

Capstone Mining Corporation's



Fatigue Risk Management Plan (FRMP) - DRAFT Copy

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Introduction

This policy was developed in consultation with Capstone management, supervisors, workers and contractors. It is reflective of current research and knowledge of fatigue and safety management systems, particularly fatigue risk management systems. It is designed to align closely with the existing safety management systems at Minto mine. It is based upon a five level fatigue risk management strategy that is designed to provide multiple layers of controls to assist in mitigating fatigue risk factors.

Scope of FRMP

This policy and supporting procedures apply to all supervisors and workers in the underground mine operations at Minto including direct Capstone employees, contractors or employees of contractors. Any worker who will, at any time, be spending more than 8 hours underground in the mine, shall comply with this Fatigue Risk Management Plan and procedures contained within to ensure they maintain the capacity to safely perform work.

Objectives

This Fatigue Risk Management Plan seeks to mitigate risk factors associated with fatigue in Minto Mine's underground mining operations.

The key objectives of this Fatigue Risk Management Plan are to ensure a safe and healthy working environment free of fatigue related injury or illness by:

- controlling work related fatigue risk factors to minimize the likelihood of a worker being fatigued;
- minimising the risks of persons presenting for work or conducting work while impaired by fatigue;
- establish appropriate steps to manage persons who are effected by fatigue; and
- reducing the likelihood of a fatigue related error or incident.

Communication Strategies

To ensure a common understanding of Capstone's fatigue risk management plan, a copy of the plan will be made available to all supervisors and workers involved in underground mining operations. The Minto Explorations Fatigue Management Policy Statement will be displayed in a visually accessible place to demonstrate Capstone's commitment to properly mitigating fatigue factors.

Minto Explorations Fatigue Management Policy Statement

Minto Explorations Ltd. believes that the health and safety of its employees is fundamental to its business operations. Work related injury or illness is unacceptable and the company is committed to the identification, elimination, or control of workplace hazards for the protection of all employees. The goal is to have zero lost time accidents. The company is committed to implementing operational improvements that offer superior safety and occupational health management.

The management of fatigue in the underground mines is an integral part of Capstone's "Fit for Duty" Policy and as such, is a shared responsibility between Capstone, its contractors and its employees. All employees in the underground mining operations must undertake their work in accordance with this policy to the best of their ability and to take all reasonable care for their own safety and health, as well as the health and safety of their work colleagues.

Capstone Mining Corp. understands fatigue is a risk factor and as such is committed to the following:

1. Zero harm to personnel due to fatigue related error.
2. Operating in accordance with industry standards, while meeting or exceeding compliance with all relevant legislative requirements.
3. Providing the expertise and resources needed to maintain a fatigue risk management system designed to recognize and manage fatigue risks to create safe systems of work and safe and healthy work environments.
4. Promoting fatigue awareness through appropriate training and education to ensure workers and supervisors are able to effectively manage fatigue and are able to communicate openly about fatigue related issues.
5. Ensuring employees understand their right and obligation to protect themselves from workplace hazards and alter or stop work if they believe fatigue is compromising the safety of themselves or others.
6. Ensuring all underground mine employees, sub-contractors and visitors are informed of, understand their obligations, and comply with this policy.
7. Measuring health and safety performance with regards to fatigue, the effectiveness of this policy in managing fatigue, and making improvements as warranted.
8. Investigating the causes of accidents and incident including reviewing fatigue factors, and developing effective and immediate preventative and remedial actions as needed.

Sebastian Tolgyesi
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Definitions

For the purpose of this document, the following definitions apply:

Fatigue: A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a worker's alertness and ability to safely perform their duties.

(This definition is modified from Aviation IFALPA IATA FRMS for Operators, 2011).

A Fatigue Risk Management Plan (FRMP) is an integrated set of management practices, beliefs and procedures for monitoring and managing the risks posed to health and safety by fatigue. It is based in safety management system theory with an emphasis on risk management.

Capstone's FRMP incorporates:

The FRMP Document: The FRMP document defines and details the way that fatigue-related risk is dealt with in the underground mine at Minto, and is the written version of the FRMP.

Risk Mitigation Strategies: Contained within the FRMP are five levels of defenses designed to reduce the likelihood of a fatigue related error occurring. The FRMP includes tools, strategies and control measures for monitoring and managing fatigue-related risk.

Education and Training: All underground mine employees need to be aware of the risks posed by fatigue, understand the importance of controlling fatigue risk factors and understand the individual and organisational strategies that are employed in managing that risk. This is facilitated through both supervisor and worker education and training programs.

Revision and Review Functions: The system must be monitored for continuous improvement and to ensure it is flexible to changing work practices. The review function is essential and is therefore built into the Capstone FRMP framework.

Employee/Worker: Any person who works on the site, regardless of their employer. This includes direct Capstone employees, contractors and their employees.

Manager/Supervisor: Any person who is directly responsible for the supervision and well being of other employees.

Company/Employer: Capstone Mining Corporation or Minto Explorations Ltd.

Contractor: A company hired by Capstone Mining Corp. to complete work on site. Employees of the contractor are referred to as employees/workers or managers/supervisors.

FRMP: Fatigue Risk Management Plan

Shift: The hours between the start and finish of established daily work schedules.

Work Rotations/Cycles: The working period scheduled between any significant break away from work.

Work Schedules/Rosters: The hours to be worked for each day, shift, week, month or year, as scheduled by the employer.

A complete list of definitions and terms related to this document can be found in Appendix B.

Standards and Legislation

The following standards and legislation were consulted in the preparation of this FRMP.

O.I.C. 2006/178

YUKON OCCUPATIONAL HEALTH AND SAFETY ACT

REGULATIONS: PART 15 – SURFACE and UNDERGROUND MINES or PROJECTS

Hours underground 15.13

(1) A worker shall only remain underground in an underground mine or project for more than eight hours in any consecutive 24 hours, measured from the time the worker enters to the time the worker leaves the underground workings

- (a) when an emergency causes an extension of the time,
- (b) on one day of a week but only for the purpose of changing shift, or
- (c) if the worker is a supervisor, pump worker, cage tender, or a person engaged solely in surveying or measuring or in emergency repair work.

(2) The director may consider and approve an application for a modified hours of work schedule in an underground mine if the director is satisfied that the risk to the health or safety of the workers is not increased.

“underground mine or underground project” means a mine or project that is not a surface mine and includes any work, undertaking or facility used in connection therewith.

Emergency Response

An Emergency is defined in Capstone's Safety Management System. In the event of an emergency, workers and supervisors may be required to work outside of normal shift hours and fatigue may become a key safety issue. In the case of an emergency, all efforts should be made to properly mitigate fatigue risk factors through risk management strategies contained within this FRMP. Supervisors should be extra diligent in monitoring fatigue and in assisting workers in being aware of and managing fatigue to the best of their abilities. If possible, the emergency response manager should conduct regular fatigue assessments to determine if fatigue will become a safety hazard. When the emergency situation has finalized, all workers should be allowed a sufficient period to rest prior to recommencing work duties.

Training

Improving supervisor and worker competency in understanding, assessing and controlling fatigue risk factors, is an integral component of Capstone's FRMP. Specific training programs have been designed and delivered to key Minto employees involved in the underground mining operations. All new workers who will be involved in the underground mining operations will be trained in fatigue competency as part of their on-boarding process. Training records will be kept up-to-date to ensure fatigue competency.

Roles and Responsibilities

Capstone and all of its underground mining personnel share in the responsibility to minimize and manage the adverse effects of work related fatigue. As with all safety management systems, the FRMP recognizes an integral role played by management, contractors and workers. Broadly, roles and responsibilities are outlined below.

Workers are responsible for:

- Obtaining sufficient sleep to be fit for work.
- Reporting when they have been unable to obtain sufficient sleep or when they feel at risk of making a fatigue related error.
- Complying with implemented Fatigue Risk Management Plans and policies including following all processes and completing all required documentation related to Capstone's FRMP.
- Participating in fatigue related education and training provided by Capstone.
- Participating in fatigue investigations as required.
- Seeking medical or other assistance with fatigue related health issues (such as illness or sleep disorders).
- Addressing any concerns regarding fatigue with a supervisor as required.

Supervisors are responsible for:

- Ensuring new workers are oriented and informed about issues relating to fatigue and the Capstone FRMP.
- Providing ongoing information and awareness to all underground mining workers regarding fatigue risk factors.
- Ensure workers are following procedures and processes outlined in Capstone's FRMP.
- Conducting regular health and safety meetings that periodically discuss fatigue risk management.
- Ensuring all observed and reported fatigue symptoms are properly addressed through consultation with workers and through agreed actions within the Capstone FRMP.
- Taking action if an employee is not fit for work due to fatigue.
- Reviewing and investigating all reports of fatigue related errors and incidents.
- Ensuring Capstone Fatigue Incident Investigation Information is gathered as part of any underground mine incident investigation.
- Setting a good example for workers by properly managing fatigue factors.
- Addressing any concerns regarding fatigue with workers and management as required.

Employer is responsible for:

- Creating and implementing a fatigue risk management plan and control strategies to mitigate fatigue related risk.
- Providing resources necessary for education and training to assist workers in building competency in identifying, assessing and controlling fatigue.
- Scheduling work to ensure adequate sleep opportunities for workers.
- Providing conditions that are conducive to managing fatigue, specifically providing adequately for nutritional, hydration and fitness needs of workers while at Minto camp site.
- Providing a proper sleep environment for workers when not on duty at Minto camp site.
- Ensuring resources are available to maintain and regularly review and revise the FRMP.
- Supporting employees with non-work fatigue related issues through existing health and safety programs.

Understanding Fatigue

Understanding fatigue is a key component of any fatigue risk management plan. It is essential for supervisors and workers to understand fatigue factors to be able to properly identify assess and mitigate fatigue risks.

Information required for understanding fatigue includes: circadian rhythms, sleep cycles, causes of fatigue, effects of fatigue, identifying signs of fatigue, and methods of controlling and managing fatigue. These key understandings are an integral part of the supervisor and worker training programs that are provided to all personnel involved in the underground mining operations. These training programs ensure all personnel involved have the understanding and competencies required to properly manage fatigue risk factors. A very brief summary of fatigue understandings is provided below.

Fatigue is an issue because it can impair a workers abilities and can significantly increase the risk of a safety incident occurring. Fatigue causes an increased risk of incidents because of reduced physical and mental abilities and an overall lack of worker alertness. When workers are fatigued they are more likely to have reduced awareness and reduced abilities to respond to changes in their working environment, to react emotionally and/or to exercise poor judgement. This leads to an increased likelihood of incidents occurring due to human error. Fatigue has also been positively linked to multiple long term health concerns such as: digestive issues, ulcers, obesity, diabetes, heart disease, stroke, and immune system deficiencies.

There are numerous factors that influence an individual's likelihood to become fatigued. Key risk factors include: quality and quantity of previous sleep obtained, disruption of circadian rhythms, time of day, age, overall health and nutrition, individual variations, sleep disorders, poor sleep hygiene, stress, family and social obligations, and drug or alcohol use.



Work factors can also greatly influenced fatigue. Key factors to consider include: shift work particularly length, timing, and frequency of shifts; physical and mental requirements of job tasks; working environment; and inadequate breaks.

There are a number of strategies that can be employed to assist in managing fatigue. These strategies include organizational, individual and team-based countermeasures. All three types of control strategies are employed in this FRMP.

Increased awareness of fatigue factors and increased competency in identifying and managing fatigue will reduce fatigue related risk and the likelihood of fatigue related errors and incidents.

Fatigue Risk Assessments Completed at Minto Mine

Risk management encompasses the identification, assessment, control and evaluation of hazards that pose a meaningful risk to the health and safety of employees/workers (including contractors) and visitors to the workplace.

To properly deal with fatigue risk factors, it is important to:

1. identify where fatigue is a hazard and may pose a risk; and
2. assess the level of risk that a given fatigue hazard represents; and
3. when necessary, put in place controls and mitigation strategies,
4. monitor to make sure that they manage the risk at an acceptable level; and
5. evaluate the implemented controls to ensure they have been successful.

Hazard assessments conducted at the Minto Mine site focused on reviewing hazards associated with fatigue. Assessments were conducted based on observations, consultation and discussions with workers, supervisors and contractors. The following areas were examined: mental and physical work demands; work scheduling and planning; environmental conditions; and individual and non-work factors. Risk assessments were based on both likelihood and severity. Results were graphed and quantified and may be viewed in their entirety in Appendix C. Results were used to create the Capstone 5 Level Fatigue Risk Management Plan. Below is a summary of the quantitative results of the initial hazard assessment conducted.

Table 1.1 Capstone's Minto Mine Fatigue Risk Assessment Results

Factor Grouping	Capstone Risk Points	Total Factor Points	Percent of High Risk Areas
Work Demands	18	30	60%
Work Scheduling - Hours	22	50	44%
Work Scheduling - Shifts	25	40	63%
Work Scheduling - Night Work	40	70	57%
Work Environment (listed as high as they are not currently fully assessed)	35	40	88%
Off Duty Factors	8	40	20%
Totals and Average %	148	270	55%

Fatigue risk factors and assessment have been taken from the following document (Fatigue Management Plan - A practical guide to developing and implementing a fatigue management plan for the NSW mining and extractives industry, 2009)

In the initial hazard assessment a number of high risk factors for fatigue were identified. These have been specifically outlined and addressed in the FRMP. An outline of some specific control measures used to assist in managing high risk areas are outlined below.

Table 1.2 High Risk Factor Controls

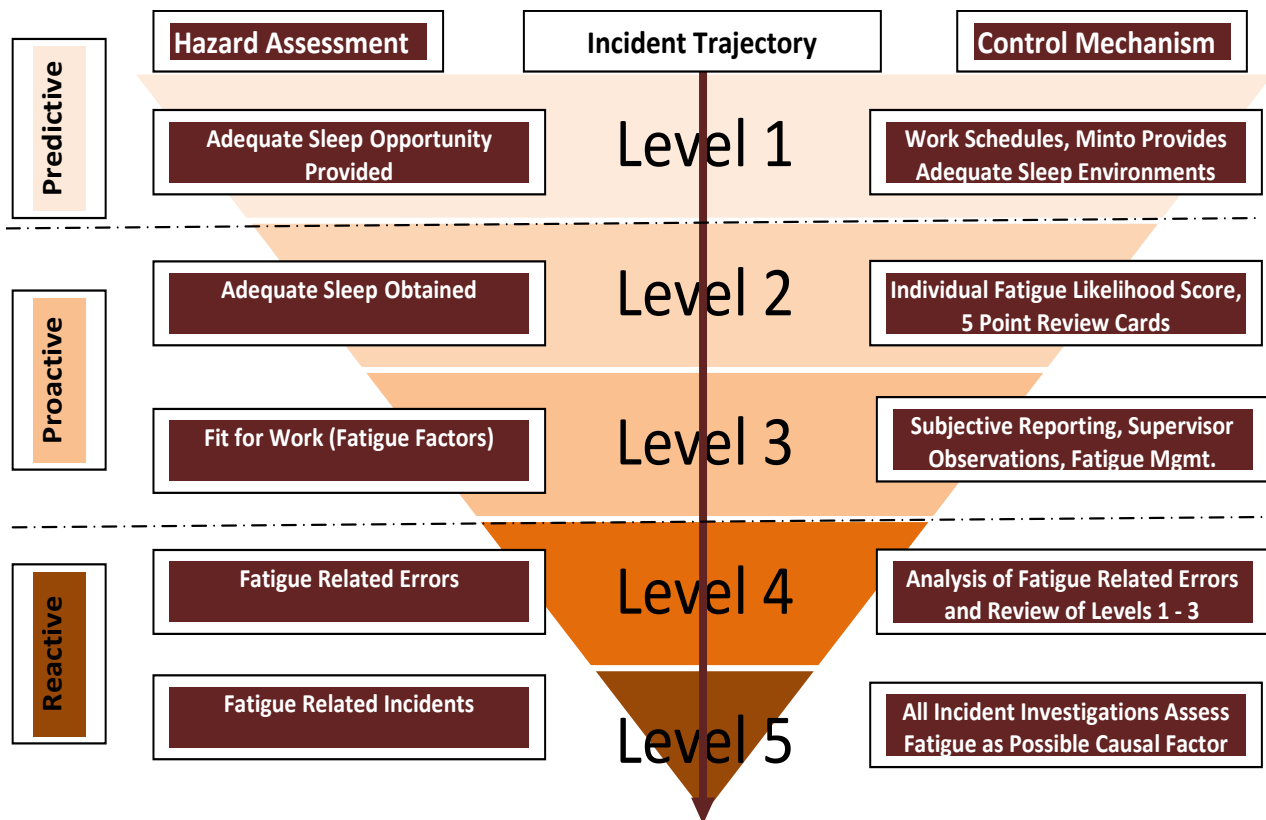
Risk Factor	Control Measures
<p>Work Scheduling</p> <ul style="list-style-type: none"> • 12 hour shifts • 14 consecutive shifts • 84 hours in a typical work week • Slow rotations - 2 weeks of day shifts, 2 weeks of night shifts • Night shifts 	<p>Increase Sleep Opportunities</p> <p>Minimize Non-Work/Off Duty Factors to Increase Sleep Opportunities</p> <ul style="list-style-type: none"> • Camp provides limited commute and non-work responsibilities to allow for increased sleep opportunities for workers. • Minimal family and social obligations outside of work to reduce fatigue risks. • Food and lodging provided onsite to minimize obligations outside of work. <p>Ensure worker access to optimal health requirements to reduce fatigue risk including: overall nutrition, hydration, recreation and exercise.</p> <ul style="list-style-type: none"> • Camp menus are designed for optimal worker nutrition and health. A gym is onsite for worker fitness needs. A recreation facility is also available onsite for workers. A variety of bottled beverages and water are always available to workers. Drugs and alcohol are strictly forbidden at Minto Mine site. <p>Provide Proper Sleep Environment:</p> <ul style="list-style-type: none"> • Efforts are made to keep sleeping areas secluded and quiet. There are specific quiet areas set aside for night workers to rest during the day. • All rooms have blinds to reduce daylight. • New camp facilities are planned for the spring and sleep hygiene needs have been reviewed for these new facilities.
<p>Start times before 6 AM</p>	<ul style="list-style-type: none"> • Start times are being adjusted to 7 AM
<p>Work Demands</p> <p>Certain job tasks are physically and mentally more demanding (Stoper, Jackleg)</p>	<p>Certain job tasks, such as Stoper and Jackleg Operators, will have mandatory 15 minute breaks after every 2 hours operating equipment.</p>
<p>Work Environment</p> <p>Work environmental factors - currently unknown. Possible exposure to hazardous substances, noise, temperatures, vibration, etc.</p>	<p>On-site industrial hygiene testing is being completed to assess work environmental factors. Control measures will be implemented as required.</p>

Fatigue Management Plans

Addressing safety from the point of view of risk management has become an increasingly accepted way of allowing companies to integrate safety systems and reduce worker risk. There is a growing body of research that shows using a strictly prescriptive approach, relying on hours of service alone as a key mitigation factor for fatigue, is not comprehensive enough to fully insulate workers from the risks of fatigue. A worker can be given ample opportunity for sleep, but due to a variety of circumstances (ex. a sleep disorder, a new baby, an illness, etc) not actually obtain the necessary hours of sleep needed to be alert and fit for duty. Ensuring ample opportunities for workers to sleep is seen as only the first level of safety controls in a complete fatigue risk management plan.

Using a multileveled and comprehensive risk management approach allows companies to identify high risk situations, and then put into place countermeasures that can minimize the likelihood of an incident occurring. This type of system relies on hazard identification, assessment and control measures within a comprehensive safety management system. The Fatigue Risk Management Plan (FRMP) is designed to provide multiple opportunities to introduce countermeasures intended to minimize the possibility of a fatigue related error occurring.

Diagram 1.1 Diagram of Capstone's 5 Level Fatigue Risk Management Plan



Adapted from Centre for Sleep Research, University of Southern Australia

A Brief Overview of the 5 Level Fatigue Risk Management Plan

Capstone's FRMP is based on the 5 Level Fatigue Risk Trajectory and focuses on multiple levels of countermeasures, designed to be used in combination to minimize the risks associated with fatigue.

Details regarding the plan are outlined below.

An Overview of the Plan

Controls	Type	Details
Level 1	Organizational	Adequate sleep opportunity provided
Level 2	Individual/Workers	Self reporting (Fatigue Likelihood Scores)
Level 3	Team	Monitoring for fatigue signs
Level 4	All	Fatigue proofing the system
Level 5	Organizational	System review

- **Level 1 Controls** – Management ensures provision of adequate sleep opportunity through scheduling of work and appropriate sleep environments.
- **Level 2 Controls** – Workers verify that adequate sleep has been obtained through Fatigue Likelihood Assessment and self reporting.
- **Level 3 Controls** – Management and workers ensure behavioral indicators of fatigue are identified and managed.
- **Level 4 Controls** – All ensure the likelihood that errors becoming incidents are minimized – fatigue proofing.
- **Level 5 Controls** –Management ensures fatigue-related incidents are prevented from re-occurring unnecessarily. This is done through fatigue specific incident investigation.

Control s are focused in the following way:

- i. Predictive - Level 1
- ii. Proactive - Level 2 and 3
- iii. Reactive - Level 4 and 5

Additionally:

Levels 1 - 3 require education and training for workers and supervisors to understand the need for sleep, the causes and effects of fatigue, the signs of fatigue, and the safety hazards fatigue can create.

Levels 2 - 5 require a culture that understands and accepts fatigue as a safety hazard, not a worker weakness. Workers must know there are no repercussions for self reporting fatigue.

Levels 4 -5 require a strong commitment from management to follow up on fatigue reports and examine any places in the system that are not properly mitigating fatigue related risks. To be effective the plan must be reviewed on a regular basis to ensure risk controls are effective.

Table 1.3 Details of the 5 Control Levels Including: Key Responsibilities, Assessment Strategies, Documentation Processes and Control Actions.

Level	Responsibility	Risk Factor	Initial Strategy	Assessed Through	Documentation Process	Control Actions Required
1	Supervisor	Adequate sleep opportunities for workers	Ensuring adequate sleep opportunity through work scheduling	Review of initial schedules, rosters, hours/types of shifts, etc and a new review conducted for any major changes	Existing shifts signed off by mine manager. New shifts approved by mine manager prior to implementation.	High risk factors in rostering, scheduling and shift lengths are recognized and mitigated through the many layers contained in this comprehensive FRMP
	Supervisor	Specific job tasks may increase fatigue risks	Review of work tasks and breaks scheduled for specific work tasks	Worker feedback, observed signs of fatigue	Specific tasks (scoper, jack lift) require scheduled breaks that are taken and documented each shift.	Scheduled breaks taken. Job task risk factors are also recognized and mitigated through the other layers contained in this comprehensive FRMP
	Employer	Proper nutrition, hydration and fitness needs for workers to maintain health	Ensuring camp conditions are adequate and can serve to reduce fatigue risks	Review of current camp conditions with regards to nutrition, hydration and fitness needs. Ensuring sleep hygiene is considered in current camp and as new camp is built.	Fatigue Factors: Minto Mine Checklist in Appendix D and part of cyclical review.	Specific efforts are made to ensure proper nutrition through camp menus, hydration through access to fluids and exercise through the onsite gym and various recreational opportunities (ex. hockey rink). Sleep hygiene factors are understood and all efforts are made to incorporate them at the camp. This includes, but is not limited to blinds in the rooms, quiet sleep areas, controlled temperatures in the rooms, etc.

Level	Responsibility	Risk Factor	Initial Strategy	Assessed Through	Documentation Process	Control Actions Required
2	Worker	Workers being fit for work in relation to fatigue factors	Obtaining adequate sleep during off hours and accurately reporting sleep obtained	Individual Fatigue Likelihood Assessment	On 5 Point Review	Follow agreed control strategies listed in Level 2
	Supervisor	Workers being fit for work in relation to fatigue factors	Ensuring workers have obtained adequate rest	Review of 5 Point Review Cards for Fatigue Factors	Fatigue scores found in 5 Point Review Cards are reviewed and recorded.	Follow agreed control strategies listed in Level 2
3	Worker	Ability to manage fatigue risk factors at work	Self-reporting and monitoring of any fatigue symptoms or risk factors	Samn-Perelli Scale	On 5 Point Review	Follow agreed control strategies listed in Level 3
	Worker	Ensuring coworkers are not affected adversely by fatigue factors	Observations for fatigue symptoms in co-workers	Fatigue Symptoms Checklist	Verbally report concerns to co-worker and supervisor. Document on 5 Point Review	Follow agreed control strategies listed in Level 3
	Supervisor	Ensuring workers are not affected adversely by fatigue factors	Observations for fatigue symptoms	Fatigue Symptoms Checklist	Document any observed symptoms, conversations regarding fatigue and control measures taken.	Discuss concerns with worker. Follow agreed control strategies listed in Level 3

Level	Responsibility	Risk Factor	Initial Strategy	Assessed Through	Documentation Process	Control Actions Required
4	Worker	Fatigue related error occurring - (indicates system error in levels 1 - 3)	Report fatigue related errors	Self-assessed based on fatigue levels and actions.	No-loss incident reporting form	Stop Work! Discuss with supervisor. Alter work duties to not include any safety sensitive tasks or do not continue until fit for work.
	Supervisor /Employer (Safety Team)	Fatigue related error occurring - (indicates system error in levels 1 - 3)	Follow up on all fatigue related errors reported.	Worker self-reporting, worker reporting of co-worker error, observations made by supervisor.	No-loss incident reporting form	Take seriously and stop worker immediately! Discuss with worker. Alter work duties to not include any safety sensitive tasks or do not allow worker to continue until fit for work. Post incident follow up to discover where Levels 1 - 3 were ineffective.
5	Worker	Fatigue related incident occurring	Report all Incidents	Incident Investigation	Incident Reporting Form	All work is stopped after an incident. Work does not commence until a supervisor deems it safe to continue.
	Supervisor / Employer (Safety Team)	Fatigue related incident occurring	Investigate all Incidents	Incident Investigation	Incident Reporting Form, Incident Investigation Report including Capstone's Fatigue Incident Investigation Information	If fatigue is in any way a causal factor, a thorough review to discover where levels 1 - 3 were ineffective is required. A review of the FRMP may be required.

Level 1 - 5 Supporting Processes and Procedures

Level 1 - Understanding Management Influences on Sleep Opportunities

Primarily level 1 controls involve organizing work to provide adequate sleep opportunities for workers. It also involves scheduling breaks as needed to avoid fatigue.

Key areas this focuses on are:

1. Work Scheduling
 - a. Work shifts
 - b. Schedules (including start times)
 - c. Rotations
2. Camp Environment
 - a. Camp nutrition, hydration and exercise opportunities
 - b. Quiet, dark sleeping environments
3. Work Environment
 - a. Testing underway
4. Work Tasks
 - a. Worker Task Break Schedule

Key documents to assist in this are:

1. Fatigue Factors: Minto Camp Checklist (Appendix D)
2. Summary of Minto Mine's Underground Environment Testing

Level 1 Controls Brief Description:

There are a variety of scheduling factors that can be reviewed to reduce fatigue. These focus on applying what is known about human needs for rest and circadian rhythms to existing company needs for work to be scheduled. Where possible, schedules should be examined and altered to accommodate worker needs for proper rest. Where it is not possible to alter schedules for optimal worker alertness, levels 2 - 5 of the FRMP must be implemented to reduce worker risk of fatigue error.

Camp conditions should be designed, as much as possible, to support worker access to nutrition, hydration and exercise. Proper sleep environments should be available to workers.

Current environmental conditions in the underground Minto mine have not been assessed. Processes are under way to begin the testing and assessment. Until assessments have been completed, high-level controls will be put into place to ensure fatigue risk factors are controlled.

Certain work tasks have been identified as increasing a workers likelihood to become fatigued. As such work breaks have been scheduled that are specific to work tasks. The following table outlines work tasks and mandatory minimum breaks to be provided for workers completing those tasks.

Table 1.4 Worker Task Break Schedule

Job Designation and Key Tasks	Minimum Work/Break Schedule Required
Supervisor Jumbo Driller Scoop Operator (Mucker) Maclean Operator (Rock Bolt Machine) Truck Driver Welders, Electricians, Mechanics	Breaks should be taken as required with a minimum 30 minute break (or two 15 minute breaks) every 6 hours.
Stoper Operator Jackleg Drill Operator	Breaks should be taken as required with a minimum 15 minute break taken for every two hours of equipment operation.
Other non designated tasks or workers	Follow typical break schedule of taking breaks as required with a minimum 30 minute break (or two 15 minute breaks) every 6 hours unless work is physically or mentally demanding and/or the worker is experiencing fatigue. Then a minimum 15 minute break every two hours should be taken.

Currently, under the Dumas contracting system, underground miners work the following shifts:

14 day shifts of 12 hours each starting at 6 AM and finishing at 6 PM, a 24 hour break, followed by 14 night shifts for 12 hours each starting at 6 PM and finishing at 6 AM, followed by 2 weeks off.

Upon implementation of this FRMS, Dumas shifts will be altered to the following:

14 day shifts of 12 hours each starting at 7 AM and finishing at 7 PM, a 24 hour break, followed by 14 night shifts for 12 hours each starting at 7 PM and finishing at 7 AM, followed by 2 weeks off.

When Capstone moves from using Dumas as an independent contractor to having direct Capstone employees work in the underground mine, the following shift schedule is planned:

14 day shifts of 12 hours each starting at 7 AM and finishing at 7 PM, followed by 2 weeks off, followed by 14 night shifts for 12 hours each starting at 7 PM and finishing at 7 AM, followed by 2 weeks off.

Additional Level 1 Controls

Review of NSW controls and choosing appropriate ones to suggest and implement.

Level 2 Controls - Worker Self-Reporting of Sleep Obtained

Worker self-reporting of sleep obtained using the Individual Fatigue Likelihood Assessment. Agreed controls based on fatigue likelihood score.

Diagram 1.2 Individual Fatigue Likelihood Wallet Card (side 1)

Capstone Minto Mine					
INDIVIDUAL FATIGUE LIKELIHOOD ASSESSMENT					
Step 1. Sleep in prior 24 hours					
Sleep	≤ 2h	3h	4h	5h+	
Points	12	8	4	0	
Step 2. Sleep in prior 48 hours					
Sleep	≤ 8h	9h	10h	11h	12h+
Points	8	6	4	2	0
Step 3. Hours awake since last sleep					
Add one point per hour awake greater than sleep in Step 2					

Workers assess likelihood of fatigue based on previous sleep obtained. Score is determined by calculating sleep obtained in the last 48 hours and by assessing how long it has been since the worker last slept.

Scores are calculated by assigning points to sleep obtained in the last 24 hours (any sleep over 5 hours is 0 points) and adding it to sleep obtained in the previous 24 hours (an average of 6 hours a night or 12 hours in total is 0 points). The score is then compared to the number of hours the individual has been awake.

Example 1: An individual slept 5 hours the night before their shift and 4 hours the night before that. They have been awake for 3 hours. Score ($0 + 6 + 0 = 6$) They should request supervisor monitoring.

Example 2: An individual slept 6 hours the night before their shift and 5 hours the night before that. They have been awake for 12 hours. Score ($0 + 2 + 1 = 3$) They should self monitor for signs of fatigue and manage as needed.

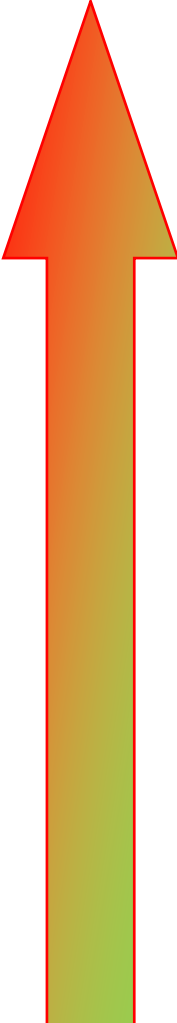
Example 3: An individual slept 3 hours the night before their shift and 3 hours the night before that. They have been awake for 8 hours. Score ($8 + 8 + 2 = 18$) They are not fit for duty and should not commence work. They should speak with their supervisor and obtain rest before starting a shift.

Note: This sleep scale does not accurately account for individual differences in sleep needs. It also does not account for accumulated sleep debt. Level 3 controls should still be used if needed even if a Fatigue Likelihood score is 0.

Diagram 1.3 Individual Fatigue Likelihood Wallet Card (side 2)

Capstone Minto Mine	
INDIVIDUAL FATIGUE LIKELIHOOD ASSESSMENT	
Step 4. Add all points together to determine your score	
Score	Agreed Control Strategies
1 to 4	Self Monitoring
5 to 11	Request Supervisor Monitoring
12+	Do NOT Commence Shift Until Fit For Work
Refer to FRMS policy for detailed explanation of controls	

Table 1.5 Possible Symptoms and Agreed Controls for Fatigue Likelihood Scores



Score	Possible Signs and Symptoms	Agreed Control Strategies
12+	Difficulty staying awake and possibly experiencing microsleeps. Uncoordinated physically and experiencing difficulty staying focused. Significant impairment evident.	Document and report risk to supervisor. Do not engage in ANY safety critical work or behaviors. Do not recommence until fit for work.
10	Clear evidence of behavior impairment. Difficulty sustaining attention on simple tasks. Uncoordinated p.	Document and report risk to supervisor. Complete Samn Pernelli and Fatigue Symptoms Checklist.
8	Clear loss of motivation and physically weak and listless. Significantly reduced situational awareness. Task performance impaired.	Engage in individual and team fatigue management strategies. Organize supervisory checks and work directly with a co-worker if possible. Nap if possible. Should not engage in safety critical work - task reassignment if necessary.
6	Difficulty concentrating. Occasional lapses of attention. Poor judgement on complex tasks. Physically affected - sagging body posture, slow blinking, etc.	Document. Complete Samn Pernelli and Fatigue Symptoms Checklist. Take approved individual or team countermeasures. Self-monitor for symptoms, team monitor by co-workers, task rotation or other job alterations as required.
4	Difficulty in maintaining extended concentration for complex tasks. Low energy levels and weakness apparent.	Controls and fatigue management may be necessary. Assess and monitor for fatigue symptoms.
2	Slowed cognition. Occasional minor fatigue behaviors observed. Minor mood changes observable. Low energy levels or hyperactive.	No controls unless otherwise indicated by other fatigue risk factors
0	Able to perform tasks safely. Unlikely fatigue impairment, but monitor if required.	

Level 3 Controls - Team Controls to Ensure Fatigue Risks are Controlled.

Workers experiencing fatigue use level 3 checklists (Samn-Perelli Fatigue Checklist, Symptoms of Fatigue Checklist), report to supervisor and co-workers any fatigue concerns, and engage in individual and team controls as needed.

Supervisors check all recorded fatigue data, watch for signs of fatigue, and take all reports of fatigue seriously. Team controls are implemented as needed. Any worker not fit for duty is removed from safety sensitive work, given alternate tasks or removed from duty as required.

Diagram 1.4 Samn-Perelli Fatigue Checklist (side 1)

Samn-Perelli Fatigue Checklist	
1	Fully alert
2	Very lively
3	Okay
4	A little tired
5	Moderately tired
6	Extremely tired
7	Completely exhausted

Diagram 1.5 Samn-Perelli Fatigue Checklist (side 2)

Samn-Perelli Fatigue Checklist Controls Based on Score	
1 to 3	Proceed with work, monitor if symptoms appear
4 to 5	Supervisor monitoring required, implement individual and team management strategies, alter work duties if needed
6 to 7	Stop work, obtain rest before beginning shift

This checklist can be used throughout a shift, triggered by the following:

- start of shift (routine assessment)
- start of night shift
- following a nap
- if shift is to be extended
- on call-in overnight shift
- if Level 2 assessment places the person in yellow or red zones
- coworker or supervisor notes symptoms
- individual experiences symptoms
- error committed or noticed
- incident

Supervisor Monitoring

The following is a list of fatigue symptoms to assist with monitoring. Workers should also be taught to monitor themselves and each other for signs of fatigue. Workers exhibiting signs should be approached and questioned regarding fatigue likelihood scores and feelings of fatigue. A mitigation strategy should be worked out with the worker. Remember, those who are fatigued often underestimate the level of their fatigue and are less able to make effective decisions. Err on the side of caution.

Diagram 1.6 Symptoms of Fatigue Checklist

Common Symptoms of Fatigue Checklist					
Physical	Observed	Mental	Observed	Emotional	Observed
Yawning		Difficulty concentrating		Quiet	
Slow blinking		Lapses in attention		Withdrawn	
Rubbing eyes or face		Memory lapses		Lethargic	
Aching muscles or headache		Difficulty communicating		Bored	
Uncoordinated movements		Lack of situational awareness		Lacking motivation	
Sagging body posture		Making mistakes		Irritable	
Weak and low energy		Confusion		Easily frustrated	

Individual and Team Fatigue Management Strategies

The following are examples of individual and team control measures that can be used depending on the level of fatigue.

Diagram 1.7 Individual Control Examples

Individual Control (Examples)
Controlled use of caffeine
Adequate hydration and food intake
Adjust working temperature
Adjust lighting
Take a break
Change tasks
Remove safety sensitive tasks from work
Take a 20- 30 minute nap
Increase social interaction
Defer to a second opinion
Increase supervision
Stand Down - do not proceed until fit for work

Diagram 1.7 Team Control Examples

Team Control (Examples)
Communicate fatigue status at morning safety meeting
Communicate high Fatigue Likelihood Score to supervisor and coworkers
Document high Fatigue Likelihood Score
Increase cross checking among coworkers (watching out for each other)
Increase supervision
Task reallocation or rotation (trading tasks when needed)
Delay safety sensitive work when possible
Take a collective break (encourage breaks when needed)
Work together with a co-worker where possible (chat to keep alert)
Engage in conversations and social interactions
Fatigue leave - all crew stand down

Level 4 - Fatigue Related Errors - Assessing the System

One of the key factors in Capstones 5 Level Fatigue Risk Management Plan is the reactive measures used to ensure the plan is working appropriately. Any report of fatigue related error should be immediately followed by an informal investigation to determine where levels 1 to 3 were inadequate in properly mitigating fatigue factors.

The following procedures should occur:

1. All fatigue related errors are reported immediately to a supervisor
2. All fatigue related errors are documented within that shift on no loss incident investigation forms.
3. No loss incident investigation forms are to be submitted to the safety committee for informal investigation.
4. Informal investigation will take place within one week of receiving the incident forms.
5. Informal investigation should include the following:
 - a. Discussion with the worker to determine causal factors of fatigue
 - b. The effectiveness of the reporting process used on the day of the incident
 - c. The reasons that levels 1-3 were ineffective in assessing and mitigating the fatigue risk.
6. Formal fatigue incident investigation tools found in level 5 may be reviewed and used if necessary.

Level 5 - Fatigue Related Incidents - Fatigue Incident Investigation Information Required

All incidents investigated in the underground mining operations need to be assessed to determine if fatigue was a risk factor. Normal Capstone SMS incident investigation procedures are used. The addition of the fatigue incident investigation information will assist in determining if fatigue was a causal factor in the incident. Fatigue incident investigation information must be collected on all incidents occurring within the underground mining operations. All data collected as part of all incident investigations shown to have fatigue causal factors must be recorded and used as part of the fatigue risk management plan review process.

Capstone Fatigue Incident Investigation Information

1. **Date, time and place** of the accident. (not the time of the report) _____

Level 1

2. **Work Schedule History (Schedule, Rotation, Shift Length, Breaks)**

Level 1

What was the actual work schedule (regular hours plus overtime) for the **four days** prior to the accident? (Please fill out by date and shift until all four days prior to the accidents are covered).

Work Shift -1:	Start time/Date: _____	End time/Date: _____
Work Shift -2:	Start time/Date: _____	End time/Date: _____
Work Shift -3:	Start time/Date: _____	End time/Date: _____
Work Shift -4:	Start time/Date: _____	End time/Date: _____

How many hours into the shift did the incident occur? (ex. 3 hours in) _____

How far into the work schedule was the individual involved?

Day #/Shift #: (ex. Day 12/28) _____

What shift was the individual working (day or night)? _____

How long from the last scheduled break? _____

How long in duration was the last scheduled break? _____

3. **Work Task and Work Environment**

Level 1

What task was being performed at the time of the incident? What was the work environment like? How mentally or physically stimulating was the task and work environment prior to the accident? (Refer to Capstone's FRMS for details on fatigue risk factors relating to work tasks and work environments).

Job Designation (Title) of individual(s) involved, task being performed, and work environment described: _____

Rate Mental Factors _____

(on a Scale of 1 - 5 with 1 being very stimulating and 5 being fatiguing)

Rate Physical Factors _____

(on a Scale of 1 - 5 with 1 being very stimulating and 5 being fatiguing)

Work Environment Rated: _____

(on a Scale of 1 - 5 with 1 being very stimulating and 5 being fatiguing)

4. **Number of hours of actual sleep** in previous 24, 48 and 72 hours (i.e. 3 days) prior to the accident.

Day 1: _____

Day 2: _____

Day 3: _____

Number of hours awake (from previous sleep) when accident occurred. _____

Level 2

5. **Overall quality of sleep** 24, 48 and 72 hours (i.e. 3 days) prior to the accident.

First Day Prior: Poor Fair Good Excellent

Second Day Prior: Poor Fair Good Excellent

Third Day Prior: Poor Fair Good Excellent

Level 2

6. Did any **health problems** affect the individuals sleep during the month leading up to the accident?

Yes No Uncertain If Yes provide details:

Level 2

7. Any **symptoms of fatigue** during the persons waking hours prior to the accident. (either self reported or observed by others)?

Frequent Eye Closure Lethargic or Low Energy Fixed Gaze
Distracted or Forgetful Excessive Yawning Head Nodding

Other: (refer to Symptoms of Fatigue Checklist found in Capstone FRMS)

Level 3

8. What **fatigue assessment** and documentation had occurred prior to and during the shift? (ex. Fatigue Likelihood score, self-reporting of fatigue, supervisor noting of symptoms, Samn-Perelli Scale, etc.)

Level 2 &
Level 3

9. Any other information relating to the incident or worker relating to fatigue that could be relevant to the investigation.

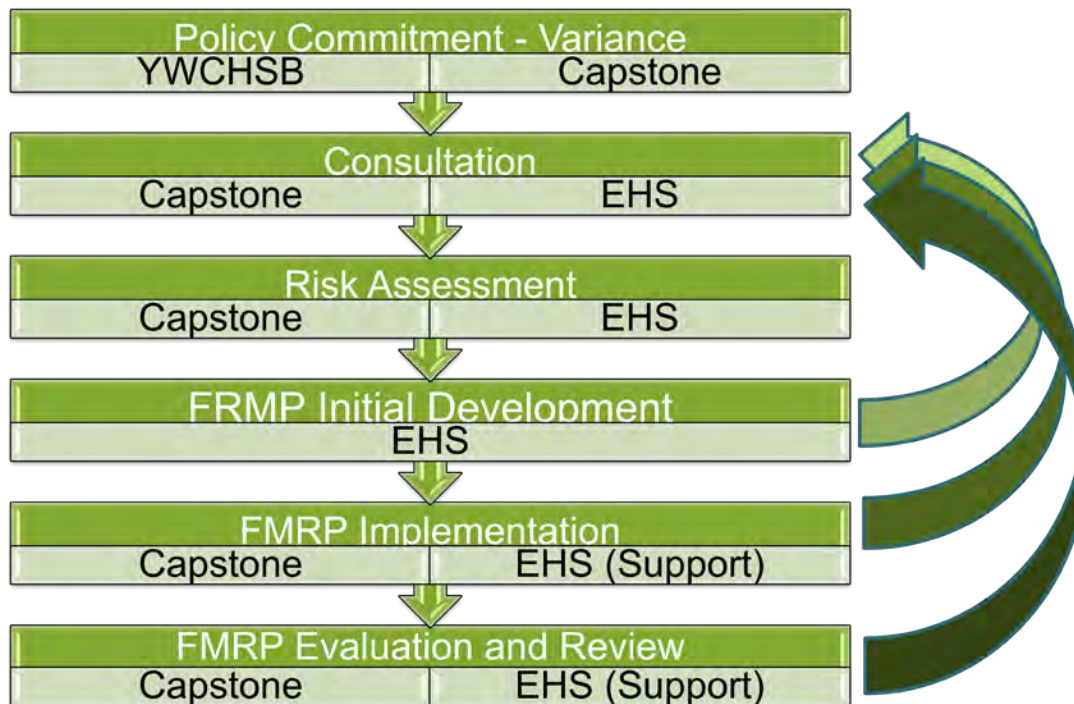
Level 1 to
Level 3

Implementation Strategies

Implementation Role Clarification

Initial policy creation was based upon variance agreements between Capstone Mining Corp. and the Yukon Worker's Compensation Health and Safety Board. EHS Partnerships was brought in as a consultant to assist in identifying, assessing and controlling fatigue risks. The creation of the Fatigue Risk Management Plan has been a process based upon consultation with Capstone and YWCHSB.

Upon completion of the consultation and revision processes, the FRMP implementation process will be completed by the Minto Mine Safety Management Team at the direction of the Capstone Mine Corporation. Consultation and support for the implementation will be available, upon request, from EHS Partnerships.



Suggested Time Frames

Jan 2013

- I. Rough Draft of FRMP Completed.
- II. Initial consultation process
 - a. Review of FRMP by Capstone
 - b. Review of FRMP with input from YWCHSB
- III. Supervisor Training Initiated

February/March 2013

- I. Revisions to FRMP as required.
 - a. Final consultation with Capstone.
- II. First version FRMP published.
- III. Copies of FRMP sent to:
 - a. Capstone Corporate
 - b. Minto Mine
 - c. YWCHSB
- IV. Supervisor Training Completed
- V. Worker Training Initiated
- VI. Communication to Minto Mine employees regarding FRMP.

April 2013

- I. Implementation Process Begins
- II. Worker Training Completed
- III. Provisions made for on-boarding fatigue training of new workers and supervisors.

May/June 2013

- I. Review of Implementation process to ensure FRMP is being followed correctly and meeting expectations.

April 2014

- I. First annual review of FRMP.

Communication Strategies

To ensure a common understanding of Capstone's underground mining fatigue risk management plan, a copy of the policy will be made available to all supervisors and workers. The Capstone policy statement will be displayed in a visually accessible place to demonstrate capstones commitment to properly mitigating fatigue factors.

When final revisions are complete, a copy of this plan will be sent to the following:

- i. YWCHSB
- ii. Capstone Corporate
- iii. Minto Mine Management
- iv. Minto Safety Committee
- v. Underground Mine Supervisors
- vi. Underground Mine Workers
- vii. Other Key Stakeholders (Contractors)
- b. Participation Requirements
 - i. All Underground mine contractors, supervisors, and workers are required to fully participate in the Capstone FRMP including the training provided and the policies and procedures contained within.
- c. Supervision Responsibilities
 - i. Overall implementation responsibilities fall to Capstone Mining Corp. These may be designated as required to Minto Mine Management and the Minto Safety Team.

Planned Audit and Review

The fatigue management procedure or plan must be reviewed at regular intervals to ensure the continual effectiveness of the controls. Review of control measures should be undertaken when methods, tasks, equipment, hazards, operations, procedures, rosters or schedules are introduced or the environment changes or there is any indication risks are not being controlled.

- d. Specific Review Dates
 - i. Capstone's FRMP should be reviewed on an annual basis (minimal standard) to ensure the plan is working to properly mitigate the risks of fatigue.
- e. Review Roles and Procedures
 - i. Annual review will led by the Minto Mine Safety Team and will include:
 1. Review of the FRMP document.
 2. Completion of the Fatigue Management Self Assessment Worksheet found in Appendix E.
 3. Review of all fatigue data including:
 - a. Summary of fatigue information gathered during shifts.
 - b. Summary of all fatigue related errors and no loss incidents and a review of the investigation information conducted on these.
 - c. Summary of any Incident Investigation that identified fatigue as a causal factor.
 - d. Specific review factors to consider include:
 - i. have control measures been implemented as planned?
 - ii. are they working?
 - iii. are there any new problems? and
 - iv. incidents, near misses, injuries and other data, such as absenteeism and staff turnover rates.
 - e. Further review of control measures should be undertaken when hazards, procedures, rosters or schedules are introduced or there is any indication risks are not being controlled.
 4. Feedback Method (Internal)
 - a. Solicitation of formal and/or informal feedback from workers, supervisors, contractors involved in the FRMP should be gathered.
 - i. Specifically:
 1. Do they feel the plan is effectively controlling fatigue risks?
 2. Any ways they feel the plan could be improved.
 5. Revision Process
 - a. If required, necessary revisions and implementation of revisions should take place within 60 days of the annual review process.

Appendices

- A. References
- B. Definitions and Terms
- C. Minto Mine's Initial Risk Assessment Results
- D. Fatigue Factors: Minto Camp Checklist
- E. FRMP Self Assessment Checklist

Appendix A: References

1. NSW Mine Safety Advisory Council & NSW Government (2009), *Fatigue Management Plan - A practical guide to developing and implementing a fatigue management plan for the NSW mining and extractives industry*
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18. Drew Dawson Ph.D., Kirsty McCulloch, *Managing Fatigue: It's About Sleep - Stupid*,

Appendix B: Terms and Definitions

Term	Definition
Alertness	The opposite state of sleepiness, the state of cognitive and physiological arousal, and responsiveness to environmental/situation conditions.
Circadian Rhythm	A neural pacemaker in the brain that monitors the day/night cycle (via a special light input pathway from the eyes) and determines our preference for sleeping at night. Shift work is problematic because it requires a shift in the sleep/wake pattern that is resisted by the circadian body clock which remains 'locked on' to the day/night cycle.
Contractor	A company hired by Capstone Mining Corp. to complete work on site. Employees of the contractor are referred to as employees/workers or managers/supervisors.
Controls	System-level defensive strategies designed to minimize fatigue risk on an ongoing basis.
Cumulative Sleep Debt	Sleep loss accumulated when sleep is insufficient for multiple nights (or 24-hr days) in a row. As cumulative sleep debt builds up, performance impairment and objective sleepiness increase progressively, and people tend to become less reliable at assessing their own level of impairment
Employee/Worker	Any person who works on the site, regardless of their employer. This includes contractors.
Employer/ Company	Capstone Mining Corporation or Minto Explorations Ltd
Fatigue	Fatigue is a state of impairment. It is a physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a worker's alertness and ability to safely perform their duties.
Fatigue Countermeasures	Organizational, individual and team based fatigue management strategies to reduce the effects of fatigue.

Fatigue Likelihood Assessment	A quantitative measure of the amount of sleep an individual is able to obtain. It is used to determine the likelihood an individual will experience fatigue symptoms or reduced levels of alertness.
Fatigue Risk Management	The management of fatigue in a manner appropriate to the level of risk exposure and the nature of the operation, in order to minimise the adverse effects of fatigue on the safety of operations.
Fatigue Risk Management Plan (FRMP)	is an integrated set of management practices, beliefs and procedures for monitoring and managing the risks posed to health and safety by fatigue. It is based
Fatigue Symptoms Checklist	A list of fatigue symptoms that can be used to assist in identifying when an individual might be experience fatigue.
Five Level Fatigue Trajectory	model utilising multiple layers of defence to manage the occurrence of fatigue-related incidents. It is the major practical or day-to-day aspect of the FRMS and includes tools and controls for monitoring and managing fatigue-related risk. At each level there are opportunities to put in place control strategies to manage the fatiguerelated risk. For an incident to occur, each level must have failed in some part to allow the error to pass through.
FRMS Training	Competency-based training programs designed to ensure that all stakeholders are competent to undertake their responsibilities in the FRMS.
Manager/Supervisor	Any person who is directly responsible for the supervision and well being of other employees.
Micro Sleeps	A short period of time (seconds) when the brain disengages from the environment (it stops processing visual information and sounds) and slips uncontrollably into light non-REM sleep. Microsleeps are a sign of extreme physiological sleepiness.
Mitigations	System-level interventions designed to reduce a specific identified fatigue risk.

Nap	A brief period of sleep, usually defined as less than half of a full night time sleep period. Naps as short as 5 minutes have been shown to provide (temporary) relief from the cumulative effects of sleep loss
Performance	The observable/behavioural manifestation of alertness and sleepiness, and the combination of one's efforts and the results of those efforts.
Prior Sleep	The amount of sleep obtained prior to a specific time (eg. the start or end of a shift).
Prior Wake	The amount of time spent awake prior to a specific period (usually assessed at the start and end of a shift).
Risk	The potential for harm, a concept that denotes a potential negative impact to some characteristic of value that may arise from a future event. Risks are events or conditions that may occur, and whose occurrence, if it does take place, has a harmful or negative effect.
Risk Management	The process of identifying and managing the factors contributing to risk, errors and incidents, at an individual or an organisational level, and determining how to best handle such exposure.
Safety Management System (SMS)	A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures.
Samn-Perelli Checklist	A subjective checklist used to measure a worker's fatigue levels.
Shift	The hours between the start and finish of established daily work schedules.
Shift Worker	a person who works rotating shifts, irregular shifts, evening shifts, afternoon shifts, morning shifts or split shifts. Another term for this work is 'non-traditional work hours.'

Sleep Disorders	A range of problems that make it impossible to obtain restorative sleep, even when enough time is spent trying to sleep. More than 80 different sleep disorders have been identified, that can cause varying amounts of sleep disruption. Examples include obstructive sleep apnea, the insomnias, narcolepsy, and periodic limb movements during sleep
Sleep Inertia	Transient disorientation, grogginess and performance impairment that can occur as the brain progresses through the process of waking up. Sleep inertia can occur on waking from any stage of sleep but may be longer and more intense on waking from slow-wave sleep (non-REM stages 3 and 4), or after sleep periods or naps containing a high proportion of slow-wave sleep.
Sleep Need	The amount of sleep that is required on a regular basis to maintain optimal levels of waking alertness and performance. Very difficult to measure in practice because of individual differences.
Sleep Quality	Capacity of sleep to restore waking function. Good quality sleep has minimal disruption to the non-REM/REM cycle. Fragmentation of the non-REM/REM cycle by waking up, or by brief arousals that move the brain to a lighter stage of sleep without actually waking up, decreases the restorative value of sleep.
Sleep Quantity	The total amount of sleep that an individual is able to obtain. It is usually measured to the nearest hour.
Sleepiness	A state of increased motivation to sleep. Difficulty in maintaining the alert state so that if an individual is not kept active and aroused, they will fall asleep.
Subjective Fatigue	Self-reported levels of feelings of fatigue, assessed on a seven-point scale ranging from 'fully alert, wide awake', to 'completely exhausted, unable to function'.
Work Rotations/Cycles	The working period scheduled between any significant break away from work.
Work Schedules/Rosters	The hours to be worked for each day, shift, week, month or year, as

Appendix C: Fatigue Hazard Assessment at Minto Mine

Hazard assessments conducted at the Minto Mine site focused on reviewing hazards associated with fatigue. Assessments were conducted based on observations, consultation and discussions with workers, supervisors and contractors.

The following areas were examined: mental and physical work demands; work scheduling and planning; environmental conditions; and individual and non-work factors.

Risk assessments were based on both likelihood and severity. Results were graphed and quantified . Below is a summary of the quantitative results of the initial hazard assessment conducted.

Table 1.1 Capstone's Minto Mine Fatigue Risk Assessment Results

Fatigue risk factors and assessment have been taken from the following document (Fatigue Management Plan - A practical guide to developing and implementing a fatigue management plan for the NSW mining and extractives industry, 2009)

Factor Grouping	Capstone Risk Points	Total Factor Points	Percent of High Risk Areas
Work Demands	18	30	60%
Work Scheduling - Hours	22	50	44%
Work Scheduling - Shifts	25	40	63%
Work Scheduling - Night Work	40	70	57%
Work Environment (listed as high as they are not currently fully assessed)	35	40	88%
Off Duty Factors	8	40	20%
Totals and Average %	148	270	55%

Appendix D: Fatigue Factors Minto Mine Checklist

Minto Mine Fatigue Factors Camp Checklist	Check
Accommodations	
Temperature - Rooms should be between 18 - 22 C	
Lighting - Room should be able to be darkened during daylight hours (ex. Effective window blinds, black our curtains, etc.)	
Bed should be firm but comfortable	
Sufficient blankets and comfortable pillow should be provided	
Noise	
Room should be able to block sound. Alternately, quiet areas created for night workers or white noise devices or ear plugs provided.	
Beds	
Mattresses and pillows should be comfortable for workers. Adequate blankets provided.	
Nutrition	
Healthy food choices should be available to workers for both day and night shifts.	
Light protien, low fat snacks and meals should be available to night workers.	
Low glycemic index food (low sugar and carbohydrate content) should be available to all workers, especially night shift workers.	
Caffeine should be available at all times if needed.	
Exercise and Recreation	
Recreation opportunities should exist for both day and night workers.	
Exercise facilities should be available for workers on day or night shifts.	
Travel	
Travel to and from work site should be limited if working long night shifts.	
Drivers should be assessed (self checks or other) for signs of fatigue prior to transporting crews.	

Appendix E: Fatigue Management Plan Self Assessment Worksheet

Exercise 3

Fatigue management self assessment worksheet

Individually assess your mine's Fatigue Management Plan. Elements of the self-assessment correspond to elements that need to be addressed in a Fatigue Management Plan.

Mine name:						Section:						
Assessment Team Leader:						Participants (names/positions):						
QUESTIONNAIRE						RESPONSE						
CONSULTATION, COMMITMENT AND RESPONSIBILITIES: Everybody is given sufficient opportunity, time and resources to participate in fatigue management and are clear about their roles and responsibilities.						Not started	Just started	Progressing	Done	Averaged Score		
						0	1	2	3	4	5	
Fatigue management is reflected in the site's health and safety policy or there is a stand alone fatigue management policy. The policy has been developed in consultation with employees and contractors and is signed by the most appropriate senior person.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>
Commitment to fatigue management is demonstrated by having fatigue management procedures (or plan) in place and allocating time, money and training resources.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Roles and responsibilities for fatigue management are allocated to positions within the organisation.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
An education and communication strategy has been agreed.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
A consultative arrangement has been established to develop a joint approach to controlling fatigue risk.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
FATIGUE RISK MANAGEMENT: Everybody works together to identify the FATIGUE hazards and fix problems at the source before exposures occur.												
Workers are provided with necessary information about fatigue hazards and controls to enable meaningful participation in fatigue risk management.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>
Work-related fatigue risks impacting on the amount and quality of sleep (such as work scheduling and planning) of employees and contractors are considered when carrying out fatigue risk management.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The risk management process considers how mental and physical demands of the job and the work environment contribute/ impact the effects of fatigue.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fatigue related risks are controlled according to the "hierarchy of control" and controls are monitored and reviewed for their continued effectiveness.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
The health and safety reporting system allows employees to report themselves or others as fatigued without criticism.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fatigue-related information is captured in the incident reporting process.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IMPLEMENTING FATIGUE MANAGEMENT: Everybody is competent to manage fatigue risks within their area of responsibility and supervisors are trusted and decisions are supported.												
Supervisors identify when fatigue is an issue and initiate immediate control measures and record concern for further review (as required).						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>
Employees and contractors are provided education and awareness about the site's fatigue management plan and procedures at induction and on a periodic basis. Consideration is given when communicating to those on shift work and contractors to ensure all have been informed on fatigue management issues.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Unplanned changes to the work schedule (ie. maintenance, break downs, unexpected shortage of staff) are considered in fatigue risk management planning for employees and contractors.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Safety-critical tasks are not performed at times when fatigue is likely to be higher? If tasks need to be performed, fatigue related risks have been considered as part of the risk assessment/ work instructions and procedures.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sites have a system/ methods for monitoring hours of work of employees and contractors.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IMPLEMENTING HEALTH MANAGEMENT - EVALUATION AND REVIEW: The fatigue management plan includes ongoing monitoring and evaluation for effectiveness.												
The fatigue management procedure or plan is reviewed at regular intervals to ensure the continual effectiveness of the controls.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>
Review of control measures are undertaken when methods, tasks, equipment, hazards, operations, procedures, rosters or schedules are introduced or the environment changes or there is any indication risks are not being controlled.						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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