ENVIRONMENT, SAFETY AND HEALTH

FATIGUE MANAGEMENT CHAPTER

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Version Control

Responsible Person	Revision Date	Document Version	Publication Date	Description of Change
Larry Jaudon	Original	Initial	11/26/2018	New Chapter

1.0 PURPOSE

This document has been developed to set minimum expectations for managing the impacts of fatigue on safety, health and productivity at the Sanford Underground Research Facility (SURF). The development and implementation of this document supports the SURF Occupational Safety and Health Standards.

Fatigue is a physical or mental condition that results in reduced performance or ability to carry out a task; the consequences of which could include serious injury, illness or death, significant equipment damage or significant environmental impact.

The purpose of this procedure is to set out the requirements and describe the processes used at SURF to manage fatigue.

2.0 SCOPE

This procedure is applicable to SURF and applies to all South Dakota Science and Technology Authority (SDSTA) employees, science collaborators and contractors.

3.0 DEFINITIONS

Active Work—Time spent performing duties in the workplace (not including short breaks or scheduled breaks).

Emergency Situation—The consequence of following absolute limits on hours of work involves a threat to life, impacts to the critical infrastructure or underground operations.

Fatigue—A physical or mental condition that results in reduced performance or reduced ability to safely carry out a task that can occur due to the following:

- Too little or poor quality of sleep.
- Working during normal ‘sleep’ times.
- Carrying out mentally or physically demanding activities.
- Working excessive hours.
- Other health factors.

Fit for Duty/Work—The individual is physically and mentally capable of safely performing the essential function of his/her job. An individual is capable of working safely and is not adversely affected by drugs (including legal medications) or alcohol, is feeling alert without the risk of fatigue and free of any other physical or psychological impairment.

Hazard—A potential occurrence or condition that could lead to injury, delay, economic loss or damage to the environment.

Night Shift—Any shift which includes work between the hours of 6:00 PM and 6:00 AM.

Risk—Any event that could have an impact upon personnel, the environment, community or the business. It is measured in terms of consequences and likelihood (probability).

Risk Assessment—The process used to determine risk management priorities by evaluating and comparing the level of risk against predetermined standards, target risk levels or other criteria.

Roster—An employee’s assigned work schedule which reflects scheduled Shift Time and scheduled time off.

Roster Panel—A standard work sequence showing a full cycle of work shift/days/hours, followed by time-off days/hours and the next full cycle of shift/days/hours (see example in Section 6.3).

Shall and Should—'Shall' is mandatory; 'Should' is recommended, but not mandatory.

Scheduled Break—A break scheduled from Active Work where personnel shall go to areas set aside for the consumption of meals, rest, refreshment, etc.

Shift Pass-downs—Includes the process of communicating information from one shift to the next, crew changes made in the work area/activity (hot-seat) or 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).

Shift Work—Generally work that is outside of normal hours (6:00 AM to 6:00 PM). Any rotating schedule.

Short Break (Fatigue Break)—A break from Active Work, which can include toilet stops, checking equipment, rest and refreshment, not necessarily taken at a lunch/break room.

Split Shift—A type of Shift Work where a person's normal work day is split into two or more segments.

- Example: Work from 7:00 AM–11:00 AM (leave site and return) 2:00 PM–6:00 PM

For Fatigue Risk Assessment Tool Purposes, the following definitions apply:

Travel Time*—Includes time taken to commute to and from the place of work, travelling between sites or any business travel undertaken including national and international flights.*

Working Time*— Used for the Risk Assessment Tool calculations:*

- *Shift Time + Travel Time = Working Time*

Period including Shift Time, Shift Pass-downs and any overtime or additional time worked.

4.0 RESPONSIBILITIES

4.1. Laboratory Director:

- Ensure that working arrangements and fatigue management practices meet the requirements of this procedure.
- Approve implementation of new rosters.
- Approve risk assessment and implementation of split shift rosters.
- Approve risk assessment and implementation of short duration rosters (e.g., shutdown work).
- Approve the procedure and revisions.

4.2. Department Director:

- Approve risk assessments and control plans relating to extending work hours (e.g., Shift Time greater than 12.5 hours).
- Document and approve risk assessments for situations where more than 12.5 hours are worked.

4.3. ESH Director:

- Assist Department Managers and Supervisors with fatigue advice and risk management strategies.
- Consider fatigue risk factors in incident investigations, and monitor and respond to trends in such incidents.
- Approve risk assessments for short duration planned work (e.g., shutdowns).
- Approve roster risk assessments for split shift.
- Approve risk assessment and control plans where scheduled Shift Time and roster patterns are greater than the maximum limits specified in this procedure.
- Approve risk assessment and control plans for new rosters.

4.4. Managers and Supervisors:

- Responsible for the safety of their direct-reports (personnel) and their work areas.
- Ensure personnel under their supervision comply with this procedure.
- Monitor personnel under their supervision for signs of fatigue.
- Report any fatigue incidents or hazards.
- Follow up with the ESH Director if personnel under their supervision have repeated fatigue issues.

4.5. All Personnel:

- Comply with all requirements of this procedure.
- Manage their personal fatigue and fitness for work.
- Assist in monitoring fatigue symptoms of coworkers.
- Report any fatigue risks or issues relating to themselves or other individuals in their work area.
- Attend fatigue management training as directed.
- Safely manage their commute to and from the site.

5.0 PROCEDURES

5.1. Employees:

Employees shall report to work, fit for duty. When an employee is experiencing excessive fatigue, their safety performance, work performance, communications skills and productivity are impaired. As outlined in this document, the responsibility for managing fatigue is shared between the SDSTA employees and management.

5.2. Controlling Fatigue Related Hazards:

All reasonable steps shall be taken to control fatigue-related hazards including provisions for:

- Using the hierarchy of controls where fatigue risk is identified.
- A Roster designed with hours of work rules to provide adequate sleep opportunity.
- A formal risk assessment process for extending hours of work or temporary changes to rosters.

- Providing personnel with the tools and education to prevent and/or manage their own fatigue.
- Providing personnel with the tools and education to assess themselves and others for signs of fatigue and to take appropriate action, if required.

5.3. Roster Design Criteria:

- The maximum Shift Time per 24 hours shall not exceed 12.5 hours.
- Rest periods between consecutive shifts shall be at least 10 hours (without regard to length of shift, e.g. 8, 10, 12, 12.5 hr., etc.).
- The maximum time for shift pass-downs shall not exceed 30 minutes.
- The maximum number of consecutive shifts shall not exceed 7 shifts or 87.5 hours within a 7-day time span.
- Where personnel are required to change shift from day/night or night/day shift within a roster panel, they shall be given a 24-hour rest period. Prior to personnel who have worked 7 consecutive 12 or 12.5 hour shifts 84 or 87.5 hours in a 7-day time span shall be provided a 48-hour rest period following this work time and must be provided 24 hours off immediately preceding a resumption of this roster. (Example, Section 6.3)
- All panels within a roster which include rotating day and night shifts should start on day shift; e.g. rotate days/swing/graveyard, days/nights.
- For 12 or 12.5-hour shift schedules, the maximum shift time without an allowed break should not exceed 6-hours.
- Break times shall be allowed as follows:
    - 30 minute break-time for 8 or 10-hour shifts,
    - 45 minute break-time for 12 or 12.5-hour shifts.
    - Break-time can be split into two separate breaks.
- Where breaks cannot be taken within the recommended timeframe, additional controls shall be implemented to ensure that personnel receive appropriate breaks to manage fatigue risks.

5.4. Extending Shift Time:

On occasion it may be necessary to extend Shift Time beyond 12.5 hours, a Fatigue Risk Assessment shall be conducted and be approved by the associated department director or designee.

Mandatory controls shall include:

- Shift Time shall not exceed 14 hours.
- More frequent breaks shall be included into the extended period.
- Individuals shall not work alone after 12.5 hours.
- Consideration of the amount of time that people have been awake and the time of day/night of the call-out.
- The department manager/supervisor shall consider that the individual be driven to their residence.
- A minimum of 10 hours break shall be taken by individuals who have worked extended hours, regardless of their normal roster. Reducing the length of the next shift and determination of the individuals sleep patterns should be considered when determining when they will return to work.

5.5. Extending Shift Time (Emergencies):

In an emergency situation where the consequence of following absolute limits on hours of work involves a threat to life, or the loss of the key assets or operation; work hours may be extended past 16 hours only after a risk-assessment/hazard analysis has been performed. At a minimum the risk assessment shall consider:

- Working alone
- Operation of heavy equipment.
- Performance of high hazard activity
- Employee provided with a ride from the SURF to their place of residence.

Where emergency response teams are mobilized, the team coordinator shall ensure fatigue risks are considered and monitored over the course of the response.

In such an emergency situation, where working in excess of 16 hours is required, additional controls shall be implemented to account for reduced recovery time. Such deviations in compulsory rest periods or excessive work hours require the written permission of the SDSTA Laboratory Director or appointed designee.

5.6. Call Outs:

When employees are required to respond to a call-out after completion of their regularly scheduled shift, without having had 10 hours off, a Fatigue Risk Assessment shall be conducted upon arrival at site, and controls implemented as necessary. Any individuals who are required to work the additional hours shall sign the Fatigue Risk Assessment to demonstrate they understand the additional controls implemented in relation to fatigue.

For examples of managing call-out situations, refer to:
•Section 6.1. Call-out Example 1.
•Section 6.2. Call-out Example 2.

5.7. Split Shift Roster Requirements:

Where there is a requirement for a standard split shift schedule, a formal risk assessment shall be carried out. The risk assessment shall be signed off by the site ESH Director. The risk assessment and the roster must be approved by the Laboratory and ESH Directors, before the roster can be implemented.

5.8. Business Travel:

On occasions when employees are required to undertake business travel, travel time and connections (lay-overs) may exceed 14 hours in a 24 hour period. In these cases, appropriate controls shall be in place including:

- Wherever possible, overnight accommodation arranged to avoid lengthy travel and thus, an extended shift.
- Provision of cab charges/alternative transportation by an approved service provider to drive to/from the airport to the place of accommodation.
- Business travel often follows partial or full work days; 10-hours of rest/recovery time is required prior to engaging in the next day's activities.
- Ensure individuals traveling internationally do not undertake driving or other culturally challenging high-risk activities while the risk of fatigue/jet lag is increased. International driving norms can change from one country to the next increasing risks associated with driving.

5.9. Rest Breaks Prior to Returning to Work

It is recognized that some individuals undertake activities outside of their paid employment with SDSTA, such as volunteer work, academic study and family commitments.

All personnel have an obligation to be fit for work which includes ensuring adequate rest and recovery prior to commencing work following scheduled time off.

5.10. Fatigue Management Techniques

Fatigue shall be managed at the following levels:

1. Self-management.
2. Peer management.
3. Supervisor management.

5.10.1. Self-Management

Self-management is by far the most effective control for fatigue because responsibility is with the individual who is most able to identify and control fatigue. Every individual is responsible and accountable for managing their personal fatigue levels.

Individuals shall advise their supervisor of anything that they are aware of that may affect their alertness. This includes extended travel time to work, sleep disorders and medications that may cause drowsiness or fatigue. The individual and their supervisor shall then have a discussion to determine appropriate control strategies to control the hazard and where required, follow up with the ESH Director or site nurse, to assist in investigating and addressing any underlying issues.

5.10.2. Peer Management

Everyone has a responsibility to identify and control hazards in the workplace, including fatigue-related hazards.

Should any person have a concern that another person is showing signs of fatigue, they should discuss their concern with the individual. If the concern cannot be resolved, it shall be reported to the relevant supervisor by either party.

5.10.3. Supervisor / Management

Supervisor / Management shall also be utilized to support and enhance the implementation of self-management and peer management.

Supervisors should utilize the Fatigue Observation Checklist to assist in identification of signs and symptoms of fatigue.

A Fatigue Risk Assessment Tool has been developed to assist the supervisor in determining a risk profile associated with fatigue.

The Fatigue Risk Assessment Tool provides:

- An objective means for quantifying fatigue.
- Consistency when categorizing risk.
- A reliable approach to managing various levels of risk.

The Fatigue Risk Assessment Tool should also be used to aid discussions with individuals on fatigue risks, risk assessment and implementation of control actions. This tool should be used when:

- An Individual reports they are fatigued.
- Signs or symptoms are observed in an individual.
- Extending hours of work for non-emergencies.
- There are symptoms of accumulative effects of fatigue especially on Night Shift.
- Shutdowns or project work occur.
- Call-outs are made.

Supervisors shall receive training in the use of the Risk Assessment Tool and how to incorporate the recommended actions based on the identified level of risk.

Supervisors shall consider fatigue risks when planning work tasks. Consideration shall be given to the type of task being performed (physical and mental demands) as well as workplace conditions such as heat, humidity and noise which can impact an individual's alertness.

If an individual has ongoing or regularly repeated issues with fatigue, the supervisor shall follow up with the ESH Director or site nurse to assist in investigating and addressing any underlying issues.

5.11. Managing Repeated Fatigue Management Issues

The management of individuals who repeatedly demonstrate fatigue in the workplace will be as follows:

- Where the Fatigue Risk Assessment Tool results in frequent and recurring high risk occurrences, alternate safe work should be identified. If alternate safe work is not available and the person is not able to perform their normal work activities safely, they should be removed from the work area. Employee should be referred to the Human Resources Manager and the ESH Director.

5.12. Fatigue Breaks

Fatigue breaks shall be made available for individuals when:

- Working in excess of a 10-hour shift (in addition to lunch breaks).
- Requested, subject to authorization by supervisor on each occasion.
- The supervisor identifies that individuals may be fatigued.
- Extreme heat or cold is present or heavy work is scheduled.

During the fatigue breaks, the individual shall remove themselves from active work for a short period of rest and/or refreshments.

If an individual continues to require excessive non-scheduled fatigue breaks on a regular basis, the supervisor shall follow up with the ESH Director to assist in investigating and addressing any underlying issues.

5.13. Training

Employees, contractors and supervisors shall be provided with training to assist in the prevention and management of fatigue at work and outside of work.

- Safety Basic:

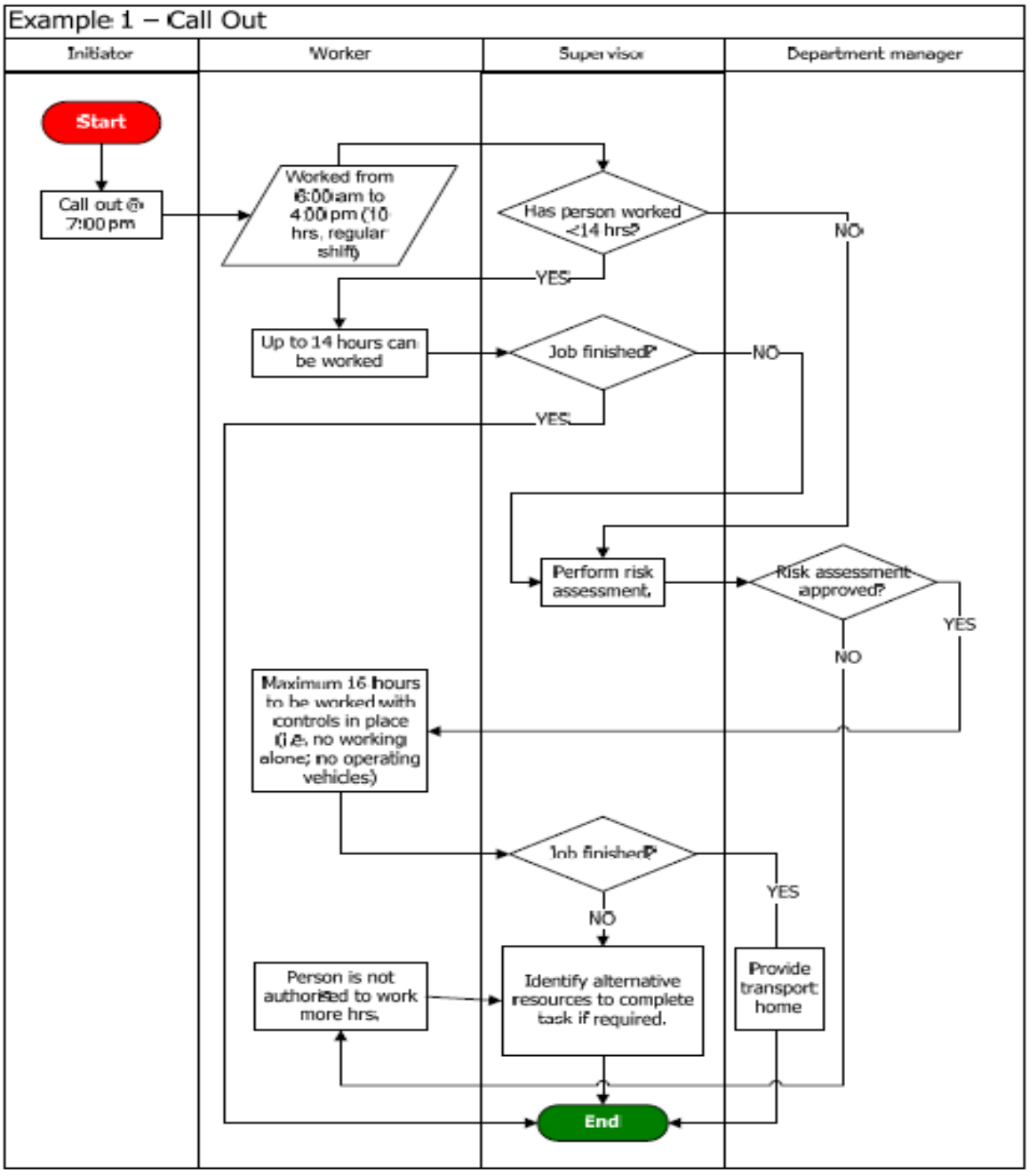
  - All employees and contractor personnel shall complete Fatigue Management Training as part of the Basic Safety Training.
- Supervisor Training:
  - In addition to the above training, all employees in supervisory roles shall complete Supervisor Fatigue Management Training.
- Annual Refresher Training:
  - All employees and contractor personnel shall complete fatigue refresher training as part of the Annual Refresher Training.

6.0. PROCESS EXAMPLES

Diagrams and Flow-Charts.

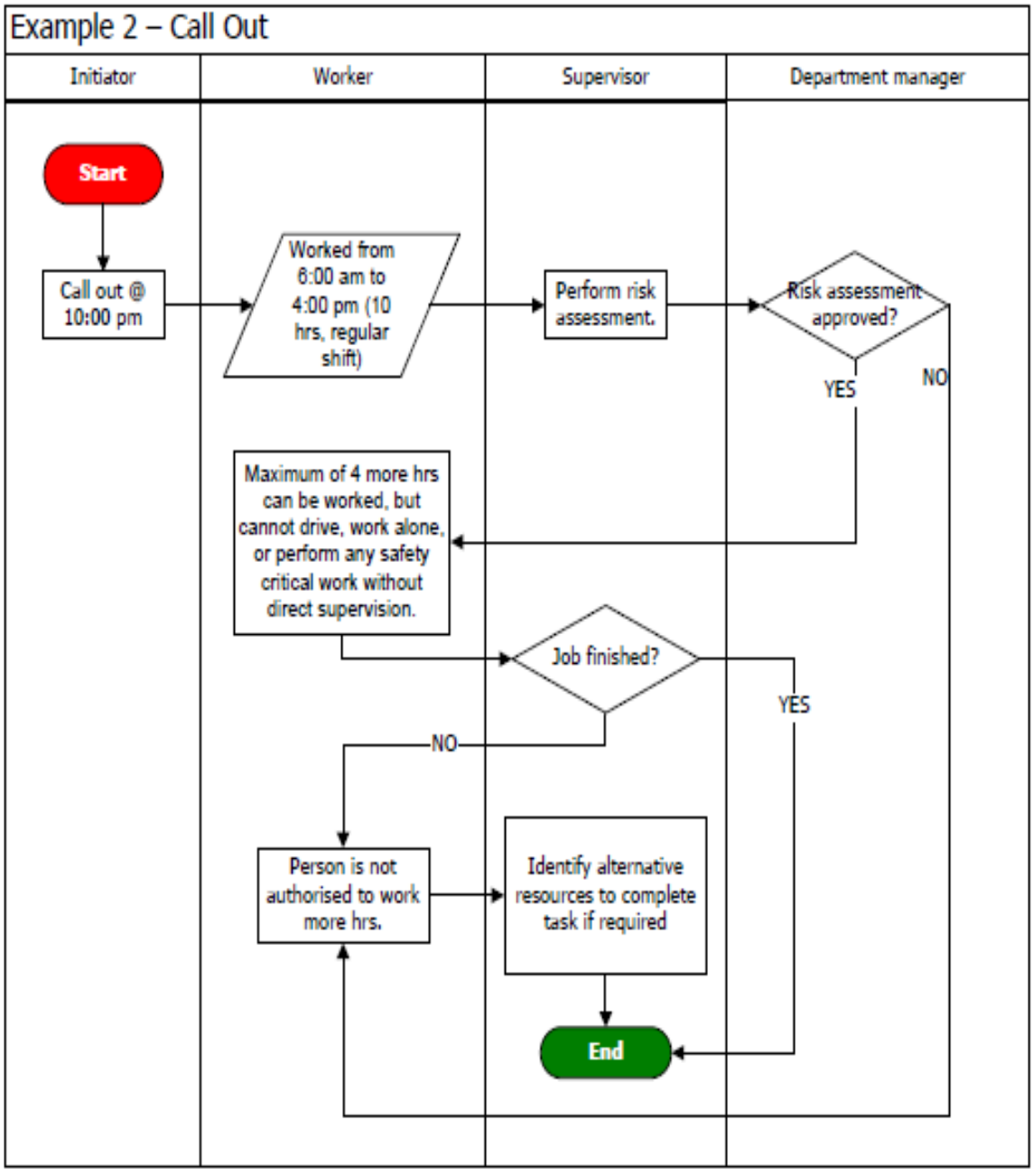
6.1. Call-Out Example 1

An employee had worked their normal shift e.g. 6:00 AM to 4:00 PM when a call-out request was made. The call-out was at 7:00 PM:



6.2. Call-out Example 2

A person has worked their normal shift from 6:00 AM to 4:00 PM (10 hours) and is called out at 10:00 PM, the person has not yet been to sleep and has potentially been awake >16 hours. Even though the person has not worked >14 hours, a risk assessment must be completed due to the number of hours awake being >16 hours.



6.3. Examples of Time Off Schedule & Roster Panel

MINIMUM TIME-OFF SCHEDULE (Example- Roster may not cycle Mon.-Sun.)

	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
Days	On	On	On	On	On	On	On	Off	Off	Avail.	Avail.	Avail.	Avail.	Off							
Nights								48-HOURS						24-HOURS	On	On	On	On	On	On	On

7-Days On / 7-Days Off ROSTER-PANEL (Example- Roster may not cycle Mon.-Sun.)

	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
Days	On	On	On	On	On	On	On	Off	Off	Off	Off	Off	Off	Off							
Nights															On	On	On	On	On	On	On

7.0. REFERENCE / RELATED DOCUMENTS

7.1. Related Documents:

- Fatigue Risk Assessment Tool
- Fatigue Observation Checklist