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28 April 2015

Ms Lucy Roberts
Acting Principal Research Officer
Education and Health Standing Committee
Level 1, 11 Harvest Terrace
WEST PERTH WA 6005

Dear Ms Roberts

INQUIRY INTO THE MENTAL HEALTH IMPACTS OF FIFO WORK ARRANGEMENTS: FATIGUE MANAGEMENT

Thank you for your email of 17 April 2015 in which you requested a copy of BHP Billiton's fatigue management plan. We are pleased to continue assisting the Education and Health Standing Committee in its Inquiry into the mental health impacts of fly-in fly out work arrangements.

In response to your request, I attach the complete suite of BHP Billiton Iron Ore fatigue management documents, which in totality explain the systems and processes used for managing fatigue within our Western Australia Iron Ore (WAIO) operations. Included in this package is a copy of the *WAIO Fatigue Management Procedure* and its supplementary documents:

- *Approved Rosters Procedure*
- *Fatigue Assessment Tool*
- *Fatigue Observation Checklist*
- *Individual Commute Plan Template*
- GLD.011 Health
- Fitness for Work Supervisor Training Overview

As mentioned to Dr Jacobs and Ms Freeman during their visit to our Yandi operations on 4 February 2015, BHP Billiton Iron Ore has recently simplified and standardised our frontline safety procedures. This standardisation and simplification initiative was undertaken to drive improved relevance and practicality into our procedures.

Our simplified safety procedures, including the *WAIO Fatigue Management Procedure* provided, employ a risk-based approach, that is, with minimal prescription. In adopting this approach we apply a level of trust to our people, empowering them to make common sense choices to ensure the safety of themselves and others.

In developing its recommendations, we ask the Committee to consider the improved safety systems and outcomes achieved by BHP Billiton Iron Ore through simplification and the reduction of prescription.

Should you require any further assistance or advice, please feel free to contact me on Ph (08) 6321 3154 or via email to Mark.F.Donovan@bhpbilliton.com

Yours sincerely

Mark Donovan
Head of Corporate Affairs

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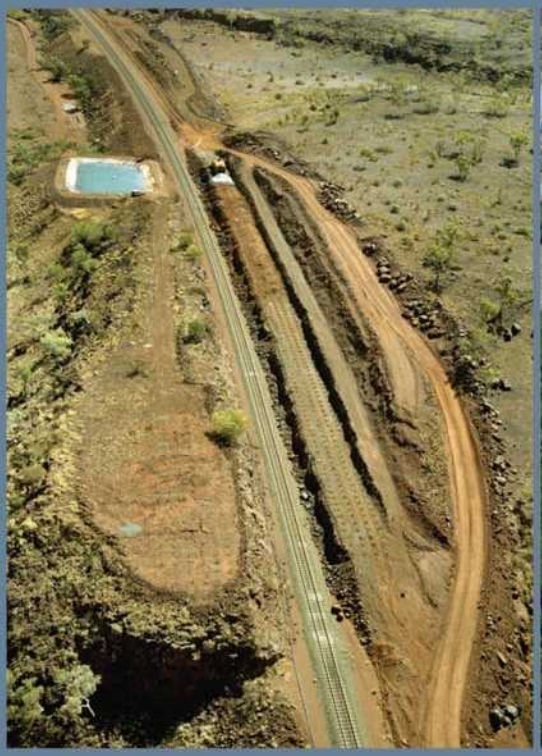
Iron Ore Controlled Document

Procedure

WAIO Fatigue Management

HSE – Health Improvement Number: SPR-IHS-SAFOH-004 Version:19.0


Electronic Approval Record

Author Role	Name	Date of Change
Principal Advisor Health Improvement	Lauren Gullo	04/15
Reviewer Role	**Name**	**Date of Change**
Principal Advisor Hygiene	Neil Bartholomew	04/15
Approver Role	**Name**	**Date of Change**
Manager Health Improvement	Ian Sawyer	04/15

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16.0	All	RPS – All content revised.	09/2014
17.0	2	Minor amendment Electronic Approval Record.	09/2014
18.0	4 & 6	'Approved Rosters Framework BLD' amended to 'WAIO Approved Rosters Procedure' and included as Reference.	11/2014
19.0	7	Removed reference to Matrix (FRM-IHS-SAFOH-001) which is now cancelled & edited reference to WA Code of Practice on Working Hours	04/15

Key Stakeholders

The following people have a stated interest in this document and should be informed of any significant changes to content:

Department	Name	Position
	Bobbie Foot	Manager Health and Safety NJV
	Paul Smithall	Program Delivery Director Major Projects
	Pieter Vermeulen	Program Director Delivery Sustaining Capital
	Johnny Velloza	General Manager Area C
	Jaco Harwig	General Manager Central Maintenance Fixed
	Garry Brogden	General Manager Central Maintenance Mobile
	Chris Dark	General Manager Eatern Ridge
	Tim Day	General Manager Jimblebar
	Michael Bailey	General Manager Port
	Michael Dowd (pp Steven Keating)	General Manager Rail
	Pat Bourke	General Manager Whaleback
	Paul Hemburrow	General Manager Yandi
	Joseph Knight	Head of Exploration
	Rob Fiske	General Manager of Non Process Infrastructure

Table of Contents

1. Purpose

This document describes a systematic approach to controlling the risks associated with fatigue and outlines the complete BHP Billiton Iron Ore fatigue management program. This procedure document applies to all BHPIO Employees and Contractors

2. Scope

Fatigue presents a material risk in Iron Ore. This procedure is founded on the WA Code of Practice and Working Hours, which itself is based on extensive studies in the field of fatigue risk management and control. As a result there is a significant base of science underpinning BHPBIO fatigue risk management requirements.

Causes of fatigue include but are not limited to:

- Roster design and working hours
- Work tasks and environment
- Amount and Quality of sleep
- Sleeping environment
- Sleep disorders and other health issues

More in depth information is available to leaders via the reference table in this procedure.

Fatigue should be managed at the following levels and in the following order:

- Self-Management
- Peer Management
- Supervisor Management

It must be recognised that the individual has the greatest amount of control over their own fatigue and as such the primary accountability for managing personal fatigue risk resides with the employee.

3. Controls

3.1. Rosters

Only approved rosters will be used in accordance with WAIO Approved Rosters Procedure.

3.2. Working Hours

The following key fatigue risk factors are relevant to day to day operations and represent the threshold conditions, beyond which additional controls may be required to manage fatigue risks.

3.2.1. Maximum working time per 24 hours will not exceed 14 hours, inclusive of travel time.

3.2.2. Maximum of 14 consecutive dayshifts

3.2.3. Minimum time between shifts to not be less than 10 hours.

3.2.4. When rotating shifts, they are to rotate from day to night.

3.2.5. When rotating from day shift to night shift, the minimum time between shifts is not less than 23 hours. For avoidance of doubt, the transport time to and from the point where work commences can be within the 23 hour period

3.2.6. Maximum of 7 consecutive nightshifts for FIFO, 4 consecutive nightshifts for residential.

3.2.7. Where a roster starts on night shift, flight arrangements will ensure that individuals have the opportunity for 4 hours sleep at their site accommodation before the start of their first night shift.

3.3. Exception Process

Where operational needs require a temporary deviation to the conditions set out in Section 3.2 – Working Hours, a risk assessment shall be prepared and approved. The risk assessment shall outline any additional controls required to manage fatigue related risks.

3.3.1. Risk assessments for work beyond 14 hours shall be approved by the responsible Manager.

3.3.2. If an individual's working hours including travel exceeds 14 hours they shall not operate any vehicle or work alone.

3.3.3. Risk assessments for work beyond 16 hours shall be approved by the responsible General Manager.

3.4. FIFO Travel

3.4.1. It is an individual's responsibility and duty of care to manage their own fatigue and their commute arrangements to the airport in order to safely work their full first shift.

3.4.2. On fly-out day, it is an individual's responsibility and duty of care to safely manage their own fatigue, including commute arrangements to their destination.

3.4.3. Reasonable flight arrangements will be scheduled to enable individuals to manage fatigue.

3.5. Additional Fatigue Risk Controls

In addition to the mandated controls in this procedure and the emphasis on self-management, line leaders may elect to employ additional fatigue risk controls, including but not limited to:

- WAIO Fatigue Assessment Tool
- Access Card Management Procedure
- Work task rotation and additional rest breaks
- Alertness Technologies
- M11.08 Camp and flight end user requirements
- Injury Management Procedure and Employee Assistance Program for chronic issues

3.6. Training

3.6.1. Appropriate education and training shall be provided to assist in the prevention and management of fatigue

3.7. Management Monitoring and Reporting

3.7.1. Field Leadership is to be used to monitor effectiveness of fatigue management

3.7.2. HSEC will support analysis and reporting of fatigue trends

4. References

References	Title
0115006	WAIO Approved Rosters Procedure
SPR-IOH-SAF-010	BHPBIO Iron Ore Formal HSE Risk Assessment Procedure
SPR-IHS-SAF-105	BHPBIO Access Card Management Procedure
FRM-IHS-SAFOH-006	BHPBIO Iron Ore Fatigue Assessment Tool
FRM-IHS-SAFOH-005	BHPBIO Iron Ore Fatigue Observation Checklist
FRM-IHS-SAFOH-007	BHPBIO Fatigue Individual Commute Plan Template
SPR-IHS-SAFOH-002	BHPBIO Injury Management Procedure
SPR-IHS-SAF-073	BHPBIO Drug and Alcohol Management Procedure
SPR-IHS-SAFOH-010	BHPBIO Medical Assessment & Surveillance Procedure
STD-IOH-SAF-010	BHPBIO Heat Management Standard
	BHPBIO Fatigue Studies Supervisor Guidance Document
External	WA Code of Practice on Working Hours (2006)

5. Appendices

None

IRON ORE FATIGUE ASSESSMENT TOOL

[Refer SPR-IHS-SAFOH-004 Iron Ore Fatigue Management]

Use when:

-Individual reports they are fatigued
-Supervisor or peers observe signs of fatigue or have concerns that an individual is fatigued
-Other situations where there may be a fatigue risk, for example:

- First night or day shift where there has been an extended commute;
- After hours call outs; etc

Supervisor shall discuss with the individual and complete assessment together.

CIRCLE THE MOST APPROPRIATE RISK CATEGORY FOR EACH QUESTION LISTED BELOW	**LOW RISK**	**MEDIUM RISK**	**HIGH RISK**
1. How many hours sleep have you had in the last 24 hours?	7 or more	5 to <7	Less than 5
2. How many hours sleep have you had in the last 48 hours?	14 or more	12 - <14	Less than 12
3. How many hours have you been awake (or how long will you be awake by the end of your shift)? A _____ B _____ **A - B = _____**			
4. How many hours sleep in the last 48 hours?	A - B is 0 or negative	A - B is equal to 1 or 2	A - B is 3 or more
5. Do you feel alert? **RATING** / **DESCRIPTION** 1 Feeling active, alert or wide awake 2 Functioning at a good level, but not at peak, able to concentrate 3 OK, but not fully alert 4 A bit groggy, hard to concentrate 5 Sleepy, groggy, would like to lie down	1- 2	3	4 - 5
6. How many alcoholic drinks did you have before your sleep? Male	0 - 4	5 - 6	7 or more
Female	0 - 2	3 - 4	5 or more
7. Are you on any medication or other substances that could cause drowsiness or cause you to be unfit for work?	No		Yes
8. Do you have any stress, health problems or other personal problems that are significantly affecting your concentration and/ or sleep?	No		Yes
Score the responses as instructed: 1) Add up the number of answers circled in each risk category	Number of Low Risk boxes ticked _____	Number of Medium Risk boxes ticked _____	Number of High Risk boxes ticked _____
2) Times this number by the multiplier number to get a Risk Score for each risk category — Multiplier	**x 0**	**x 1**	**x 2**
Risk Score			
Add your Risk Scores together and use this number to follow the Recommended Action listed on the following page			

LEVEL OF RISK	RECOMMENDED ACTION
LOW RISK **Total Score = 0 - 2** **AND** **individual is** ▪ **Alert** ▪ **Normal eye blinks (less than 1 second)** ▪ **Coordinated body movements** ▪ **Tolerant of others**	▪ **Continue to monitor.** ▪ **Remind individuals about fatigue and alertness management strategies (interaction with others, coffee, exercise, cold air on face, etc).**
MEDIUM RISK **Total Score = 3 - 7** **OR** **The individual reports they are fatigued and/or are showing some of the following signs:** ▪ **Irritable/impatient** ▪ **Longer eyelid closure (1-2 seconds)** ▪ **Wandering thoughts** ▪ **Rubs eyes or face** ▪ **Facial contortions** ▪ **Restless movements** ▪ **Yawning**	**As above plus …** ▪ **Discuss possible reasons for fatigue** ▪ **Rotate tasks** ▪ **Encourage the use of alertness strategies** ▪ **Provide opportunity for a short breaks/brief nap of no more than 15 minutes.** ▪ **Have personnel work together (if possible).** ▪ **Remove from safety sensitive work.** ▪ **Assess fitness for work before you allow person to return to work.** ▪ **Schedule regular supervision for remainder of shift.**
HIGH RISK **Total Score = 8-14** **OR** **The individual reports they are significantly fatigued and/or may be showing the following serious signs:** ▪ **Quiet and withdrawn** ▪ **Long eyelid closure (2 or more seconds)** ▪ **Fixed staring** ▪ **Frequent yawning** ▪ **Micro sleeps**	▪ **Immediately prevent person from working and discuss the possible causes and action required.** ▪ **Determine if the individual can be placed on alternate duties for the remainder of shift and managed at work.** ▪ **If unable to be managed on alternate duties, send the individual home (provide transportation) and report event in 1SAP.**

I have had a one-on-one discussion with my Supervisor and have responded honestly to all questions. I agree to follow the controls listed below to manage any identified fatigue issues:

Action Taken:

☐ No action required –individual to report any further fatigue issues to supervisor

☐ Controls implemented as detailed below:

_____

☐ Individual placed on the following alternate duties for the remainder of shift: _____

☐ Individual sent home and reported in 1SAP. Transport arrangements: _____

Employee/Contractor Signature: _____ Supervisor Signature: _____

Employee/Contractor Name: _____ Supervisor Name: _____

Date: _____ Time: _____

IRON ORE FATIGUE OBSERVATION CHECKLIST

[Refer SPR-IHS-SAFOH-004 Iron Ore Fatigue Management Procedure]

How did the person come to your attention?

- ☐ Direct observation of persons behaviour or performance
- ☐ Self report of fatigue
- ☐ Other individual/s raised concerns regarding person's fatigue or performance
- ☐ Other _____

Did the person show any of the following signs of fatigue?

APPEARANCE

- ☐ Bloodshot eyes
- ☐ Poor coordination
- ☐ Frequent blinking
- ☐ Long eye blinks/ staring
- ☐ "Droopy" eyelids
- ☐ Slow or disjointed speech
- ☐ Repeated Yawning

MOOD

- ☐ Irritable / short tempered
- ☐ Argumentative
- ☐ Impatient
- ☐ Poorly considered decisions
- ☐ Over focus on minor issues

DRIVING

- ☐ Drifted across lanes
- ☐ Erratic steering
- ☐ Forgot to dip headlights
- ☐ Varied speed without noticing
- ☐ Missed turnoff / traffic signs

PERFORMANCE

- ☐ Loss of attention
- ☐ Difficulty following instructions
- ☐ Requested repeat of instructions
- ☐ Reduced ability to think clearly
- ☐ Poor anticipation
- ☐ Automatic or repetitive ("zombie like") behaviour

Are there any other factors that could make the situation worse?

- ☐ Currently on night shift
- ☐ Undertaking potentially hazardous work
- ☐ On first shift back after awakening / long commute to site
- ☐ On first night shift, not had an afternoon sleep
- ☐ Medication (prescription, over the counter, herbal
- ☐ Other _____

FATIGUE INDIVIDUAL COMMUTE PLAN TEMPLATE

[Refer SPR-IHS-SAFOH-004 Iron Ore Fatigue Management]

Instructions for Employees/Contractors:

1) Identify appropriate controls to manage any higher risk aspects of your commute to and from the airport (refer to the suggested strategies for safe commuting on the next page).

Name:	Supervisor:	Site/ Project:
Job Role:	*Detailed Roster Description:	
Home address:		
	Include number of days/nights on shift, Hours per day, shift start times, etc	

Commute Arrangements		
Journey Component	**Details of Commute**	**Identified Controls**
Travel to Site: FIFO: Extended driving prior to flight for first day shift or extended travel plus flight immediately prior to night shift; OR Non-FIFO: Extended driving prior to shift start (other than FIFO) - early morning or immediately prior to night shift		
Travel Home: FIFO: Extended driving after the completion of scheduled work time and flight (airport to home); OR Non-FIFO: Extended driving after the completion of scheduled work		

SAFE COMMUTING – STRATEGIES TO MANAGE FATIGUE RISKS ASSOCIATED WITH COMMUTING

Individual strategies – extended driving before a flight at the start of a roster period (FIFO staff) or before shift start (those other than FIFO). Recommendations to manage commuting risk include:

- Gradually readapt to "site time" by going to bed progressively earlier 2 or 3 nights prior to flying to site. On your last night at home you should be going to bed no more than 30-60 minutes later than you would typically do when working.
- If you have to drive more than 50km to the airport, travel to the airport the evening before your flight and stay in overnight accommodation.
- Car pooling - share travel with another employee
- Avoid alcohol and sleeping medications for at least 24 hours prior to your return to site
- Address any sleeping problems (e.g. sleep apnoea)
- Have an afternoon sleep of at least 4 hours prior to commencing your first night shift.

Individual strategies – extended driving after the completion of scheduled work time e.g. travel from airport to home (FIFO) and travel from work to home (other than FIFO). Recommendations to manage commuting risk include:

- Do not operate a vehicle if you have worked more than 14 hrs including travel time. Organise a taxi, utilise public transport, or have someone pick you up from the airport.
- If you live outside the metropolitan area, have 2-3 hours sleep prior to driving home
- Car pooling - share travel with one or more other employees. Ensure the driver/s have worked less than 14 hours at the time of driving.
- Plan your trip to avoid driving at times when fatigue is likely to be greatest (usually 2400 to 0600 and 1300 to 1600).
- Monitor and manage your alertness level (e.g. take breaks, listen to music, drink water) and respond to signs of a loss of alertness

For additional assistance and/or strategies, refer to the Health & Safety Department.

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Procedure

WAIO Approved Rosters Procedure

Department: Human Resources Number: 0115006 Version:.1.0



Electronic Approval Record

Reviewer Role	Name	Date of Change
Head of Health and Safety	Paul Slocombe	1 September 2014
Head of Organisation Effectiveness	Michael Wheeler	1 September 2014
Approver Role	**Name**	**Date of Change**
Manager Employee Relations	Michael Hoare	1 September 2014

Document Amendment Record

Version	Page No/s	Change Effected	Date of Change
1.0		All content revised – draft procedure for review	1 September 2014

Key Stakeholders

The following people have a stated interest in this document and should be informed of any significant changes to content:

Department	Position
Health and Safety	**All Heads of Health and Safety**
Human Resources	**All Heads of Human Resources**

Re-validation Period

The document needs to re-validated 5 years from the date of creation.

Table of Contents

1. Purpose and Applicability

This document describes a systematic approach to controlling the risks associated with fatigue and outlines the complete BHP Billiton Iron Ore Approved Rosters Procedure. This procedure document applies to all BHPBIO Employees and Contractors.

2. Context

Rosters and Working Hours can cause fatigue. Fatigue is a material risk in Iron ore. This procedure is founded on the WA Code of Practice and Working Hours, which itself is based on extensive studies in the field of fatigue risk management and control. As a result there is significant base of science underpinning Iron Ore Approved Rosters.

Only Approved Rosters can be worked in accordance with this document.

3. Controls

This document contains:

- The Fatigue Rules against which rosters are assessed against for approval, based on the fatigue risk management and control science. Appendix 1.
- The approvals required for a new roster or application of a different roster. Appendix 2.
- Human Resources maintain the Approved Rosters in a 1SAP Work Schedule Rule guide.

4. Implementing New Rosters

Where a new roster is required to meet operational needs and it is not contained in the Approved Rosters it must be recommended by the Manager and contain a business case.

4.1 Business Case Requirements

A business case must be developed to support the request for a new roster. The business case should detail:

- the current state, the proposed solution,
- the implications for supervision, accommodation, travel, operational change, etc
- the operational requirements that are driving this change,
- implications for manning and remuneration,
- any costs and risks associated with the change,
- the benefits associated with the change,
- whether the proposed new roster meets the Fatigue Rules, see Appendix 1.

4.2 Application of Residential rosters to FIFO work groups

Before existing residential rosters are applied to FIFO arrangements, a Fatigue Management assessment must be completed. The roster structure of team must be understood, particularly where a team will be made up of a hybrid of residential and FIFO or multiple rosters.

5. Terms and Conditions of Employment

Rosters and working hours have associated terms and conditions of employment underpinned by statutory requirements and as such are approved by the HR Vice President.

5.1 Leave Entitlements

Leave entitlements are based on the roster and location of work. All employees are entitled to a base of 4 weeks per annum. Employees working on site in the Pilbara are entitled to an additional week and a further week if they are working a shift roster (regularly rostered to work Sundays and Public Holidays) up to a total of 6 weeks.

For example:

9 on 5 off	**Average weekly work hours**	**Shift length**	**Shift work**
Hours	54	12	Yes
Employment Arrangement	Site Residential or FIFO		
Location	Newman / Port Hedland		
Annual leave entitlement in weeks	6 weeks (4 weeks + 1 for shift work + 1 for Pilbara location)		
Annual leave entitlement in hours	324 hours		
Annual leave entitlement in shifts	Average 4.5 shifts/week x 6 weeks annual leave = 27 shifts		

6. Appendix 1 – Fatigue Rules

Criteria against which all Approved Rosters are assessed			
	All Rosters	**Residential Rosters**	**FIFO Rosters**
Maximum normal shift length (operations)	12 hrs (does not include shift handover)	12 hrs (does not include shift handover)	12 hrs (does not include shift handover)
Maximum shift handover	30 mins	30 mins	30 mins
Maximum working time per 24hr period including handovers and travel time	14 hrs Can not operate vehicle after 14 hrs	14 hrs Can not operate vehicle after 14 hrs	14 hrs Can not operate vehicle after 14 hrs
Maximum number of consecutive shifts	14	14	14
Maximum number of consecutive night shifts		4	7
Max average weekly hours	56 hrs	56 hrs	56 hrs
Start time day shift	No earlier than 6am (does not include shift handover)	No earlier than 6am (does not include shift handover)	No earlier than 6am (does not include shift handover)
Rotation of roster panel	Forwards (day shift worked before night shift)	Forwards (day shift worked before night shift)	Forwards (day shift worked before night shift)
Minimum rest period between shifts	10 hrs	10 hrs	10 hrs
Break between day and night shift or night and day shift change over	At least 23 hrs	At least 23 hrs	At least 23 hrs
Recommended time off work if roster is greater than 5 consecutive shifts	At least half of the number of days worked	At least half of the number of days worked	At least half of the number of days worked

Any Rosters not meeting the above rules or involving split shifts (i.e. 2 blocks of work in one day or night) are subject to detailed risk assessment and review by fatigue expert.

7. Appendix 2 – Approvals Framework

Approvals Framework			
Category / Activity	**RECOMMEND**	**APPROVE**	**ENDORSE**
An addition to the Approved Rosters	Department Manager	Responsible Line Vice President	Heads of Health and Safety, Human Resources and Organisational Effectiveness
Application of an Approved roster new to an operation	Department Manager	General Manager	Manager Human Resources and Employee Relations
Terms and Conditions associated with Approved Rosters	Human Resources Manager	Vice President Human Resources	Heads of Human Resources and Organisational Effectiveness

8. Appendix 3 – Definitions

Term	Description
Average Weekly Shift Time Hours	Average shift time hours over a 7 day period in any recognised roster. Calculated by the number of days worked multiplied by the hours of work per shift (not including shift handovers) divided by the roster cycle length in weeks.
Fatigue	Fatigue is a physical condition that results in reduced performance or reduced ability to carry out a task that can occur due to the following: • Too little or poor quality sleep; • Working during normal 'sleep' times; • Carrying out mentally or physically demanding activities; or • Other health factors.
Night Shift	Any shift which includes work between the hours of 23:00 and 06:00.
Night Shift – Rail Operations **(NB: applies to Rail Transport Continuous Rolling Rosters only)**	Night shift is defined as working more than 3 hours between the hours of 2300 and 0600. For example: • 1400-0200 = day shift under this definition • 1500-0300 = night shift under this definition
Roster Period	The rostered work shift plus the break until the next shift. For example: 4 on 4 off = 4 shifts of working time plus four days of non working time is equal to a roster period of 8 days. 9 on 5 off = 9 shifts of working time plus 5 days of non working time is equal to a roster period of 14 days.
Rotating Roster	A roster which rotates between day and night shift (e.g. 2D, 2N, 2O).
Shift Handovers	Includes the process of handing over information from one shift to the next, hot seat changes and other activities involved in transitioning to the subsequent shift.
Shift Time	Time scheduled to be spent in the workplace including Short Breaks, Scheduled Breaks and Active Work. Does not include time spent traveling to and from work or shift handovers.
Split Shift	A type of shift work where a person's normal work day is split into two or more segments.
Travel Time	Includes time taken to commute to and from the place of work, traveling between sites, or any business travel undertaken including national and international flights.
Working Time	Period including Shift Time, Shift Handovers and Travel Time, and any overtime or additional time worked.

GLD.011
HEALTH

Group Health, Safety and Environment

The Key Contact for this GLD is listed on the Portal.

Glossary

Please click here for list of glossary terms relating to this GLD.

Brief description

In alignment with *Our BHP Billiton Charter*, we efficiently identify and manage acute and chronic health hazards in the workplace and factors that may impact fitness for work.

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1. Health risk management

Workplace illness is prevented by efficiently managing health hazards and health status for *employees* and *contractors*.

Identification and assessment

- Identify health hazards which have the potential to cause illness and injury.
- Establish the exposure risk profile for harmful agents by performing risk-based qualitative (based on documented underlying assumptions and analysis) and/or quantitative exposure assessments using the Appendix 1 methodology and taking into consideration extended work shifts, work rosters and combined exposures.
- Assess health hazard risk and exposure to harmful agents using the occupational exposure limits (OELs) (Appendix 2), biological monitoring (Appendix 1) and other relevant standards where applicable.
- Report the exposure assessment results to relevant stakeholders (including workers and line managers).
- Review the exposure risk profile to validate exposure levels and to account for process changes.

Exposure control

- Evaluate and implement exposure *controls* in project design and equipment selection.
- Prioritise exposure *controls* on the basis of potential health consequences, number of people exposed and magnitude of exposure reduction.
- Implement elimination, substitution, isolation or engineering exposure *controls*, supplemented by administrative *controls* (where required) to meet BHP Billiton public health targets.
- Implement exposure *controls* consistent with the methodology in Appendix 1 for carcinogenic agents with uncertain dose response (Appendix 2) where exposure exceeds or is anticipated to exceed 50 per cent of the OEL.
- Implement exposure *controls* in accordance with the hierarchy of *controls* (elimination, substitution, isolation, engineering, administrative, personal protective equipment (PPE)) where exposure exceeds or is anticipated to exceed the OEL or based on risk assessment for hazards where an OEL does not apply.
  - Implement PPE programs according to a recognised standard and perform personal fit testing for respiratory protective equipment and for hearing protection devices.
- Maintain, monitor and verify the effectiveness of exposure *controls*.

Medical surveillance

- Identify potential illness at an early stage through the implementation of a baseline and periodic medical surveillance process that is consistent with the exposure risk profile when exposure exceeds 50 per cent of an OEL, or when the OEL is exceeded for threshold-based exposure limits (Appendix 2).
- Report the results of medical surveillance to relevant stakeholders (including workers and line managers), managing medical information/records in accordance with applicable legislative requirements.

2. Fitness for work

Incident, illness and injury risk is minimised by managing the factors that impact the ability of *employees* and *contractors* to perform their work.

Medical assessment

- Identify roles which require medical assessment based on risk, taking into consideration the work to be performed and the work environment.
- Determine the frequency of assessment based on the likelihood of change in health status that may impact a worker's ability to undertake such roles.
- Implement an evidence-based medical assessment process specific to the roles identified that indicates whether a worker is fit, fit subject to work modifications, or unable to meet inherent requirements of the role, managing medical information/records in accordance with applicable legislative requirements.

Fatigue, Drugs and Alcohol

- Develop and implement a fatigue management plan that is consistent with relevant industry standards and includes *controls* to address identified causes of fatigue and prevent/mitigate associated risks.
- Maintain and monitor the effectiveness of the fatigue management plan using the Appendix 1 methodology specific to the causes and *controls*.
- Implement a risk-based drug and alcohol program that includes *controls* to address potential impairment and prevent/mitigate associated risks.

3. Case management

Work-related injury or illness is managed to minimise its long-term impact on *employees* and *contractors*.

- Facilitate medical treatment for work-related injury or illness and, where necessary, a rehabilitation program based on medical advice.
- Optimise return to work outcomes through early reintegration into the workplace, and back to the pre-injury role, to the extent practicable.

Appendix 1. Methods of analysis, exposure assessment and exposure control

Issue/Agent	Methodology that is consistent with:
Aerosol sampling	ISO TR 7708:1995 Air quality - Particle size fraction definitions for health-related sampling. UK Health & Safety Executive, Health and Safety Laboratory MDHS 14/4: General methods for sampling and gravimetric analysis of respirable, thoracic and inhalable aerosols. ISO 10882-1 Second edition 2011-1—01: Health and safety in welding and allied processes – Sampling of airborne particles and gases in the operator's breathing zone – Part 1 Sampling of airborne particles.
Biological monitoring	American Conference of Governmental Industrial Hygienists 'Introduction to the Biological Exposure Indices © (BEI)' and use either ACGIH Biological Exposure Indices © or other recognised index.
Chemical analysis of samples	US National Institute for Occupational Safety and Health, Manual of Analytical Methods. UK Health and Safety Executive, Methods for the Determination of Hazardous Substances. US Occupational Safety and Health Administration, Sampling and Analytical Methods. ISO 15202 series, Workplace air – Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry.
Comparing exposure to OELs	**Chronic agents**: If the exposure is log-normally distributed, use Land's 95 per cent upper confidence limit (UCL) of the arithmetic mean estimate. If the exposure is not log-normally distributed but is normally distributed, use the 95 per cent UCL of the arithmetic mean exposure. **Acute agents**: Use the 95th percentile of the exposure distribution.
Diesel particulate	Government of Western Australia, Management of diesel emissions in Western Australian mining operations.
Exposure assessment and reassessment	Sections I and II of the American Industrial Hygiene Association's 'A Strategy for Assessing and Managing Occupational Exposures' 3rd Edition, and use the specific methods and occupational exposure limits (OELs) contained in the remainder of this table and Appendix 2 assessment.
Fatigue management	Performance indicators for fatigue risk management systems: Guidance document for the oil and gas industry. IPIECA 2012.
Heat Stress	Thermal Work Limit (TWL) or alternate recognised methodology where a risk assessment has identified that an equivalent or better level of protection for workers than that provided by TWL. For TWL, see Brake and Bates, Limiting Metabolic Rate (Thermal Work Limit) as an Index of Thermal Stress, Applied Occupational and Environmental Hygiene, Volume 17(3): 176–186, 2002.
Infectious disease	International SOS (login to the member's website using the membership number 12ACMA000050) or other recognised authority to assess infectious disease risk.
Ionising radiation	International Atomic Energy Agency. Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards - Interim Edition General Safety Requirements Part 3. IAEA Safety Standards Series No. GSR Part 3 (Interim), 2011, English (issued 21/11/2011).
Noise	Calculation of the A-weighted noise exposure level normalised to an eight-hour working day daily noise exposure level as defined in Section 3.2 of ISO 9612:2009 Acoustics - Determination of occupational noise exposure - Engineering method.
UV Radiation	UV index.
Vibration	Directive 2002/44/EC of the European Parliament and of the Council of 25 June 2002 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration). HSE vibration calculator: Hand-arm vibration exposure calculator, Whole body vibration calculator.

Appendix 2. OELs for airborne substances and physical agents

OELs for agents not listed must be taken from the Health and Safety Executive (HSE) Workplace Exposure Limits (WELs) published by the HSE in EH40/2005 2nd Edition 2011.

Substance	Chemical Abstract Number (CAS)	BHP Billiton OEL (mg/m^3 unless otherwise listed)	Notation
Benzene	71-43-2	TWA 0.5 PPM STEL 2.5 PPM	International Agency for Research on Cancer (IARC) Group 1; Skin; Biological Exposure Index (BEI)
Benzo(a)pyrene	50-32-8	TWA 1 µg/m^3 TWA 0.2 µg/m^3 as of 1 July 2015	IARC Group 1; BEI
Coal mine dust: respirable		TWA 2.0 (R)	
Coal tar pitch volatiles as benzene/cyclohexane soluble fraction (BSF/CSF) of total particulate matter	65996-93-2	TWA 0.05 (BSF) TWA 0.035 (CSF)	IARC Group 1; BEI
Carbon monoxide	630-08-01	TWA 30 PPM STEL: • up to 50 PPM for 60 minutes; • up to 100 PPM for 30 minutes; or • up to 200 PPM for 15 minutes.	BEI
Diesel particulate as elemental carbon(U)		TWA 0.1	IARC Group 1
Fluoride (inorganic as F)	16984-48-8	TWA 0.5	BEI
Lead: inorganic dusts and fumes	7439-92-1	TWA 0.15 (I)	IARC Group 2A; BEI
Manganese (all forms), as Mn	7439-96-5	TWA 0.5 (I) TWA 0.1 (R)	
Nickel: elemental and compounds, as Ni	Various	TWA 0.05 (I) (T)	Nickel compounds IARC Group 1; Nickel, metallic and alloys IARC Group 2B
Particulates not otherwise specified (PNOS)		TWA 10 (I) TWA 3 (R)	
Silica, crystalline	Various	TWA 0.1 (R)	IARC Group 1
Sulphur dioxide	7446-09-5	TWA 2.0 PPM STEL 5.0 PPM	
Sulphuric acid (Thoracic fraction)	7664-93-9	TWA 0.2	IARC Group 1

(R) Measured as respirable dust **(I)** Measured as inhalable dust **TWA** 8 hour time weighted average **STEL** 15 minute time weighted average
(U) Uncertain dose response **(T)** Threshold-based exposure limit **PPM** Parts per million
IARC Group 1: Agent is carcinogenic to humans;
IARC Group 2A: Agent is probably carcinogenic to humans
IARC Group 2B: Agent is possibly carcinogenic to humans

Physical Agent	BHP Billiton OEL	
Noise	Continuous or intermittent noise	$L_{Aeq,8h}$ = 85 dB(A)
	Impact or peak noise	$L_{C,peak}$ = 140 dB(C)
Ionising radiation	Effective dose of 100mSv over 5 years. Maximum of 50mSv in one year.	

Activity Summary

Fit For Work Supervisor

Expand All Collapse All

Description and Notes
Below are the details about this activity including activity description, user notes and instructor notes.

Description:

DESCRIPTION:
This module provides Supervisors with a clear understanding of their roles and responsibilities in identifying employees who are at risk of or are impaired by Fatigue. It imparts Supervisors with the skills necessary to undertake an appropriate course of action with regards to risk reduction including the use of work place controls, assistance with employee self management techniques, medical assessment and referral to support programmes.

LEARNING OUTCOMES:
• List the key BHP Billiton Iron Ore BIO procedures, policies and assessment tools that guide their responsibilities in relation to ensuring that an employee is 'fit for work'

• Identify symptoms that indicate an employee is experiencing fitness for work issues, such as fatigue, drug or alcohol impairment or problems associated with physical or mental wellbeing

• Describe the processes for assessing and reporting fit for work issues

• Identify strategies that can be used to manage the effects of fit for work issues, including: implementation of work place controls, development of a positive reporting culture, self-management techniques and available support and referral options.

DELIVERY METHOD:
Online

DURATION:
30-40 minutes

ASSESSMENT:
Online test

Additional Information
Below are the additional details about this activity such as facility, location and so on.

Category Details
This activity is organised into the categories below.