing whether there was, in fact, a leaflet in the plastic wallet attached to Ms Lawler’s pump.

- g. I find that Nicole Lawler was advised that the petrol pump could be used in the house provided it was ventilated and that it would be safer in that it would not be stolen. Although both men said they would never have advised that the pump could be used inside with ventilation, I weigh against that the fact that the very safety instructions which they both now say were usually provided, namely those produced by their Trade Organisation, HAE, plainly envisage use inside with ventilation.
- h. I also find that no safety instructions were provided with the petrol pump hired to Ms Lawler. I am not persuaded that safety instructions were provided “to all customers” given that both Ian Berry and Alistair Higgs told me that they had hired equipment from SHS with no safety instructions attached. Further, I also take into account the fact that no safety instructions were found in the plastic wallet attached to the petrol pump, or anywhere in the house, by the police after Zane’s death. The Scenes of Crime Officer, PC Price, told me that she had searched most particularly for them.

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28. It has been suggested that if I consider Ms Lawler has been an untruthful or unreliable witness in any way, then I ought not to accept her account about what took place in the hire shop. As a matter of law and proper approach, I do not accept that I am so restricted. It is open to any tribunal to accept part but not all of a witness' evidence, if there is reason to do so. Further, I am not conducting an adversarial process in which I must choose between parties' competing "cases". Rather, I must assess all the evidence in order, if possible, to ascertain what actually happened. For the reasons set out above, I find Ms Lawler's account of what happened in the hire shop more convincing than that provided by Mr Toogood and Mr Dormer.

29. Having got the pump home on the 6th February 2014, Zane's parents told me that they wanted to check that it was working. They set it up inside the house, in the lavatory. I have considered the extent to which, in doing so, they were relying upon the indication given by SHS that the pump could be used inside with ventilation. I do not find that the evidence available enables me to reach any very clear conclusions about that. I do find that Mr Gbangbola and Ms Lawler were themselves aware that a petrol pump ought to be operated outside and not in a confined space. They as much as said so. In any event, they are both intelligent people and Mr Gbangbola has an engineering background. It is evident from Ms Lawler's account that, when she went to hire the pump, it was their expectation that they would operate the pump outside and doubtless they would have done so if the intake pipe had been long enough. It seems to me that SHS's

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indication, that the pump could be used inside with ventilation, may well have provided some re-assurance and played some part in their decision to set it up in the lavatory. But I do find, also, that both parents took re-assurance from their understanding and belief that the house was protected by a working CO monitor, a matter which they both mentioned after Zane's death in support of their belief that CO could not have been the cause of his death.

30. The initial test of the petrol pump revealed that there was a problem with one of the seals which had to be replaced. Ms Lawler contacted SHS and arrangements were made for the part to be posted to her. To avoid delay, Ms Lawler asked for it to go to the local post office so that she could collect it the following morning, Friday 7th February, after taking Zane to school, and that is what happened.

The Events of the 7th / 8th February 2014

31. On the morning of the 7th February, when Ms Lawler came home with the new seal, she and Mr Gbangbola again tried to set up and operate the petrol pump. It is uncontentious that the new seal enabled them to get the petrol pump running and working properly and that it was operated inside the house (in the lavatory) for some period of time that day. What is contentious, however, is the extent to which the pump was used on Friday 7th February and the time at which it finally stopped running. I will return to that issue a little later.
32. I will first set out my findings as to the family's movements and other relevant events on the 7th February. Zane spent the day at school as

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normal, whilst his mother (after returning home) and father spent the day in and around the house largely preoccupied with the flooding and its effects. There were visitors, including a BT engineer to repair the telephone lines, who interrupted their work. At about 2.30 pm Ms Lawler left to collect Zane from school, returning home with him between 4.00 and 4.15 pm. There was some further contact with the local residents who were digging at the back of the house and, at 5.00 pm, Ms Lawler went to her GP appointment. After returning home from school, Zane got changed and was in or around the house until about 5.30 pm when Mr Gbangbola took him to the local public house to meet other residents. Whilst there, at about 6.00 pm, Zane ate fish and chips for his supper. Ms Lawler went to the pub to collect the house key and went home first, soon followed by Kye and Zane who arrived home at about 6.30 pm. Zane then had a bath, got into his onesie and, at about 7.00 pm, went with his mother to Bedroom 2 to watch the opening ceremony of the Olympic Games. Nicole Lawler told me that Zane fell asleep whilst they were watching the television and she settled him down in bed for the night, in Bedroom 2. The door to Bedroom 2 was left open. Meanwhile, at about 7.00 or 7.30 pm, Mr Gbangbola, who worked from home, had gone into Bedroom 1 to work on the computer there. Both he and Nicole Lawler were unsure whether the door to Bedroom 1 was open or closed, but Ms Lawler does not recall seeing him again prior to the ambulance being called many hours later.

33. Ms Lawler's account to me of her own movements between settling Zane and calling an ambulance at about 3.30 am, a period of probably

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about seven hours, was lacking in detail. She said that Kye had stayed up the night before on flood watch and that it was her turn to do so. After leaving Zane she went downstairs to check on the water level in the basement and that the electric pumps were operating. It was her intention to keep an eye on the flooding and to try to snooze and she moved between the ground floor and Bedroom 2 for those purposes. Given the lack of any detailed account of her activities, the fact that she cannot recall seeing Kye again that evening, and that she was unwell with a chest infection, I find it is likely that Ms Lawler snoozed for much of the seven hour period. She told me that she recalled checking Zane periodically, suggesting that she did so every hour, but she was not specific as to times. I do not consider that the evidence enables me to reach a reliable finding as to the precise time at which Zane was last checked before about 3.30 am.

34. In any event, at about 3.30 am Ms Lawler did check on Zane and she found he was not breathing. He was lying on his front, had wet himself (which was unusual) and his jaw was locked. She telephoned for an ambulance and, by following the call handler's instructions, tried to resuscitate Zane. When the paramedics arrived they continued the resuscitation attempts but they did not see any signs of life. They did not notice anything unusual in Zane's temperature but he was slightly cyanosed and was described by one as "very grey and ashen looking". The emergency team found Zane's jaw to be very rigid. On arrival at hospital he was hypothermic and very acidotic, the latter resulting from his being in cardio respiratory arrest. Lactic acid is produced by the blood cells in response to a lack of oxygen, I was told. The treating

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Registrar noted apparent rigor mortis. Despite continued resuscitation there was no improvement or sign of life and at 04.39 hours Dr Bhatti, the Consultant, declared Zane's death.

35. Ms Lawler was also found to be unwell by the paramedics who attended the house. The ambulance staff had found her to be somewhat confused, "vacant" and behaving a little strangely. She too was taken to hospital and given oxygen. She was kept in as a patient but made a full recovery quite quickly.
36. As for Kye Gbangbola, he told me that he could remember going to Bedroom 1 to work as he had three big pieces of work to do. However, he said, he had very little recollection of doing the work and his next memory is of waking in hospital. He had no recollection of starting to experience symptoms and believes that he must have been overcome quickly. I find that he was overcome and suffered symptoms within a relatively short time of entering Bedroom 1 and settling down at his computer to work.
37. Kye Gbangbola was found in Bedroom 1 by the second ambulance crew on the scene. He was half-sitting and half-lying on the bed, with his feet on the floor, facing his desk and computer. He had vomited. He was fully clothed in several layers and was hot, and some clothing was removed by the paramedics. He was described as having no muscle tone and being a dead weight and a member of the crew sat behind him for support whilst he was given oxygen via a mask. When questioned he was able to answer "yes" and "no" but little more. He

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was taken to hospital. Mr Gbangbola described waking in hospital and then being “in and out of consciousness”, and subsequently suffering blisters on the back of his neck and then loss of sensation and power in his legs. He was later diagnosed as suffering rhabdomyolysis.

38. In an effort to discover the cause or causes of Zane’s death and his parents’ symptoms, investigations were conducted in the immediate aftermath and over the following weeks and months. I will now review the principal results of those investigations.

Investigations in relation to the House

39. The emergency services and other state agencies attended the house on the 8th February 2014 and I heard a considerable amount of evidence as to what they found. As stated above, the first to enter the house were the paramedics and technicians from the ambulance service. None of the ambulance staff who had entered the house noticed any unusual sight or sound, other than a “hum” in the background, which I find was from the electric pumps. A number of them told me that they noticed no unusual smell, but Richard James, who was in Bedroom 1 dealing with Mr Gbangbola, said it was quite warm in that room and that he opened the front windows because he felt a little dizzy and needed some air. He also said there was quite a “damp” smell in the house, a “weird” smell which he did not recognise, a matter to which I shall return. Mr James said that the front door of the house was open

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while the ambulance staff were in the house and that the window of Bedroom 1 and front door were left open when they left.

40. At about 4.30 am the Surrey Fire and Rescue Service (“SFRS”) arrived at the house. The SFRS’ HAZMAT team attended having been briefed to assist the police, and having been told there was suspected CO present. (This had been the suspicion of PS McDowell, the first police officer on the scene.) Watch Commander Julian Best walked around the house. He did not notice any distinctive smell. He found the petrol pump and noted that it was cold to the touch. The SFRS’ DIM team then attended. They had specialist equipment which enabled them to test for the presence of hazardous gases and substances. Between approximately 5.45 am and 7.30 am Officers Schooling and Pointer carried out three “sweeps” of the house using three pieces of equipment. First, they used a PID machine which detects Volatile Organic Compounds (“VOCs”) but cannot identify any particular compound. Secondly, they used a GfG multi gas detector which is capable of detecting specific gases. Thirdly, they used Drager Tubes which can also detect the presence of specific gases.

41. On their initial sweep, one of the PID machines recorded VOCs of 2,000 ppb on the first floor and 2,500 ppb in Bedroom 4. Officer Pointer’s PID machine recorded 2,300 ppb in Bedroom 1. She noticed that the window in Bedroom 1 was open. No VOCs were found at ground floor level. Their GfG machines did not alarm on the first sweep. In order to establish what was a typical reading for VOCs in a local house with no

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ill health, the officers went to number 245 Thameside and found a VOC reading of 1,300 ppb.

42. The officers then conducted a second sweep of the house (that is, number 243). They found a lower reading for VOCs on the first floor but, as they were about to cross the threshold of the front door to leave the house, one of their GfG machines alarmed for hydrogen cyanide ("HCN"). The machine alarmed audibly and showed an amber signal. This meant that the threshold of 10 ppm had been reached. The next threshold of 20 ppm had not been reached because the signal did not turn red. To put this in context, I was told that a person can safely be exposed to a dose of 10 ppm for 15 minutes per day whereas a reading of 50 ppm is classified as an immediate danger to life. The officers left the property but returned to conduct the third sweep with both their GfG machines and Drager Tubes. They wanted, in particular, to test again for the presence of HCN. They entered the house and closed the front door. On this occasion, the GfG machines did not alarm and the Drager Tubes, which were specifically capable of detecting HCN, did not do so. CO was not detected in the house in any of the three sweeps.

43. The HAZMAT team leader, Stephen Burnell, told me, and I accept, that the final conclusion of their testing was that (i) there had been findings of VOCs at a low rate and (ii) there had been a single alarm for HCN which he described as "qualitative but not quantitative" and which could not be repeated. He agreed that had CO been present in the house at the time of the testing it would have been detected by the

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team's equipment. The advice he handed over to others was that his team could find no hazardous gases and therefore it was not dangerous to enter the house, but the windows should remain open for proper ventilation which, he said, was standard practice where a chemical may have been involved. He said there was no need to decontaminate personnel or the family. (Although some decontamination was arranged by the police, PS McDowell told me that this was a precautionary measure and he confirmed that Stephen Burnell had informed him that only "trace elements" of HCN had been found in the house.)

44. As a result of the SFRS' findings, the Environment Agency ("the EA") also decided to conduct testing at the house. They decided to test the water in the flood basement for the presence of HCN. EA officers Joshua Tinsley and Natasha Farinha were given this task and they went to the house at 16.40 hours on the 8th February 2014. Two officers from SFRS, Officers Andrew Claverly and Jay Beaver, attended at about 07.00 pm to assist with the collection of the water samples. They wore breathing apparatus to enter the property, although it was not clear from the evidence why this was thought necessary, given that Stephen Burnell's advice, when the SFRS left the property at 08.00 am that morning, had been that it was safe to enter the property. In any event, Officers Claverly and Beaver entered the house and gathered two samples of water from what they described as the "stagnant" water in the flood basement under the hatch in the reception room. This was sent for testing and was found, by Andrew Fegan, to be uncontaminated, clear surface water as found in a river or lake.

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45. Most unfortunately, a good deal of confusion has arisen in this case as a result of the contemporaneous notes and evidence of the two EA officers, Tinsley and Farinha. First, they suggested that there had been a reading for HCN at a level of 28,000 ppm or 25,000 ppm in the house earlier that day. When I heard the evidence of Fire Officer Joe Badreddine it was apparent that he was the source of that information. He had attended the house with the SFRS in the early hours of the 8th February; he returned later that afternoon and that was when he spoke to the EA officers. It is clear that he misinformed the two EA officers about the results of the DIM team's testing. In fact, as set out above, the DIM team had found a single reading of HCN which had reached the threshold of 10ppm.
46. Secondly, Natasha Farinha suggested that equipment carried by the two fire officers collecting the water samples from the house also indicated that they too had found HCN in the house. Both Officers Claverly and Beaver gave the clearest evidence to say that they did not carry any equipment which could have provided any "reading" for gas present in the house. The suggestion that they emerged from the house with any "reading" for HCN was, they said, impossible. Their only equipment and monitor was for their breathing apparatus. I have no hesitation in accepting this evidence from these two officers who I found to be entirely sensible and reliable witnesses. In contrast, I was unimpressed by the evidence of Natasha Farinha, whom I found to be unreliable. For example, in giving her evidence she was unable to explain to me a diagram she had made of the premises and was herself

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unclear as to what number she had intended to record when she wrote “25 hundred”. Insofar as her evidence differs from that of Officers Claverly and Beaver, I reject her evidence and prefer theirs.

47. I record my view that it is most unfortunate that both Joe Badreddine and Natasha Farinha, as officers of state agencies with important investigatory roles, have been the source of significant confusion in this inquest. Their assertions about HCN being found in the house at the times and levels they suggest are plainly wrong.

48. As far as testing of water at the house was concerned, I note and accept the evidence I heard that tap water samples taken on the 11th February 2014 were also tested and were found to be uncontaminated drinking water.

Investigations in relation to the Land

49. The apparent discovery of HCN in the house subsequently triggered investigations of the landfill area of land behind Thameside.

50. Brett Aggregates, the current owners, arranged for testing of the land. I heard evidence from Jamie Robinson, an independent Geochemist, who told me that he had been instructed by Bretts to undertake sampling of surface water from the lake and a smaller pond of water at the rear of Thameside. He told me he had done so in November 2014 and that, when tested, the samples contained no free cyanide (or HCN). He had also tested for ground gases by conducting a Flux Box survey and an FID survey. These detected no HCN, CO, methane or

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hydrogen sulphide and the oxygen concentrations found were consistent with the surrounding atmosphere. He said that the absence of methane reduced the likelihood of other hazardous gases being present. More generally, Mr Robinson told me that he was very experienced and had tested over a thousand sites but could “count on one hand” those where a high level of free cyanide had been found, and all of them had been associated with former gasworks. He commented that the ecology of the lake behind Thameside looked quite diverse with birds and fish and it looked like a healthy environment. Mr Robinson’s methodology was questioned by Mr Thomas, but I found his explanation of his method of work to be convincing and I consider that he was an impressive expert whose evidence I accept.

51. I also heard evidence from Olivia Flint, a Principal Pollution Control Officer of Spelthorne Borough Council, who told me that because a press article had linked Zane’s death to the landfill at the rear of the house, the Council decided that they needed to explore this, given its statutory duty to inspect the land from time to time. Ms Flint assessed the information available and produced a desk top study which was intended to address the question of contamination on the site generally. She explained that the site was split by the M3 with a corner of the southern part running up to the rear of Thameside. Ms Flint provided to me a history of the land’s use since 1950, including the licences and permissions granted for landfill use. She said inspections had revealed no significant polluting incidents. She explained that the concept of land contamination was based on “source – pathway –

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receptor” and that there was no basis upon which she could assess the site as contaminated. She said the Council were not aware of any evidence of a source of HCN in the land although, if it were present, a pathway was theoretically plausible.

52. I heard more detailed evidence from two experts who had been instructed by the Council, Edward Stutt and Steven Wilson. Together they produced a joint report in which they noted that there was no history of industrial or gasworks waste (potentially containing cyanide) being tipped at the site but acknowledged that historically illegal tipping could have taken place. They sought to assess whether cyanide-containing waste, if present, could possibly lead to harmful or lethal levels of HCN entering nearby properties at a time of flooding.
53. Mr Stutt told me that his expertise was in how cyanide in land can migrate. He considered in particular how cyanide in the landfill site (if present) could have migrated in to the house on the 7th February 2014. He said that cyanide is highly soluble but the floodwater did not appear to him to be a plausible pathway. In his view, massive quantities of free cyanide would have to have been present in the land to result in a harmful or lethal level of gaseous HCN being present in the atmosphere of the house. Steven Wilson, who is a Chartered Civil Engineer and Environmentalist, agreed. He explained that when gas migrates in to a building it will be diluted by the free flow of fresh air through the building via cracks, open doors, windows and vents etc. He used a standard calculation to estimate the likely dilution effect in the house. Both experts suggested that if the necessary level of HCN

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had been present in the land, they would have expected to see an environmental impact, such as dead fish in the lake or the Thames itself. Mr Stutt also said he would have expected that there would have been evidence of cyanide “leaching out” elsewhere over the years. Further, if HCN had entered the house in this way, he would not expect the presence of HCN “to come and go” quickly; rather, he said, it would be present and detectable for some time. In this case no HCN was detected in the flood water taken from the basement of the house on the evening of the 8th February 2014. In all the circumstances, both experts considered that it was unlikely that there could have been sufficient levels of HCN in the house to cause Zane’s death or Mr Gbangbola’s symptoms on the evening of the 7th February.

54. Mr Wilson made the additional observation that the above conclusion was reached on the basis of an assumption not only that gas was present in the land but also that it could easily be pushed out. He said, however, that in reality the top 2.8 metres of land at the site is clay (overlying sand and gravel) and this is impervious and acts to keep gas within landfill. Further, the presence of flood water in the basement of the house would have made it far more difficult for any gas in the land to move through the soil’s pore spaces.

55. I also heard evidence from Gavin Roberts, a Geo-environmentalist who assessed the ongoing risk of contamination of the land after Zane’s death, on behalf of the Gbangbolas’ insurers. Although it was suggested to him that his views and evidence had been influenced by Kye Gbangbola and Nicole Lawler, I consider that he was a careful

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witness who displayed an appropriate level of independence. Mr Roberts told me that after the flooding had receded he conducted soil and water testing at the house over a four week period but, he said, nothing was revealed by his monitoring which established any potential source of HCN. Nevertheless, he had advised that it remained plausible that there could be a source given the usage of the land behind the house and its history. He said the possible presence of HCN in the land could not be ruled out and that it was on the basis of this potential future risk that he had recommended to the insurers that work should be carried out at the house to protect against that risk, such as the provision of a gas membrane and HCN detectors. He said this was a precautionary approach. Overall, Mr Roberts did not disagree significantly with much of what Olivia Flint, Edward Stutt and Steven Wilson said in evidence, save for one matter. He considered it was possible that the flood waters had triggered a one-off discharge, or mobile plume, containing HCN from a source within the land and carried it in to the basement of the house on the 7th February 2014, and that this had been washed away by the time the water was tested about 12 hours later. He said that if the HCN source was in the parcel of land between the lake and the house then its presence would not have an adverse effect on bird and fish life in the lake or river.

56. I should mention also that I heard evidence, from Andrew Graham of the EA, that when a “lock keeper’s relief hut” was constructed in the vicinity in 2010, a potential risk from landfill gas was identified and consequently ground gas protection measures were incorporated in the design of the hut. Mr Graham said that this step was taken on a

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precautionary basis and simply because of the hut's proximity to landfill. He said the EA were not aware of any evidence suggesting an actual presence of toxic gas, or HCN in particular, on the land. He explained that it was commercially cheaper to install a gas proof membrane in the hut than to investigate the gas hazard risk. I accept Mr Graham's evidence and, in the circumstances, I did not find that this aspect of the evidence assisted me one way or the other in reaching my findings. The same is true of the evidence I heard about the membrane that the EA placed, during repairs after the flooding, in their property which is rented to Paul Marsden. Although Mr Marsden suspected that it was placed there to prevent gas entering the property, I have seen no evidence to support that.

Medical Investigations

57. Medical investigations have also been conducted in order to throw light on the cause or causes of Zane's death and his parents' symptoms. There was a post mortem examination of Zane's body and Mr Gbangbola underwent clinical investigation.

58. Blood tests were carried out in relation to all three members of the family to see whether there was evidence that they had been affected by HCN or CO. Exposure to CO results in the presence of carboxyhaemoglobin in the blood.

Results :

Zane :

Blood taken on the 11.2.14 (at post mortem) was tested the same day and gave a carboxyhaemoglobin reading of 8.0 %.

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Blood taken on the 11.2.14 (at post mortem) was tested in early May 2014 and gave a carboxyhaemoglobin reading of 9.8 %.

Blood and liver tissue taken on the 11.2.14 (at post mortem) were tested in early May 2014 for cyanide and gave readings of 0.05 mg/L and 0.03 mg/L respectively.

Kye Gbangola :

Blood taken at 04.50 hours on the 8.2.14 and analysed immediately gave a carboxyhaemoglobin reading of 11.4 % and when analysed on 27.3.14 gave a carboxyhaemoglobin reading of 10.5 %.

Blood taken on 8.2.14 and analysed for cyanide on 10.2.14 and 27.3.14 gave readings of 0.09 mg/L and 0.07 mg/L respectively.

Nicole Lawler :

Blood taken at 04.10 hours on the 8.2.14 and analysed at 09.03 hours gave a carboxyhaemoglobin reading of 6.5 % and blood taken at 14.13 hours on the 8.2.14 and analysed immediately gave a carboxyhaemoglobin reading of 2.6 %.

Blood taken on 8.2.14 and analysed for cyanide on 10.2.14 gave a reading of 0.07 mg/L.

59. The testing for cyanide was conducted by a specialist centre at Cardiff Toxicology Laboratories and, having heard from Alun Hutchings, a Consultant Analytical Toxicologist there, I am satisfied that a reliable method of testing was used. I am also satisfied, on the basis of his evidence and that of Alexa Crampton, that the samples taken from

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Zane at post mortem were appropriately stored and transported to Cardiff and have produced reliable results. Mr Hutchings told me that, in his experience, cyanide is stable in blood samples. He said he had never seen evidence of instability and he had experience of measuring high levels of cyanide on occasions. He said that, if anything, cyanide had a tendency to increase rather than decrease in the course of extended storage.

60. The outcome of these results is that all three members of the family had elevated carboxyhaemoglobin levels, indicating an exposure to CO. In contrast, they all had normal levels of cyanide.
61. I note also that immediately after Zane's death a number of neighbours and two police officers were tested for toxic gas exposure and they all received negative results.
62. Zane's post mortem examination was conducted on the 11th February 2014 jointly by Professor Risdon, a Consultant Home Office Forensic Pathologist, and Dr Marnerides, a Consultant Paediatric Pathologist, both of whom gave oral evidence. They agreed that their examination of Zane's body had not revealed a cause of his death. There were no abnormalities or injuries. They noted that his stomach contained undigested food and explained that this suggested he had probably died within 2 to 3 hours (Prof Risdon) or 2 to 6 hours (Dr Marnerides) of his eating his last meal.

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63. The two doctors arranged for a number of further investigations to be undertaken, including confirmation that he suffered sickle cell trait, the testing of Zane's blood and liver sample (the results of which are set out above), and the examination of his brain by Professor Al-Sarraj, a Consultant Neuropathologist.
64. I heard evidence from Prof Al-Sarraj who told me that he found no evidence of ischaemic damage due to lack of oxygen. He said he conducted BAPP stain testing which revealed very intensive staining in the white matter of the brain, the pattern and intensity of which were consistent with toxic damage caused by a drug overdose or CO, with death occurring after several hours of exposure. There was no basal ganglia damage which is found in 40 or 50 % of cases of death by CO poisoning. Prof Al-Sarraj concluded that his findings were suggestive of death being the result of CO toxicity. When he gave his evidence the doctor was asked to consider whether his findings were also suggestive of, or consistent with, HCN poisoning, a question he had not previously considered. Prof Al-Sarraj undertook further research, although available data relating to HCN poisoning is apparently limited. He told me that death by reason of HCN toxicity is relatively rare. The professor also told me that, in his opinion, whilst there may be some similar post mortem findings for both CO and HCN toxicity, one difference is that CO poisoning will result in damage to the white matter (as revealed by the BAPP staining) whereas HCN poisoning will not. In CO poisoning there is primary damage to the white matter (without, necessarily, there being damage to the cortex or basal ganglia) which, he said, is different from the damage caused by

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ischaemia which is seen in HCN damage. Additionally, he stated that he would expect HCN poisoning to result in damage to the basal ganglia. In Zane's case there was damage to the white matter but no damage to the basal ganglia. Prof Al-Sarraj was questioned at some length but remained firmly of the view that the neurological findings indicated to him, on balance, that the damage found had been caused by the effects of CO and not HCN. He therefore remained of the view that his findings were suggestive of death being the result of CO toxicity. He also agreed that if I were to find that there had, in fact, been no exposure to HCN, his conclusion would be strengthened.

65. After the further investigations were complete, Prof Risdon and Dr Marnerides formed their final opinions as to the cause of Zane's death. Dr Marnerides told me that in reaching his view he had considered the facts that Zane's blood tests showed normal HCN levels and a carboxyhaemoglobin reading of 8 %. He discussed the latter with the toxicologist, Dr Paterson, who told him that, in her view, it was indicative of exposure to CO but, on its own, it was not a "diagnostic level" from a toxicological point of view. She said, however, that if there was other evidence suggesting CO poisoning as the cause of death, the reading of 8 % would not refute that. Dr Marnerides explained that he also took account of Prof Al-Sarraj's findings and said that, in his view, the positive findings arising from the post mortem investigations were the raised carboxyhaemoglobin reading, Zane's sickle cell trait and the neurological findings suggestive of CO toxicity. His opinion was that the cause of death was, "1a Carbon Monoxide Intoxication, 2 Sickle Cell Disease Trait (Carrier)". He said

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he reached the view that CO poisoning was the cause because of the evidence of exposure, the neurological findings and the lack of any other explanation for the death. He also stated that the carboxyhaemoglobin reading of 8 % was sufficient to cause death given that Zane's sickle cell trait increased his vulnerability to the effects of oxygen deprivation. When challenged about this, Dr Marnerides said that this increased vulnerability by reason of sickle cell trait was common medical knowledge and trite medicine.

66. Prof Risdon took a similar approach, save in relation to the relevance of Zane's sickle cell trait. Prof Risdon expressed his opinion as to the cause of death as simply "1a Carbon monoxide intoxication". He said that Zane's carboxyhaemoglobin reading of 8 % was lower than is normally seen in deaths caused by CO and he agreed that death was normally associated with a reading of 50 % or more. But he said that the 8% reading was not, in his view, incompatible with death. On the basis of this reading and Prof Al-Sarraj's findings, he was satisfied, on balance, that CO was the cause of death. He said that he did not rely upon Zane's sickle cell trait in reaching his opinion as to the cause of death as he did not think it was a significant factor. He said he would not dismiss the possibility that the trait may have had some effect but he could not put it higher than that.

67. In addition to the evidence of the doctors directly involved in Zane's post mortem examination, I heard evidence from a number of other medical experts who had considered the cause of Zane's death. Considerable differences of opinion emerged. I heard from Dr Will, a

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Consultant Paediatric Haematologist, who disagreed with Dr Marnerides and stated that Zane's sickle cell trait would not have made him more vulnerable to the effects of CO. He said there is potential for increased vulnerability in extreme circumstances but that a non-sufferer would be affected in such circumstances in any event.

68. Dr Elizabeth Soilleux is a Consultant Haematopathologist who had been asked to consider this case by Spelthorne Borough Council. She told me that it was difficult to know at what minimum level of carboxyhaemoglobin death can result as this had not been tested and could not be reliably deduced from the literature. However, from the literature it appeared that there was a very wide range at which CO poisoning causes damage (from as low as 3 %). Further, she said it must be borne in mind that readings taken from blood samples may well be significantly lower than the level at the time of exposure. For those who survive exposure, carboxyhaemoglobin levels will drop as soon as there is removal from the environment and as a result of oxygen being administered. If a person dies during the exposure, she said, the carboxyhaemoglobin level in their blood will slowly reduce and could reduce further when the body is opened in atmospheric air at post mortem. In relation to the testing for HCN, she agreed that its half-life could affect the testing of survivors but said that after death, and once removed from the body, HCN is relatively stable in a blood sample. She said that HCN can persist in a deceased person and had been detected post exhumation. Overall, she said that it was unlikely that, post death, a reading would drop from a fatal level in to a normal range. She stated that the endogenous production of CO would not be

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at a clinically significant level. As far as the relevance of Zane's sickle cell trait was concerned, Dr Soilleux agreed with Dr Marnerides and said that a sufferer was more vulnerable to the effects of CO exposure than someone without the trait.

69. I accepted into evidence and have taken into account also the evidence of Dr Parker, a Consultant Haematologist, as set out in his written reports. I would have heard oral evidence from him but for his own sad death shortly before the inquest. His reports were lengthy and I will not repeat their contents here, but the points Dr Parker made included (i) in considering Zane's carboxyhaemoglobin readings it is important to take account of the body's endogenous production of CO and (ii) in considering the reliability of Zane's normal cyanide reading, it must be noted that cyanide is metabolised by the body even after death.

70. I also heard from Dr John Thompson, a Clinical Pharmacologist, who told me that Zane's carboxyhaemoglobin level was unlikely to have changed after his death and if there were no signs of life when he was found then the 8% reading is likely to reflect the level before death. On the basis of this reading and all the other evidence he had seen, however, he considered that CO exposure was the likely cause of death.

71. Further, I heard from Prof Bridges, an Environmental Toxicologist who is not medically qualified. He told me that he would not place any reliance on the results of the testing for HCN because of its half-life. He

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stated that levels of carboxyhaemoglobin in Kye Gbangbola and Nicole Lawler were probably higher when they were present in the house than their blood test readings, because they had been removed and given oxygen before their blood samples were taken. He was not aware of any fatality in which the reading had been lower than 30 % and he “could not explain” how Zane’s reading of 8% could be associated with death. He said that “from a toxicological point of view” he could not conclude that CO had caused the death. Nevertheless, when giving his evidence Prof Bridges considered three scenarios as to the use of the petrol pump in the house. I note that he considered that there was a degree of compatibility between the parents’ readings and symptoms and the scenario of the pump operating until the early evening. He did state that he would have expected Zane “to have died much earlier” in this scenario, but that was on the basis of his death being pronounced in hospital in the early hours of the 8th February.

72. In addition to the medical evidence addressing the cause of Zane’s death, I also heard evidence from the doctors who assessed Kye Gbangbola and the cause of his symptoms. Dr Hughes, a Consultant Physician, reviewed Mr Gbangbola about 30 hours after his admission to hospital. He noted his loss of consciousness, muscle weakness and blistering rash and formed the view that he was suffering the effects of toxicity. Because of his raised carboxyhaemoglobin reading he formed the view that CO exposure was the likely cause. The doctor said this diagnosis was the “best fit” and was supported by evidence in the literature of rhabdomyolysis and blistering rash resulting from CO poisoning. He was aware of the possibility of HCN poisoning but, in

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his view, that did not fit the picture as closely as CO exposure. Dr Hughes also said that either Kye Gbangbola or Nicole Lawler had discussed using a petrol driven pump “but not for five hours prior to hospital admission”.

73. I heard that in due course Mr Gbangbola was anxious to discover the cause of his symptoms and Zane’s death and as a result he sought and obtained a referral to Dr Wood, a Consultant Physician and Clinical Toxicologist. Dr Wood told me that he met Zane’s parents on the 19th March 2014 when he took a full history, as set out in his contemporaneous record. (I will return to what was said in this consultation a little later.) Dr Wood subsequently made further investigations and, on the basis of all the information he gathered, he advised Mr Gbangbola’s General Practitioner, in a letter dated the 3rd April 2014, that “... there is no clinical evidence of exposure to hydrogen cyanide. It is likely that there was exposure to carbon monoxide explaining the elevated carboxyhaemoglobin concentration and also the clinical features seen in Mr Gbangbola himself, in particular the rhabdomyolysis subsequent to his admission to hospital”.

74. I note that I have seen no evidence of any clinician advising Mr Gbangbola that his symptoms and consequential disability have been caused by HCN poisoning (as Kye Gbangbola suggested he had been told). I have seen a test report from Dr Fowle, a Consultant Clinical Neurophysiologist, which states, at its outset, “Rhabdomyolysis six months ago due to hydrogen cyanide” but that doctor confirmed to me

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that he was unsure of the origin of that entry and it was not a diagnosis or a reflection of his opinion. Dr Fowle said he had reached no view as to the cause of Mr Gbangbola's symptoms and in the report he was simply commenting on test results.

The Use of the Petrol Pump on the 7th February 2014

75. As stated earlier, one of the most contentious issues at this inquest has been the extent to which the petrol pump was operated on the 7th February and the time at which it finally stopped running. I shall now return to that issue in the light of all the evidence I received. The evidence given by both Nicole Lawler and Kye Gbangbola to this court is that during the course of the morning of the 7th February 2014 the pump was intermittently on and off, solely for the purposes of setting it up and testing it. It was Ms Lawler's evidence to me that the petrol pump was used for short periods of 2 to 5 minutes only in order to set it up and was not operated after about 1.15 or 1.30 pm. Mr Gbangbola told me that it was used sporadically in the morning as it was being set up in a "start / stop" process. He said that between the morning and the afternoon it was on for no more than 20 minutes and it was definitely off by the time Ms Lawler went to collect Zane from school.

76. Nicole Lawler said she did not buy any petrol for the pump. Both she and Mr Gbangbola said that the petrol pump had been hired as a "back-up" and their intention was to use it only if there was a power failure (causing the electrical pumps to stop) or if the water rose further. Ms Lawler said the three petrol cans which were in the lavatory / utility room (and which can be seen on the photographs) had

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previously been used for holding petrol for the family's lawnmower and motorboat. The two small cans were empty and the large one contained only dregs. The cans had been brought inside from the garage and were ready to be used to collect petrol from the nearby 24-hour petrol station, should petrol be needed for the pump. She said that she did not want to buy petrol for the pump until it was needed because it was expensive and there was a danger in storing it in the house.

77. I heard evidence to suggest that both Kye Gbangbola and Nicole Lawler had previously provided accounts about the extent of the pump's use on the 7th February 2014 which differ from their oral evidence to me. In particular:

- a. Claire Louise Moore, a paramedic, produced a statement which stated that when she was driving Nicole Lawler to the hospital on the 8th February 2014, Ms Lawler said that there was a petrol pump in the house which had been operating since it was put in, although it is noteworthy that Ms Moore told me that she could not now remember precisely what had been said.
- b. Immediately after declaring Zane's death, Dr Bhatti, the Consultant Paediatrician, spoke to Nicole Lawler about the possible cause. In his contemporaneous note he recorded :

"Mother also told me that their house (basement) is flooded with flood water which was being drained by a petrol pump (arranged by the family themselves)."

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Ms Lawler told me that she does not recall making these remarks to Ms Moore and Dr Bhatti.

- c. On the 19th March 2014 Kye Gbangbola and Nicole Lawler attended the consultation with Dr Wood, Consultant Physician and Clinical Toxicologist. They had sought the referral because they hoped Dr Wood would identify the cause of Mr Gangbola's condition and Zane's death. Dr Wood recorded in his contemporaneous note that :

"One other pump that had been on for < 6 hrs on 7/2/2014
petrol pump
All windows open
located at very rear of property
Went off at 18.30 in evening."

Mr Gbangbola denies that this was said to Dr Wood.

- d. Also in March 2014 Mr Gbangbola delivered to my office, for my attention, a 19 page document which was entitled "Health Report". He told me in evidence that its purpose was to provide me with an accurate account and raise specific issues for my investigation. On page one of the report he wrote :

"The property has an externally monitored and maintained alarm system complete with Carbon Monoxide detector as the house has 3 working open flued fireplaces which have not been used since December 2013. The house has 6 electric pumps and a single (hired) petrol pump (turned off at 6.30 pm 7th Feb) extracting water from the subfloor flood basement in order to stop water rising into the house."

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In his evidence to me at the inquest Mr Gbangbola told me that the reference to “6.30 pm” was a typo, or typographical error, and that he should have written that the pump was turned off at “2.30 pm”, which was the time he gave in his subsequent written statement.

78. In deciding where the truth lies about the use of the pump, in addition to considering the parents’ consistency, I have considered too some circumstantial factors. First, I asked myself whether there was petrol available on which the pump could have run for up to 6 hours (as suggested by Dr Wood’s note) on the 7th February. It was the evidence of Stephen Dormer and Jerry Toogood that it was usual for petrol pumps to be hired out by SHS with a full tank of petrol. Neither checked the tank of the pump hired to Ms Lawler but, given that even on the parents’ own accounts to me, the pump ran for 20 minutes or so on the 7th February, I find that it was hired with a full tank as Mr Dormer and Mr Toogood would have expected. Ian Berry said that when he hired a similar pump from them it came with petrol and he said that he was topping up the tank, which had a capacity of about 3 litres, every 2 to 2 ½ hours. Steven Critchlow, who inspected the pump, expected it would run for 3 to 4 hours on a full tank.

79. I find it inherently improbable that, having hired the pump in order to be able to deal with the impending further influx of water, or a sudden loss of electric power in the night, Mr Gbangbola and Ms Lawler would not also have ensured that they were able to use it immediately, if need be. It may well be that they did not buy further petrol on the 6th

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or 7th February but I find there was more petrol already available in the larger 20 litre petrol can. In this regard, I find it significant that when I asked recently for the contents of the can (which was seized by the police after Zane's death) to be measured, it was found to contain 7.125 litres, which is considerably more than the "dregs" described by Ms Lawler. It is also noteworthy that PC Price found the can with its lid closed but not locked down, suggesting it had been opened since its storage in the garage.

80. I therefore find that there was sufficient petrol available to enable the parents to run the pump for a period of up to six hours on the 7th February 2014.

81. Secondly, it was Zane's parents' evidence that on the 7th February the flood basement was almost full and the water was only a few inches below the top. They had been warned that at least a further 12" of water was expected over the weekend. There was therefore a real risk that the water would start to flood the ground floor of the house, an event which was going to trigger Nicole and Zane moving out. It is likely, I find, that having hired and set up the additional pump, they would have used it in the course of the 7th February to lower the water level in the basement, in advance of the expected further deluge.

82. Thirdly, when it was seen after Zane's death, the pump's on/off switch was found by the police to be in the "on" position, which suggests it had not been stopped deliberately by turning it off but, rather, had stopped when it ran out of petrol. The pump's choke was set at or

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about the 75 % mark. At first blush this could be seen as suggesting that it had not been running for long because, on most engines, the choke is engaged initially to aid the starting up process, but will cause the machine to judder and stop if left open for too long. However, as I will come to in a moment, Steven Critchlow of the Health and Safety Laboratory, who tested the petrol pump, told me that, unusually, the engine on this pump ran more smoothly if the choke was left open permanently. This coincides with Ms Lawler's evidence, in that she told me that the choke was in the "two-thirds" position when she hired it and that Mr Toogood had "said to leave it in that position". Further, when examined, the tank of the machine was all but empty. Taken all together, I find that when the pump stopped for the final time prior to Zane's death, it probably did so because it ran out of petrol and not because it was actively stopped by either Mr Gbangbola or Ms Lawler.

83. Finally, I find that if the pump had been used for a relatively short time and had stopped running (and producing CO) altogether by lunchtime on the 7th February, it is difficult to understand how Zane's carboxyhaemoglobin level became raised, given that he did not return home until several hours later at around 4 pm.

84. I have no hesitation in accepting that the Mr Gbangbola and Ms Lawler did not want the pump to be operating in the house once Zane was getting ready for bed and Kye Gbangbola settled down to work, given the noise it made. Further, it was cold when the fire officers attended and clearly had not been used for some time. However, in all the circumstances set out above, I cannot accept their accounts given in

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evidence to me at this inquest that on the 7th February the pump was used for no more than 20 mins and only until lunchtime. I find that the truth is as Mr Gbangbola and Ms Lawler reported nearer the event. I find that in March 2014 they did tell Dr Wood that the pump was operated for “up to six hours until 18.30 hours”. The doctor made a contemporaneous note of this and I accept his evidence that he would not have made this precise note unless that is what he was told. The account was given in circumstances in which the parents were keen for Dr Wood to have an accurate picture of what had occurred as they were anxious to understand what had caused Zane’s death and his father’s injuries. Although Mr Gbangbola now asserts that Dr Wood’s notes were inaccurate in a number of ways, he was not able to identify these to me. Further, the account given to Dr Wood precisely coincides with the account which Mr Gbangbola sent to me in March 2014. His suggestion that there was a “typo” in that document is one that I do not find to be a credible explanation. The document is lengthy, full of detail and, in my view, carefully written. I cannot accept that Kye Gbangbola would have written in error and failed to correct “6.30 pm” when he meant 2.30 pm.

85. I am sorry to say that I find that the assertion that the pump was not used after 2.30 pm, or even earlier, came after it became apparent to the parents that the experts involved in the case were of the view that Zane’s death was likely to have resulted from CO poisoning. On a human level I can sympathise with the enormity of the difficulty they face, as Zane’s devoted parents, in accepting any link between their use of the pump in the house and his death, but I must decide

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dispassionately where the truth lies. Although I have no doubt that they are both generally honest people, and although I have found most of their evidence to be reliable and accurate, in relation to the difficult (for them) matter of when the pump was last used, I find that they provided an accurate account originally, but not to me at this inquest. I find that the pump was used for up to six hours in the course of the 7th February, including in the course of the late afternoon / early evening, and that it stopped for the final time at or by about 6.30 pm, probably when it ran out of petrol.

86. In reaching these findings I have considered the evidence of the neighbours of the Gbangbolas who told me that they did not hear a petrol pump in operation but I have been unable to place any great weight upon it. Ian Berry stated that he did not hear a petrol pump being used at all on the 7th February, but it is uncontentionous that it was used for some period. Paul Marsden made a statement that the area was quiet and he heard no petrol pump when he walked past the house at about 5.30 pm on the 7th February. However, this evidence was given for the first time only very recently and taking this together with his clear lack of objectivity I did not find this evidence reliable.

87. I also find that the position and circumstances in which the pump was operated resulted in the presence of a significant level of CO within the house. Ms Lawler and Mr Gbangbola told me that the pump remained situated in the lavatory with the intake pipe running into the flood basement via the hatch in the floor and the outlet pipe running from the pump and out through the open casement which is set in the top

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part of the window in the utility room. This set up coincides with what was found by the police after Zane's death and can be seen in the police photographs and, I find, was in place at all material times.

88. The window in the lavatory itself was not opened while the pump was operated. I note from the evidence of PC Price, the SOCO who attended and photographed the house on the 9th February 2014, that the casement window in the utility room was open by only 5 cm and was partly blocked by the muslin curtain. I was told by Zane's parents that the kitchen window at the side of the house was open whilst they were setting up the pump so that they could communicate with each other, one being inside and the other being outside. This window was, however, closed by the evening. Their evidence as to the back door was more equivocal. Ms Lawler said that it was open whilst the pump was being set up but Mr Gbangbola said he did not recall but he thought it probably was open. On the basis of all the evidence, I am not convinced about that. I note that Ms Lawler's concern in the hire shop was that the green intake pipe was too short to travel through the open window into the flood basement and she was not envisaging the back door being open. Further, I am not persuaded that the very considerable quantity of items stacked up against the back door (as can be seen in the photographs) were put there at 6.30 pm to stop someone leaning in through the open window and gaining access, as Ms Lawler suggested to me in evidence. Given the amount of items placed against the door, and the arrangement of pipes and curtain running across the door, I find it unlikely that the back door was opened that day. Finally, in all these circumstances I find that the area in which

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pump was operated on the 7th February was not sufficiently ventilated to ensure that the CO it produced was taken out of the house.

The Presence and Location of CO in the House on the evening of 7th February 2014

89. Having found that the petrol pump was operated until the early evening of the 7th February, I have considered my findings as to the presence and location of CO in the house. I have already found that the CO produced by the pump when in operation was not fully taken from the house by ventilation. I find also that the CO was not contained within the utility room. I note from the evidence of PC Price, the SOCO who attended the house on the 9th February 2014, that electricity wires prevented the door between the utility room and the kitchen from fully closing, leaving at least a 7 mm gap.
90. In this regard the evidence of Stephen Critchlow, a gas engineer employed by the Health and Safety Laboratory, is of relevance. He was asked to test the petrol pump, primarily in relation to its production of CO. By way of general information, he explained that using a petrol engine in a confined space results in the depletion of oxygen and a build-up of CO. The amount of CO produced will depend upon the size of the machine, the time for which it is run and the size of the room. CO is odourless but its production can result in a smell "like gas, a musty smell like a damp room". If CO is emitted into an airtight space it will be contained and a tight fitting fire door would restrict its movement. However, he said that if CO is emitted in a room with a door which is even slightly open, it will be able to move freely from the

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room and into the rest of the property. CO is emitted as a cloud and unless there is significant turbulence it tends to move as a cloud rather than mix with the surrounding air. Therefore, there can be pockets within a property where CO is high and other pockets where it is lower. He said that although CO has a similar density to air, when it is produced by the combustion process it is hot and buoyant and therefore can rise to the ceiling initially and then travel across the ceiling rather than dispersing throughout the room. This movement can include a movement upwards to the top of an open stairwell and he said he would expect higher levels of CO to be found on an upstairs landing than a downstairs hallway. Mr Critchlow explained that it can take a significant amount of time for CO to disperse from a property, although he was unable to provide any specific timescales. He said, however, that all properties have ventilation through which dispersal will take place, even those with double glazing.

91. When he inspected and tested the petrol pump, in April 2014, Mr Critchlow found it to be in a satisfactory condition and working order. He said he received it, from the police, with its “on/off” switch and fuel control both in the “on” position. The speed control was set to maximum and the choke was set to 2/3 of its maximum. There was a very small amount of fuel in the tank which enabled it to start once or twice but it had to be refuelled before the engine was run in order to measure its production of CO. He estimated that the pump would run for 3 to 4 hours on a full tank of petrol. When it was operated, Mr Critchlow found that, unusually, it ran more smoothly if the choke was kept in the 2/3 position. Mr Critchlow discovered that at full speed

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and with the choke in the 2/3 position, the pump produced an average of 55,790 CO ppm in five minutes, taken directly at the exhaust. A reading level in a room into which this level of CO is emitted would be lower but, if the pump was run for a few hours he said it would produce a very significant amount of CO. Mr Critchlow said it would never be safe to run the pump inside premises if there was any chance that a person might be in there. I accept the evidence of Mr Critchlow which I found to be of assistance and importance in this inquest.

92. In the light of all the relevant evidence I find as a fact that some or all of the CO emitted by the petrol pump up until about 6.30 pm on the 7th February 2014, rose and travelled from the lavatory / utility room, along the kitchen ceiling, and then up the open stairwell to first floor of the house. I further find that the CO and was present at a significant level on the first floor and in Bedrooms 1 and 2 when the family entered those rooms at about 7 pm that evening and when Zane died and Kye Gbangbola was overcome.

93. In reaching these findings I have taken account of the fact that no CO was detected in the house when the DIM team attended the following morning. I do not consider this undermines my findings. As the DIM testing did not take place until approximately 12 hours after production of the CO by the pump ceased, there was a considerable period in which the CO would have been gradually dispersing. Further, the rate of dispersal was likely to have increased significantly once the ambulance crews arrived. The front door of the house and the window in Bedroom 1 were open from that time onwards and,

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therefore, for about three hours before the DIM testing took place. I find there was probably sufficient time to enable full dispersal of the CO to take place.

The Presence and Location of HCN in the House on the evening of 7th February 2014

94. I have considered also whether there is evidence of HCN being present in the house on the evening of the 7th February when Zane died and Kye Gbangbola was overcome. The only evidence I have heard which suggests a presence of HCN in the house at any time is the alarm response at about 7 am on 8th February, which was eight hours or more after Zane died and Mr Gbangbola was overcome. The alarm sounded by the open front door of the house, at the threshold. It gave a low reading and it could not be repeated. Further, I heard evidence that the alarm, though apparently indicating the presence of HCN, was not necessarily doing so. Bruce Joliffe, a scientific adviser from Bureau Veritas who advised SFRS at the time and conducted investigations subsequently, told me that the HCN sensor on a GfG detector can be activated not only by HCN itself, but also by Nitric Oxide and Nitrogen Dioxide (“the oxides of nitrogen”). He stated that a positive reading can be differentiated by further testing using a Drager tube, because a Drager tube will respond positively to the presence of HCN but will not respond to the presence of the oxides of nitrogen. Indeed, it was his evidence that if a positive response for HCN on a GfG detector is not confirmed by Drager tube testing (as was the case with the testing on the morning of the 8th February) then it is likely that the GfG was responding to the presence of one of the oxides of nitrogen

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rather than HCN. Oxides of nitrogen are part of the exhaust fumes from a petrol engine and fire appliances were parked outside the house at that time.

95. In considering this issue I have taken account also of the evidence as to the potential source of HCN and how likely it is that it had entered the house from that source on the 7th February. Whilst it is clear from the evidence that landfill can be a potential source of toxic gases, including HCN, none of the land/soil or water testing conducted at the house or the land behind it (as set out above) found any evidence of a source of HCN (or any other toxic gases). I understand and accept Gavin Robert's assertion that it does not follow that the potential or possible presence of cyanide in the land can be ruled out. However, on the basis of the evidence and reasoning of Edward Stutt and Steven Wilson I find that it is very unlikely that a source of HCN had found a pathway to enter the house on the 7th February at a harmful or lethal level, whether by means of a one-off toxic plume triggered by the flooding (as suggested by Mr Roberts) or otherwise, and was then gone by the time the water was tested on the 8th February.

96. In the light of all the relevant evidence, I find that the single reading for HCN taken on the morning of the 8th February is insufficient to persuade me that there was probably HCN present in the house, including in Bedrooms 1 and 2, at the time that Zane and his father suffered toxic poisoning. I find, on the balance of probabilities, that there was no HCN present in the house at that time and that the reading taken by the front door at about 7 am on the 8th February was

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triggered by the presence of the oxides of Nitrogen, probably from a fire appliance outside the property.

The Medical Cause of Zane's Death

97. It is uncontroversial that Zane died from the effects of toxicity. This is the clear evidence of the pathologists and all the medical experts who have given evidence. Further, the acute symptoms suffered by Kye Gbangbola and Nicole Lawler, and the long-term damage suffered by Mr Gbangbola, are all consistent with the effects of toxicity. The issue for me is whether, on the balance of probabilities, I can reach any conclusion as to the identity of the toxic gas responsible. Am I able to conclude that the medical cause of death was CO toxicity or HCN toxicity or CO and HCN toxicity, or am I unable to reach any conclusion as to which toxic gas or gases caused Zane's death ?
98. In reaching my conclusion I have taken into account all the evidence and I find that it points clearly in one direction, namely towards Zane's death resulting from exposure to CO alone. Neither Zane, Kye Gbangbola nor Nicole Lawler showed any obvious sign of suffering the effects of toxicity until after 7.00 pm on the 7th February. Apart from Ms Lawler's chest infection, they were all well when they went in to Bedrooms 1 and 2 at about 7.00 / 7.30 pm. Neither Zane nor Mr Gbangbola left those rooms before being removed by the ambulance crews. I find that they suffered the effects of a toxic substance whilst in the house, and largely, or entirely, after 7.00 pm whilst in the two front bedrooms of the house. CO was present on the first floor and in Bedrooms 1 and 2 of the house. All three members of the family had

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raised carboxyhaemoglobin readings which establish that they were exposed to and affected by the CO before their removal from the house. There was no HCN present in the house and all three members of the family were found to have normal readings when tested for HCN. On the basis of the evidence of Alan Hutchings, and Dr Soilleux also, (as referred to above) I am satisfied that Zane's blood would have shown a raised level of HCN if that gas had caused his death.

99. Further, I accept and find significant the evidence of Prof Al-Sarraj. In particular, I find that the neurological findings of damage to the white matter of Zane's brain provides important evidence of CO toxicity. The absence of damage to the basal ganglia supports my finding that HCN toxicity played no part in Zane's death.

100. I have paused to consider very carefully whether I can be satisfied, even on the balance of probabilities, that Zane's death resulted from CO poisoning given his relatively low (8%) carboxyhaemoglobin reading. Although it is clear to me that his parents probably had higher carboxyhaemoglobin levels when they were in the house than their subsequent blood test results, the evidence I have heard suggests that Zane's may not have been significantly higher than 8% at any stage. If Dr Soilleux is correct, Zane's carboxyhaemoglobin level may have been higher before his death and post mortem, but I do not consider that the evidence enables me to find that it probably was. I have considered, therefore, whether the level of 8% is too low to account for Zane's death. I find that although it is lower than is usually seen in fatalities, the evidence does not suggest

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that death cannot result at this level; the level is not incompatible with death. Further, Zane's carboxyhaemoglobin level is only one piece of the jigsaw. Taking it into account with the post mortem evidence and all the circumstances, I am satisfied, on balance, that CO toxicity is established as the cause of death.

101. I have considered also whether Zane's sickle cell trait played any part in his death. I have found it surprising that such divergent views should be expressed by the medical experts, all eminent, as to whether the trait does, or does not, leave a carrier more vulnerable to the effects of CO. The difference of opinion is difficult to resolve but, it seems to me, is not determinative. By which I mean that, for the reasons set out above, I am satisfied that Zane's death was caused by CO poisoning whether or not he was more vulnerable to it by reason of his sickle cell trait. In this regard I agree with the opinion as to the cause of death expressed by Prof Risdon. In my view, I need to grapple with this issue only in order to decide whether or not to include a reference to the trait in the medical cause of death. I have decided that, in view of Dr Will's particular expertise and clear view, I cannot be satisfied that Zane's sickle cell trait played a part in his death.

102. In all the above circumstances, on the balance of probabilities, my conclusion as to the medical cause of Zane's death is :

1a Carbon Monoxide Toxicity.

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Time of Death

103. Although Zane's death was officially pronounced at hospital at 04.39 hours on the 8th February 2014, I have considered whether he had, in fact, died earlier whilst still at home. I have noted that Zane was lifeless when found and throughout his resuscitation. He was hypothermic on arrival at hospital and his locked jaw was thought to have been a result of early rigor mortis. Significantly, both Prof Risdon and Dr Marnerides stated that the food found in Zane's stomach suggests he probably died within 2 to 3 or 2 to 6 hours of eating. This evidence, taken with Zane's condition at 3.30 am and on arrival at hospital, leads me to conclude that he was probably already dead when he was found by his mother and that he had probably died by about 10.30 pm on the 7th February 2014.

Conclusion as to the Death

104. I first considered whether I should conclude and record that Zane was unlawfully killed. In the circumstances of this case, I could reach this conclusion only if I were satisfied, beyond reasonable doubt, that is so that I was sure, that he had died as a result of gross negligence manslaughter. Gross negligence manslaughter has five elements each of which has to be proved to that same standard, namely beyond reasonable doubt. If any one of the five elements is not proved to that standard then the conclusion of unlawful killing would not be available to me. Those five elements are:

- (1) That an individual owed a duty of care to the deceased person,

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- (2) That the individual breached that duty (by negligence),
- (3) That the risk of death (not just the risk of serious injury) was a reasonably foreseeable consequence of the breach,
- (4) That the breach caused the death, and
- (5) That the negligence was so “gross” as to merit the conviction of the individual for the serious crime of manslaughter.

105. The fourth element, causation, requires me to be sure about two matters. First, I must be sure as to the medical cause of Zane’s death and, secondly, I must be sure that an individual’s gross negligence was a substantial (more than minimal) cause of the death. It need not be the sole or principal cause.

106. I can say straight away that, in my view, the evidence does not enable me to record an unlawful killing conclusion. Although I consider that, taken together, I can be satisfied on balance that Zane died as a result of CO toxicity, I do not consider that the evidence establishes this beyond reasonable doubt, given the level of Zane’s carboxyhaemoglobin reading and the extent of the differences in the opinions of the medical experts. It is noteworthy that both Prof Risdon and Dr Marnerides, with whose opinions as to CO being the cause of death I agree, stated that they were able to reach their views on the balance of probabilities only. I too find that I am satisfied as to the medical cause of Zane’s death on the balance of probabilities but not so

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that I am sure. In the circumstances, an unlawful killing conclusion is not open to me on any basis.

107. I can add that insofar as I considered this conclusion on the basis of what was said by SHS to Nicole Lawler, as I have already stated (above) the evidence as to what part SHS's advice played in the parents' decision making is unclear. In my view, the evidence would not enable me to be sure that what was said by SHS in the shop, even if grossly negligent, was a significant cause of Zane's death.

108. In the circumstances, I do not intend to make specific findings on any other of the elements of the potential unlawful killing conclusion.

109. I next considered whether Zane's death was accidental. This is the appropriate conclusion if, on the balance of probabilities, I am satisfied that the death resulted from an unintended act or omission or was the unintended consequence of a deliberate act or omission. I have found that Zane's death resulted from the use of the petrol pump in the house and it was clearly an unintended consequence of that use. It is my conclusion, and I shall record, that Zane's death was an accident.

Prevention of Further Deaths Report

110. Having heard evidence from both the Hire Association Europe Ltd and the Health and Safety Executive I do intend to prepare a PFD report in relation to two matters:

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- a. The adequacy and accuracy of the Safety Guidance documents prepared by HAE for their members, not only in relation to this centrifugal pump, but in relation to any piece of equipment that is powered by an internal combustion engine where there is a realistic prospect that that piece of equipment might be used in an enclosed area.
- b. The use of the HSE logo on documents that are prepared for general use by trades people and members of the public alike, whether that be the official HSE logo or whether it be in the form of an HSE banner. To ensure that the use thereof does not give the appearance of the guidance within that document having, in someway, been endorsed by the HSE when in fact it has not been.

111. I intend to send the report to the following people:

- a. Rt Hon Penny Mordaunt MP, Minister of State for Department for Work and Pensions.
- b. Mr Martin Temple, the Chair of the HSE Board.
- c. Mr Graham Arundell, the MD of HAE Ltd.

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CONCLUSIONS

Box 1 :

Zane Ilorie Christopher Yusuf Gbangbola

Box 2 :

1a Carbon Monoxide Toxicity

Box 3 :

Zane Gbangbola died during the evening of the 7th February 2014 at his home address at Thameside, Chertsey in Surrey as a result of inhaling toxic carbon monoxide fumes that had been generated by a petrol pump that had been used inside the house earlier that same day in order to pump flood water from the property's flood basement.

Box 4 :

Accidental Death

Box 5 :

(a) 21st October 2006 at Chertsey, Surrey

(b) Zane Ilorie Christopher Yusuf Gbangbola

(c) Male

Inquest touching the death of Zane Ilorie Christopher Yusuf GBANGBOLA

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(d) N/A

(e) 7th February 2014, Thameside, Chertsey, Surrey

(f) Son of Kye Gbangbola and Nicole Lawler , 243, Thameside,
Chertsey, Surrey

Richard Travers

HM Senior Coroner for Surrey

7th September 2016

IN THE SURREY CORONER'S COURT
IN THE MATTER OF:

**The Inquest Touching the Death of
Zane Ilorie Christopher Yusuf GBANGBOLA
A Regulation 28 Report – Action to Prevent Future Deaths**

	<p>THIS REPORT IS BEING SENT TO:</p> <ul style="list-style-type: none">• The Rt Hon Penny Mordaunt MP, Minister of State for Department for Work and Pensions.• Mr Martin Temple, the Chair of the HSE Board.• Mr Graham Arundell, the MD of HAE Ltd.
1	<p>CORONER Richard Travers HM Senior Coroner for Surrey</p>
2	<p>CORONER'S LEGAL POWERS I make this report under paragraph 7(1) of Schedule 5 to The Coroners and Justice Act 2009.</p>
3	<p>INVESTIGATION and INQUEST The inquest into the death of Zane Gbangbola was opened on the 13th February 2014 and was resumed on the 13th June 2016. It was concluded on the 7th September 2016.</p> <p>I found the medical cause of death to have been: 1a. Carbon Monoxide Toxicity.</p> <p>I concluded with a short form conclusion of: 'Accidental Death'.</p>
4	<p>CIRCUMSTANCES OF THE DEATH At the date of his death on the 7th February 2014, Zane was seven years old and was living with his parents, [REDACTED] and [REDACTED] at the family's home address at Thameside, Chertsey, Surrey. At that time, that area of Surrey had suffered severe flooding and as a result Zane's parents had bought a number of electric pumps to pump out water from the property's flood basement.</p> <p>On the 6th February 2014, having been told to expect a further rise in the</p>

level of the flood water, Zane's parents decided to hire a non-electric and more powerful pump. In consequence, on the 6th February 2014 [REDACTED] attended Surrey Hire and Sales Ltd ('SHS') where she hired a centrifugal petrol driven pump. There was a dispute in the evidence as to what was said in the hire shop, but I found that [REDACTED] was told that she could use the pump inside the house provided it was ventilated. That advice was in line with advice given in a Safety Guidance document relating to petrol driven centrifugal pumps prepared by Hire Association Europe Ltd ('HAE') for use by their members. It contained the words, "To reduce the risk of serious or fatal injury from breathing toxic fumes, do not run the pump indoors unless you have good ventilation. Ensure that you have proper ventilation when working in other confined areas such as trenches." HAE is a trade body representing plant, tool and equipment hire companies. SHS were members of HAE and had access to that Safety Guidance document.

The Safety Guidance document had on it an oblong box containing the HSE's logo, although this was described to me by [REDACTED] a Deputy Director in the HSE's Field Operations Division, as a "banner" as opposed to the HSE logo itself. He explained to me that the HSE had not approved the contents of the Safety Guidance document and the banner was there simply to provide details of how to find the HSE's website, where further safety information would be available. Mr Galloway stated that the inclusion of the HSE's oblong shaped banner, rather than the HSE's logo in a square box, was intended to convey that this did not represent the HSE's endorsement of the document. However, he accepted that, whilst this might have been the intention, there was a real risk that members of the public would not understand the niceties of the notice and would take it as an endorsement by the HSE of the document and its contents.

The Safety Guidance document presents a potential danger. During the course of the evidence I heard from [REDACTED], a very experienced Gas Incident Investigation Officer who has been employed by the Health and Safety Laboratory, which is an agency of the HSE, since 1991. He told me that, when in use, this pump created very large volumes of Carbon Monoxide and that "it would never be safe to have the pump inside the premises if there was any chance that a person might be there'.

Whilst [REDACTED] could not accept the finality of that statement as the level of danger would, he said, depend upon the size and nature of the premises and the means of ventilation available, he did agree that, as a general statement, it had force, especially in relation to use for domestic purposes. He further agreed that this advice would apply to any piece of equipment that was driven by an internal combustion engine.

	<p>██████████ the Managing Director of HAE, took a very similar stance and said that HAE intended to review their Safety Guidance documents, although they remain in use pending that review.</p>
5	<p>CORONER'S CONCERNS</p> <p>During the course of the inquest the evidence revealed matters giving rise to concern. In my opinion there is a risk that future deaths will occur unless action is taken. In the circumstances it is my statutory duty to report to you.</p> <p>I am concerned that the Safety Guidance documents currently prepared by HAE in relation to equipment that is driven by an internal combustion engine, where there is a realistic risk that that equipment might be used in confined areas, are inadequate and potentially misleading. Further, that the use of the HSE logo, in whatever form it might appear, runs the risk of being interpreted by someone reading the document as being an endorsement by the HSE of the document and its contents, thereby exacerbating the potential risk of harm by increasing that person's confidence in the guidance albeit that the guidance may be poor.</p> <p>The MATTERS OF CONCERN are:</p> <ol style="list-style-type: none"> a. The adequacy and accuracy of the Safety Guidance documents prepared by HAE for their members, not only in relation to this centrifugal pump, but in relation to any piece of equipment that is powered by an internal combustion engine where there is a realistic prospect that that piece of equipment might be used in an enclosed area. b. The use of the HSE logo on documents that are prepared for general use by trades people and members of the public alike, whether that be the official HSE logo or whether it be in the form of an HSE banner Consideration should be given to taking steps to ensure that the use of any such logo, banner or equivalent representation of the HSE emblem does not give the appearance of the guidance within that document having been endorsed by the HSE when in fact it has not been.
6	<p>ACTION SHOULD BE TAKEN</p> <p>In my opinion action should be taken to prevent future deaths and I believe that you, the persons listed in paragraph one above, have the power to take such action.</p>

7	<p>YOUR RESPONSE</p> <p>You are under a duty to respond to this report within 56 days of its date; I may extend that period on request.</p> <p>Your response must contain details of action taken or proposed to be taken, setting out the timetable for such action. Otherwise you must explain why no action is proposed.</p>
8	<p>COPIES and PUBLICATION</p> <p>I have sent a copy of this report to the following:</p> <ol style="list-style-type: none"> 1. The Rt Hon Penny Mordaunt MP, Minister of State for Department for Work and Pensions. 2. [REDACTED] the Chair of the HSE Board. 3. [REDACTED] the MD of HAE Ltd. 4. Leigh Day Solicitors (on behalf of the family) 5. BLM (on behalf of Surrey Hire and Sales Ltd) 6. DWF (on behalf of the Spellthorne Borough Council) 7. The Environment Agency 8. CMS Cameron McKenna LLB (on behalf of Brett Aggregates) 9. Ashford and St Peter's Hospitals NHS Foundation Trust 10. [REDACTED] – Chief Fire officer – Surrey Fire and Rescue Service 11. The Chief Coroner <p>I am also under a duty to send the Chief Coroner a copy of your response.</p> <p>The Chief Coroner may publish either or both in a complete or redacted or summary form. He may send a copy of this report to any person who, he believes, may find it useful or of interest. You may make representations to me, the Coroner, at the time of your response, about the release or the publication of your response by the Chief Coroner.</p>
	<p>Signed:</p> <p>Richard Travers</p> <p>DATED this 13th September 2016</p>