Coroners Act 1996
[Section 26(1)]

Western *Australia*

RECORD OF INVESTIGATION INTO DEATH

Ref: 5/14

I, Barry Paul King, Coroner, having investigated the death of ***Wayne Lance Ross*** *with an inquest held at the* ***Perth Coroner's Court, Court 51, CLC Building, 501 Hay Street, Perth,*** *on* ***17, 18 and 19 February 2014****, find that the identity of the deceased person was* ***Wayne Lance Ross*** *and that death occurred on* ***11 April 2010*** *at* ***Perseverance Nickel Mine, Leinster,*** *from* ***multiple injuries*** *in the following circumstances:*

Counsel Appearing:

Ms I Burra-Robinson assisting the Coroner
Mr P Quinlan SC and Ms Rowe (instructed by King & Wood Mallesons) appearing for BHP Billiton Nickel West
Mr N Van Hattem and Ms Hill (State Solicitor's Office) appearing for the Department of Mines and Petroleum
Mr R Corboy (Corboy Legal) appearing for the deceased's family
Mr R Hooker and Mr Talbert (instructed by Sparke Helmore Lawyers) appearing for Mr P Gruessing

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INTRODUCTION

1. Wayne Lance Ross (**the deceased**) worked as a loader operator at the Perseverance Nickel Mine in Leinster (**the mine**). The mine was owned and operated by BHP Billiton Nickel West Ltd (**Nickel West**).

2. The deceased died on 11 April 2010 from multiple injuries when the loader he was operating fell 25 metres down an unprotected stope (a vertical void between levels) at the mine.

3. I held an inquest into his death from 17 to 19 February 2014.

4. The cause and manner of the death of the deceased were apparent before the inquest. Rather than those issues, the inquest focused on how the incident came about and on what safety procedures could be implemented in mines to ensure so far as practicable that a similar incident does not happen again.

5. Documentary evidence was adduced in the form of reports compiled by police investigators and by District Inspector of Mines Andrew Harris.[1] A statement by Florian Morris,[2] the Underground Manager and Mining Manager at the mine from May 2010 to February 2014, together with three volumes of related material[3] was provided by Nickel West.

6. Oral evidence was provided by Inspector Harris, by mechanical engineer Martin Simms who had examined the relevant loader after the accident, by the deceased's Shift Supervisor on the day of his death, Peter Gruessing, by Nickel West Superintendent of Survey Simon Johnston who had informed Mr Gruessing about work to be done near the top of the void, by geo-mechanical engineer Ryan Brennan who had inspected the area near the top of the void, and by Mr Morris.

[1] Ex 1, Vols 1 - 8
[2] Ex 2
[3] Ex 3, Vols 1 - 3

7. In her opening, Counsel Assisting identified the following issues for consideration at the inquest:

    a. In what task was the deceased engaged near the open stope?
    b. What procedures did Nickel West have in place to govern the use of manned loaders near open stopes?
    c. What circumstances led to the loader falling into the stope?
    d. What could have been done to prevent the loader from falling into the stope?
    e. Could something have been done with respect to the loader itself to minimise the risk of injury?

THE DECEASED

8. The deceased was born in New Zealand on 21 December 1964 so he was 45 years old at the time of his death.

9. The deceased went from New Zealand to Australia in about 1986 when he travelled to the Northern Territory and worked packing fruit. There he met his first wife, Linda, with whom he had two children. Around 1991 the deceased moved with his family to Western Australia where he and Linda separated.

10. The deceased later married again, but that relationship soon ended. About that time the deceased began working in mines.

11. In 1999 the deceased returned to New Zealand for his brother's wedding and began dating a friend from his teenage years, Jocelyn Murphy, with whom he formed a lasting relationship.

12. The deceased came back to Australia with Ms Murphy and worked in the mine on a two week on, two week off rotation as an operator of load haul dump vehicles, commonly known as boggers or loaders.

13. He quit the mining industry in 2000 in order to spend more time at home, but had to file for bankruptcy due to a failed business venture in 2007 and went back to mining about that time. He commenced at Argyle with McMahons and then transferred to the mine at Leinster in September 2007 and began to work directly for BHP. By this time the deceased and Ms Murphy had a daughter.

14. By April 2010 the deceased had all but paid off a debt to the Insolvency and Trustee Service of Australia. He and his family were planning to move to Tasmania in April 2011 so that the deceased could stay in the mining industry while Ms Murphy could be closer to her family in New Zealand.

15. At the mine, the deceased was highly regarded as a loader operator. Denver D'Angelo, Underground Manager at the mine, provided a statement to police in which he stated that he knew the deceased, who had an excellent work reputation. Mr D'Angelo said that the deceased was experienced at driving boggers and performed his job very well at the mine.[4]

16. The deceased was issued a Certificate of Competency for load, haul dump vehicles on 9 September 2007. He was re-assessed and issued with another such certificate on 16 December 2009.[5]

17. The deceased was not only competent and experienced as a loader operator; he had been trained and assessed in several safety-related matters at the mine, including some 42 inductions and procedures. The procedures in which the deceased was trained and/or assessed included Installation and Use of Wall Bollards Theory Assessment, Backfilling Open Stopes Theory Assessment, Safety Signs in the Mine Theory Assessment, Working at Heights Certificate, and Task Hazard Analysis Theory assessment.

18. Ms Murphy expressed the view that the deceased appeared to love his job and was very safety conscious.[6]

[4] Exhibit 1, Vol 1 Tab 9
[5] Ex 1, Vol 7, Tabs 13 and 14
[6] Ex 1, Vol 1, Tab 7

19. Senior Underground Safety Advisor Costa Papadopoulos provided a statement to police in which he said that he knew the deceased from professional interaction to be a safety oriented person who performed his work to a high level and could not be faulted from a safety perspective.[7]

THE MINE

20. The mine was located 10 kilometres north of Leinster and about 235 kilometres north of Kalgoorlie-Boulder. It was part of the Leinster Nickel Operations owned by Nickel West.

21. The mine was an underground mine created below an old open pit. Ore was produced in the mine from three ore bodies using different mining methods. The ore body at which the deceased was working at the time of his death was known as the 1A ore body.

22. The mining method employed by Nickel West at the 1A ore body was a bottom-up long hole stope extraction method.

23. This method involved the use of an access tunnel, or drive, into the ore body from a decline known as the Progress Decline which came off of the Main Decline.[8] From the access drive were ore drives at progressive levels from the access drive along the ore body to the extremity of the ore's economic limit. The relevant ore drives at the 1A ore body ran south and north from a T-junction at the end of the access drive. The levels were about 25 metres apart vertically. The ore drives were usually four metres wide and 4.1 metres high.[9]

24. Ore was drilled and blasted at intervals between two levels, creating voids known as stopes as broken ore was removed. The mined ore was transported from the lower level by boggers to be processed elsewhere.

[7] Ex 1, Vol 1, Tab 11
[8] Ex 1, Vol 3, Tab 19 and 20
[9] ts 13

25. This method was called 'bottom-up' because the creation of stopes began at the lowest level and progressed upwards to the next levels after the extraction of ore from the lowest level had been completed and the stopes filled in.

26. The dimension of stopes was typically 20 metres (along the ore drive) by four metres (the width of the ore drive) by 25 metres (the vertical distance to the next level).[10] Pillars of rock about five metres wide were left between stopes.

27. Annexed is a copy of a diagram of the 1A stopes of the mine showing the relevant levels and stopes including the dates of the completion of each stope.[11]Each stope, or panel, was designated a number based on the number of the lower level and the number of previous stopes at that level.

28. The stope relevant to the death of the deceased (**the stope**) was 9540 1A (level) SOD (South Ore Drive) Panel (stope) 5. It was situated between the 95401A SOD (the bottom level) and the 9565 1A SOD (the top level).

SAFETY PROCEDURES

29. As would be expected, Nickel West had safety operating procedures applicable to mining activities with identified risks.[12]

30. When stopes at the mine were drilled and blasted, a procedure was followed to place warnings on the top level of the resultant voids. The procedure involved the use of bollards in the form of yellow, 2.5 metre long 80mm metal tubes that were placed into both sides of the drive at about six metres from the edge of voids at waist height.[13]

31. The use of bollards was implemented by Nickel West following an incident at the mine in July 2001 involving a loader driving partially into a stope while constructing a

[10] Ex 1, Vol 2, Tab 1 p48
[11] Ex 1, Vol 3, Tab 21
[12] Ex 1, Vol 2, Tab 1, p126-129; Vol 1 Tabs 34-38
[13] Ex 1, Vol 1, Tab 35; Ex 1, Vol 4, Tab 5 (back of Vol 4)

CMS pad. An investigation concluded that a cause of the incident was confusion and inadequacy in the existing low level risk assessment procedures.[14]

32. The procedure provided that bollards projected into drives but did not meet in the middle, forming a visible warning but not a physical barricade to personnel or loaders. Under the procedure for installation and use of bollards, loaders were not permitted in down hole stope level drives, except when backfilling, unless authorised by the shift supervisor who had to make the loader operator aware of the open hole hazard. Barricades and signs were to be reinstalled if they were removed to allow access for any work.[15]

33. This procedure could be read to have allowed loaders to operate between the position of bollards and open stopes, even when not backfilling, provided the shift supervisor had so authorised. However, the same procedure provided that no-one was to travel past bollards without wearing working at heights equipment in accordance with a working at heights procedure.

34. Signs were also used as warnings and procedural barriers. A procedure required prescribed danger signs to be hung on chains across drives at one metre high.[16]

35. At the time leading up to the incident, when the deceased went to the 9565 1A SOD there was a chain across the drive about 20 metres from the stope with signs attached stating 'NO UNAUTHORISED ENTRY' and 'OPEN HOLE' and there were bollards in the walls of the drive about six metres before the stope. Neither the chain nor the bollards had a locking mechanism, so each could be removed without a key. The procedure applying to the OPEN HOLE sign prohibited entry without authorisation from the relevant supervisor.[17]

[14] Ex 1, Vol 3, Tab 5 (back of Vol 3)
[15] Ex 1, Vol 1, Tab 35
[16] Ex 1, Vol 1, Tab 34
[17] Ex 1, Vol 1, Tab 34

36. When a stope was completed, it was backfilled with broken waste rock up the level of the upper drive. A procedure required that a bund or barrier, usually of rock, be placed on the lower level on the access-side edge of the stope and the stope was backfilled from the upper level. The bund stopped rocks dropped into the stope from the level above from going into the ore drive towards the access drive.[18]

37. At the 1A ore body, backfilling of stopes was generally done with loaders from the top levels. When backfilling of a stope was carried out, procedures required the use of a steel 'bund' or 'wheel stop' to be fixed at the top level at minimum of 1.5 metres from the edge. The steel bunds were bolted to the drive walls with chains. The use of bollards and signs was required, and flood lights were required to be used at six metres and 10 metres from the tipping points.[19]

38. During the creation of a stope and after it was completed, surveys of the cavity created were carried out using a laser imaging technology known as Cavity Monitoring System, or CMS. The technology involved the use of a laser rangefinder which was attached to a boom in order to insert it into the stope. The rangefinder rotated around the boom and sent data by a cable to a data logger. At the mine a wheeled trolley was used to help move and support the boom into stopes.[20]

39. Prior to a CMS survey, the initiation of the survey was to be approved by the underground manager and a checklist was to be completed by the mine's geomechanics department, the shift supervisor, and the survey department.[21]

40. At the 1A ore body, CMS surveys of stopes were more often done at the lower levels of the stopes but surveys from the top levels were also performed.[22] When CMS surveys were performed from the bottom level, a 'CMS bund' with a

[18] Ex 1, Vol 1, Tab 38
[19] Ex 1, Vol 1, Tab 38
[20] Ex 1, Vol 2, Tab 1 p50-52
[21] Ex 1, Vol 1, Tab 36
[22] Ex 1, Vol 2, Tab 1 p52

flattened top was placed on that level at the brow of the stope.

41. While the procedures described above were in place in the sense that they existed on paper and that steps were taken to see that they were brought to the attention of personnel, it seems that neither their existence nor their details were necessarily known or regularly implemented by all relevant personnel. For example, an experienced loader operator at the mine provided a statement in which he said that within 12 months of the incident, CMS bunds were used for CMS surveys from the top level.[23] This was contrary to the procedure that had been in place since August 2008.[24]

42. That personnel were not familiar with all procedures is hardly surprising given evidence that some personnel would work in areas where they were not affected by some procedures but would have to follow others on a regular basis. There was evidence, discussed below, which indicated that at the time of the incident the deceased's supervisor, Mr Gruessing, may not have been familiar with the procedures applicable to CMS surveys from top levels.

43. As well as operating procedures for identified risks, Nickel West also had risk management procedures in place. These procedures had three levels. The first level was a work area checklist called a Daily Planned Inspection or DPI. DPI's were supposed to be completed by operators every time they went to a new work area. One purpose of DPI's was to identify when a risk was significant enough to trigger the next level of risk assessment.[25]

44. The next level of risk management was the Task Hazard Analysis, or THA, in which assessments are carried out by small teams including the person who was to perform the task. Before the task can be undertaken, the THA had to be authorised by a supervisor.[26]

[23] Ex 1, Vol 2, Tab 28
[24] Ex 1, Vol 1, Tab 36
[25] Ex 1, Vol 2, Tab 1 p120
[26] Ex 1, Vol 2, Tab 1 p119

45. After the incident, a DPI form completed by the deceased on 11 April 2010 for the task he was intending to carry out at the 9565 1A SOD was recovered. Among other things, the deceased had indicated on the form that the travelways, roadways, and housekeeping at the ore drive were to standard. He indicated that the task was not out of his normal scope of work or he did not have a procedure (meaning that he did have a procedure). He assessed the risk level as low, which meant that he did not have to complete a THA.[27]

46. The third level was the Workplace Risk Assessment and Control, or WRAC, which was conducted for complex tasks with high risks, introduction of new equipment, processes or work methods. WRACs required management review and site registers.[28]

47. In oral evidence, Inspector Harris noted that there were problems associated with the use of low level risk assessment procedures such as DPIs because the operator is the person assessing the hazard and the risk and then making decisions based on that assessment. He said that lower level risk assessments are still important because they require an operator to look around a workplace to see if there are any changes, but they require a quality control process to make them more effective.[29]

THE LOADER

48. The loader operated by the deceased was one of seven such machines being used at the mine at the time of the incident. Machines of this nature are heavy duty purpose-built machines used primarily for moving and transporting broken rock over a maximum of a few hundred metres in underground mines.[30] They are integral to underground mining operations in Western Australia.[31]

[27] Ex 1, Vol 3, Tab 2 (back of Vol)
[28] Ex 1, Vol 2, Tab 1 p118
[29] ts 47, 72
[30] Ex 1, Vol 2, Tab 1 p49
[31] ts 17

49. Operators of load haul dump machines sit low to the ground so do not have the advantage of easy visibility of the area to the front of the bucket of the machine that is available to the operators of front-end loaders commonly seen on construction sites above ground. This is particularly so when the machine is used to tram, or transport, material with the bucket in a lowered and crowded position; that is, with the bucket tilted back to keep the material from falling out the front. In those circumstances, visibility to the front of loaders is very limited.

50. The operators of load haul dump machines sit sideways to the direction of travel to enable them to see more readily to the rear of the machines when reversing. They wear lap belts as safety precautions, but as they sit sideways to the direction of travel and the lap belts provide only forward restraint, operators are not effectively restrained from sideways movement in the event of a sudden stop.[32]

51. The maximum speed of the loader operated by the deceased was about 25 kph.[33]

EVENTS LEADING UP TO THE DEATH

52. The last production blast of the stope was on 4 April 2010.[34]

53. In the early morning of 11 April 2010 a loader operator finished bogging the ore from the bottom of the stope with a remote controlled loader. He prepared a CMS bund at the brow of the stope on that bottom level, 9540 1A SOD at the direction of his shift supervisor, Richard Hayman.[35]

54. At 5.45am on 11 April 2010 the deceased's supervisor, Mr Gruessing, met with Mr Hayman for a hand over. Also present for at least part of the meeting was graduate mining engineer Jonathan Owens. Mr Hayman informed

[32] ts 83
[33] Ex 1, Vol 5, Tab C
[34] Ex 1, Vol 2, Tab 1 p107
[35] Ex 1., Vol 2, Tab 19

Mr Gruessing about the fact that all the broken ore had been bogged from the 9540 1A stope and that a CMS bund was in place.[36]

55. Around this time, Mr Owens went to see surveying personnel, Simon Johnston and David De Piazzi, to confirm that they would conduct a CMS survey of the stope.[37] Mr Johnston and Mr De Piazzi requested that the survey be done from the top level, 9565 1A SOD, because their CMS unit had been damaged during a previous survey by a falling rock during a survey of that stope from the bottom level.[38]

56. At about 6.45am, Mr De Piazzi met briefly with Mr Gruessing while on the way to the white notice boards where the day's planned activities were listed. Mr Owen was also nearby.

57. Mr De Piazzi asked Mr Gruessing if everything was ready to carry out the CMS survey of the stope.

58. Mr Gruessing said that everything was good and that there was already a bund ready at the 9540 1A level. Mr De Piazzi said that the survey would be done at the top level.

59. Exactly what was said then by Mr Gruessing is not clear. Mr De Piazzi provided statements to police investigators and to Inspector Harris in which he stated that Mr Gruessing said or implied that he would send someone to make a bund at the top level.[39]

60. Mr Johnston said that he walked in on the conversation between Mr De Piazzi and Mr Gruessing. Mr Johnston said that there was talk about a requirement for a bund at the top level, but that he said to Mr Gruessing twice that there was no need for a bund and that it was a 'working at

[36] Ex 1., Vol 2, Tab 19
[37] Ex 1, Vol 2, Tab 21
[38] Ex 1, Vol 2, Tab 12
[39] Ex 1, Vol 1, Tab 18; Ex 1, Vol 2, Tab 21

heights' issue.[40] Mr Owens also heard Mr Johnston say that to Mr Gruessing[41] as, apparently, did Mr Brennan.[42]

61. In oral evidence Mr Gruessing said that he did not recall saying that he would arrange for a bund at the top level, but that he may have asked if one were required.

62. That evidence suggests that Mr Gruessing may not have realised at the time that the procedure for a CMS survey from the top level did not involve the placement of a bund before the stope. The relevant procedure had been in place, on paper at least, since August 2008. Mr Johnston was clearly aware of it, but then he had created it. Mr Gruessing said that he had probably not prepared for a CMS survey from the top level before. He thought that he might have seen one done 18 months previously.[43]

63. Shortly after the conversation with Mr De Piazzi and Mr Johnston, Mr Gruessing went to a Pre-Shift Information meeting where safety issues were discussed and shift work plans were handed out to the crew. At about this time, Mr Gruessing spoke to the deceased.

64. In a statement provided to Inspector Harris, Mr Gruessing said that he asked the deceased to look at the 9565 1A SOD. He told the deceased that he, Mr Gruessing, had not been past the sign in the 1A SOD that week and he asked the deceased to check that the bollards had been installed as they should have been since the stope had been fired. He asked him to check whether there was any bunded material before the bollards and to fix it up so the surveyors could do the CMS survey. The deceased said OK. Mr Gruessing then said that everything should be OK up there; the surveyors will use the bollards for the probe.[44]

65. In oral evidence Mr Gruessing said that his intention at that time was to get to the 9565 1A SOD before or at the

[40] Ex 1, Vol 2, Tab 12
[41] Ex 1, Vol 2, Tab 29
[42] Ex 1, Vol 2, Tab 5
[43] ts 121
[44] Ex 1, Vol 2, Tab 4

same time as the deceased.[45] His instruction was to check the ore drive and to see if the roadway needed a clean-up of bunded material so the CMS survey could be done.[46]

66. Mr Gruessing said that his expectation was that the deceased would be waiting for him when he got there as had happened in the past. That was particularly the case because he expected the deceased to have filled out a risk assessment form, a DPI, which would have triggered a THA and required Mr Gruessing's signature before he could proceed to the next step.[47]

67. After he had spoken to the deceased, Mr Gruessing attended a foreman's meeting until about 9.00am. He then left the office and went to his vehicle in order to drive to the 9565 1A SOD in order to inspect it. At the vehicle Mr Gruessing received a radio call from the deceased who said that he was at the 9565 1A SOD in his loader. The deceased requested authorisation to go past the sign.

68. In his statement to Inspector Harris, Mr Gruessing said that he told the deceased that he had permission to go past the sign. He told him that he had spoken to the engineer who had been in the drive the other day and that everything was fine, but that he, Mr Gruessing, wanted the deceased to make sure that the bollards were there and if there was any bunded material to fix it up ready for the CMS survey. He told the deceased that he was on his way and that he would see the deceased in 10 minutes. The deceased acknowledged him.[48]

69. However, in his statement to police, Mr Gruessing said that he told the deceased 'I want you to check if there are bollards and a bund in place' and 'If the bund isn't right could it be fixed up, ready for the CMS… '. [49]

70. In oral evidence, Mr Gruessing said that he had said something about a bund. He said the police statement was

[45] ts 95
[46] ts 123
[47] ts 101
[48] Ex 1, Vol 2, Tab 4
[49] Ex 1, Vol 1, Tab 15

very brief and he was just trying to think what happened. He told the inquest that it was just a quick statement and it wasn't until he had actually sat down and read it a couple of days later that he noticed it.[50]

71. In answer to Mr Hooker's questions, Mr Gruessing agreed that the statement to police, given within hours of the incident when he was confused and distressed, was inaccurate and that the statement to Mr Harris, which was prepared over five hours two days after the incident, was accurate.[51]

72. As mentioned above, a CMS survey procedure requires a checklist to be completed beforehand. The member of the geomechanics department at the mine who was charged with the responsibility to complete that department's part of the CMS survey checklist was Mr Brennan, the graduate geomechanical engineer. Mr Brennan was informed that he only had to inspect the 9565 1A level since the survey was going to take place from the top of the stope.[52]

73. Before going underground to carry out the inspection, Mr Brennan saw Mr Gruessing who asked him if he was going to inspect the 9565 1A for the survey, and Mr Brennan replied that he was.[53]

74. Mr Brennan arrived at the 9565 1A level at about 8.50am in a utility vehicle. He noted that ventilation fans at that level were not running and that ventilation doors were open. He parked the vehicle near the sign across the 1A South Ore Drive near the junction with the access drive and, because he had already obtained Mr Gruessing's authorisation to go past the sign, inspected the 1A SOD on foot. It took him about 20 minutes.[54]

75. Mr Brennan noted that there was no dust in the air. He stopped at the bollards about 6 metres from the stope and did the inspection from both sides of the drive, filling in his

[50] ts 123-124
[51] ts 137-138
[52] Ex 1, Vol 2, Tab 5
[53] Ex 1, Vol 2, Tab 5
[54] Ex 1, Vol 2, Tab 5

part of the checklist form. He then walked back to the sign and left the form rolled up in a clip on the sign.

76. As Mr Brennan was about to leave, he noticed a loader enter the level and come up to the 1A SOD intersection and back out of the access drive into the M931 access near the intersection. He had previously heard the deceased call up the level on the radio. It is apparent from that and other evidence, including that of the Pitram operator timeline report for the deceased,[55] that the loader he saw was being operated by the deceased.

77. Mr Brennan drove out of the access and saw the loader parked bucket-first in the M931 access. The deceased was standing at the rear of the loader. Mr Brennan saw the deceased switch on the ventilation fan and go back to his loader. Mr Brennan then drove out of the area.

78. Mr Gruessing drove to the 9565 1A SOD at about 9.30am. As he drove through the ventilation doors he was met with a cloud of dust coming towards him. He noted that the ventilation fan was on. He waited for a couple of minutes for the dust to clear and drove to the 1A SOD T-junction where he was met with more dust and had to stop again. He drove into the SOD a couple of metres and noticed that the chain and signs were on the right hand wall[56] consistent with the procedure where signs are not in use.[57] He saw the checklist form left by Mr Brennan.

79. Mr Gruessing drove a few metres further and stopped. The dust was starting to lift and he saw the edge of the stope about eight metres in front of him. There were no bollards protruding from the walls as there should have been.

80. In his statement to police, Mr Gruessing said that the first thing he thought was, 'Where is the bund? Where are the bollards?'

[55] Ex 1, Vol 4, Tab 26
[56] Ex 1, Vol 2, Tab 4
[57] Ex 1, Vol 1, Tab 34

81. In oral evidence, Mr Gruessing said that when the dust cleared he expected to see uneven ground with floor heave and cracks down the walls; this was the first stope of all the ones he had worked on where the floor was flat to the edge of the stope.[58]

82. When Mr Gruessing saw the stope in front of him, he also heard the sound of a loader engine running. He backed out of the ore drive and tried to call the deceased on the radio. He re-hung the signs and took the CMS checklist form from the chain.

83. Mr Gruessing drove down to the 9540 1A access drive and walked into the SOD where he could see the deceased's loader jack-knifed in the bottom of the stope with the motor running. He could see that the cabin door of the loader was open and the deceased's body was lying out of the cabin onto the left front mudguard. Mr Gruessing called Control for a full emergency response.

84. Due to the dangers to personnel associated with going into the stope, the emergency response resulted in a protracted recovery process of the deceased's body.

85. Evidence provided by forensic pathologist Dr Jodi White established that the deceased died within minutes of the crash.

CONDITION OF THE LOADER

86. When the loader was first located, rock material that could be used to create a rock bund was found in the bucket. In oral evidence, Mr Gruessing indicated that there was no other reason for the deceased to be going in the direction of the stope with the material in the bucket but to put a rock bund on the edge of it.[59]

87. The deceased had been thrown part of the way out of the cab of the loader. He was still attached to the seat by the seatbelt.

[58] ts 123-124, 138
[59] ts 124-5

88. Mechanical engineer Martin Simms inspected the loader and discovered that two of the bolts holding the seat were missing, which meant that the seat was free to break loose and swing around.[60] Later investigations revealed that the seat had been removed and replaced in October 2009, and it is likely that a failure to replace two of the bolts occurred at that time.[61]

89. Mr Simms calculated the speed of the loader as it fell to have been up to 75kph, depending on whether it had been slowed on the way down by contact with the walls of the stope.

90. In his view, it is difficult to say what effect the seatbelt might have had if the seat had been properly attached because, as the deceased would have been sitting sideways and as the seatbelt does not provide lateral restraint, the seatbelt would not have stopped him from being thrown sideways. It was his view that there was still a likelihood that the deceased would have been fatally injured but that the lack of the two bolts made his fatality a near certainty.

91. Apart from the missing bolts from the seat, Mr Simms found no mechanical defect or deficiency with, or any maintenance or servicing issues of, the loader that could have caused or contributed to the incident.[62]

92. Mr Simms also noted that the loader's park brake and emergency stop were off, indicating that the deceased had not tried to stop the loader before it fell down the stope.[63]

EXAMINATION OF THE 9565 1A SOD

93. District Mines Inspector Harris carried out a thorough and detailed investigation into the incident. As part of that investigation, he inspected the 9565 1A and 9540 1A levels on 12 April 2010.[64]

[60] ts 81
[61] ts 86
[62] ts 83-84
[63] ts 83
[64] Ex 1, Vol 2, Tab 1

94. At the 9565 1A level Inspector Harris noted what appeared to be loader tyre tracks at the start of an access drive in which rock material had been stockpiled.[65] It is possible that the material found in the bucket of the loader after the crash had been taken from this stockpile by the deceased. Inspector Harris found another possible source of similar material in an access drive off of the 9565 1A NOD.[66]

95. In the 9565 1A SOD at about 10 metres from the junction with the access drive Inspector Harris found that the chain with signs mentioned above was hung across the drive.[67]

96. The floor of the drive was flat and even. About 10 metres from the open stope Inspector Harris saw two bollards leaning against the right hand wall.[68] He went close enough to the edge of the stope to see two tyre imprints at the edge. There did not appear to be any scrape marks near the edge consistent with a loader being used to clean up the floor with its bucket.[69]

97. Inspector Harris noted that there was a slight left-hand bend in the drive from about eight metres before the edge of the stope. He also noted that when he first came around the bend, the far edge of the stope appeared to be the near edge.[70]

98. Inspector Harris turned on the ventilator fan on the 9565 1A level and was confronted by a significant amount of dust, probably from the ventilation bag suddenly inflating and throwing off dust that had accumulated on it. The dust in the air reduced visibility from about 40 metres to less than three metres. Inspector Harris left the area within a couple of minutes, so was unable to say how long it took for the dust to clear.

[65] Ex 1, Vol 2, Tab 1, p56
[66] Ex 1, Vol 2, Tab 1, p73
[67] Ex 1, Vol 2, Tab 1, p58
[68] Ex 1, Vol 2, Tab 1, p62
[69] Ex 1, Vol 2, Tab 1, p68
[70] ts 42

WHAT HAPPENED

99. There is no direct evidence of precisely what the deceased was attempting to do at the time of his death.

100. It seems clear that the deceased went to the 9565 1A SOD with instructions by his supervisor, Mr Gruessing, to check it and prepare it for a CMS survey of the stope. Given that Mr Gruessing had just been informed by Mr Johnston that a bund was not required for the CMS survey, it is unlikely that he instructed the deceased to construct one at the edge of the stope.

101. Mr Gruessing probably used the word 'bund' or 'bunded material' in his instructions, but it is also unlikely that he told the deceased to remove the bollards or to go past them.

102. However, from his subsequent actions, it appears that the deceased may have understood his instructions to be to place a bund of rock material at the edge of the stope if one were not in place already.

103. The deceased entered the 9565 1A SOD past the chain as was authorised by Mr Gruessing during the radio call. He moved the chain and signs to the side wall, indicating that the signs were not in use.

104. The deceased filled in a DPI in which he assessed the risk as low despite knowing of the existence of the open stope, clearly a high or extreme risk to a loader operator requiring him to complete a THA and to obtain the approval of Mr Gruessing before continuing with the task. It may be, as Inspector Harris suggested, that over time operators can develop a 'tick and flick' mentality to low level risk assessments[71] and that the deceased had such an attitude.

105. The deceased probably inspected the ore drive on foot as far as the stope and then removed the bollards, leaning

[71] ts 71-72

them against the right hand wall. That action is difficult to reconcile with the deceased's reputation as being safety conscious. He may have considered that his instructions as he understood them authorised him to operate his loader past the position of the bollards, but any conclusion would be speculatory at best.

106. The deceased drove his loader to one of two access drives where he picked up rock material in the bucket of the loader in order to make a bund at the edge of the stope.

107. The deceased trammed the rock material with his loader towards the stope and, due to the poor visibility from the loader, possibly exacerbated by dust caused by the ventilation fan being switched on, and possibly also due to the bend in the drive and an illusion caused by the appearance of the far edge of the stope, he failed to stop in time to avoid dropping into the stope.

108. When the loader hit the bottom level of the stope at 9540 1A SOD, the deceased was thrown part of the way out of the cab of the loader despite wearing a seat belt because the seat to which the belt was attached was missing two of the four bolts attaching it to its frame.

109. As a result, the deceased sustained fatal injuries and died a short time later.

HOW DEATH OCCURRED AND THE CAUSE OF DEATH

110. I am satisfied on the evidence before me that the deceased died by accident.

111. Forensic pathologist Dr J White conducted a post mortem examination of the body of the deceased on 15 April 2010. Dr White found that the deceased had sustained fractured ribs and a fractured sternum, with torn lungs and blood in the chest cavity. The deceased's heart, aorta, liver and spleen were lacerated. His pelvis was fractured and his limbs had bony injuries and soft tissue injuries.

112. Dr White concluded that the cause of death was multiple injuries, and I so find.

113. Dr White was unable to express an opinion on the question of whether the deceased might have survived the accident had the seat been properly attached.

COMMENTS ON PUBLIC SAFETY UNDER SECTION 25(2) OF THE CORONERS ACT 1996

114. Following the death of the deceased, Nickel West filled in the stope and stopped mining at the 1A ore body at the mine, so no further open stopes have been created there. The only underground mine operated by Nickel West is the Cliffs Mine where a top down method with paste backfilling is used.[72] That method does not expose personnel to the hazard of open stopes.

115. However, Inspector Harris advised that open stope mining remains quite common in Western Australia, with some 35 operational mines employing some form of the open stoping method.[73] In these circumstances it is important for me to consider what procedures might be implemented in mines with respect to the use of equipment near open holes and to make any recommendations accordingly.

116. The Department of Mines and Petroleum has the ability to communicate safety information to members of the mining industry through Significant Incident Reports, safety bulletins, guidelines and specific communications from the State Mining Engineer.

117. Inspector Harris proposed that I recommend that the Department of Mines and Petroleum issue a communication to mine operators containing four recommendations.

118. The first three of those proposed recommendations were for the use of formal, team based risk assessments where

[72] Ex 2 p18-19
[73] ts 28

manned equipment is required to work near open holes, for there to be no reliance solely on lower level assessments made by operators, and for the assessment process to consider the use of alternative technology or techniques that remove the need for an operator to go near an open hole.

119. Nickel West supports those proposed recommendations in principle, but makes the point that team based risk assessments are undertaken at the time of selecting the mining method in order to consider the relevant equipment and to determine the appropriate controls. Such assessments would not need to be undertaken every shift or every time loaders work near open stopes. As I understand his evidence, Inspector Harris would agree with these points.

120. Nickel West also makes the point that lower level risk assessments are an important part of an effective safety system. Inspector Harris also thought that there was a place for such assessments, but in his view on-going reinforcement in the use of lower level risk assessment tools to make sure that they are being used correctly was important.

121. As to consideration of alternative equipment or techniques, Nickel West's position was that such consideration should occur as part of the risk management process undertaken at the outset. It is important in that process to assess any risks which the use of alternative technology might itself introduce; for example, the use of remotely controlled equipment may create a hazard for people working in the area. That position is quite reasonable in my view.

122. The fourth recommendation proposed by Inspector Harris was, wherever possible, for physical hard barriers to be designed, constructed and located to prevent equipment from accessing the edge of an open hole. Such barriers should be used in conjunction with lower level access controls such as signage, demarcations or mechanisms requiring the presence of an authorised person to remove them. The mechanisms would be lockable barriers where

the keys would be held by supervisors or someone in authority.[74]

123. Nickel West agreed that demarcation and preventing access to open holes is critical.

124. After the death of the deceased, Nickel West conducted a risk assessment of the use of mobile equipment with operators near open stopes and other openings. It determined that engineering controls in the form of hard barriers were the best means of restricting access to an unprotected void. A procedure was implemented at the Cliffs Mine whereby bunds or hard barricades were always put in place prior to voids even being created.[75] The implementation of that procedure indicates that it is practicable, at least at one mine.

125. In my view, a similar procedure should be adopted with respect to the hazard of open holes in all underground mines where at all possible and be used in conjunction with lower level risk management. It seems to me that the implementation of the first two proposed recommendations ought to lead to this procedure. The procedure if adopted might also be expected to reduce the need to rely on alternative technologies to some degree.

126. I therefore make the following recommendation.

RECOMMENDATION

That, wherever possible, mine operators manage the hazard of open holes in mines by designing, constructing and locating physical hard barriers so as to prevent equipment from having access to the edge of such open holes, and that the barriers be used in conjunction with lower level access control systems such as signage, demarcation and lockable barriers controlled by persons in authority.

[74] ts 48
[75] Ex 2 p17,20

127. The issue of whether loaders could be modified to reduce the risk of injury in similar circumstances was not the subject of much evidence. Mr Morris testified that Nickel West had investigated the feasibility of using differently configured seatbelts in loaders, but he said that alternative seatbelts tested were impractical. Nickel West therefore continued to use lap belts which was the industry practice.[76]

128. There was no evidence to demonstrate that another means of restrain would be appropriate, so I am unable to offer a comment or recommendation in relation to this issue.

B P King
Coroner
14 March 2014

[76] 177-178

Appendix 2.3.4