

Model Work Health and Safety Regulations for Mining - Public Response Form

Organisational name: Rio Tinto Limited	
Codes of Practice	
Roads and Other Vehicle Operating Areas	
Section/page number	Comment
General comment	Rio Tinto considers that the Roads and Other Vehicle Operating Areas Code of Practice encapsulates requirements for large, single tray haul vehicles and not multi axle, multi trailer vehicles that are becoming more common in mining industry, especially in circumstances where trucks are required to drive on public roads. For these vehicles, some of the specifications set out in the Code of Practice as currently drafted are not applicable.
Scope & Application – page 3	<p>First sentence</p> <ul style="list-style-type: none"> • Rio Tinto recommends that the sentence “...<i>vehicle and pedestrian movement and interaction <u>around mines</u></i>” should read “...<i>in mines</i>”. <p>Otherwise, Rio Tinto is of the view that the Code of Practice may apply to areas outside the mine’s jurisdiction.</p> <p>Second sentence</p> <ul style="list-style-type: none"> • Rio Tinto considers that the words: <ul style="list-style-type: none"> ○ “<i>roads</i>” should read “<i>mine roads</i>” or “<i>roads at mine sites</i>”; and ○ “<i>operating areas</i>” should read “<i>mine areas</i>”.
2 – page 6	<p><i>Identifying the Hazards</i></p> <p>Third paragraph</p> <ul style="list-style-type: none"> • In addition to the unwanted events associated with roads and other vehicle operating areas listed in this section, Rio Tinto considers that the following should be included: <ul style="list-style-type: none"> ○ type of vehicles; ○ design effectiveness; and ○ faulty equipment / accessories / items in poor repair or maintenance.
3 – page 7	<p><i>Assessing the Risks</i></p> <ul style="list-style-type: none"> • In addition to the documented risk factors, Rio Tinto considers that activities conducted whilst operating vehicles at mine sites and associated work arrangements of employees, including length of sitting time, should be included in this section.

Roads and Other Vehicle Operating Areas	
4.1 – page 9	<p>Design <u>Road widths</u> Second paragraph, second sentence</p> <ul style="list-style-type: none"> Rio Tinto recommends that the wording “<i>two-way traffic road</i>” is used instead of the current drafting “<i>two lane road</i>”, as there are no distinct lanes in opencast or unsealed roads.
4.1 – page 10	<p>Design <u>Sight distance</u> Sixth dot point</p> <ul style="list-style-type: none"> In addition to the existing wording, Rio Tinto recommends the inclusion of “<i>high visibility colours</i>” and “<i>reflective markings to enable visibility during hours of darkness</i>”. <p><u>Stopping distance</u> Second paragraph, fifth dot point</p> <ul style="list-style-type: none"> In addition to the existing wording, Rio Tinto recommends the inclusion of the following wording in the brackets, “<i>load carried by the vehicle</i>”.
4.4 – page 13	<p>Restricted Access Exclusion Zones Last paragraph</p> <ul style="list-style-type: none"> In addition to the examples listed in this paragraph, Rio Tinto considers that the wording “<i>conducting blasting operations</i>” should also be included.
4.5 – page 14	<p>Vehicle Selection</p> <ul style="list-style-type: none"> Rio Tinto considers that this section should read: “<i>When selecting vehicles, consideration should be given to existing or planned road layout and conditions on site and the vehicle activities required to be carried out / conducted, to ensure that the selected vehicles can operate within their design specifications and capabilities.</i>”
4.11 – page 15	<p>Inspections and monitoring Fifth dot point</p> <ul style="list-style-type: none"> Rio Tinto recommends the inclusion of the requirement for driver behaviour monitoring by way of driver monitoring technology. From this requirement, the subjective assessment common after a driving incident is removed and corrective actions can be identified.

Managing Naturally Occurring Radioactive Materials in Mining	
Section/page number	Comment
1.2 – page 5	<p>Who has duties to manage naturally occurring radioactive materials? Principal mining hazard management plan for NORMs Third paragraph, second sentence</p> <ul style="list-style-type: none"> Rio Tinto considers that this sentence should read, “<i>Therefore, persons conducting a business or undertaking at an exploration, mining or processing site must ensure <u>that they</u> identify the hazard, assess the risks and implement adequate control measures to protect all from exposure to radiation</i>”.
2.2 – page 8	<p>Assessing the risks Second paragraph, fourth dot point</p> <ul style="list-style-type: none"> In relation to the sentence, “<i>all relevant control measures including classification...</i>”, Rio Tinto considers that further information should be prescribed about the “classification” process: who undertakes this classification and what skills/knowledge is required to demonstrate competence.
3.1 – page 9	<p>Hierarchy of control First dot point</p> <ul style="list-style-type: none"> Rio Tinto considers that the word “<i>alters</i>” needs to be changed to “<i>eliminates</i>” and the phrase “<i>should do more good than harm i.e. justification this applies to all exposure situations</i>” should be deleted as it is superfluous.
3.2 – page 10	<p>Minimising the risks Principles of best practicable technology First paragraph</p> <ul style="list-style-type: none"> Rio Tinto considers this sentence should read, “<i>The person controlling a business or undertaking at a mining operation should be able to demonstrate that the <u>mining operation is employing the best practicable technology that is reasonably practicable to use and that radiation doses to workers received as a result of that mining operation are eliminated or reduced, so far as is reasonable practicable.</u></i>” <p>Third paragraph, first sentence</p> <ul style="list-style-type: none"> This sentence refers to a company’s “<u>approved radiation management plan</u>”. Rio Tinto considers that the Code of Practice needs to provide detail in relation to the authority responsible for “approving” the plan.
3.3 - Page 16	<p>Administrative processes for optimisation <u>Classifying an exposure result as a special exposure</u> Third paragraph</p> <ul style="list-style-type: none"> Rio Tinto considers the phrase “<i>...how exposure was not satisfactorily identified...</i>” should be changed to “<i>...whether and if so, why exposure was not satisfactorily identified...</i>”.

Managing Naturally Occurring Radioactive Materials in Mining	
4.1 – page 20	<p><i>Considerations when developing a principal mining hazard management plan</i> <i>Minimum standards for radiation controls and monitoring</i> Fourth paragraph after the dot points (“<i>Ingestion of radioactive material...</i>”)</p> <ul style="list-style-type: none"> Rio Tinto is of the view that the Code of Practice should provide direction as to the proper level of personal hygiene.
5.1 – page 31	<p><i>Contents of a principal mining hazard management plan</i> <i>Critical group information</i></p> <ul style="list-style-type: none"> Rio Tinto is of the view that the ‘critical group’ definition should not include the words “<i>diet and those behavioural characteristics</i>” as these features are required to be subjectively assessed and therefore inconsistencies may result in their application.

The Mine Records	
Section/page number	Comment
1.2 – page 4	<p><i>What is the purpose of the mine record?</i> First sentence</p> <ul style="list-style-type: none"> Rio Tinto considers that “<i>health and</i>” needs to be included before the word “<i>safety</i>”.
1.3 – page 4	<p><i>What must the mine record contain?</i> ‘For example’: second dot point</p> <ul style="list-style-type: none"> Rio Tinto considers that “<i>health and</i>” needs to be included before the word “<i>safety</i>”. Rio Tinto also considers it would be clearer if the phrase “<i>high potential incidents</i>” was replaced with the words “<i>significant potential incidents</i>”.

WHS Management Systems in Mining	
Section/page number	Comment
2.2 – page 7	<p>Why is a WHS management system necessary? First paragraph</p> <ul style="list-style-type: none"> Rio Tinto considers the paragraph should read “<i>mining is a <u>potentially</u> hazardous industry...</i>”.
2.2 – page 8	<p>Appendix A</p> <ul style="list-style-type: none"> Rio Tinto is of the view that if compliance with the requirements set out in the Code of Practice is intended to be mandatory, then to avoid confusion, it is recommended that all references to “<i>should</i>” in the Code of Practice (including Appendix A) be replaced with the word “<i>must</i>”. Otherwise, application of the requirements of the Code of Practice may be construed as discretionary.
2.3 – page 8	<p>Elements of a WHS management system 3 – Operations Second dot point</p> <ul style="list-style-type: none"> Rio Tinto recommends that the word “<i>should</i>” be deleted. <p>4 – Maintenance systems</p> <ul style="list-style-type: none"> Rio Tinto considers that the words “<i>are to be</i>” should be replaced with “<i>must</i>”.
3.2 – page 12	<p>Consultation</p> <ul style="list-style-type: none"> Rio Tinto is of the view that consultation with a project workforce is likely to be challenging as hazard and risk assessment must be undertaken, and systems developed and ready to be implemented, often prior to the project workforce being recruited. Accordingly, Rio Tinto suggests that the Code of Practice provide guidance in relation to how the requirement to consult with workers may be satisfied with an incoming project workforce.
4.3 – page 20	<p>Emergency response plan Second to last paragraph</p> <ul style="list-style-type: none"> Rio Tinto requests that the Code of Practice clarify the frequency, type of drills and specific exercises required to be tested in order to comply with this section. For example, whether compliance would occur if a desktop testing exercise was undertaken in one year and mock rehearsal every other year.
5.3 – page 24	<p>Reviews and audits Seventh dot point</p> <ul style="list-style-type: none"> Rio Tinto suggests that the health and safety representative must be required to have objectively reasonable grounds for requesting a review. Otherwise, this right may not be used appropriately.

Inundation and Inrush Hazard Management	
Section/page number	Comment
1.1 – page 5	<p><i>What is inundation and inrush?</i> First paragraph</p> <ul style="list-style-type: none"> Rio Tinto recommends that this paragraph be redrafted as follows: “<i>Inundation or inrush is an ingress <u>or engulfment</u> of liquid, gas or other substance...</i>”. <p>Third dot point</p> <ul style="list-style-type: none"> Rio Tinto considers that “engulfing” should also be added to this sentence and recommends the wording be amended to “<i>engulfing of flammable or toxic gases...</i>”.
1.2 – page 5	<p><i>Who has duties relating to inundation and inrush?</i> Second paragraph</p> <ul style="list-style-type: none"> Rio Tinto recommends that consideration is given to redrafting this paragraph to include “<i>engulfment</i>”. <p>Fourth paragraph, third dot point</p> <ul style="list-style-type: none"> As per the above comment, Rio Tinto recommends that consideration is given to redrafting this point to include “<i>engulfment</i>”.
2.1 – page 7	<p><i>Sources of inrush</i> <i>Sources of inrush for the working seam or area being mined</i> <u>Abandoned mines</u> Fifth dot point</p> <ul style="list-style-type: none"> Rio Tinto considers that this sentence should be amended as follows, “<i>abandoned single or multiple seam high wall <u>and/or underground</u> coal mining operations of an adjacent open cut mine</i>”.

Emergency Response in Australian Mines	
Section/page number	Comment
2.1 – page 8	<p><i>What is an Emergency Plan?</i> Second paragraph</p> <ul style="list-style-type: none"> Rio Tinto recommends that this paragraph be redrafted as follows:

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	<p><i>"The emergency plan must address all aspects of emergency response including:</i></p> <ul style="list-style-type: none"> <i>• <u>how an emergency response is activated at the mine</u></i> <i>• <u>what alarms are employed at the mine and what they mean</u></i> <i>• <u>actions required of any first responder who witnesses an emergency</u></i> <i>• <u>a system that enables all persons at the mine to be promptly located</u></i> <i>• <u>the provision of adequate rescue equipment, and</u></i> <i>• <u>that an adequate number of persons trained in the use of rescue equipment are available (either on-site or on call) if a person is working at the mine.</u>"</i>
2.2 – page 8	<p><i>Contents of the Emergency Plan</i></p> <p>First paragraph</p> <ul style="list-style-type: none"> Rio Tinto recommends that this paragraph be redrafted as follows: <p><i>"Schedule 9.4 of the WHS Regulations requires the following information to be included in an emergency plan:</i></p> <ul style="list-style-type: none"> <i>• <u>site and hazard details</u></i> <i>• <u>incident command structure and site personnel responsibilities</u></i> <i>• <u>activation and notification</u></i> <i>• <u>emergency resources and equipment, and</u></i> <i>• <u>emergency procedures.</u>"</i> <p>Second paragraph, second dot point</p> <ul style="list-style-type: none"> Rio Tinto recommends that the words <i>"or catastrophic"</i> be included after the word <i>"major"</i>.
2.3 – page 9	<p><i>Improving emergency response – audit and review</i></p> <p>First dot point</p> <ul style="list-style-type: none"> The requirement to test the plan <i>"a number of times each year"</i> requires further clarification in the Code of Practice. However, Rio Tinto considers that testing once per year (as is current practice at mine sites) would be a more appropriate interval. <p>Fourth dot point</p> <ul style="list-style-type: none"> In addition to the existing emergency equipment documented in the fourth dot point, Rio Tinto recommends that <i>"alarm systems"</i> be included as the first sub-point.

Emergency Response in Australian Mines	
4 – page 11	<p>Command Structure and Site Personnel</p> <ul style="list-style-type: none"> Rio Tinto suggests that the title of the section should be amended to “<u>Incident</u> Command Structure and Site Personnel” <p>Second paragraph</p> <ul style="list-style-type: none"> Rio Tinto is of the view that this paragraph should be redrafted to “An <u>Incident command</u> organisation chart for use during emergencies must be developed. This chart must detail all functions and responsibilities”. <p>Third paragraph</p> <ul style="list-style-type: none"> Rio Tinto considers that the wording “Issues to consider when determining the emergency command structure...” should be amended to “Issues to consider when determining the <u>incident</u> command structure”.
4.1 - page 12	<p>Control room or dedicated person</p> <p>Second paragraph</p> <ul style="list-style-type: none"> Rio Tinto recommends that the word “response” be amended to “incident management”.
5.1 – page 14	<p>Communication</p> <ul style="list-style-type: none"> Rio Tinto recommends that the sentence “Communication about the emergency plan should occur before any emergency occurs” be amended to “Communication about the emergency plan <u>must</u> occur before any emergency occurs”.
6.3 – page 15	<p>Fire fighting equipment</p> <p>First paragraph</p> <ul style="list-style-type: none"> Rio Tinto considers the paragraph needs to be redrafted, “The mine operator must provide equipment sufficient and appropriate for <u>detecting and extinguishing any potential fire. All fire fighting equipment must be compatible throughout the mine and must be inspected and tested in accordance with the relevant Australian standard</u>”. Rio Tinto recommends that a further paragraph be included in this section which reads, “<u>There should be a dedicated emergency water supply for fighting fires that is separate to the mine process or potable water supply</u>”.
6.5 – page 16	<p>First aid</p> <ul style="list-style-type: none"> Rio Tinto recommends that one additional point be included: <ul style="list-style-type: none"> an emergency vehicle capable of transporting sick and/or injured persons to a medical facility.
7.1 – page 17	<p>Withdrawal – general</p> <p>Final sentence</p> <ul style="list-style-type: none"> Rio Tinto recommends that this sentence read, “...a threat to health and safety, for example, not amounting to an emergency (<u>for example blast fume</u>) warrants such action”.

Emergency Response in Australian Mines	
7.6 – page 20	<p>Place of safety</p> <ul style="list-style-type: none"> Rio Tinto recommends that, rather than “<i>Place of safety</i>”, this section be headed “<i>Safe Haven</i>”. Likewise, Rio Tinto recommends that all references to “<i>place of safety</i>” be changed to “<i>Safe Haven</i>”. <p>First dot point</p> <ul style="list-style-type: none"> Rio Tinto considers that the wording “<i>must be appropriate given the hazard...</i>” be changed to “<i>must <u>provide protection from</u> the hazard...</i>”.

Strata Control in Underground Coal Mines	
Section/page number	Comment
2.2 – page 6	<p>Assessing the risks</p> <p>Second paragraph, 14th dot point, fourth sub point</p> <ul style="list-style-type: none"> Rio Tinto requests that further clarification is provided by Safework Australia as to how the prescriptive pillar height ratio of 4:1 or less was assessed.
3.6 – page 11	<p>Strata control of failure model and design of roadway support rules</p> <p>Strata control support rules</p> <p>Final dot point</p> <ul style="list-style-type: none"> Rio Tinto recommends the inclusion of the following further tests: <i>periodic testing of support; re-tensioning rules; and quality checks of supplied roof support.</i>

Ventilation of Underground Mines	
Section/page number	Comment
2.2 – page 11	<p>Gaseous contaminants</p> <p>Methane (CH₄)</p> <p>First dot point in box</p> <ul style="list-style-type: none"> Rio Tinto considers that the requirement to trip the supply of electricity when the concentration of methane exceeds 1.25% is too low and recommends a level set at a concentration of around 3%.

Survey and Drafting Directions for Mine Surveyors	
Section/page number	Comment
1.1 – page 6	<p>Compiling mine plans Third paragraph</p> <ul style="list-style-type: none"> Rio Tinto suggests that the Code of Practice clarify who is to assume responsibility for the verification / validation of accuracy of the old working plans.

Health Monitoring	
Section/page number	Comment
1.1 – page 5	<p>Who has duties in relation to health monitoring in mining? First paragraph</p> <ul style="list-style-type: none"> Rio Tinto suggests that the Code of Practice provide further clarification in relation to the health monitoring of contractors. Specifically, Rio Tinto seeks clarification as to whether, in circumstances where a risk assessment indicates that health monitoring is required, the obligation is on the mine operator or the contracting company to conduct and report on the findings of the health monitoring.
1.2 – page 6	<p>What is health monitoring in mining?</p> <ul style="list-style-type: none"> Rio Tinto's considers that the use of the term "<i>hazardous chemicals</i>" in this section and throughout the Code of Practice could potentially lead to confusion as: <ul style="list-style-type: none"> in the first sentence of section 1.2, it is noted that "health monitoring" means the monitoring of individuals for the purpose of identifying changes in health status due to occupational exposure to a hazard including <u>hazardous chemicals</u> and what Rio Tinto considers to be <u>physical hazards</u>, being noise and vibration; whereas the second sentence of section 1.2 restricts health monitoring "in this document", which Rio Tinto understands to be this Code of Practice, to "...health monitoring in relation to exposure to <u>hazardous chemicals</u> in mining" and on Rio Tinto's understanding, eliminates health monitoring for physical hazards such as noise, vibration and heat stress. <p>However, Rio Tinto notes that physical hazards are listed in section 2.1 (final four dot points) and considered in Appendix E (heat stress). Accordingly, Rio Tinto recommends that the application of the term "hazardous chemicals" in the Code of Practice be reviewed.</p>
1.2 – page 6	<p>Hazardous chemicals under Schedule 14 of the WHS Regulations First paragraph, last sentence</p> <ul style="list-style-type: none"> Rio Tinto recommends that the sentence be redrafted to explain the meaning of the word "<i>valid</i>" in the sentence "...all have <u>valid</u> techniques to detect health effects or if <u>valid</u> biological monitoring procedures."

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1.5 – page 9	<p><i>When does health monitoring occur?</i> Second dot point</p> <ul style="list-style-type: none"> Rio Tinto notes that the requirement that health monitoring “<i>must:be carried out immediately before the worker ceases carrying out work that exposes the worker to risks associated with mining operations</i>” is often not feasible, as workers often refuse a termination medical examination.
1.6 – page 9	<p><i>Who carries out the health monitoring?</i> First dot point</p> <ul style="list-style-type: none"> Rio Tinto considers it would be beneficial if the Code of Practice provided specific detail in relation to the standard required for medical practitioners to possess “<i>relevant competencies</i>”. <p>Second dot point</p> <ul style="list-style-type: none"> Rio Tinto considers the requirement that health monitoring “<i>..must be carried out: ...only in relation to the worker’s work at the mine</i>” excludes medical monitoring for wellbeing programs. Rio Tinto recommends that this sentence be amended to “<i>....only in relation to the worker’s work at the mine <u>or as agreed by the worker participating in a wellbeing program.</u></i>”
2.1 – page 11	<p><i>Health monitoring for workers exposed to significant levels of hazardous chemicals</i> Sixth paragraph, dot points</p> <ul style="list-style-type: none"> Rio Tinto considers the last four dot points are not chemicals and should therefore be deleted.
2.2 – page 11	<p><i>Health monitoring for specific hazardous chemicals listed</i> Second paragraph, first dot point</p> <ul style="list-style-type: none"> Rio Tinto is of the view that: <ul style="list-style-type: none"> reference to the “above table” in the first dot point needs clarification; and for consistency, reference to “<i>substance</i>” should be “<i>chemical</i>”.
3.6 – page 15	<p><i>Health monitoring summary and keeping records</i> Second paragraph</p> <ul style="list-style-type: none"> Rio Tinto considers there may be issues with confidentiality in relation to the requirement that the mine operator obtain a summary of the results of the health monitoring from the supervising medical practitioner. Rio Tinto recommends that this paragraph provide further detail in relation to the responsibilities of mine operators, employees and medical practitioners to comply with this section.
3.6 – page 16	<p><i>How long to keep the record</i></p> <ul style="list-style-type: none"> Given the latency of some diseases such as asbestosis, Rio Tinto considers that the requirement to keep health monitoring records for all workers for at least 30 years may not be long enough and consideration should be given to extending the period to say, 40 years.

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Appendix B – page 22	<p>Respirable crystalline silica Second paragraph</p> <ul style="list-style-type: none"> To facilitate understanding of this requirement, Rio Tinto recommends that the term “<i>respirable fraction</i>” be defined. <p>Silicosis First paragraph, last sentence</p> <ul style="list-style-type: none"> Rio Tinto recommends that rather than applying the words “<i>can kill</i>” consideration is given to the words “<i>may be fatal</i>”.
Appendix B – page 23	<p>10th paragraph</p> <ul style="list-style-type: none"> Rio Tinto notes that this section requires the keeping of health records and the results of lung function tests for 40 years. This is contradictory to the requirement set out in section 3.6, page 16 (noted in Rio Tinto’s submission above) that records must be kept for a minimum 30 years. Rio Tinto recommends that all health records, including lung function tests, should be kept for 40 years.
Appendix B – page 24	<p>Monitoring First paragraph</p> <ul style="list-style-type: none"> In relation to a suitable sampling strategy, Rio Tinto recommends the insertion of the requirement that all sampling should be undertaken under the guidance of a certified occupational hygienist.
Appendix E – page 29	<p>Heat stress Seventh paragraph commencing “<i>Normally, several physical and physiological mechanisms...</i>”, third sentence</p> <ul style="list-style-type: none"> Rio Tinto recommends that this sentence be amended to “<i>With exercise <u>or work</u>, the <u>metabolic</u> heat produced by muscle activity rises rapidly.</i>”
Appendix E – page 30	<p>Heat stress factors Second dot point</p> <ul style="list-style-type: none"> Rio Tinto recommends that this sentence be amended from “<i>Absolute humidity</i>” to “<i>Humidity. When the humidity is high, evaporation of sweat is <u>negatively impacted</u>, thereby reducing the body’s opportunity to lose its heat.</i>”
Appendix E – page 30	<p>Effects of heat stress on the body First paragraph, first sentence</p> <ul style="list-style-type: none"> Rio Tinto suggests the following amendment to this sentence: “<i>The body core temperature is significantly affected by <u>heat</u>.</i>”
Appendix E – page 31	<p>Table – description of the symptoms of various effects</p> <ul style="list-style-type: none"> Rio Tinto suggests that “Heat Illness” is an appropriate title for the table as each of the adverse effects listed in the table are various degrees of heat illness. Rio Tinto considers that the table should reference, follow and apply the <i>Australian Institute of Occupational Hygienists “Heat Stress Standard & Documentation Developed for Use in the Australian Environment” (AIOH Standard)</i>.

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Appendix E – page 32	<ul style="list-style-type: none"> The AIOH Standard prescribes detail on the Predicted Heat Strain (PHS) index and the Thermal Work Limit (TWL). In Rio Tinto's view, both the PHS and TWI are applied in the Australian mining industry and accordingly, should be referenced in this section. <p>Methods for reducing heat stress (load)</p> <p>Third dot point</p> <ul style="list-style-type: none"> Rio Tinto recommends the following wording be added, <i>“providing engineering controls, such as ventilation, <u>shading and shielding</u>, to minimise heat loads”</i>. Rio Tinto also recommends the insertion of an additional dot point: <i>“providing a cool area with adequate supplies of potable water”</i>.
Appendix E – page 32	<p>Evaluation of heat stress (load)</p> <p>Rio Tinto recommends the implementation of a Three Tiered Heat Stress Assessment Protocol in line with the Australian Institute of Occupational Hygienists (AIOH) <i>“Heat Stress Standard & Documentation Developed for Use in the Australian Environment”</i> (AIOH Standard). This methodology has been designed such that it may be applied to different scenarios where there is a potential risk to heat stress. It involves a three-stage process dependent on the severity and complexity of the situation. It allows for the use of simple tools in basic exposures ranging up to physiological monitoring for more difficult or complex scenarios.</p> <p>Set out below is a summary of the recommended AIOH Standard.</p> <p>Level 1: the basic assessment</p> <p>The first level also referred to as the basic thermal risk assessment is designed as a qualitative assessment which does not require specific technical skills in its application or interpretation. Simple tools such as checklists, thermal risk assessment matrices and/or the wet bulb globe temperature (WBGT) may be used to determine if a heat stress risk exists. It is an initial assessment of the work environment and where the assessments determine a significant risk it triggers the next higher level of assessment.</p> <p>Level 2: thermal assessment using a heat stress index</p> <p>The second step of the process begins to look more towards a quantitative approach and requires the measurement of a number of environmental and personal parameters outlined below.</p> <ul style="list-style-type: none"> radiant heat air temperature air movement humidity intensity of physical work clothing worn, and individual acclimatisation.

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These parameters are utilised in heat stress indices to assess the impact on the worker. Some of these include:

1. **Wet Bulb Globe Temperature.** Considered the simplest of indices to use, the index is sensitive to dry bulb, radiant and natural wet bulb temperatures, and air velocity. It can be adjusted to take into account clothing, work rate or duration of exposure. This is best utilised as a preliminary guide only such as in the level one assessments as mentioned above. Whilst relatively easy to use its applicability in the Australian climate is questionable and has a number of limitations.
2. **Effective Temperature (ET) and Corrected Effective Temperature (CET)** were devised originally as a comfort scale. This CET index combines the effects of globe temperature (radiant and dry bulb), wet bulb and air velocity, though not under hot, humid conditions. ET does not take into account the radiant heat load.
3. **Heat Stress Index (HSI)** is based on the physical analysis of heat exchange. The index equates the amounts of heat required to be dissipated by evaporation of sweat with the maximum possible evaporative capacity. This index tends to overestimate the environmental heat load, and is rarely used.
4. **Predicted Four Hour Sweat Rate (P4SR).** This is the quantity of sweat, in litres, likely to be produced under specific thermal conditions. It takes into account the metabolic rate and to a lesser extent the clothing worn, along with dry bulb, radiant temperature, wet bulb and air velocity. This index is also complex and requires a nomogram to obtain corrected figures.
5. **The Wet-Kata Thermometer.** This is the measure of the cooling power of the environment. This index correlates well with body responses in hot, humid conditions, but is less meaningful in hot dry conditions and with unacclimatised people.
6. **The Air Cooling Power.** This index is used in South African underground mines and recognises workload, and clothing additionally to the environmental factors of wet and dry bulb temperatures, radiant temperature and wind velocity. This index is complex and requires a short computer programme.
7. **The Predicted Heat Strain (ISO 7933)** is a rational index based on the thermal balance equation and uses measured environmental parameters in a series of equations to predict the body's response to the heat stress as a rise in core temperature. It is a very useful tool for developing control strategies and assessing the impact of these controls or changes of environment on the worker. It's one drawback is that it uses quite complex equations and requires the use of a computer program, however these are becoming more readily available. It is a powerful tool best utilised by health and safety professionals.
8. **Thermal Work Limit (TWL)** also a rational index, was developed in Australia and tested in a number of mining scenarios, both above and underground. The index is designed specifically for self-paced workers and does not rely on estimation of actual metabolic rates. Work areas are measured and categorised based on a metabolic heat balance equation, using environmental parameters such as dry bulb, wet bulb and air movement to measure air-cooling power. An instrument specifically designed to take the necessary measurements and calculate the TWL is available commercially. The calculated TWL figure can be then related to a set of defined parameters which will indicate the level of work that can be undertaken in those conditions. It is simpler to use than the predicted heat strain.

Level 3: Physiological Monitoring.

The third level is utilised where the allowable exposure time is determined to be less than 30 minutes usually calculated from a rational heat stress index (i.e. Predicted heat strain or TWL) in the level 2 assessments or where there is an involvement of high level PPE such as Hazmat suits. In these situations some form of physiological monitoring should be employed. These can range from auditory canal temperature monitors, heart rate monitors through to ingested core temperature monitors. These instruments measure the individual's actual physiological responses to the heat stress and provide a more accurate measure of the heat strain on the worker.

Health Monitoring	
	<p>Note</p> <ul style="list-style-type: none"> The different levels of assessment require increasing levels of technical skill increasing from the level one assessment which require limited technical skills through to the level three assessments which will require professional skills for interpretation of the data. It is important to note that no single index can accurately account for the numerous variables associated with heat stress assessment and for that reason they should only be used as guidelines, not safe/unsafe limits.
Appendix E – page 34	<p><i>Minimising the potential for heat strain</i></p> <p><i>1. Ensure appropriate water consumption</i></p> <p>Fourth, fifth and sixth paragraph</p> <ul style="list-style-type: none"> Rio Tinto is of the view that these paragraphs can be simplified by replacing the current drafting with the following: <i><u>“A simple spot urine test can be undertaken, prior, during or at the completion of a work period, to assess the specific gravity of the urine. This specific gravity can then be compared against known values which correlate the specific gravity to the level of dehydration. This simple method utilises either electronic or hand held urine refractometer, which is readily available from technical instrument suppliers. Urine test strips are also available for self testing by employees”.</u></i>
Appendix E – page 36	<p><i>4. Clothing</i></p> <p>First sentence</p> <ul style="list-style-type: none"> In addition to the existing wording, Rio Tinto recommends the following addition to this paragraph, <i>“Clothing that is both loose fitting and made from cloth that “breathes” may be appropriate. <u>Shirts with “vents” and mesh inserts are also available, which help to improve air circulation. Artificial fibre cloth...”.</u></i>

Mine Closure	
Section/page number	Comment
	No Comment.

Ground Control in Open Pit Mines	
Section/page number	Comment
	No Comment.

Ground Control for Underground Mines	
Section/page number	Comment
Scope & Application – page 3	<ul style="list-style-type: none"> Rio Tinto considers that this section should read “<i>This Code has been prepared to ensure that the mine operator at an underground mine has given adequate consideration of all geotechnical / ground control aspects relevant to the safe design, operation and abandonment of the mine for which they are responsible</i>”.
Appendix B – page 52	<ul style="list-style-type: none"> In order to facilitate ease of understanding and application of the Code of Practice, Rio Tinto suggests that in addition to the glossary of terms, Appendix B should also contain a glossary of acronyms used throughout the Code.

Underground Winding Systems	
Section/page number	Comment
	No Comment.

General Comments of Rio Tinto Limited	
Further guidance	
<ul style="list-style-type: none"> Rio Tinto suggests that the Codes provide further guidance as to: <ul style="list-style-type: none"> a mine operator's responsibility to prepare the work health and safety management system and comply with the relevant Mining Codes of Practice; and contractors' obligations to ensure compliance with the Mining Codes of Practice when on a mine site. 	
Formatting, language and style comments	
<ul style="list-style-type: none"> Rio Tinto recommends that throughout the Codes of Practice, reference to "health and safety" should be included as opposed to "safety". Specific examples of where this currently occurs are sections 1.2 and 1.3 of the Mine Record Code of Practice. 	
<ul style="list-style-type: none"> Rio Tinto considers that the Codes of Practice would benefit from sections setting out the definitions of key terms and acronyms used. 	
<ul style="list-style-type: none"> Rio Tinto encourages the use of plain language to facilitate understanding of the Codes of Practice. 	
<ul style="list-style-type: none"> Rio Tinto considers that some terminology currently included in the Codes of Practice should be reviewed to ensure that it aligns with the terminology applied in State-based legislation and Australian Standards. 	
<ul style="list-style-type: none"> Throughout its review of the Codes of Practice, Rio Tinto has identified some grammatical and other language areas for improvement and would welcome the opportunity to share its observations with SafeWork Australia upon request. <p>To assist with this process, some of these language observations are set out in the following pages.</p>	

Language observations	
Roads and Other Vehicle Operating Areas	
Section/page number	Comment
1.1 – page 5	<p><i>What is a road and other vehicle operating area?</i></p> <p>First paragraph</p> <ul style="list-style-type: none"> Rio Tinto recommends that the words "<i>take place</i>" are deleted. <p>Final sentence</p> <ul style="list-style-type: none"> Rio Tinto recommends that the words "<i>to be</i>" are deleted.

Managing Naturally Occurring Radioactive Materials in Mining	
Section/page number	Comment
2.2 – page 8	<p>Assessing the risks 10th dot point</p> <ul style="list-style-type: none"> Rio Tinto considers that the word “<i>relevant</i>” should be included at the start of the sentence before the word “<i>training</i>”.
3.2 – page 10	<p>Principles of radiation design First paragraph</p> <ul style="list-style-type: none"> Rio Tinto considers that the wording “...<i>all other health, safety and welfare requirements</i>” should be replaced with “...<u>also for other health, safety and welfare requirements</u>”.
3.3 - Page 14	<p>Classification of workers and dose constraints <u>Classification of designated workers</u> Third paragraph, first dot point</p> <ul style="list-style-type: none"> Rio Tinto recommends that the wording of this paragraph be improved by including simpler, easy to understand language. For example, the word “<i>a priori</i>” should be replaced with “<i>former</i>”.
3.3 - Page 16	<p>Establishing triggers for action and control Second paragraph, third sentence</p> <ul style="list-style-type: none"> Rio Tinto considers that the wording of this paragraph (“...<i>pre-determined statistical bounds of the work category mean</i>”) could be improved by including simpler, easy to understand language.
3.3 - Page 16	<p><u>Classifying an exposure result as a special exposure</u> First dot point, first paragraph, first sentence</p> <ul style="list-style-type: none"> Rio Tinto recommends that this phrase is amended from “...<i>a view will need to be formed on whether that task will be repeated frequently...</i>” to “...<i>it must be determined if that task will be repeated frequently...</i>”.
WHS Management Systems in Mining	
Section/page number	Comment
2.2 – page 7	<p>Why is a WHS management system necessary? Second dot point</p> <ul style="list-style-type: none"> Rio Tinto recommends the word “<i>that</i>” replace “<i>but</i>”.

WHS Management Systems in Mining	
Section/page number	Comment
2.3 – page 8	6 - Emergency response plan (Division 4, Part 2) <ul style="list-style-type: none"> Rio Tinto recommends that this sentence read “<i>including consulting the emergency services and local authorities, is prepared to address the...</i>”.
4.1 – page 15	Resources First sentence <ul style="list-style-type: none"> Rio Tinto recommends that this paragraph be redrafted to “<i>Adequate resources must be provided to implement, maintain and improve the WHSMS</i>”. Officer under the WHS Act First paragraph <ul style="list-style-type: none"> Rio Tinto recommends that this paragraph be redrafted to “<i>The representative of the mine operator becomes an officer under Section 27 of the WHS Act and must exercise due diligence to ensure the person conducting a business or undertaking complies with the relevant duties and obligations.</i>”
4.2 – page 17	Identifying hazards Forth dot point – first sub-dot point. <ul style="list-style-type: none"> Rio Tinto recommends the word “<i>then</i>” be deleted so that the sentence read, “<i>the situation is presenting new risks</i>”.
4.2 – page 17	Risk assessment First paragraph Rio Tinto recommends that the first sentence be redrafted to “ <i>Risks relating to each of the above hazard groups generally require <u>different assessment methods</u>. The hazard should be assessed both separately as well as with other hazards as the interactions may lead to other risks.</i> ”
Inundation and Inrush Hazard Management	
Section/page number	Comment
2.2 – page 9	Identifying inundation or inrush hazards <u>Scheme of protective drilling</u> First paragraph <ul style="list-style-type: none"> Rio Tinto recommends that the final sentence be amended from “<i>...to be free of unrecorded workings</i>” to “<i>...<u>is</u> free of unrecorded workings</i>”. Second paragraph <ul style="list-style-type: none"> Rio Tinto recommends that the sentence “<i>Sealing, if to occur at all, was by hammered in timber plugs</i>” be amended to “<i>Sealing, if to occur at all, was <u>done</u> by hammered in timber plugs</i>”.

2.3 – page 10	<p><i>Identifying the existence of inundation and inrush hazards</i></p> <p>Seventh paragraph</p> <ul style="list-style-type: none"> Rio Tinto recommends that the Code of Practice use plain and simple language and accordingly suggests that the word “<i>septum</i>” be replaced with “<i>separation distance</i>”.
Emergency Response in Australian Mines	
Section/page number	Comment
3 – page 10	<p><i>Site and Hazard Details</i></p> <p>First paragraph</p> <ul style="list-style-type: none"> Rio Tinto recommends that the second sentence read “<i>Early identification <u>and notification</u> of the emergency event...</i>”.
Health Monitoring	
Section/page number	Comment
1.2 – page 6	<p><i>What is health monitoring in mining?</i></p> <p><i>Hazardous chemicals under Schedule 14 of the WHS Regulations</i></p> <p>First paragraph, first sentence</p> <ul style="list-style-type: none"> Rio Tinto recommends that this sentence be amended to read, “<i>...so health monitoring is mandatory <u>where</u> these chemicals are used...</i>”.
Mine Closure	
Section/page number	Comment
5.1 – page 18	<p><i>Responsible Authority</i></p> <p>Second sentence</p> <ul style="list-style-type: none"> For the purposes of applying simple, easy to understand language to the Codes, Rio Tinto recommends that the sentence be amended to “<i>All release criteria are <u>based</u> on the prescribed or agreed post-mining land use.</i>”