



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
CONSTRUCTION PHASE PLAN**

NEOM-NLF-NMS-006.002 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02.00     | Sector Review          | Issued for Implementation | 01-02-2022 |

## Document Approval

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, safety (Safety) risks associated with the construction phase of a project

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with the work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements.
- (b) ANSI requirements.
- (c) NFPA Standards and requirements.
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms   | Definitions  |
|---|--|
| NEOM Co   | NEOM Company   |
| Client  | NEOM Sector /Department responsible for management and oversight of the Contractor   |
| Employer  | The person or organization that employs personnel to complete the work   |
| Contractor  | The organization contracted to carry out the works   |
| Sector, Organization, Department or Contractor      | The Sector, Organization, Department or Contractor is the NEOM entity or developer designated by NEOM to accept custody for planning, designing, constructing, or managing and operating a particular asset or a group of assets   |
| Sector, Organization, Department or Contractor Head | The head of the Sector, Organization, Department or Contractor is responsible and accountable for the implementation and supervision of this procedure within the Sector, Organization, Department or Contractor   |
| Responsible Person                                  | The Sector, Organization, Department or Contractor Head may delegate a "Responsible Person" utilizing their approved delegation of authority process. The "Responsible Person" is the senior NEOM employee who has responsibility for the day-to-day management of the work activities, or the contracted party engaged in such activities |
| Safety Practitioner/ Coordinator                    | The "Safety Practitioner/Coordinator" is an employee working for the Sector, Organization, Department or Contractor Safety Department.   |
| Safety Management System (SMS)                      | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard   |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| ISO           | International Standards Organisation           |
| IBC           | International Building Codes                   |
| SAFETY        | Occupational Health and Safety                 |

| Abbreviations | Descriptions       |
|---------------|--------------------|
| ER            | Emergency Response |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name  |
|-----------------------------|--|
| NEOM Element 1              | Leadership and Commitment  |
| NEOM Element 2              | Risk and Opportunity Management  |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance                     |
| NEOM Element 4              | Personal Health and Safety   |
| NEOM-Element 5              | Training, Awareness and Competency.                                      |
| NEOM-Element 6              | Contractor Management  |
| NEOM Element 7              | Management of Change   |
| NEOM Element 8              | Incident Investigation and Management                                    |
| NEOM Element 9              | Emergency Planning and Response Management                               |
| NEOM Element 10             | Monitoring, Measurement and Performance Review                           |
| NEOM Element 11             | Continual Improvement and Communication                                  |
| NEOM-NLF-SM                 | Safety Management Manual - Roles and Responsibilities                    |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table  |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety and Fire Safety requirements for Contractors   |
| NEOM-NLF-NMS-006.001        | Organisation and Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | SAFETY Construction Management Plan                                      |
| NEOM-NLF-NMS-006.003        | Scaffolding  |
| NEOM-NLF-NMS-006.007        | Working at Heights   |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards   |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals   |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                      |
| NEOM NLF- NMS-006.022       | Occupational Noise   |
| NEOM NLF- NMS-006 .023      | Vibration  |
| NEOM-NLF-NMS-006.024        | Occupational Health Screening and Medical Surveillance                   |
| NEOM-NLF-NMS-006.029        | First Aid and Medical Treatment  |
| NEOM-NLF-NMS-006.040        | General Workplace Amenities  |

**NOTE:** All other NEOM Occupational Health and Safety Procedures and NEOM Minimum Standards shall be available to Sector, Organisation, Division, department and or Contractor.

## **7 Roles and Responsibilities**

### **7.1 Client**

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 SAFETY Construction Management Plan) (CPP) which will form part of the Contractor review and selection process (This document)
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring.
  - (b) Managing change.
  - (c) Continuous improvement.

### **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM–NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organizational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks. (Refer: NEOM Element 2 Risk and Opportunity)
  
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available. (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment (PPE))
- 7.2.7 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
- 7.2.8 Shall ensure the attached plan is completed and submitted to project management for NEOM for review.
- 7.2.9 Shall ensure the information given in his CPP is accurate
- 7.2.10 Shall ensure all risk assessments completed as part of the CPP are attached and submitted for review by NEOM
- 7.2.11 LPFS will audit the CPP for compliance during routine inspections

### **7.3 Specific Responsibilities**

- 7.3.1 The Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made for the safe systems of work to prevent and minimize risks in each workplace
- 7.3.2 The Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness, as well as other members of the management team
- 7.3.3 Line Managers / Supervisors are responsible for training their workers on risks and controls
- 7.3.4 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.3.5 The LP & FS Public Safety department will carry out compliance checks and support and guide the various safety teams.

### **7.4 Duty Holder Responsibilities**

**Duty holders\* – Who are they?**

**Main duties – What they need to do**

|  |   |
|--|---|
| <p><b>Clients</b> – Organisations or individuals for whom a construction project is carried out that is done as part of a business.</p>  | <p>Make suitable arrangements for managing a project, including making sure:</p> <ul style="list-style-type: none"> <li>▪ other duty holders are appointed as appropriate</li> <li>▪ sufficient time and resources are allocated</li> </ul> <p>Make sure:</p> <ul style="list-style-type: none"> <li>▪ relevant information is prepared and provided to other duty holders</li> <li>▪ the principal designer and principal contractor carry out their duties</li> <li>▪ welfare facilities are provided</li> </ul>  |
| <p><b>Designers</b> - Organisations or individuals who as part of a business, prepare or modify designs for a building, product or system relating to construction work.</p>   | <p>When preparing or modifying designs, eliminate, reduce, or control foreseeable risks that may arise during:</p> <ul style="list-style-type: none"> <li>▪ construction</li> <li>▪ the maintenance and use of a building once it is built</li> </ul> <p>Provide information to other members of the project team to help them fulfil their duties.</p>   |
| <p><b>Principal Designers</b> appointed by the client in projects involving more than one contractor. They can be an organisation or an individual with sufficient knowledge, experience, and ability to carry out the role.</p> | <p>Plan, manage, monitor, and coordinate health and safety in the pre-construction phase of a project. This includes:</p> <ul style="list-style-type: none"> <li>▪ identifying, eliminating, or controlling foreseeable risks</li> <li>▪ ensuring designers carry out their duties</li> </ul> <p>Prepare and provide relevant information to other duty holders.</p> <p>Liaise with the principal contractor to help in the planning, management, monitoring and coordination of the construction phase.</p>  |
| <p><b>Principal Contractor</b> – Contractors appointed by the client to coordinate the construction phase of a project where it involves more than one contractor.</p>   | <p>Plan, manage, monitor, and coordinate health and safety in the construction phase of a project. This includes:</p> <ul style="list-style-type: none"> <li>▪ liaising with the client and principal designer</li> <li>▪ preparing the Construction Phase Plan</li> <li>▪ organising cooperation between contractors and coordinating their work</li> </ul> <p>Make sure:</p> <ul style="list-style-type: none"> <li>▪ suitable site inductions are provided</li> <li>▪ reasonable steps are taken to prevent unauthorised access</li> <li>▪ workers are consulted and engaged in securing their health and safety</li> <li>▪ welfare facilities are provided</li> </ul> |

|  |   |
|--|---|
| <p><b>Contractor</b>— Those who carry out the actual construction work, contractors can be an individual or a company.</p> | <p>Plan, manage and monitor construction work under their control so it is carried out without risks to health and safety.</p> <p>For projects involving more than one contractor, coordinate their activities with others in the project team – in particular, comply with directions given to them by the principal designer or principal contractor.</p> <p>For single contractor projects, prepare a <b>Construction Phase Plan</b>. (CPP)</p>                        |
| <p><b>Workers</b> – Those working for or under the control of contractors on a construction site.</p>                      | <p>Workers must:</p> <ul style="list-style-type: none"> <li>▪ be consulted about matters which affect their health, safety, and welfare</li> <li>▪ take care of their own health and safety, and of others who might be affected by their actions</li> <li>▪ report anything, they see which is likely to endanger either their own or others' health and safety</li> <li>▪ cooperate with their employer, fellow workers, contractors, and other duty holders</li> </ul> |

\* Organisations or individuals can carry out the role of more than one duty holder, provided they have the skills, knowledge, experience and (if an organisation) the organisational capability necessary to carry out those roles in a way that secures health and safety.

## 8 Other Sections related to subject

### 8.1 The Construction Phase Plan (CPP)

- 8.1.1 NEOM Sector, Division and or department shall ensure the documentation in relation to Element 6 Contractor Management and other information in relation to the NEOM Safety Management System is made available to the Contractor.
- 8.1.2 The Contractor shall ensure all details required in the CPP attached in FORM A are completed as required.
- 8.1.3 Section 1 of the attached Form A requires the Contractor to supply details, as a minimum, of;
  - (a) A description of the Project to be constructed
  - (b) Details of the Construction Programme
  - (c) Details of the groups and or personnel who represent the following, as a minimum;
    - I. Client
    - II. Principle Designer
    - III. Designer
    - IV. Principle Contractor (Sometimes referred to as Project Management Consultant (PMC))
    - V. Contractor
    - VI. Main Sub-Contractors
- 8.1.4 Neom will provide details of the NEOM SMS in relation to Contractor Management (Element 6 documentation of the NEOM Safety Management System)
- 8.1.5 Section 2 of the attached CPP requires the Contractor to provide details regarding;
  - (a) The Management Structure

- (b) Contractor Site SAFETY structure
  - (c) Details regarding liaison meetings planned
  - (d) Details related to design information and discussion
  - (e) How design changes will be managed
  - (f) How sub-contractors will be identified and managed during the works
  - (g) How SAFETY information will be managed and maintained across all personnel
  - (h) Security arrangements
  - (i) Inductions and site training
  - (j) Welfare and first aid
  - (k) Incident recording and investigation including root cause analysis
  - (l) Risk assessment methodology
  - (m) Site Rules and Fire Safety and Emergency Response (ER) processes
- 8.1.6 Section 3 of the plan looks to the arrangements for controlling Safety and Health risks
- 8.1.7 Section 4 has details for the recording and storage of SAFETY records and the site safety files.
- 8.1.8 Appendices to the attached CPP require information detailed to specific needs such as a site layout plan, Traffic management plan etc....

## 8.2 Contractor and Client Information Exchanges

- 8.2.1 It is the responsibility of the Contractor to work closely with the NEOM Sector, Division and other departments to ensure the CPP is detailed and has all the planned SAFETY requirements to ensure the Contractor meets or exceeds the requirements of the NEOM LP&FS Public Safety Processes and Procedures as well as ensuring compliance with the NEOM SAFETY Minimum Standards.

## **9 Appendices**

### **9.1 Appendix A:**

# **Construction Phase Plan**



# Construction Phase Plan

(As required by Element 6 Contractor Management)

Document no. ....

|               |  |                  |                   |
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## Contract name

## CONSTRUCTION PHASE PLAN

Revision no. 0

Issue date: ..... 2022

**NOTE: This document incorporates comments (appearing in the right-hand margin) to assist users with compiling and updating the required information.**

|   |   |
|---|---|
| To show or hide comments on-screen:     | <p><i>EITHER:</i></p> <ul style="list-style-type: none"><li>– Display the ‘reviewing’ tool bar (if it is not already there) by going to ‘View’ and ‘Toolbars’ and click on ‘Reviewing’.</li><li>– Select “Final showing mark-up” or “Final”.</li></ul> <p><i>OR:</i></p> <ul style="list-style-type: none"><li>– Go to the ‘View’ menu and select (or unselect) ‘Markup’.</li></ul> |
| To show or hide comments when printing: | <p><i>Do not use the ‘print’ icon on the toolbar.</i></p> <ul style="list-style-type: none"><li>– Go to ‘File’ and ‘Print’ and against ‘Print what’ select either “Document showing markup” or “Document”.</li></ul> <p><i>When printing without the comments, it is recommended that this panel also be deleted (after saving).</i></p>  |
| To delete an individual comment:        | <ul style="list-style-type: none"><li>– Right-click on the comment and select ‘Delete comment’.</li></ul>   |
| To delete all comments (permanently):   | <ul style="list-style-type: none"><li>– Display the ‘reviewing’ toolbar (see above)</li><li>– Click on the arrow beside the ‘reject change’ icon (the red cross).</li><li>– Click on ‘Delete all comments’.</li><li>– Delete this panel.</li></ul>  |

**It is recommended that the comments be deleted from any digital copy of this Plan that is being issued externally.**



# Construction Phase Plan

(As required by Element 6 Contractor Management)

Document no.

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## Details of reviews, revision, and issues:

| Rev. | Issue date | Description of changes or review           | Prepared<br><i>Name and signature</i> | Checked & approved<br><i>Name and signature</i> |
|------|------------|--|---------------------------------------|---|
| 0    |            | Initial issue                              |                                       |   |
| 1    |            | Guidance on completion is marked in yellow |                                       |   |
|      |            |  |                                       |   |
|      |            |  |                                       |   |
|      |            |  |                                       |   |
|      |            |  |                                       |   |
|      |            |  |                                       |   |

Note: The Plan should be reviewed every month.



# Construction Phase Plan

(As required by Element 6 Contractor Management)

Document no.

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# Construction Phase Plan

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## 1. DESCRIPTION OF PROJECT

### 1.1 Project description

(Insert a brief description of nature of the works and the scope of this contract.)

**Project address:**

**Project telephone and fax numbers:**

### 1.2 Programme details

Insert anticipated programme including start and finish dates and significant milestones such as partial take over, commissioning, consent dates.

**The look ahead:** Provide details of the main activities that will be conducted in the next four weeks.  
Include details of the main risk and the control measures.

| Organisation | Trade or activity | Main risks | Permits required | Comments and control measures |
|--------------|-------------------|------------|------------------|-------------------------------|
|              |                   |            |                  |                               |
|              |                   |            |                  |                               |
|              |                   |            |                  |                               |
|              |                   |            |                  |                               |
|              |                   |            |                  |                               |
|              |                   |            |                  |                               |

### 1.3 Details of Client, Principal Designer, Designer, Principal Contractor, and others

Client: Name:  
Contact name:  
E-mail address:  
Postal address:  
Telephone no.

Principal Designer: Name:  
Contact name:  
E-mail address:  
Postal address:  
Telephone no.

Designer: Name:  
Contact name:  
E-mail address:  
Postal address:  
Telephone no.



# Construction Phase Plan

(As required by Element 6 Contractor Management)

Document no.

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Principal Contractor: Name:  
Contact name:  
E-mail address:  
Postal address:  
Telephone no.

Role: Name: Add details of any other significant roles including details of all contractors.

Contact name:  
E-mail address:  
Postal address:  
Telephone no.

## 1.4 Extent and location of existing records

The existing documentation that is relevant to health and safety on this site is listed in the following table:

| Document no. | Document title   | Document scope | Document location |
|--------------|--|----------------|-------------------|
|              | This list should be updated to include as-built drawings (showing new buried services) as the construction works are completed. If the list is long, place it in an appendix (or elsewhere) and give a cross reference. (Note that this section replaces the Pre-tender Health and Safety Plan.) |                |                   |
|              |  |                |                   |
|              |  |                |                   |

For existing information relating to asbestos surveys, refer to the Asbestos Management Plan in Appendix F.

## 2. MANAGEMENT OF THE WORK

### 2.1 Management structure and responsibilities

The project will be managed and constructed in accordance with the NEOM Safety Commitment Statement, a copy of which is displayed on site notice boards. This Construction Phase Plan should be read in conjunction with other documents in NEOM's Health and Safety management system.

The health and safety management structures affecting this project are described in the following sections. Section 2.2 covers the organisation within NEOM as a whole and section 2.3 covers the arrangements specific to activities on this site.

The Site Manager, (...Insert name.....), shall be responsible for safety on the site on a day-to-day basis. If the Site Manager is absent from the site, ...(...Insert name of deputy).... is responsible for safety on the site.



# Construction Phase Plan

(As required by Element 6 Contractor Management)

Document no.

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Key Site Safety appointments have been made by the Site Manager and are set out in Appendix E.

## 2.2 NEOM safety organisation structure

The organisation of NEOM in respect of health and safety is defined in the NEOM Safety Management Manual (document NEOM-NLF-SM), together with the responsibilities of personnel undertaking functions.

In general, for project-related work, it is the responsibility of line management to ensure that:

- the NEOM Safety Commitment and safety management system are properly applied within their areas of control.
- relevant legislative requirements are met.
- all necessary measures are implemented to safeguard the health and safety of NEOM personnel and others who may be affected by NEOM activities.

The line manager hierarchy in respect of projects involving site-based construction work is:

- NEOM Board.
- Senior Project Directors.
- Project Directors, Senior Project Managers or Contracts Managers.
- Project Managers.
- Site Managers.

The NEOM health and safety management system is maintained LPFS and implemented by the Health and Safety Manager and is monitored with assistance from Safety Advisers.

## 2.3 Site health and safety management structure

Insert an organisation chart which shows project-reporting lines and includes sub-contractors and the reporting line to the Project Delivery Director.

## 2.4 Health and safety goals and the monitoring of performance

### (a) Safety goal

Insert details of any site-specific or project-specific health and safety goals

### (b) Behavioural Safety Programme – (If Applicable)

This project will fully participate in the NEOM behavioural safety campaigns which requires all personnel, including contractors working on this project, to receive an on-site briefing within two weeks of their induction to the site.

NEOM requires a commitment from everyone not to tolerate anything that may create an unsafe situation. Anyone who identifies an unsafe act or unsafe situation should stop work and report the situation to a supervisor so that appropriate action can be taken to deal with the situation. In taking this action a person has the full authority and support of NEOM, its directors, safety and health teams, site managers and supervisors.

### (c) Monitoring performance

The health and safety performance of the project, employees, agency staff and sub-contractors shall be monitored using the following arrangements:

| Inspection type | Frequency | Inspection by     | Records           |
|-----------------|-----------|-------------------|-------------------|
|                 | Weekly    | NEOM Site Manager | Inspection report |



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| Inspection type             | Frequency                   | Inspection by   | Records                                |
|-----------------------------|-----------------------------|---|--|
| General safety inspection   |                             | If inspections by a sub-contractor are required, insert sub-contractor's name and job title of person to do inspection. | Inspection reports                     |
| Senior Managers' inspection | xxxxx                       | NEOM Contracts Manager<br>Modify to suit the details of the person conducting the Senior Managers' inspections.         | Inspection report<br>Insert frequency. |
| Health & Safety Adviser     | Monthly<br>Insert frequency | NEOM Health & Safety Adviser<br>If applicable, insert sub-contractor details, as above.                                 | Inspection report                      |

In addition to the above the achievement of the projects health and safety goals will be monitored and discussed during project meetings detailed in 2.5 below.

## 2.5 Regular liaison between parties on site (Insert meeting types, editing suggested examples as necessary.)

Liaison on health and safety will take place in accordance with the table detailed below:

| Meeting type               | Attendees   | Frequency |
|----------------------------|---|-----------|
| Project progress           | Client's representative, Principal Designer, Project Manager, Contracts Manager, Safety Adviser |           |
| Site planning and progress | Project Manager, Agent, Foreman, Engineers, Safety Adviser                                      |           |
| Safety co-ordination       | Project Manager, sub-contractors' Representatives   |           |
| Design co-ordination       | Principal Designer, Design Liaison Engineer, Designers  |           |
| Client operations staff    | NEOM Project Manager, Client's Operations Manager   |           |

## 2.6 Consultation arrangements

NEOM recognise that high standards of health and safety will only be achieved through effective consultation with the workforce. With this in mind, the thoughts and views of individuals will be sought during the following:

- site inductions.
- method statement and risk assessment briefings.
- weekly toolbox talks.
- daily task briefings.



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- progress meetings.
- discussions between operatives and site staff.
- monthly safety consultation meetings. **This may be deleted if less than 25 people are working on the site**

In addition to the above, individuals can raise health and safety concerns with any of the following:

| Name | Position                  | Contact number |
|------|---------------------------|----------------|
|      | Site Manager              |                |
|      | Project Manager           |                |
|      | Senior Project Director   |                |
|      | Health and Safety Adviser |                |

## 2.7 The exchange of design information

Insert the name and job title of the person responsible for co-ordinating design issues between the design team and construction team..... will co-ordinate all design issues between NEOM, the client, the designer(s) and the Principal Designer (all as named in section 1.3) and will be the single point of contact throughout the project for receiving design information and for passing this information to site personnel and, where applicable to NEOM's sub-contractors.

All documentation that is issued will be controlled in accordance with the document control arrangements set out in the project's quality plan. In addition, design liaison meetings will be held throughout the project at suitable intervals and venues as detailed in section 2.5.

## 2.8 Handling design changes during the project

... Insert the name and job title of the person responsible for co-ordinating design issues between the design team and construction team..... will be responsible for disseminating any design changes to NEOM staff and for communicating them to the Client, suppliers, and sub-contractors, as appropriate. All design updates or changes will be recorded and issued by way of the document control system. Design issues will also be highlighted at regular forums such as internal meetings, progress meetings and design review meetings.

If, during the construction phase, changes are made to the design, either by the designer or by NEOM, and if these changes have health and safety implications that are significantly different from the previous design, arrangements will be made to ensure that details of the changes are made known to the Principal Designer. Any changes in the design will be accompanied by a risk assessment, if necessary, which will be made available to the Principal Designer. In some cases, revisions to this Plan may be required to take account of the changed circumstances or methods of working.

## 2.9 The selection and control of contractors

The selection of contractors by NEOM will be undertaken in accordance with NEOM's procurement procedures, which ensure that a company is only employed if it has the necessary skills, experience, and resources to undertake the package of work being sub-contracted by NEOM. The main stages of this selection process are set out below:

- Step 1: Questionnaire is completed by contract organisation
- Step 2: Questionnaire is reviewed by NEOM safety, quality, and environmental specialists.
- Step 3 Sub-contractor is added to the 'approved supplier' database following satisfactory completion of step 2.
- Step 4: Tender documentation incorporating health and safety clauses is issued to sub-contractors on the NEOM approved supplier database who wish to tender for the work.
- Step 5: Returned tender documentation is reviewed by NEOM site staff.



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- Step 6: Selected sub-contractors are invited to competence-assessment interview.  
Step 7: Following satisfactory responses at the interview and agreement on commercial terms, the contract is awarded.

Following contract award, the activities of contractors shall be controlled through the approval of method statements and risk assessments and the monitoring of their activities in accordance with the arrangements set out in sections 2.4 and 2.5 above.

If, in the course of the work, concerns are raised regarding a sub-contractor's performance in relation to health and safety or other matters, appropriate reports shall be made to ensure that these concerns are made known to others as necessary, such as by way of the supplier database.

## 2.10 The exchange of health and safety information between contractors

The sharing of health and safety information on the project shall be undertaken by several routes dependent on the information being communicated. The main communication methods used shall be:

- daily task briefings.
- weekly progress meetings.
- safety co-ordination meetings.
- memos, e-mails, and faxes.

## 2.11 Security

Unauthorised persons (including children and trespassers) will be excluded from the site by means of the existing site perimeter fence around the ... Insert site name.

... Modify or delete text to suit the arrangements being implemented at this site..... A secondary fence comprising of anti-climb heras panels will be used in construction areas to separate them from operational areas. The main entrance gate will be kept locked at all times and out-of-hours security shall be provided.

Signposts will direct visitors and delivery drivers to the site offices on arrival, where they will be required to sign in, and out on their departure. Signs will also be displayed to warn unauthorised intruders of the dangers within the site boundary. Where appropriate, excavations and scaffolding shall be secured against unauthorised access by the use of barriers or the removal of ladders. All plant and equipment shall also be secured against theft and unauthorised use.

## 2.12 Site induction

All operatives, personnel, site staff and visitors will receive a site induction prior to commencing work. No unaccompanied access to the site will be permitted before the induction is completed. At the induction, personnel will be required to sign an attendance sheet. Sub-contractors' supervisors shall be interviewed by . Insert name of senior manager interviewing sub-contract supervisors.... and attend a supervisors' induction which advises them of their additional responsibilities for ensuring health and safety standards are maintained.

In addition to the above the competence of plant operators will be assessed during the induction process by ... Insert name .....

## 2.13 Site training

### (a) Daily task briefings:

All personnel who wish to enter the construction area of the site (as a visitor, supervisor, or worker) must be given a daily task briefing before they enter the area. This briefing



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should cover the key activities, hazards, risks and control measures, with particular focus upon the activities of the personnel being briefed and the interfaces with other work groups, trades and organizations.

(b) Toolbox talks:

Regular and suitable toolbox talks (a minimum of one each week) will be given and records of these talks, their content and those attending will be kept in the site files.

(c) Method statement, safe system of work and risk assessment briefings:

Briefings covering relevant details of method statements and the like will be given to all personnel that will be involved in the activity, affected by it or supervising it.

These briefings shall be given at the point of work.

During this briefing, personnel will be given an opportunity to comment on the proposed method of work, with suggested changes being discussed and, if agreed, incorporated before the activity starts.

(d) Other training

All site personnel shall be trained so that they are competent to complete their work activities on the site. Levels of competency shall take into consideration professional qualifications site training, or equivalent, time served and CV. Individuals working on the site will be required to meet the minimum training and competence standards listed below.

| Role or activity                      | Acceptable competence standard   |
|---------------------------------------|--|
| Crane driver                          |  |
| Forklift driver                       |  |
| Telescopic handler operator           |  |
| Dump truck driver                     |  |
| Tractor driver                        |  |
| Excavator driver                      |  |
| MEWP/Multi-boom access                |  |
| Slinger / signaller                   |  |
| Lifting operations – Appointed Person |  |
| Lifting operations – Crane Supervisor |  |
| Scaffolder                            |  |
| Confined spaces access                |  |
| Cable detection                       |  |
| Manual handling                       |  |
| Gas fitter                            | 'Gas Safe' (Industrial equivalent)   |
| Operatives and site staff             | Accredited competence certificate covering activities being undertaken<br>Amend as necessary to suit any client's requirements |
| Managers and supervisors              |  |

## 2.14 Welfare facilities and first aid

(a) Welfare:

Welfare facilities are shown on the site layout plan and traffic management plan, located in Appendix B. Lockers will be provided in the drying room for securing personal items.



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Separate canteen facilities with seating, drinking water, microwave and water boiler will also be provided. Operatives will be expected to keep the facilities tidy at all times. A separate toilet and shower block will form part of the welfare facility and will contain barrier creams, hand cleaners and after-work skin care creams. A separate, lockable toilet will be provided for use by female members of site or operational staff. (Delete sentence if not required.)

(b) First aid arrangements:

The site accident book is kept in the ... Insert location..... office.

The conference room (Insert locations ) can be used as a first aid room if necessary.

There are ..... first aid boxes on the site and these are located ... Insert locations .....

The names of trained NEOM and sub-contractor First Aiders or Appointed Persons are:

| First aid at work (4-day course) | Appointed Person |
|----------------------------------|------------------|
|                                  |                  |

Insert name ..... is the First Aider responsible for monthly checking and re-stocking of the first aid boxes.

First aid posters are exhibited on notice boards and in communal areas such as mess rooms.

(c) Access route to local hospital

The nearest hospital is Insert hospital name and address and the route to this hospital is displayed on the site notice board and discussed during site inductions.

## 2.15 Investigation and reporting of accidents, dangerous occurrences and near misses

The NEOM Site Manager must be informed of any incidents on site by the quickest possible means so that the requirements of the NEOM incident-reporting Process and, if applicable, the client's reporting arrangements can be implemented.

The NEOM Site Manager (with support from sub-contractors' staff, if applicable, and NEOM safety advisers) shall conduct an investigation into any accidents, incidents or near misses on site and, where appropriate, shall notify the relevant authorities.

During an accident investigation, the relevant parties must provide the following information:

- description of the circumstances of the incident and events leading up to it;
- full details of any injuries.
- details of the on-site treatment given to those injured and, if known, of any off-site treatment.
- a copy of relevant page in the accident book.
- copies of any signed witness statements including, where possible, of statements from any injured personnel.
- direct and indirect reasons for the incident, where known or perceived.
- details of any measures already taken or planned to prevent recurrence of the incident.
- details of how such preventive measures have been (or will be) communicated to those who could be affected.

All incidents and near-miss events on site MUST be reported to the NEOM Safety Adviser within two hours of the event occurring.



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## 2.16 The production and acceptance of risk assessments and method statements

The Site Manager is responsible for ensuring that all risk assessments are prepared, submitted and reviewed before the start of work on the activity to which they relate.

The Site Manager is also responsible for ensuring that work does not start until a safe system of work (method statement) detailing suitable control measures has been developed, agreed with those undertaking the work and adopted. Method statements shall be prepared and signed by those designated in Appendix E of this Plan.

All risk assessments and method statements must be updated, monitored and reviewed as the work progresses to take account of any changed circumstances.

## 2.17 Site Specific Rules

Site-specific rules are included in Appendix A. Copies of these will be displayed on notice boards and will be included in all site induction briefings.

## 2.18 Fire and emergency procedures

An emergency contact list for all necessary parties, including sub-contractors, is shown in Appendix C and is posted on the site notice boards and beside the main site telephone. This list is reviewed at regular intervals by the Site Manager and revised when necessary.

The anticipated types of emergencies and the arrangements for their management are detailed in the following sections. (Add further sections for other foreseen emergencies where necessary)

### (a) Fire

In the event of a fire, individuals must raise the alarm by ... Insert alarm method ..... . On hearing this alarm, individuals must make their way to the fire assembly point which is located ...Insert location..... and identified by a fire assembly point sign.

One arrival at the assembly point, the Fire Safety Co-ordinator will initiate a roll call and arrange for the emergency services to be called if necessary.

These arrangements must be displayed on the site notice board.

### (b) Chlorine leak

Insert details, if applicable.or delete

A site plan indicating the emergency assembly point(s) is included in Appendix B.

## 3. ARRANGEMENTS FOR CONTROLLING SIGNIFICANT SITE RISKS

### 3.1 Safety risks (Edit table for specific site risks)

| Significant risk            | Control arrangements   |
|-----------------------------|--|
| Access to construction site | <ul style="list-style-type: none"><li>- Initial site set-up risk assessments</li><li>- Suitable and adequate signage</li><li>- All site personnel and visitors advised of directions to site</li><li>- Location plan provided on request</li></ul> |
| Trespassers                 | <ul style="list-style-type: none"><li>- Site boundary fenced</li><li>- All gates locked at night and during day, where appropriate</li><li>- All plant and equipment locked or stored correctly</li></ul>  |



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| Significant risk   | Control arrangements  |
|--|---|
| Traffic routes and segregation of vehicles and pedestrians                       | <ul style="list-style-type: none"><li>- Designated pedestrian routes marked</li><li>- Adequate signage provided</li><li>- Escape routes defined</li><li>- Parking areas clearly marked</li><li>- Documented traffic management plan</li></ul>   |
| Deliveries   | <ul style="list-style-type: none"><li>- Delivery drivers to be given a specific induction</li><li>- Deliveries will be loaded and unloaded in specific locations</li><li>- Access scaffolding will be provided to facilitate safe loading and unloading</li><li>- The telescopic handler will be used for unloading in a designated area</li></ul>  |
| Working on an operational site   | <ul style="list-style-type: none"><li>- All site personnel briefed on Site Rules during induction</li><li>- Pedestrian routes keep individuals away from tanker movements</li><li>- Segregated work areas for construction activities</li><li>- Isolation rules to be implemented before working on operational equipment</li></ul>   |
| Services, including temporary electrical installations, buried & overhead cables | <ul style="list-style-type: none"><li>- CAT scans and surveys</li><li>- All underground services to be marked once found and marking maintained</li><li>- Existing drawings consulted</li><li>- Goal posts erected on site</li><li>- Suitable and adequate signage provided</li><li>- Fencing to be provided around buried high-voltage cables and medium or high-pressure gas mains</li></ul>  |
| Confined space entry   | <ul style="list-style-type: none"><li>- All personnel to be trained to recognise industry standards</li><li>- Confined space entry plan to be produced</li><li>- Permits to enter required</li><li>- Confined space entry log to be kept</li></ul>  |
| Working at height  | <ul style="list-style-type: none"><li>- Avoidance of work at height, where possible</li><li>- Use of cherry pickers and MEWPs</li><li>- Control of use of ladders and step ladders</li><li>- Scaffolding to be provided where a working platform is required</li><li>- Inspection of scaffolding before initial use and every seven days</li><li>- Edge protection to be provided where necessary</li><li>- Toolbox talks to be completed where appropriate</li><li>- Appropriate PPE (such as harnesses) to be used</li><li>- Rescue arrangements to be in place and practised</li></ul> |
| Lifting operations   | <ul style="list-style-type: none"><li>- Lifting plans to be produced for all lifts and activities to comply with Lifting regulations</li><li>- Slinger/signallers to be used for all operations</li><li>- Authorised Person to be in post at all times</li></ul>  |
| Excavation work  | <ul style="list-style-type: none"><li>- Risk assessments and method statements to be prepared</li><li>- Earthworks to be inspected daily and every seven days</li><li>- If necessary, excavations to be provided with suitable edge protection</li></ul>  |
| Working with electricity   | <ul style="list-style-type: none"><li>- Permit to work to be in place as detailed in company's Electrical Safety Rules</li><li>- Competent personnel only to work on electrical devices and systems</li></ul>   |



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| Significant risk                          | Control arrangements  |
|---|---|
| Demolition, refurbishment, or dismantling | <ul style="list-style-type: none"> <li>– Asbestos 'demolition and refurbishment' survey required</li> <li>– Review of asbestos survey by NEOM H&amp;S Adviser</li> <li>– Review of demolition sequence by NEOM structural and temporary works engineer</li> <li>– Risk assessments and method statements including detailed demolition sequence</li> <li>– Exclusion zones 1.5 x tallest structure</li> <li>– Controlled entry into working area</li> <li>– NEOM personnel and sub-contractors to be fully briefed on method of work and controls required</li> </ul> |
| Backfilling of existing structures        | <ul style="list-style-type: none"> <li>– Risk assessments and method statements to be prepared</li> <li>– Banksman to be used at all times</li> </ul>   |
| Drowning (in water-filled tanks)          | <ul style="list-style-type: none"> <li>– Risk assessments to be completed</li> <li>– Appropriate PPE to be provided, such as lifelines and life jackets</li> <li>– Suitable edge protection to be provided</li> </ul>   |

## 3.2 Health risks Edit table as appropriate to suit site risks

| Significant risk                                    | Control arrangements   |
|---|--|
| Asbestos  | <ul style="list-style-type: none"> <li>– Identification of asbestos as supplied in pre-construction works information</li> <li>– Demolition and refurbishment activities require a competent survey</li> <li>– Appointment of NEOM approved sampling contractor</li> <li>– NEOM Asbestos Management Plan (Appendix F) to be completed and forwarded to asbestos-sampling contractor</li> <li>– Removal of asbestos by licensed contractors in accordance with detailed method statements and risk assessments</li> <li>– Air sampling and air clearance certification before demolition or other work commences</li> </ul> |
| Exposure to UV radiation (from the sun)             | <ul style="list-style-type: none"> <li>– Cover-up policy in force, individuals to wear long trousers and short-sleeved shirts</li> </ul>   |
| Manual handling                                     | <ul style="list-style-type: none"> <li>– The control arrangements associated with manual handling shall be detailed in risk assessments and method statements</li> <li>– Individuals required to undertake manual handling shall be provided with manual handling training</li> </ul>  |
| Hand-arm vibration                                  | <ul style="list-style-type: none"> <li>– Individuals operating vibrating hand tools shall be provided with information on the recommended maximum daily usage times identified from the tool assessment</li> </ul>   |
| Chemicals   | <ul style="list-style-type: none"> <li>– Hazardous substances will only be used if:           <ul style="list-style-type: none"> <li>– there is no safer alternative.</li> <li>– a COSHH assessment has been completed.</li> <li>– individuals have been trained in the precautions set out in the assessment</li> </ul> </li> </ul>   |
| Contact with sewage, leptospirosis, rat infestation | <ul style="list-style-type: none"> <li>– Appropriate PPE to be provided, such as overalls, gloves, and goggles</li> <li>– Weil's disease card and letter for doctor issued during induction</li> <li>– COSHH assessments and briefings completed</li> <li>– Rodent control specialist used</li> <li>– Contaminated PPE not allowed in canteens</li> </ul>  |



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| Significant risk | Control arrangements   |
|------------------|--|
| Noise            | <ul style="list-style-type: none"><li>— Noise assessments to be completed by Insert name .....</li><li>— Training in the correct use of hearing protection</li><li>— Provision of appropriate hearing protection</li></ul> |
| Process          | <ul style="list-style-type: none"><li>— Add process hazards and associated controls</li></ul>  |

## 4. HEALTH AND SAFETY FILE

### 4.1 Content, layout, and format

The content of the Health and Safety File shall be in accordance with industry guidance and any special requirements defined by the client or the Principal Designer.

The following items will be included in the file: —

- a brief description of the work carried out, including residual hazards and how they have been dealt with (such as surveys or other information concerning asbestos, contaminated land, water-bearing strata or buried services).
- key structural principles incorporated in the design of the structure (such as bracing and any sources of substantial stored energy, including pre- or post-tensioned members) together with details of the safe working loads for floors and roofs, particularly where these may affect the placing of scaffolding or heavy machinery.
- any hazards associated with the materials used (such as hazardous substances, lead paint or special coatings which should not be burnt off).
- information regarding the removal or dismantling of installed plant and equipment (such as planned arrangements for lifting heavy components).
- health and safety information about equipment provided for cleaning or maintaining the structure.
- the nature, location and markings of significant services, including firefighting services; information and as-built drawings of the structure, its plant and equipment (such as the means of safe access to and from service voids, and fire doors).

### 4.2 Arrangements for the collection and gathering of information

The compilation of the Health and Safety File needs to start during the pre-construction phase. The Principal Designer and the Principal Contractor will agree on the information required and the timings of the handover of various sections. Some of the information will be contained within the Operation and Maintenance Manuals which will be handed over prior to take-over.

If the Principal Designer appointment ceases before the end of the project, the Principal Contractor will obtain all the information compiled to date from the Principal Designer and finalise the Health and Safety File to pass onto the Client.

### 4.3 Storage of information

All information intended for incorporation in the Health and Safety File will be passed to the Principal Designer. However, copies of any items that are likely to be needed during installation or commissioning activities should be retained on site.



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## APPENDIX A: SITE SPECIFIC RULES (EDIT THESE RULES TO SUIT THE CIRCUMSTANCES ON THE SITE.)

### Site Rules

1. Whilst in the construction areas of the site, hard hats, safety footwear, gloves, eye protection and Class 2 or 3 high-visibility clothing shall be worn. Task-specific PPE shall also be used when detailed in risk assessments.
2. All accidents, dangerous occurrences and near-miss incidents must be reported immediately to the Site Management.
3. No person working on this site is permitted to consume or be under the influence of alcohol, non-prescribed drugs, or other intoxicants. NEOM reserves the right to carry out random drug and alcohol testing at any of its projects or office establishments. Personnel having a requirement to take medication shall advise their supervisors and a NEOM supervisor.
4. No work shall commence on site until the risk assessment for the activity has been accepted by NEOM and personnel have been briefed at the point of work.
5. Designated walking routes shall be used at all times – DO NOT WALK ON SITE ROADS.
6. All persons working on this site shall wash their hands before eating, drinking, or smoking. Food and drink shall only be consumed in designated areas. Personnel may only smoke in designated areas.
7. No person shall remove or alter edge protection around holes and openings, scaffold platforms or places where work at height is being carried out unless authorised.
8. No person shall enter any chamber or confined space without being in receipt of the appropriate permit or authorisation.
9. The use of mobile telephones (including with 'Blue tooth' earpieces) is only permitted in designated areas. Their use on the working areas of the site is strictly prohibited.
10. Any dangerous situation or defect in equipment or plant must be reported to the supervisor immediately.
11. Individuals must be suitably dressed for site work. The minimum dress in hot weather is short-sleeved shirt and long trousers.
12. Site plant and delivery vehicles should not be reversed without guidance from a trained banksman.
13. Lifting operations (with cranes or other plant) shall only be undertaken after an appropriate Lifting Plan has been prepared and has been approved by NEOM.
14. All personnel must observe and comply with site safety warning signs.
15. All personnel (including visitors) must have an induction before starting work on the site.

**Failure to comply with these site rules may result in dismissal or disciplinary action being taken against you or your company.**

**THINK SAFE, BE SAFE, GO HOME SAFE**



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## ***The Golden Rules***

### ***Personal: —***

- **Don't** even think of coming to work if you are under the influence of illegal drugs or alcohol.

### ***Excavation: —***

- **Don't** dig or penetrate the ground unless there is a 'Permit to break ground' that covers the operation, your supervisor has explained it to you, and you understand it.
- **Don't** dig or penetrate the ground outside the area defined in the 'Permit to break ground'.

### ***Operated Plant: —***

- **Don't** operate or drive plant or machinery unless you have been authorised to do so.
- When operating plant, **don't** take signals, directions, or instructions from anyone other than the authorised signaller or banksman.

### ***Lifting: —***

- **Don't** carry out lifts with cranes, excavators, forklifts or telehandlers unless a Lifting Plan that covers the lift is in place, the Crane Supervisor has explained it to you, and you understand it.
- **Don't** carry out lifts which are not defined in the Lifting Plan even as a favour or to help someone.
- **Don't** lift a load unless it has been slung by the authorised slinger.
- When lifting, **don't** take signals, directions, or instructions from anyone other than the authorised signaller.

### ***Electricity: —***

- **Don't** work on electrical equipment unless you have been authorised to do so.

***If you break a Site Rule, there is no place for you on our sites.***



# Construction Phase Plan

(As required by Element 6 Contractor Management)

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## APPENDIX B: TRAFFIC MANAGEMENT PLAN

Refer to .....



# Construction Phase Plan

(As required by Element 6 Contractor Management)

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## APPENDIX C: EMERGENCY CONTACT LIST

| Organisation name or role     | Contact name | Address | Contact number and e-mail |
|-------------------------------|--------------|---------|---------------------------|
| <b>Utilities:</b>             |              |         |                           |
| Electricity                   |              |         |                           |
| Gas                           |              |         |                           |
| Telephone                     |              |         |                           |
| Water                         |              |         |                           |
| <b>Other authorities:</b>     |              |         |                           |
| Environment Agency            |              |         |                           |
| Health & Safety Executive     |              |         |                           |
| Local authority               |              |         |                           |
| <b>Client's personnel:</b>    |              |         |                           |
|                               |              |         |                           |
|                               |              |         |                           |
| <b>NEOM personnel:</b>        |              |         |                           |
| Contracts Director            |              |         |                           |
| Contracts Manager             |              |         |                           |
| Site Manager                  |              |         |                           |
| Area Safety & Health Manager  |              |         |                           |
| Site Safety Adviser           |              |         |                           |
| Site Environmental Supervisor |              |         |                           |
|                               |              |         |                           |
|                               |              |         |                           |
| <b>Other contractors:</b>     |              |         |                           |
|                               |              |         |                           |
|                               |              |         |                           |
|                               |              |         |                           |
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# Construction Phase Plan

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## APPENDIX D: FIRE SAFETY PLAN

**PREPARE A PLAN AND GIVE A CROSS REFERENCE HERE. INCLUDE A COPY IN ANY PRINTED COPIES OF THE CPP THAT ARE ISSUED.**

Refer to ..... prepare a plan and give a cross reference here. include a copy in any printed copies of the CPP that are issued. A Fire safety Plan template is available as NMS 026 .



# Construction Phase Plan

(As required by Element 6 Contractor Management)

Document no.

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## APPENDIX E: DUTY-HOLDER APPOINTMENTS

| Role   | Required competencies                       | Person responsible (and deputies) |           |
|--|---|-----------------------------------|-----------|
|  |   | Name                              | Signature |
| <b>Site management and general duties:</b>     |   |                                   |           |
| Temporary Works Co-ordinator                   |   | 1                                 |           |
|  |   | 2                                 |           |
| Permits to load scaffolding or temporary works |   | 1                                 |           |
|  |   | 2                                 |           |
| Weekly site safety inspections                 |   | 1                                 |           |
|  |   | 2                                 |           |
| <b>Confined spaces:</b>                        |   |                                   |           |
| Permit issuer                                  |   | 1                                 |           |
|  |   | 2                                 |           |
| <b>Electrical operations:</b>                  |   |                                   |           |
| Authorised Persons                             |   | 1                                 |           |
|  |   | 2                                 |           |
|  |   | 3                                 |           |
| <b>Isolations:</b>                             |   |                                   |           |
| Authorised Persons                             |   | 1                                 |           |
|  |   | 2                                 |           |
| <b>Equipment and plant:</b>                    |   |                                   |           |
| Plant and equipment inspections                | Plant operator<br>Relevant plant experience | 1                                 |           |
|  |   | 2                                 |           |
| <b>Excavation work:</b>                        |   |                                   |           |
| Excavation inspections (weekly)                |   | 1                                 |           |
|  |   | 2                                 |           |
| Approval of Permits to break ground            |   | 1                                 |           |
|  |   | 2                                 |           |
| <b>Lifting operations:</b>                     |   |                                   |           |
| Crane Supervisor                               |   | 1                                 |           |
|  |   | 2                                 |           |
| Authorised Person                              |   |                                   |           |
|  |   | 1                                 |           |



# Construction Phase Plan

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| Role   | Required competencies         | Person responsible (and deputies) |           |
|--|-------------------------------|-----------------------------------|-----------|
|  |                               | Name                              | Signature |
| Lifting equipment and attachment inspections |                               | 2                                 |           |
| <b>Working at height:</b>                    |                               |                                   |           |
| Scaffolding inspection (Before use & weekly) | Industry recognised standards | 1                                 |           |
|  |                               | 2                                 |           |
|  |                               | 3                                 |           |

In addition to the above, the following activities will be undertaken by the individuals named below:

| Role   | Required competencies | Person responsible (and deputies) |                     |
|--|-----------------------|-----------------------------------|---------------------|
|  |                       | Name                              | Date of appointment |
| <b>Site management and general duties:</b>     |                       |                                   |                     |
| Site Services Co-ordinator                     |                       | 1                                 |                     |
| Accident and incident notifications            |                       | 1                                 |                     |
|  |                       | 2                                 |                     |
| Accident reporting (weekly)                    |                       | 1                                 |                     |
| log-book verification                          |                       | 1                                 |                     |
| Fire Safety Co-ordinator                       |                       | 1                                 |                     |
| Traffic management                             |                       | 1                                 |                     |
| Issue of PPE                                   |                       | 1                                 |                     |
| <b>Electrical operations:</b>                  |                       |                                   |                     |
| Authorising Engineer                           |                       | 1                                 |                     |
| <b>Emergencies:</b>                            |                       |                                   |                     |
| Emergency Co-ordinator                         |                       | 1                                 |                     |
|  |                       | 2                                 |                     |
| <b>Occupational health:</b>                    |                       |                                   |                     |
| COSHH Co-ordinator                             |                       | 1                                 |                     |
| <b>Risk assessments and method statements:</b> |                       |                                   |                     |
| Civil – preparation                            |                       | 1                                 |                     |
|  |                       | 2                                 |                     |
| Civil – review                                 |                       | 1                                 |                     |
|  |                       | 2                                 |                     |
| Electrical – preparation                       |                       | 1                                 |                     |
|  |                       | 2                                 |                     |
| Electrical – review                            |                       | 1                                 |                     |
|  |                       | 2                                 |                     |
| Mechanical – preparation                       |                       | 1                                 |                     |
|  |                       | 2                                 |                     |
| Mechanical – review                            |                       | 1                                 |                     |



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# Construction Phase Plan

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| Role                                  | Required competencies | Person responsible (and deputies) |                     |
|---------------------------------------|-----------------------|-----------------------------------|---------------------|
|                                       |                       | Name                              | Date of appointment |
|                                       |                       | 2                                 |                     |
| Process / commissioning – preparation |                       | 1                                 |                     |
|                                       |                       | 2                                 |                     |
| Process / commissioning – review      |                       | 1                                 |                     |
|                                       |                       | 2                                 |                     |
| <b>Training and briefings:</b>        |                       |                                   |                     |
| Daily task briefings                  | Presentation skills   | 1                                 |                     |
|                                       |                       | 2                                 |                     |
| Induction training                    | Presentation skills   | 1                                 |                     |
|                                       |                       | 2                                 |                     |
| Toolbox talks                         | Presentation skills   | 1                                 |                     |
|                                       |                       | 2                                 |                     |



# Construction Phase Plan

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## APPENDIX F: NEOM ASBESTOS MANAGEMENT PLAN

*(If applicable for this project)*



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
SCAFFOLDING**

NEOM-NLF-NMS-006.003 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

|           | Prepared by  | Reviewed by   | Approved by                         |
|-----------|--|---|-------------------------------------|
| Name      | Robert Murphy                                      | Talal Al Anazi  | Adel Al Wuhaib                      |
| Job Title | Loss Prevention Specialist<br>LP/FS -Public Safety | Director, Loss Prevention/Fire Safety (LP/FS) Public Safety | Executive Director<br>Public Safety |



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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety risks associated with Scaffold

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to the full life cycle of scaffolding from procurement, planning through to dismantling and disposal. It addresses the control measures required for the erection, use, maintenance, alteration and dismantling of scaffolding, also to the inspection, and maintenance of scaffolds.

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with the work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes (where applicable)

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms   | Definitions   |
|---|---|
| NEOM Co   | NEOM Company  |
| Client  | NEOM Sector /Department responsible for management and oversight of the Contractor  |
| Employer  | The person or organisation that employs personnel to complete the work.   |
| Contractor  | The organisation contracted to carry out the works  |
| Sector, Organization, Department or Contractor      | The Sector, Organization, Department or Contractor is the NEOM entity or developer designated by NEOM to accept custody for planning, designing, constructing, or managing and operating a particular asset or a group of assets  |
| Sector, Organization, Department or Contractor Head | The head of the Sector, Organization, Department or Contractor is responsible and accountable for the implementation and supervision of this procedure within the Sector, Organization, Department or Contractor  |
| Responsible Person                                  | The Sector, Organization, Department or Contractor Head may delegate a "Responsible Person" utilizing their approved delegation of authority process. The "Responsible Person" is the senior NEOM employee who has responsibility for the day-to-day management of the work activities, or the contracted party engaged in such activities  |
| Safety Practitioner/ Coordinator                    | The "Safety Practitioner/Coordinator" is an employee working for the Sector, Organization, Department or Contractor Safety Department.  |
| Scaffolding   | A temporary structure on the inside or outside of a building or structure, made of wooden / metal boards and metal poles. This includes all platforms, irrespective of height, which are assembled from scaffold components in all, or part. All modular scaffolding, all tube and coupler scaffolding, all suspended scaffolding, all swinging stages and all boards placed across structures.   |
| OSHA Standards                                      | An Occupational Safety Health Administration (OSHA) standard is a regulatory requirement to serve as criteria for measuring whether employers are in compliance with the OSH Act laws. OSHA standards are published in Title 29 of the Code of Federal Regulations (CFR)  |
| Competent Person (Scaffold)                         | Is a person, designated by the employer, who is capable of identifying existing and predictable hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them. Shall have undertaken formal validated training in the safety of scaffolds and where appropriate practical training and / or on the job assessment. As a minimum should be able to perform site inspections |
| Qualified Person (Scaffold)                         | A person who by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated his/her ability to solve or resolve problems related to the work, or the project.   |
| Safety Management System (SMS)                      | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard  |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| ISO           | International Standards Organisation           |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name  |
|-----------------------------|--|
| NEOM Element 2              | Risk and Opportunity Management  |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance                     |
| NEOM-Element 5              | Training, Awareness and Competency.                                      |
| NEOM-Element 6              | Contractor Management  |
| NEOM Element 9              | Emergency Planning and Response Management                               |
| NEOM Element 10             | Monitoring Measurement & Performance Review                              |
| NEOM-NLF-SM                 | Safety Management Manual - Roles and Responsibilities                    |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table  |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors  |
| NEOM-NLF-NMS-006.001        | Organisation and Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | OHS Construction Management Plan   |
| NEOM-NLF-NMS-006.004        | Permit to Work Systems   |
| NEOM-NLF-NMS-006.007        | Working at Heights   |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards   |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals   |
| NEOM-NLF-NMS 006.014        | Ladders  |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                      |

| Document Code    | Document Name  |
|------------------|--|
| BS EN1004        | Mobile access and working towers made of prefabricated Units |
| BS EN131         | Ladders (Professional) 2018 or equivalent                    |
| BS 1139          | Scaffold Materials   |
| NEOM-NEN-PRC-006 | Safety in Design Procedure                                   |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 OHS Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.

### 7.2 Contractor

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
  
- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.(Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
- 7.2.7 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Shall ensure persons appointed to manage /oversee scaffold operations have the skills, knowledge, experience and, where relevant, the organisational capability to manage work safely and without risk to those who may be affected by the activities
  - (b) Employees working on the scaffolds are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.
  - (c) Emergency arrangements associated with work on scaffolds including escape plans are developed and communicated to all affected parties

### **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Follow the site rules, signage, and emergency arrangements
  - (b) Ensure the Scuff-Tag indicates safe to use prior to using scaffolds

### **7.4 Specific Responsibilities**

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers on risks and controls
- 7.4.5 The LP & FS Public Safety department will support the assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Planning and Risk Assessment**

- 8.1.1 Risk Assessment and Method Statements shall be prepared in consultation with the person in control of the work and communicated to those responsible for carrying out the work (Refer to: NEOM Element 2 Risk and Opportunity Management)
- 8.1.2 Scaffold risks to consider include, but are not limited to the following:
- (a) Work activity associated with erection, modification or dismantling of a scaffold or access equipment
  - (b) Using a scaffold or associated equipment
  - (c) Being in the vicinity of elevated work, scaffold, or equipment
  - (d) Working at heights/falling objects;
  - (e) Overhead electrical services
  - (f) Corrosive substances
  - (g) Movement of cranes, vehicles, and machinery
  - (h) Weak or unstable supporting structures and surfaces
  - (i) Inclement weather conditions (high winds, rain, heat)
  - (j) Ground conditions Emergency Planning

### **8.2 Emergency Planning**

- 8.2.1 Ensure that all foreseeable emergency situations are identified, and appropriate emergency/rescue procedures are developed and communicated to all affected persons
- 8.2.2 That effective procedures and control measures are in place to manage work activities (refer to NEOM-NLF-NMS-006.004 – Permit to Work Systems

### **8.3 Control of Hazards:**

- 8.3.1 Risk control measures shall be implemented in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment. Example:
- (a) Selecting a less hazardous form of scaffolding or access system;
  - (b) Modifying the design of the scaffold or access systems;
  - (c) Isolating the scaffold;
  - (d) Providing a harness and fall arrest system as a last resort (unless specifically not permitted by manufacturer's instructions).

### **8.4 Design of Scaffolding**

#### **8.4.1 Designers Roles and Responsibilities**

- (a) Designers/Engineers shall undertake their roles and responsibilities in accordance with the general requirements of OSHA 29 CFR 1910 and NEOM-NLF-SM – Roles, Responsibilities and Self-Regulation and NEOM -Element 6 - Contractor Management

## **8.5 Design Considerations**

### **8.5.1 General**

- (a) The strength, stability and rigidity of the scaffold and supporting structure;
- (b) The intended use and application of the scaffold;
- (c) The safety of persons engaged in the erection, alteration and dismantling of the scaffold;
- (d) The safety of persons using the scaffold;
- (e) Scaffold materials;
- (f) The safety of persons in the vicinity of the scaffold.

### **8.5.2 Foundations**

- (a) The scaffolding foundations shall be able to carry and distribute all the weight of the scaffold, including any extra loads placed on the scaffold, which may also include perimeter containment screens.

### **8.5.3 Ground Conditions**

- (a) Water and nearby excavations that may lead to soil subsidence and collapse of scaffold; and
- (b) Any reasonably foreseeable watercourse, such as a recently filled trench, which has the potential to create a wash out under the scaffold base, shall be diverted away from the scaffold.
- (c) Existing buried utilities. Water and nearby excavations that may lead to soil subsidence and collapse of scaffold;

### **8.5.4 Load Considerations**

- (a) The most adverse combination of dead, live, and environmental loads that can reasonably be expected during the period that the scaffold is in use;
- (b) The dead, live and environmental loads which will need to be calculated during the design stage to ensure the supporting structure and the lower standards can support the loads;
- (c) The approvals that may be required by a competent engineer through the erection period;
- (d) Manufacturer specifications relating specifically to scaffold components and accessories

### **8.5.5 Dead Load Considerations**

- (a) Dead loads which refer to the self-weight of the scaffold structure and components including any working, catch or access platforms, stairways, ladders, screens, sheeting, platform brackets, suspension ropes, secondary ropes, traversing ropes, tie assemblies, scaffolding hoists, or electrical cables;
- (b) That scaffolds shall not be used to support formwork and plant, such as hoist towers and concrete pumping equipment, unless the scaffold is specifically designed for this purpose.

### **8.5.6 Supporting Structure Considerations**

- (a) The capability of the supporting structure to bear the most adverse combination of loads reasonably practicable during the use of the scaffold;
- (b) Obtain advice from an engineer before erecting scaffolds on verandas, suspended flooring systems, compacted soil, parapets, and awnings;
- (c) Propping which may be required where the supporting structure is not capable of bearing the most adverse combination of loads.

### **8.5.7 Stability of Scaffolding**

- (a) The design of the scaffold shall consider scaffold stability which may be achieved by:

- (b) Tying the scaffold to a supporting structure;
- (c) Tying to a supporting structure;
- (d) Increasing the dead load by securely attaching counterweights near the base (kentledge scaffold)
- (e) Adding bays, stabilizers, or mobile outriggers to increase the base dimension.

#### 8.5.8 Design of the Working Platforms

- (a) Working platforms, except suspended scaffolds shall be designed to have duty classifications which will be displayed on the Scaff-tag, as follows:

- I. Access only;
- II. Light working;
- III. Heavy working

- (a) Each scaffold shall be designed to carry the required number of working platforms and to support its live loads.

#### 8.5.9 Rubbish Chutes

- (a) Designers shall ensure the design of a scaffold takes account of the additional loads which may be imposed in the normal use of a rubbish chute, by the additional wind loading and by further loads in the event of a blockage

#### 8.5.10 Design Drawings

- (a) Employers shall ensure a design drawing is prepared by a competent engineer for scaffolds over 10 meters in height or which include the use of:

- I. Ladder beams;
- II. Mesh or shade cloth;
- III. Freestanding scaffolds;
- IV. Suspended scaffolds;
- V. Non-standard ties or bracing.

- (b) Employers shall ensure all scaffolds above 10 meters are erected, altered, used, and dismantled in accordance with the design drawing or manufacturer's instructions where applicable.

- I. Where a design drawing by an engineer is not required (e.g., scaffolds below 1 meter): Persons erecting the scaffold shall be competent and trained in the basic design and erection of the particular type of scaffold;
- II. The scaffold manufacturer's instructions or drawings shall be followed and be available on site.

### 8.6 Scaffolding General Requirements

#### 8.6.1 All activities shall comply with the requirements of OSHA 29-CFR 1910 - 2016 and NEOM-NLF-NMS-006.007 Working at Heights,

#### 8.6.2 Safe Erection of Scaffolding

- (a) That scaffolding components are erected to install and provide:

- I. A platform at least 450 mm wide along the full length of the section of scaffolding;
- II. Edge protection across the space between the uprights forming the outer frame of the scaffolding at the level the scaffolding has reached;
- III. A means of access and egress (for example, temporary stairs or a ladder) to the level the scaffolding has reached.

- (b) That before each level of scaffolding is erected (except in the case of the first lift), a platform shall be installed below the level at not more than:
  - I. 3 meters if the erection of the scaffolding is housing construction work; or
  - II. 2.4 meters otherwise.
- (c) The following shall be considered during the erection of scaffolding:
  - I. A section of the platform may be left open to allow the passing of boards or other scaffolding components between levels only for the duration that the work is carried out;
  - II. A platform does not need to be installed on the bottom level of the scaffolding;
  - III. A platform may be removed after work has started two levels above it;
  - IV. If platforms are removed, they shall only be removed in a progressive manner. Prior to dismantling the complete scaffold, boards shall be reinstalled to ensure safety of employees.
  - V. Ground conditions are stable and inform scaffold erectors of any factors which may affect ground stability before the scaffold is erected. Where there are known ground stability problems the designer shall be consulted, and further control measures implemented.
  - VI. Scaffold fittings, and other connections shall be securely tightened. Where safety fittings are used, they shall be fitted in accordance with the scaffold plan.

(d) Scaffold components shall be installed as the scaffold is erected and shall include installation of:

- I. All bracing and ties;
- II. Guy ropes or buttresses
- (e) Where the internal gap on scaffolding (includes hanging bracket scaffolding) is greater than 225mm, employers shall implement appropriate control measures to manage the risk of a fall by installing:
  - I. Internal edge protection; or
  - II. Additional scaffold boards to minimize the size of the internal gap; or
  - III. Providing safety harnesses to employees and developing a safe system of work.

#### 8.6.3 Sole boards and Baseplates

- (a) Contractors shall ensure the following with regards to sole boards and baseplates:
  - I. Baseplates shall be used on all scaffolding uprights or standards to evenly distribute the load from the scaffold to the supporting surface;
  - II. The use of sole boards on less stable surfaces such as sand, soil, gravel, fill or other such surface shall be in accordance with the scaffold design.
  - III. The size of the sole board shall vary depending on the supporting surface. If in doubt designers may need to consult an engineer to determine the bearing capacity of the ground or other supporting structure;
  - IV. The minimum size of a sole board shall be 225mm x 450mm;
  - V. Needles and spurs shall be considered where ground conditions are very unstable.

#### 8.6.4 Working Platforms

- (a) Each scaffold shall be designed to carry the required number of working platforms and to support its live loads. Scaffold boards / platform shall:
  - I. Have a slip-resistant surface;
  - II. Not be cracked or split;
  - III. Be of uniform thickness;

- IV. Be captive (e.g., cannot be kicked off) and fixed to prevent uplift or displacement during normal use;
- V. Be positioned so that no single gap between scaffold boards exceeds 25 mm and the total gap between all scaffold boards does not exceed 50 mm.
- VI. Shall not be lapped on straight runs of modular and tube and fitting scaffolding but may be lapped on hanging bracket scaffolds;
- VII. If using plywood sheets to cover gaps between scaffold bays the plywood sheets shall be:
  - A minimum of 17 mm thick;
  - IX. Only used to cover gaps less than 500 mm wide (unless approved by an engineer);
  - X. Metal boards lapped on other metal boards shall be secured.
- XI. The overhang of scaffold boards which are supported by transoms shall not be greater than 150 mm or 4 times the scaffold board thickness - whichever is less.

## 8.7 Tying of Scaffolds

### 8.7.1 Contractors shall ensure the following with regards to tying scaffolds:

- (a) Tie methods and spacing shall be in accordance with the instructions of the manufacturer, designer, or supplier;
- (b) Consultation with the scaffold designer, manufacturer, supplier, or an engineer if it is not reasonably practical to position the ties in accordance with the instructions;
- (c) Additional ties are provided in the following situations:
  - I. The scaffold is sheeted or netted due to increased wind loadings;
  - II. It is used as a loading platform for materials or equipment;
  - III. Attaching lifting appliances or rubbish chutes.
- (d) A competent person regularly inspects the existence and effectiveness of scaffold ties to ensure they are not modified or altered by unauthorized persons which may include finishing trades who may loosen, relocate, or remove ties to obtain access to walls and openings;
- (e) Consultation with the scaffold designer or supplier before attaching additional loads on the scaffold, for example, signs and perimeter containment screens;
- (f) Cast-in anchors or 'through ties' (e.g., pass through an opening) are used as the preferred option to drill-in expansion or chemical anchors for securing scaffold ties;
- (g) Drill-in expansion anchors shall be limited to the load (torque) controlled type. The working load limit shall be limited to 65% of the 'first slip load' stated in the information provided by the supplier;
- (h) Deformation-controlled anchors, including self-drilling anchors and drop-in (setting) impact anchors, shall not be used;
- (i) Where drill-in expansion or chemical anchors need to be used, the following proportions of anchors shall be tested, and proof loaded to the working load multiplied by a factor of 1.25:
  - I. 10% of drill-in expansion anchors; and
  - II. All chemical anchors.
- (j) Drill-in expansion or chemical anchors shall have a safety factor of 3 to 1 on their failure load. If any anchors fail, the remaining anchors on the same level shall be tested;
- (k) Ties shall not obstruct access along the working and access platforms; and
- (l) Ties shall interconnect with both the inner and outer scaffold standards (unless otherwise specified by an engineer) to increase the rigidity of the scaffold.

## **8.8 Walkways**

- 8.8.1 Contractors shall ensure that every board or plank forming part of a working platform, gangway or run shall be:
- (a) Strong enough for the intended work and not be less than 200mm wide if 50mm thick or less, and not less than 150mm wide if more than 50mm thick;
  - (b) Not overlapping their supports by more than four times their thickness, unless they have been secured against tipping;
  - (c) Level and flat to prevent tripping hazards, where laps occur beveled strips are to be provided to minimize the risk of tripping.

### **8.8.2 Width of Walkways**

- (a) Contractors shall ensure the following widths are maintained when erecting and using scaffolding:
  - I. Working platforms more than 2 meters high, shall be:
  - II. Minimum 800mm wide (4 boards) when used for persons only and not for materials;
  - III. Minimum 1.0 meters wide (5 boards) when used for persons and for the deposit of materials, though there shall be a 430mm passage left for persons, and clear of materials. This passage shall be increased to 600mm if barrows are to be used.
  - IV. Minimum 1.0 meters wide (5 boards) if used to carry a trestle or any other higher platform, and 1.20 meters wide (6 boards) if used by masons;
  - V. When work is light and of short duration, minimum 600mm wide (3 boards) platforms are permitted.

## **8.9 Toe Boards and Guardrails**

- 8.9.1 Contractor shall ensure the following requirements with regards to guardrails and toe boards:
- (a) Guardrails and toe boards are required at the outside of and ends of all working platforms from which personnel and materials can fall;
  - (b) Guardrails and toe boards shall be fitted on the inside of standards to prevent outward movement;
  - (c) Toe boards shall rise at least 150mm above the working platform;
  - (d) Guardrails shall be fitted at a minimum height of 950mm;
  - (e) Mid-rails shall be provided on all scaffolds with a working platform level over 2 meters high;
  - (f) Gaps between toe boards and mid-rails and guardrails and mid-rails shall not exceed 470mm;
  - (g) Where materials are stacked on the working platform additional height toe boards may be required or debris guards shall be fitted;
  - (h) If guard rails and toe boards are removed to permit the passage of personnel and materials, they shall be replaced as soon as reasonably practicable afterwards.

## **8.10 Landing Places**

- 8.10.1 Landing places between ladder access routes shall be provided at each 9 meters of height and be fitted with both toe boards and guard rails;
- 8.10.2 All openings through which ladders and staircases pass shall be as small as reasonably practicable and shall not exceed 500mm in width.

## **8.11 Access and Egress**

- 8.11.1 Contractor shall provide safe access to and egress from scaffold during the erection, use and dismantling. The following means of access shall be considered:
- (a) Temporary stair towers or portable ladder access systems installed at the start of erection, progressed with the scaffold, and used by the scaffolder whenever reasonably practicable;
  - (b) Permanently installed platforms or ramps;
  - (c) Built-in access for mobile towers / system scaffolding;
  - (d) Mechanical personnel hoists used in conjunction with permanent stairs or temporary stair towers which are to be used in an emergency or in the event of a power failure;
  - (e) Using the existing stairs of a building, provided such access is safe.

## **8.12 Perimeter Containment Screening**

- (a) Design calculations shall be undertaken to determine the wind loading on the scaffold and the requirements for any structural reinforcement or additional ties;
- (b) Perimeter containment screening shall provide protection to prevent materials falling outside of the containment. If plastic sheeting is used it shall be lapped in such a way so as to ensure materials cannot fall outside the containment area.
- (c) Where perimeter containment screening is used to redirect a falling object that may reasonably be expected to hit the perimeter containment screening, onto a catch platform, each screen shall be fitted vertically to the top of or flush with, the outer edge of the catch platform in order to redirect a falling object;
- (d) Where perimeter containment screening is not used to redirect a falling object onto a catch platform, each screen shall be designed to prevent an object, that may reasonably be expected to hit the perimeter containment screening, from falling on persons from the level at which the work is to be done;
- (e) Each of the following gaps shall not exceed 25mm:
  - I. The gap, measured horizontally, between screens immediately beside each other or a screen and the framework supporting it;
  - II. The gap, measured vertically, between a screen and another screen immediately above it or a screen and the framework supporting it.

## **8.13 Scaffold Alteration**

- 8.13.1 Contractor shall ensure control measures are implemented to minimise the risk of injury during scaffold alteration including:
- (a) The scaffold designer is consulted before making any alterations;
  - (b) Only a competent person makes scaffold alterations;
  - (c) Scaffold alterations are in accordance with the scaffold plan;
  - (d) Alterations do not compromise the structural integrity of the scaffold; and
  - (e) Systems are in place (e.g., Regular inspections) to identify unauthorized interference with the scaffold.

## **8.14 Safe Dismantling of Scaffolding**

- 8.14.1 All dismantling activities shall be carried out progressively, reversing the erection sequence and scaffolders shall work along the elevation removing the guardrails and then lowering the scaffold boards from that section to the lift below;
- 8.14.2 Scaffolders shall not remove the guardrails from the whole elevation before lowering the boards;
- 8.14.3 Additional ties may be required during dismantling and in any case no ties or braces shall be removed in advance of general dismantling;
- 8.14.4 Checks shall be carried out as to the stability of the structure and platforms shall be cleared of all materials and debris before dismantling begins;
- 8.14.5 Once a scaffold is partly dismantled, all access to the dismantled sections shall be barred and a warning sign prominently displayed;
- 8.14.6 All materials shall be lowered carefully; surplus boards and fittings shall be removed from the platforms as the work progresses and, particularly, at the end of each day;
- 8.14.7 Fittings shall be stacked at ground level unless the first lift has been specially designed to support the extra loading;
- 8.14.8 The public shall be protected at all times and if necessary, barriers shall be erected around the area where scaffolding is being dismantled.
- 8.14.9 Edge protection and any means of access can be removed as the scaffolding is dismantled, provided it is removed as late as reasonably practicable;
- 8.14.10 A platform of at least 450 mm wide, at the level the dismantling has reached, is in place, where reasonably practicable;
- 8.14.11 That when dismantling scaffold, the platform immediately below the level the employee is standing on, has a full set of boards across its width;
- 8.14.12 A section of the scaffold working platform may be left open to allow the lowering of scaffolding components between levels;
- 8.14.13 All materials shall be passed from one scaffold to another or lowered using a gin wheel. Under no circumstances are materials to be 'bombed' or thrown to the ground level.

## **8.15 Documented Safe Systems of Work.**

- 8.15.1 In accordance with NEOM-SMS -SM – Safety Management Manual - Roles, Responsibilities and NEOM-NLF-NMS-006.004 Permit to Work. Contractor shall ensure documented safe systems of work are developed and implemented that include;
  - (a) Erecting, dismantling, maintaining, and altering the scaffolding;
  - (b) Using the scaffolding;
  - (c) Activities near the scaffolding which may include other employees and members of the public.
  - (d) To develop the documented safe systems of work employers shall consult with:
    - I. The scaffold designer to discuss the design loads and the capability of the structure to support any additional loadings;
    - II. The principal contractor to assess the location of underground drains or pits and the work shall be planned to avoid excavating service trenches under, through or adjacent to scaffolds;
    - III. Employees regarding erecting, dismantling, maintaining, and altering the scaffolding.

- 8.15.2 Contractor shall ensure that the documented safe systems of work include a drawing and details the elevations and sections of the scaffold which shall be communicated to those undertaking the scaffolding work.
- 8.15.3 Contractor shall ensure that the documented safe system of work addresses the following issues.
- (a) Type of scaffold to be erected;
  - (b) Details of any special design considerations;
  - (c) Scaffold erection methodology;
  - (d) Means of access and egress;
  - (e) Type and frequency of ties;
  - (f) Façade and ledger bracing requirements;
  - (g) Safe work sequences including prevention of persons or materials falling.

## **8.16 Specific Work at Height Requirements for Scaffolding.**

- 8.16.1 Contractor shall ensure that all employees engaged in the erection of scaffolding are issued with a personal safety harness. Harnesses are always required to be worn by scaffolders whilst they are working at or may be required to work at a height.
- 8.16.2 Safe systems of work shall be developed, and scaffolders shall ‘clip-on’ whenever they are working outside of an area protected by at least one guardrail provided at a height of 950mm from the working platform.
- 8.16.3 In addition to NEOM NLF NMS 006.007 Working at Heights Contractor shall further consider the hazards which may increase the risk of injury from a fall while erecting, altering, or dismantling scaffolding which include:
- I. Poor environmental conditions;
  - II. Strong winds that may cause employees to lose balance;
  - III. Rain causing a slippery work surface;
  - IV. Glare emitted from work surfaces and/or poor lighting affecting visibility;
  - V. Materials, equipment, or protruding objects below, or in adjoining work area, for example:
  - VI. Pallets of construction materials;
  - VII. Vertical reinforcing steel;
  - VIII. A rubbish skip;
  - IX. Exposed starter bars;
  - X. Fences
  - XI. Avoid areas not identified or protected including ladder access voids;
  - XII. Incomplete scaffolds or loose scaffold components where work is being done, or is reasonably foreseeable to be done;
  - XIII. Appropriate training, instruction, and supervision of scaffold employees.

### **8.16.4 Additional Risk Control Measures whilst Working at Height.**

- (a) In addition to NEOM NLF-NMS 006.007 Working at Heights Contractor shall ensure the health and safety of their employees and implement control measures that shall be used to prevent or minimise exposure to the risk of being hit by falling objects
- (b) Establish exclusion zones around scaffolding and adjoining areas to prevent unauthorized persons from accessing the area;
- (c) Use of perimeter containment screening, scaffold fans, hoardings, or gantries to contain falling objects;

- (d) Erect and dismantle scaffold in built-up areas during quiet times;
- (e) Never drop materials from scaffolds;
- (f) Attach danger tags and warning signs such as "Keep Out – Falling Objects" and 'Danger – Incomplete Scaffolding' in obvious locations to warn persons of hazards.

## **8.17 Mobile Plant and Traffic.**

- 8.17.1 Contractor shall implement control measures that shall be used to prevent or minimise exposure to the risk of injury from moving plant and traffic
- 8.17.2 Re-route motor vehicles and mobile plant away from the location of the scaffold, for example, by using traffic controllers to redirect traffic;
- 8.17.3 Use barricades, signs, posts, buffer rails, guards, or concrete or timber curbs to prevent mobile plant and traffic from meeting scaffolding;
- 8.17.4 Ensure scaffolding does not have any unnecessary protrusions, such as over length transoms, tie tubes or over-height standards;
- 8.17.5 Ensure control measures include the requirements of NEOM-NLF-NMS-006 012 – Barricading of Hazards and NEOM-NLF-NMS-006 013 – Safety Signage and Signals.

## **8.18 Mixing and Matching Scaffold Components**

- 8.18.1 Implement control measures that shall be used to prevent or reduce the risk of injury and scaffold collapse due to the incorrect mixing and matching of components
- 8.18.2 Do not mix scaffolding from different manufacturers, unless a competent engineer confirms that:
  - I. The components are of compatible size and strength;
  - II. The components have compatible deflection characteristics;
  - III. The fixing devices are compatible;
  - IV. The mixing does not lessen the strength, stability, rigidity, or suitability of the scaffold.
- 8.18.3 Avoid mixing and matching different modular systems - often connection points known as the 'star' and 'banana' used on these systems are of a different shape and tolerance and are not compatible;
- 8.18.4 Do not mix scaffolding tubing of different outer diameters and strengths;
- 8.18.5 Do not mix aluminium and steel components as steel clamps may cause aluminium tubing to be crushed, reducing the strength of the tube;
- 8.18.6 'Beam clamps' or 'flange clamps' shall be provided with information about safe use, including tightening torque required and when to use different types of couplers.

## **8.19 Partly Erected or Dismantled Scaffolds.**

- 8.19.1 Ensure no scaffold or part of a scaffold be partly erected or dismantled and remain in such a condition that it is capable of being used unless the scaffold complies with the following:
  - I. A prominent warning notice positioned at or near any point of access indicating that the scaffold, or any part thereof shall not to be used;
  - II. Access to the scaffold or any part thereof is, as far as is reasonably practicable, effectively blocked off.

## **8.20 Care and Maintenance of Scaffolding**

- 8.20.1 That when not in use, ensure scaffolding materials are appropriately stored;
- 8.20.2 When tubes are supplied with a protective coating, care shall be taken to protect the coating so that the tubes do not deteriorate excessively;
- 8.20.3 Unprotected steel shall not be used where the atmosphere is particularly corrosive;
- 8.20.4 Tube straightening shall only be carried out by competent person(s) as there is a tendency for work hardening and consequent brittleness to occur during bending and straightening operations;
- 8.20.5 Split or damaged sections of tube shall be cut out and discarded, all cuts being at right angles to the tube axis;
- 8.20.6 Couplers and fittings shall be examined before use. Moving parts shall be free from wear or damage and be well lubricated;
- 8.20.7 Scaffold boards shall be inspected after each job and any showing signs of abuse, decay or excessive warping shall be discarded. End hoops, or bands, shall be replaced or re-fixed as necessary;
- 8.20.8 Where scaffold boards have split ends, which do not exceed the standard limits, nail plates may be used, and no other repairs shall be carried out;
- 8.20.9 Scaffold boards shall not be painted or treated in any way which could conceal defects;
- 8.20.10 Scaffold boards shall be cleaned on return from site, then stacked flat, and raised from the ground on cross battens;
- 8.20.11 Scaffold boards shall not be used as makeshift crawling boards or for shuttering or propping up door frames;
- 8.20.12 Scaffold boards or other components shall never be dropped or thrown down from a height. The impact resulting from this form of abuse may result in unseen but potentially lethal damage.

## **8.21 Scaffold Construction and Material**

- 8.21.1 Every part of a scaffold shall be of good construction, made of appropriate and sound material and of appropriate strength for the purpose for which it is used;
- 8.21.2 Appropriate materials shall be provided for, and shall be used in the construction of scaffolds;
- 8.21.3 Scaffold construction shall take into consideration the type of work, load, height, and weather conditions;
- 8.21.4 Timber used for scaffold shall be of appropriate quality, be in good condition and have the bark completely stripped off;
- 8.21.5 Timber used for scaffolds, trestles, ladders, and folding stepladders shall not be so painted or treated that defects cannot be easily seen;
- 8.21.6 Metal parts used for scaffolds shall be of good quality, be in good condition and free from corrosion or other defect that could affect their strength;
- 8.21.7 No defective material or defective part shall be used for a scaffold;
- 8.21.8 All material and parts of scaffolds shall, when not in use, be kept in good condition and kept apart from any materials or parts unsuitable for scaffolds;
- 8.21.9 Every scaffold shall be appropriately maintained/kept clean, and every part shall be kept fixed, secured, or placed in position as to prevent, so far as is reasonably practicable, accidental displacement.

## **8.22 Ladders used in Scaffolds**

8.22.1 In addition to NEOM-NLF-NMS 006. 014 – Ladders, and the requirements of OSHA 1910 Subpart – D; the following are additional safe work practices which shall be followed when working on or with ladders used in scaffolds:

- I. Ladders may be used where access to the working platform is needed by only a few persons, and where tools and equipment can be delivered separately to the working platform (for example, by materials hoist, crane or a rope and gin wheel);
- II. Ladders shall be within a separate ladder access bay of the scaffold, wherever space permits;
- III. If the access bay is part of the working platform, a trap door shall be provided;
- IV. Strict control measures shall be implemented to ensure the trap door remains closed while working from the platform; and
- V. Ladders shall be set up on a firm, level surface and not used on scaffold bays to gain extra height.

**NOTE:** Ladders shall not be used as uprights to support a single board working platform. This practice is strictly prohibited.

### **8.22.2 Ladders when Provided for Access**

- (a) Top of the ladder shall be supported by the stiles resting on a firm, even base;
- (b) Stiles shall be securely lashed or fixed with a ladder clamp and shall be kept free from all obstruction, materials, and rubbish, and if they become slippery, shall be cleaned, or sanded as quickly as reasonably practicable;
- (c) Set at a working angle of 75 degrees to the horizontal, e.g., one meter out for every four meters of height, and extend at least 1.05 meters (5 rungs) above platform level to provide appropriate handhold at all stepping-off points;
- (d) Rungs on stepping-off points shall be level with the working platform;
- (e) Ladders required to rise more than 9 meters of vertical height shall have an intermediate landing place provided.
- (f) Outside of working hours, ladders shall be removed or boarded off to prevent access.

## **8.23 Mobile and Static Tower Scaffolds.**

8.23.1 They must be designed and have product conformity certification to OSHA 29 CFR 1926.451 and 452 and or BS EN1004 - Mobile access and working towers made of prefabricated Units — Materials, dimensions, design loads, safety, and performance requirements. During assembly and dismantling it is essential that fall prevention measures are used.

8.23.2 Where system mobile or static tower scaffolds are used the manufacturer's instructions shall be retained or provided by the supplier of the tower;

8.23.3 The height of a mobile or static tower scaffold, from the bottom of the scaffold to the working surface, shall be no greater than three times the minimum base dimension, unless otherwise specified by the manufacturer, supplier, or designer;

8.23.4 Access the tower using a secure internal ladder with a protected opening (for example, a hinged trap door);

8.23.5 Select the appropriate size and capacity castors to support the total mass of the dead and live loads of the tower scaffold;

8.23.6 Use castors that have the working load limit clearly marked;

- 8.23.7 Castors fitted to standards shall be locked when the tower is being erected or in use;
- 8.23.8 Castors with adjustable legs shall be used and adjusted to keep the platform level when the supporting structure / surface is at different heights;
- 8.23.9 Incorporate plan bracing at the base of mobile or static tower scaffolds to provide greater stability in accordance with the manufacturer's instructions;
- 8.23.10 Before moving mobile or static tower scaffolds check that:

- I. There are no power lines or other overhead obstructions;
- II. The ground is firm and level;
- III. No person is on the scaffold;
- IV. No equipment and material can be dislodged from the platform;
- V. The supporting surface is free of obstructions (a small obstruction may cause a mobile scaffold to overturn);
- VI. Electrical equipment and leads cannot be tangled.

8.23.11 Never move the scaffold in windy conditions;

8.23.12 Push or pull a mobile tower scaffold from the base – never use powered vehicles to move the scaffold;

8.23.13 Stabilizer shall be left in position and raised no more than 25mm; and

8.23.14 Do not lift mobile or static tower scaffolds using a crane unless checked by a competent engineer and under no circumstances use a crane to move a lightweight aluminium scaffold.

## **8.24 Inspection of Scaffolding.**

8.24.1 Ensure after erection and prior to use, the scaffold shall be inspected by a competent person to ensure that the scaffold has been erected in compliance with the manufacturer's specifications or the design drawings. It is recommended that a "scaf tag" system be introduced to maintain visual warnings to personnel regard the safe use of the scaffold or the visual warning not to use the scaffold;

8.24.2 If design drawings have been prepared by an engineer, the engineer shall be consulted and provide a sign off certification against the scaffold design drawings;

8.24.3 Keep copies of the certification on site whilst the scaffold is in use;

8.24.4 Ensure the person responsible for the erection of the scaffold provides the employer with a handover certificate which is kept on site until the scaffold has been dismantled;

8.24.5 Ensure that as a minimum, the inspections shall consider:

- I. Scaffold is built in accordance with manufacturer's instructions and approved design drawings;
- II. The scaffold structure is appropriate;
- III. The supporting structure is appropriate;
- IV. Working platforms are secured and protected;
- V. Access and egress are appropriate;
- VI. The scaffold shall enable the work to be performed appropriately and safely.

8.24.6 Determine the frequency of inspections (recording each inspection in a register signed by the competent person) which may vary depending on weather and site conditions, the type and size of the scaffold and the risks associated with scaffold collapse. However, the minimum requirements for scaffold inspections shall be as follows:

- I. Before first use and within every 7 days after this;
- II. After alteration or repair;

- III. After any event that could affect the stability of the scaffold (for example, following strong winds or storms).
  - IV. A tag system, visual indicator for personnel, is recommended to be used by each inspector.
- 8.24.7 Ensure inspection records are kept on site and include the location, comments, date and time of inspections, relevant design or specification reference and the details of the person who conducted the inspection. (Scaffold)
- 8.24.8 Each individual scaffold, including mobile and tower scaffolds, shall be clearly marked, at a prominent location, with the following information:
- I. Date erected;
  - II. Use;
  - III. Loading;
  - IV. Last inspection;
  - V. Inspected by.

## **8.25 Training and Competency**

- 8.25.1 Contractor shall ensure that OHS training complies with the requirements of:
- (a) NEOM-Element 5 – Training, Awareness and Competency.
  - (b) NEOM-NLF-NMS-006.001 – SMS Organisation, Practitioner Registration and Appointment of Contractor.
- 8.25.2 In accordance with NEOM-SMS-SM Safety Management Manual - Roles and Responsibilities. Employers shall ensure employees required to implement the requirements of this NMS are trained in the use of scaffolding and understand the risks associated with using scaffolds and the control measures implemented by the employer.
- 8.25.3 Anyone who works with scaffolds requires the relevant scaffolding competencies. These can be demonstrated in the form of a qualification, certificate, permit, training, or proven experience.
- 8.25.4 Those who assemble or dismantle mobile access towers must be competent and trained to an internationally recognised standard.
- 8.25.5 Those who provide training on mobile access towers, should be able to demonstrate that their training activity – facilities, equipment, instructor qualifications, instructor and course content are subject to independent assessment and ongoing audit by a recognised industry body.
- 8.25.6 The following roles require the stated competencies:
- (a) Scaffold designers - appropriate engineering qualifications and experience;
  - (b) Personnel erecting, modifying, or dismantling a scaffold over 10 meters high and all suspended scaffolds - Scaffolding Competency Certificate issued by approved third party training provider,
- 8.25.7 Personnel erecting, modifying, or dismantling a scaffold below 10 meters high - Scaffolding Competency Certificate issued by a registered trainer
- 8.25.8 Personnel carrying out Scaffold Inspections shall have as a minimum - Scaffolding Inspection Competency Certificate issued by a registered provider.
- 8.25.9 The employer shall provide general training to all persons who work with or use scaffolding as part of their role, including loading requirements and restrictions, inspection requirements and defects, and common hazards.
- 8.25.10 Employers shall maintain a record of the required training that contains the following information:
- (a) Name and ID number;

- (b) Subject(s) of training;
- (c) Training provider;
- (d) Dates(s) of training;
- (e) Person(s) providing the training

## 9 Appendices

## 9.1 Appendix A: Forms, Signs and Checklists

## Example Scaff-Tags



## 9.2 Appendix B: Scaffolding Audit Criteria

### Audit Criteria/ Checklist

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria                |                                     | Requirements  | Verification | Area of Concern |
|-------------------------------|-------------------------------------|---|--------------|-----------------|
| ISO<br>45001:2018<br>Clause   | NMS Ref.                            |   |              | Yes/ No         |
| 5.3                           | 7.1.3                               | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2               | 7.1.4                               | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                           | 7.2.4,<br>7.4,<br>7.2.7,<br>8.25    | The persons appointed to manage /oversee/ work scaffold operations have the skills, knowledge, experience and, where relevant, the organizational capability to manage work safely and without risk to those who may be affected by the activities  |              |                 |
| 8.1.2 (e)                     | 7.2.6,<br>7.3.3                     | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2            | 7.2.5,<br>8.1.1,<br>8.2.2,<br>8.3.1 | Hazards Identification Plan (HIP)<br><br>Assessment of the various risks shall be undertaken, Risk control measures shall be implemented in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment |              |                 |
| 7.5, 7.4.2                    | 8.15.2                              | Contractor shall ensure that the documented safe systems of work include a drawing and details the elevations and sections of the scaffold which shall be communicated to those undertaking the scaffolding work  |              |                 |
| 6.1.2.3,<br>6.1.2.2,<br>8.1.2 | 7.2.2                               | Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition  |              |                 |
| 8.2                           | 8.2.1                               | Ensure that all foreseeable emergency situations are identified, and appropriate emergency/rescue procedures are developed and communicated to all affected persons   |              |                 |
| 8.1.2                         | 8.6.2(IV)                           | If platforms are removed, they shall only be removed in a progressive manner. Prior to dismantling the complete scaffold, boards shall be reinstalled to ensure safety of employees   |              |                 |
| 6.1.2.3,<br>6.1.2.2,<br>8.1.2 | 8.11.1                              | Contractor shall provide safe access to and egress from scaffold during the erection, use and dismantling   |              |                 |
|                               | 8.13.1                              | Contractor shall ensure control measures are implemented to minimize the risk of injury during scaffold alteration  |              |                 |

| Audit Criteria                   |           | Requirements  | Verification | Area of Concern |
|----------------------------------|-----------|---|--------------|-----------------|
| ISO 45001:2018 Clause            | NMS Ref.  |   |              | Yes/ No         |
|                                  | 8.14.1    | All dismantling activities shall be carried out progressively, reversing the erection sequence and scaffolders shall work along the elevation removing the guardrails and then lowering the scaffold boards from that section to the lift below |              |                 |
| 6.1.2.3,<br>6.1.2.2,<br>8.1.2(e) | 8.16.1    | Contractor shall ensure that all employees engaged in the erection of scaffolding are issued with a personal safety harness   |              |                 |
|                                  | 8.16.1(b) | Establish exclusion zones around scaffolding and adjoining areas to prevent unauthorized persons from accessing the area  |              |                 |
|                                  | 8.17.3    | Use barricades, signs, posts, buffer rails, guards, or concrete or timber curbs to prevent mobile plant and traffic from meeting scaffolding  |              |                 |
|                                  | 8.18.1    | Implement control measures that shall be used to prevent or reduce the risk of injury and scaffold collapse due to the incorrect mixing and matching of components  |              |                 |
| 8.1.4,<br>8.1.2                  | 8.20.1    | That when not in use, ensure scaffolding materials are appropriately stored   |              |                 |
| 9.1.1,<br>9.1.2                  | 8.24.1    | Ensure after erection and prior to use, the scaffold shall be inspected by a competent person to ensure that the scaffold has been erected in compliance with the manufacturer's specifications or the design drawings                          |              |                 |

### **9.3 Appendix C: Guidance Information**

9.3.1 OSHA in CFR 1926 looks in detail of all aspects and impacts of construction work. However, no specific stand-alone work at height regulations exists within OSHA. 1926.500-503 requires the employer to take precautions to protect employees working at heights.

9.3.2 OSHA when dealing with work at height has specific requirements regarding fall protection and walking surfaces.

OSHA requires that;

- General Industry - fall protection be provided at elevations over 4 feet
- Shipyards this is at 5 feet
- Construction Industry this is 6 feet and
- Longshoring operations this is 8 feet.

9.3.3 Further guidance can be found in;

- OSHA 3146-05R 201 (Fall Protection in Construction)
- NASC SG: 19:10 a Guide to formulating a rescue Plan
- OSHA -29 CFR 1926 – 1996 and OSHA -29 CFR 1910 - 2016
- For Maritime / Ports / Terminals- OSHA -29 CFR 1215 -1917 & 1918
- OSHA Publication 3150 – (2002) Guidance for Scaffold Use
- ANSI – A 10.8 – 2019 -ANSI A10.8 - Scaffolding Safety Requirements
- OSHA 29 CFR 1926.451 & 452

9.3.4 In the UK system specific Regulations exist and are extremely informative on this subject under the Work at Height Regulations 2005. Specific guidance and educational documents include HSG 150 (Health and Safety in Construction);

- HSG 33 (Health and Safety in Roof Work);
- GEIS 5 (Fragile Roofs);
- GEIS 6 (management and use of mobile elevating work platforms);
- CONIAC -Safety Steps working at height guidance.
- SG19:17 - A Guide to Formulating a Rescue Plan



نیوم NEOM

**NEOM OCCUPATIONAL SAFETY AND HEALTH  
NEOM MINIMUM STANDARD  
for  
PERMIT TO WORK SYSTEMS**

NEOM-NLF-NMS-006.004 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (SAFETY) risks associated with Permit to Work Systems.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions  |
|--------------------------------|--|
| NEOM Co                        | NEOM Company   |
| Client                         | NEOM Sector /Department responsible for management and oversight of the Contractor                       |
| Employer                       | The person or organisation that employs personnel to complete the work                                   |
| Contractor                     | The organisation contracted to carry out the works   |
| Safety Management System (SMS) | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| PTW           | Permit to Work                                 |
| AP            | Authorised Person                              |
| IBC           | International Building Codes                   |
| SAFETY        | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code  | Document Name  |
|----------------|--|
| NEOM Element 2 | Risk and Opportunity Management                      |
| NEOM Element 3 | Control of Documented Information & Legal Compliance |
| NEOM Element 4 | Personal Safety                                      |

| Document Code               | Document Name  |
|-----------------------------|--|
| NEOM Element 5              | Training, Awareness and Competency.  |
| NEOM Element 6              | Contractor Management  |
| NEOM-SMS                    | Neom Safety Management System  |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                   |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table  |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety and Fire Safety requirements for Contractors       |
| NEOM-NLF-NMS-006.001        | OSH-MS Organisation, Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | Safety Construction Management Plan  |
| NEOM-NLF-NMS-006.011        | Excavation Work  |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards   |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)  |
| NEOM-NLF-NMS-006.028        | Lock-out and Tag-out (Isolation).  |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 a General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM—Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;

- (c) Continuous improvement.

## 7.2 Contractor

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM–Safety Management Manual-Roles and Responsibilities
  - (a) Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
  - (b) That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
  - (c) Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
  - (d) Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
  - (e) That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.(Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
- 7.2.2 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Shall ensure that all activities requiring a PTW are identified and managed in a safe manner.
  - (b) Ensure that all persons involved with activities that require a PTW, are competent. (Refer: NEOM Element 5 Training Awareness and Competence)
  - (c) Review routine operations, and where they can be carried out safely and without having an adverse impact on any other activity or persons they may be made exempt from requiring a permit.

## 7.3 Employee

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NLF-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Employees shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Employees shall ensure they follow all the rules and regulation set by the employer with regards to PTW.

## 7.4 Specific Responsibilities

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
  
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.4.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Responsible for Permit System**

- 8.1.1 In this section we place responsibilities on Contractor regarding the development and implementation of Permit to work Systems, however, these responsibilities can equally relate to the Sector, Organisation, Division and or department as well as the Contractor depending on which has control of the work.

### **8.2 Training and Competency**

- 8.2.1 Contractor shall ensure that OSH training complies with the requirements of:
  - (b) NEOM Element 5 – Training, Awareness and Competency.
  - (c) NEOM-NLF-NMS-006.001 – SAFETY-MS Organisation, Practitioner Registration and Appointment of Contractor
- 8.2.2 Contractor shall ensure that all relevant parties are competent to undertake their role within the PTW Procedure.
- 8.2.3 Training shall be developed that is specific to the organisation and defines the roles and responsibilities of each of the prescribed roles in Section 3.
- 8.2.4 Further to role specific training, organisations shall ensure that all staff has been given awareness training on the requirements of the PTW procedure and how this affects their role.
- 8.2.5 Training shall be competency-based and include:
  - (a) Overview of the PTW system.
  - (b) Legal and organisation requirements.
  - (c) Responsibilities and authorities under the PTW system.
  - (d) Documentation requirements.
  - (e) How to close Permits.
  - (f) PTW conditions e.g., validity, required signatures, precautions etc.; and

- (g) Emergency procedures.

### **8.3 Planning and Assessment**

- 8.3.1 Contractor shall evaluate each site or operation to determine if hazards are present that require the additional control of a PTW and the workplace shall be assessed using risk management practices as required by NEOM Element 2 Risk and Opportunity Management.
- 8.3.2 Contractor shall ensure the following:
  - (a) An assessment of the various risks is undertaken, and systems of work are established which are safe to all parties involved or affected including the public.
  - (b) That effective procedures and control measures are implemented in order to manage activities safely and without risk to health. (Refer: NEOM Element 4 Personal Safety)
  - (c) That the management of PTW requirements are included in the Pre-Tender Health and Safety Plan in accordance with NEOM Element 6 Contractor Management
  - (d) That associated safe systems of work, and site rules are included in the Occupational Safety and Health Construction Management Plan NEOM-NLF-NMS-006.002 and in accordance with NEOM Element 6 Contractor Management

### **8.4 Permit to Work Requirements**

- 8.4.1 A permit to work (PTW) system is a formal recorded process used to control work which is identified as potentially hazardous. It is also a means of communication between site/installation management, plant supervisors and operators and those who carry out the hazardous work. Essential features of PTW systems include:
  - (a) Training and instruction in the issue, use and closure of permits.
  - (b) Clear identification of who may authorise particular jobs (and any limits to their authority) and who is responsible for specifying the necessary precautions.
  - (c) Monitoring and auditing to ensure that the system works as intended.
  - (d) Clear identification of the types of work considered hazardous; and
  - (e) Clear and standardised identification of tasks, risk assessments, permitted task duration and supplemental or simultaneous activity and control measures.

- 8.4.2 The PTW does not make the job safe but for effectiveness relies on specified personnel implementing its requirements conscientiously under competent supervision.
- 8.4.3 It is essential that anyone undertaking hazardous work demonstrates that they have followed an appropriate risk assessment process to identify and minimise any hazard associated with the proposed work.
- 8.4.4 PTW systems shall be considered whenever it is intended to carry out work which may adversely affect the safety of personnel, plant, or the environment.
- 8.4.5 PTW systems shall not be applied to all activities, as experience has shown that their overall effectiveness may be weakened.
- 8.4.6 Permits-to-work are not normally required for controlling general visitors to site or routine maintenance tasks in non-hazardous areas.
- 8.4.7 PTW systems are normally considered most appropriate to:
  - (a) Non-production work (e.g., Maintenance, repair, inspection, testing, alteration, construction, dismantling, adaptation, modification, cleaning etc.).
  - (b) Non-routine operations.
  - (c) High risk activities.
  - (d) Where two or more individuals or groups need to co-ordinate activities.
  - (e) Where there is a transfer of work and responsibilities from one group to another.

## **8.5 Permit to Work Procedure**

- 8.5.1 Contractor shall develop a PTW procedure, specific to their undertakings, which considers the following requirements:
  - (a) Ensures the appropriate authorisation for designated work. This may be work of certain types, or work of any type within certain designated areas other than normal operations.
  - (b) Identifies clear roles and responsibilities for all key people involved in the issue and control of a permit.
  - (c) Identifies competency requirements for all roles within the PTW procedure.
  - (d) Defines the types of work, relevant to the organisation that will require a PTW;
- 8.5.2 PTW documentation shall be subject to a document control process including:
  - (a) Master control sheets.
  - (b) Unique reference numbers.
  - (c) Version control; and
  - (d) Controlled storage of completed permits and associated documentation (e.g., Risk Assessments etc.) Refer: NEOM Element 3 Control of Documented Information & Legal Compliance .
- 8.5.3 PTW documentation shall include supporting procedures, PTW forms and certificates, such as isolations or clearances, risk assessments etc.
- 8.5.4 PTW documentation shall clearly identify:
  - (a) Employees undertaking the work.
  - (b) The nature and extent of the job.
  - (c) Hazards identified through risk assessment process.

- (d) Any limitations on the extent of the work.
- (e) The timeframe during which the job may be carried out; and
- (f) Specifies the control measures implemented, including safe isolation from potential risks such as hazardous materials, electricity, and other energy forms.
- 8.5.5 Ensure that the person in direct charge of a unit, plant or installation is aware of all hazardous work being done there.
- 8.5.6 Provides not only a system of continuous control, but also a record showing that the nature of the work and the precautions needed have been checked by an appropriate person or people.
- 8.5.7 Clearly specifies the appropriate display of permits for all relevant parties.
- 8.5.8 Provides a procedure for times when work has to be suspended.
- 8.5.9 Includes the control of work activities that may interact or conflict one another.
- 8.5.10 Includes a formal procedure for use when a permit is required for a period longer than one shift or 12 hours whichever is the lesser.
- 8.5.11 Includes a formal hand-back procedure to ensure that the works are completed, and the area / plant affected by the work is in a safe condition and ready for reinstatement.
- 8.5.12 Provides a process for change, including the evaluation of change on other planned conflicting activities, a determination of when hazards need to be reassessed, and a means for controlled communication of change.
- 8.5.13 Examples of hazardous activities that shall be controlled by a PTW system are described in Table 4.
- 8.5.14 An extensive list of all activities that should be included in a PTW system; shall be identified through a robust risk assessment program (Refer NEOM Element 2 Risk and Opportunity Management)

*Table 4 Examples of Activities requiring a PTW*

| Activity       | Definition   | Examples   |
|----------------|--|--|
| Hot Work       | <ul style="list-style-type: none"> <li>Hot Work where a source of ignition is present or where non-intrinsically safe equipment is being used and there is a risk of fire or explosion</li> <li>Ionizing / Non-Ionizing Radiation</li> </ul> | <ul style="list-style-type: none"> <li>Welding, cutting, grinding</li> <li>Use of Explosive devices</li> <li>Any heat or spark producing work</li> <li>Using of ionizing and non-ionizing radiation or radioactive sources</li> </ul>  |
| Confined Space | <ul style="list-style-type: none"> <li>Work in a Confined Space</li> </ul>   | <ul style="list-style-type: none"> <li>Personnel entry into a confined space</li> </ul>  |
| Weather        | <ul style="list-style-type: none"> <li>Working in Extremes of Temperature</li> </ul>   | <ul style="list-style-type: none"> <li>Work in very hot conditions</li> </ul>  |
| Cold Work      | <ul style="list-style-type: none"> <li>Work that could affect the safety of personnel, equipment, or risk to the environment</li> <li>Any work that does not include a source of ignition</li> </ul>   | <ul style="list-style-type: none"> <li>Ground disturbance / Excavation / trenching</li> <li>Isolation of plant and equipment</li> <li>Working at heights</li> <li>Electrical work</li> <li>Scaffolding (erection and dismantling)</li> <li>Pressure testing</li> <li>Removal / isolation or relocation of safety critical equipment</li> </ul> |

## 8.6 Specific Permit System Roles and Responsibilities

- 8.6.1 The PTW procedure shall identify clear roles and responsibilities for all key duty holders within the procedure. As a minimum the following roles and responsibilities shall be identified and allocated to individuals within the organisation. Each of the roles identified shall be independent and cannot be held by the same person. Each role shall be allocated to named individuals and shall be done formally in writing.

## **8.7 Permit Control Manager**

- 8.7.1 Contractor shall nominate a competent person to be the Permit Control Manager.
- 8.7.2 The Permit Control Manager is the senior manager for the building/facility/project/plant and is ultimately responsible for the PTW system. The Permit Control Manager shall ensure that a competent Authorised Person is appointed to issue and manage Permits, including:
- (a) Ensuring that all relevant employees have undertaking appropriate training;
  - (b) That they have the necessary authority to control the operations being undertaken and have the relevant knowledge of the facility, site, or undertakings.
  - (c) That appropriate procedures are established and maintained for all work done under the PTW system.
  - (d) That arrangements are made for the workforce to be made aware of the permits and systems and are trained in their operation.
  - (e) Ensuring that the PTW system is monitored to ensure that it is effective and correctly applied.
  - (f) That appropriate control measures are implemented for any emergency situations that may arise following nonconformity with the PTW.
  - (g) Ensuring that the PTW system is audited and reviewed; and
  - (h) Allocation of appropriate resources to enable the PTW system to be implemented.

## **8.8 Authorised Person**

- 8.8.1 The Authorised Person (AP) shall be given the authority to issue and sign permits on behalf of the employer. It is essential that the AP has appropriate knowledge about the hazards associated with the relevant activity to allow them to identify those hazards and control measures (e.g., isolations) correctly. Including:
- (a) Shall ensure that all foreseeable hazards associated with the proposed job have been identified and appropriately assessed.
  - (b) Ensure that all steps necessary to ensure the safety of the site or installation have been identified.
  - (c) Shall ensure the work site has been examined, and all precautions specified to be taken before work commences (including isolations) have in fact been taken and shall remain effective while the permit remains in force.
  - (d) Verify that the permit holder, including further staff tasked with undertaking works under the PTW, have appropriate competence to undertake the role and fully understand the risks.
  - (e) Ensure that the permit holder is aware of the precautions taken, any additional ones which are to be taken, particular equipment to be used or worn, and any other procedures which are to be followed.
  - (f) Identify any work activities that may conflict with one another and ensure conflicts are avoided, or precautions included on the permit (e.g., Use of welding shields).
  - (g) Shall ensure that all relevant people are aware of the permit's duration, and action to be taken if the work is suspended.

- (h) By signing the PTW authorise the work to proceed following confirmation that all control measures are implemented and have been signed off.
- (i) Shall ensure that copies of all issued permits are displayed at an appropriate location and in a consistent arrangement so that site personnel can readily see and check which equipment is under maintenance and not available for operation.
- (j) Undertake ongoing inspections of the PTW to ensure risk control measures are being maintained.
- (k) Shall ensure that the work site is examined at any time when work is suspended and before it is restarted, and finally when the work is completed to ensure that it is in a safe condition.
- (l) Ensure that the shift handover procedure is complied with.
- (m) Ensure that the worksite is examined on completion of the works and the PTW is correctly closed, and the relevant persons informed; and
- (n) Ensure appropriate records of all permits and master controls sheet are maintained.

## **8.9 Permit Holder**

8.9.1 The Permit Holder is the competent person who has requested the permit to be issued and shall be fully responsible for the works whilst they are being undertaken. The permit holder and AP (permit issuer) shall not be the same person and shall ensure the following:

- (a) That they and the people working with them understand the operation of (and the consequences of non-compliance with) the PTW systems applicable to the areas in which they are responsible for work.
- (b) Any necessary information, instruction or training is given to users to ensure that they understand the PTW systems, and the specific precautions required for their work.
- (c) That the AP (permit issuer) and permit users fully understand their responsibilities under the PTW system.
- (d) The conditions and precautions specified in the permits are fully understood, implemented, and effectively monitored.
- (e) Immediately stop / suspend work if conditions require or if the PTW requires change.
- (f) Communicate effectively with all parties during the operation of the Permit; and
- (g) That all parties are aware of the completion of the works and the permit is correctly closed with the AP.

## **8.10 Work Party**

8.10.1 The Work Party who undertakes the work shall always comply with the requirements of the PTW including:

- (a) Ensure they understand the scope of work and the control measures implemented.
- (b) Participate in the development or review of the risk assessment.
- (c) Ensure that all control measures defined in the PTW are strictly followed.
- (d) Not interfere with the work of their colleagues and shall adhere to the roles and responsibilities assigned under the PTW.
- (e) Cease work and inform the Permit Holder when there is a breach of the PTW conditions; and

- (f) Ensure worksite is left clean and safe.

## **8.11 Scope of a Permit to Work**

- 8.11.1 There shall be a clearly defined and understood scope of work and validity period.
- 8.11.2 A PTW shall be raised to cover specific work activities. Each PTW shall however only cover one work activity.
- 8.11.3 The work conditions, boundaries and scope of work shall be clearly defined on the PTW form, including the start and finish time of the proposed work.
- 8.11.4 The period for completion of the work shall not exceed the maximum duration of the PTW as defined by the start and finish time. The timeframes for a PTW shall not exceed 12 hours or one working shift, whichever is the lesser timeframe.
- 8.11.5 For the work to extend beyond the stated finish time the PTW shall be revalidated or a new PTW issued.
- 8.11.6 The PTW system shall only allow for limited extensions or revalidations rather than continuously extending previous PTW.

## **8.12 Hazard Identification**

- 8.12.1 All hazards shall be identified, and the risk assessed as per the requirements of NEOM Element 2 Risk and Opportunity Management)
- 8.12.2 At the planning stage an appropriate formal risk assessment shall be undertaken to identify the hazards and assess the risks associated with the scope of work.
- 8.12.3 The risk assessment shall identify any:
  - (a) Simultaneous conflicting activity hazards and their control measures.
  - (b) Workplace environmental monitoring (e.g., Confined space, hot work, etc.); and
  - (c) Control measures required for work that extends beyond a single shift.
- 8.12.4 The risk assessment shall examine external influencing hazards and risks e.g., hazards that exist outside of the immediate scope of the work but may influence the safe completion of the work and example of this could be divers working below a platform – the risk assessment shall consider activities on the platform which may affect the diver's safety (lifting, over the side work etc.).

## **8.13 Control Measures Implemented**

- 8.13.1 All necessary control measures for the safe completion of the work shall be identified on the PTW form and its associated supporting documentation
- 8.13.2 The Permit Holder shall confirm or verify that all control measures are implemented before the commencement of work.
- 8.13.3 In situations where there is a requirement for OSH critical equipment to be removed from service (e.g., components of a fire safety system), the PTW shall identify the control measures required during the isolation of this equipment. The Authorised Person or delegate shall notify:
  - (a) Other potentially affected parties on the facility; and

- (b) Any relevant external parties.

## **8.14 Simultaneous Operations (SIMOPS)**

8.14.1 Workplaces shall have control measures implemented to control risks associated with concurrent or interacting activities. This process shall include the identification and management of:

- (a) Interfaces between working parties; and
- (b) Interfaces between contractors and the organisation.
- (c) Boundary interfaces
- (d) System/equipment interfaces

8.14.2 Where a number of Permits to Work are in operation, the Authorised Person shall designate a competent person to ensure that the interfaces are appropriately managed.

## **8.15 Communication**

8.15.1 Permit Holders shall communicate the requirements of the PTW to the members of the Work Party.

8.15.2 Work shall not proceed until all personnel working on the job confirm, by signature, their understanding of the PTW requirements.

8.15.3 The original PTW form and its associated documentation shall be displayed at the worksite.

8.15.4 A duplicate of all 'live' PTW forms shall be maintained in a central location (e.g., control room, supervisor's office, permit office).

8.15.5 Where work continues over more than one shift, the PTW shall be revalidated or a new PTW issued.

8.15.6 Revalidation shall be subject to site inspection confirming the implemented control measures are still appropriate.

8.15.7 A formal handover process shall be implemented to ensure:

- (a) Effective communication of all relevant work details and control measures between off going and on-coming shifts; and
- (b) Handover of permit authority, permit holder and work party responsibilities.
- (c) The communication of all necessary information shall be in a common language of understanding.

## **8.16 Close Out**

8.16.1 When work is complete or there is a requirement to close the PTW:

- (a) The Permit Holder shall ensure the work site is left in a clean and safe state and where required a process is implemented to manage any follow-up work.
- (b) The Permit Holder shall sign the 'hand-back' section of the PTW form; and
- (c) The AP (permit issuer) shall initiate the removal of control measures originally installed for the work to take place.

- 8.16.2 When the work environment has been returned to a state of readiness for return to normal duties, the AP (permit issuer) shall sign the 'permit closure' section of the PTW form on both original and duplicate copy.

## **8.17 Verification of Isolations**

- 8.17.1 All isolations shall be in accordance with NEOM-NLF-NMS-006.028 Lock-out and Tag-out (Isolation).
- 8.17.2 All isolations shall be verified as being implemented by the Authorised Person before authorisation of the PTW.
- 8.17.3 Isolation certificates shall be included to record and communicate those isolations, checks or other tests have been carried out by an AP (permit issuer). Certificates of Isolation shall be attached to the PTW and entered into an isolation register.
- 8.17.4 Certificates typically cover:
- (a) Electrical isolation / mechanical isolation. (Refer: NEOM-NLF-NMS-006.028 Lock-Out / Tag-Out (Isolations))
  - (b) Ground disturbance. (Refer"NEOM-NLF-NMS-006.011 Excavation Work)
  - (c) Gas testing; and
  - (d) Ionizing radiation.
- 8.17.5 Certificates shall only be signed after an authorised and competent person verifies that isolations and other required control measures are implemented, and the Certificate cross referenced to the controlling PTW.
- 8.17.6 The AP (permit issuer) shall confirm that all defined control measures have been established and authorised signatories have fully implemented any Permit/Certificate requirements.
- 8.17.7 The Permit Holder shall confirm that the workplace is safe to commence work.
- 8.17.8 Certificates are documents that define preparations that are additional to the prime PTW requirements and are required for work to proceed. They do not, by themselves, authorise work to proceed. They cannot stand-alone and shall always be accompanied by a covering PTW.

## **8.18 Management of Change**

- 8.18.1 Where the work scope or circumstances change e.g., conflicts identified during the work activity, work shall immediately cease and the PTW referred back to AP (permit issuer).
- 8.18.2 Where the scope of work or circumstances change the PTW shall be revoked, and a new permit issued with the new control measures identified on it.
- 8.18.3 If work covered by a PTW proceeds from one work shift to the next, the PTW form shall be re-validated with the new (on-coming shift) AP (permit issuer) confirming that it is safe to recommence work.
- 8.18.4 Both the Permit Holder and AP (permit issuer) shall sign-off onto the re-validated PTW form and the new Work Party briefed.

## **8.19 Emergency Situations**

- 8.19.1 In any emergency situation, all Permits to Work shall be suspended until the facility has returned to its normal status.
- 8.19.2 All Permits to Work shall be revalidated or re-issued prior to work resuming.

## **8.20 Record Keeping**

- 8.20.1 Contractor shall ensure records of all permits and master control sheets are maintained for a period of at least 1 year.

## 9 Appendices

### 9.1 Appendix A: Forms, Signs and Checklists



## **9.2 Appendix B: Audit Criteria**

### **9.3 Appendix C: Guidance Information**

OSHA contains no direct requirements on a general PTW system however, in 29 CFR 1910.147(c)(4)(i) requires that employers document the procedure by which the hazardous energy of equipment is isolated during servicing/maintenance operations. This actually sits under “Lock-out / Tag-out” regulations. Further, 29 CFR 1910.146(a) contains requirements for practices and procedures to protect employees from the hazards of entry into permit-required confined spaces.

A permit-to-work system is a formal written process which is or should be, part of an overall safe system of work; used to control potentially high-risk work activities. It specifies the precautions that need to be taken to control the risks.

In UK this requirement sits under the Health and Safety at Work Act 1974, and The Management of Health and Safety Regulations 1999.

The UK Health and Safety Executive publish a free guidance document - HSG250 with specific guidance on PTW systems in INDG98 (rev3) and ISBN 0 7176 1331 3, HSE, 1997. (Guidance on permit-to-work). Although centred around established paper systems, the advice accounts, where possible, for newer electric methods, explores pertinent issues such as training, competence standards, work planning, risk assessment, monitoring, audits, and system reviews.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
UNDERGROUND CONSTRUCTION**

NEOM-NLF-NMS-006.005 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 01,00     | Sector Review          | Issued for Implementation | 01-02-2022 |

## Document Approval

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## OUR NEOM VALUES



### CATALYST

Make a difference.  
Create a legacy.



### CARE

Leave the environment  
in a better place.



### CURIOS

Challenge the norm.  
Stay restless.



### PASSIONATE

Be accountable.  
Finish what you start.



### RESPECT

Be authentic.  
Be true. Be fair.



### DIVERSITY

Embrace cultural  
differences.  
Seek to understand.

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with underground construction.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross Reference Audit Table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

Underground construction work in this NMS includes, but is not limited to:

- I. Piling
- II. Tunnelling; and
- III. Shaft sinking.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with underground construction are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities involved in underground construction.

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms   | Definitions  |
|---|--|
| NEOM Co   | NEOM Company   |
| Client  | NEOM / Department  |
| Employer  | The person or organisation that employs personnel to complete the work   |
| Contractor  | The organisation contracted to carry out the works   |
| Sector, Organization, Department or Contractor      | The Sector, Organization, Department or Contractor is the NEOM entity or developer designated by NEOM to accept custody for planning, designing, constructing, or managing and operating a particular asset or a group of assets   |
| Sector, Organization, Department or Contractor Head | The head of the Sector, Organization, Department or Contractor is responsible and accountable for the implementation and supervision of this procedure within the Sector, Organization, Department or Contractor   |
| Responsible Person                                  | The Sector, Organization, Department or Contractor Head may delegate a "Responsible Person" utilizing their approved delegation of authority process. The "Responsible Person" is the senior NEOM employee who has responsibility for the day-to-day management of the work activities, or the contracted party engaged in such activities |
| Safety Practitioner/ Coordinator                    | The "Safety Practitioner/Coordinator" is an employee working for the Sector, Organization, Department or Contractor Safety Department.   |
| Safety Management System (SMS)                      | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard   |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| PPE           | Personal Protective Equipment                  |
| OSHA          | Occupational Safety and Health Administration. |
| CPP           | Construction Phase Plan                        |
| ASLI          | Automatic Safe Load Indicator                  |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code        | Document Name   |
|----------------------|---|
| NEOM Element 2       | Risk and Opportunity Management   |
| NEOM-Element 3       | Control of Documented Information & Legal Compliance                    |
| NEOM-Element 5       | Training, Awareness and Competency.                                     |
| NEOM-Element 6       | Contractor Management   |
| NEOM Element 9       | Emergency Planning and response Management                              |
| NEOM-SMS             | Neom Co Safety Management System  |
| NEOM-NLF-SM          | Safety Manual - Roles and Responsibilities                              |
| NEOM-NLF-PRC-006     | Section 2 - ISO 14001 cross reference chart                             |
| NEOM-NLF-PRC-006;    | Occupation Health, Safety, and Fire Safety requirements for Contractors |
| NEOM-NLF-NMS-006.002 | Safety Construction Management Plan                                     |
| NEOM NLF-NMS-006.004 | Permit to Work Systems  |
| NEOM-NLF-NMS 006.01  | Organisation and Practitioner Registration                              |
| NEOM-NLF-NMS-006.006 | Safe Use of Lifting Equipment and Lifting Accessories.                  |
| NEOM-NLF-NMS-006.007 | Working at Heights  |
| NEOM-NLF-NMS-006.012 | Barricading of Hazards  |
| NEOM-NLF-NMS-006.013 | Safety Signage and Signals.   |
| NEOM-NLF-NMS-006.014 | Ladders   |
| NEOM-NLF-NMS-006.021 | Personal Protective Equipment (PPE)                                     |
| NEOM-NLF-NMS-006.022 | Occupational Noise  |
| NEOM-NLF-NMS-006.023 | Vibration.  |
| NEOM-NLF-NMS-006.029 | First Aid and Medical Treatment   |
| NEOM-NLF-NMS-006.036 | Lone Working and / or in Remote Locations.                              |
| NEOM-NLF-NMS-006.039 | Hot Works.  |
| OSHA 29 CFR 1926.800 | OSHA – Underground Construction   |

## **7 Roles and Responsibilities**

### **7.1 Client**

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with, the requirements of NEOM-NLF -SM – Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6 - Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 That the contractor has all the available relevant information on the work areas to be excavated. This includes site surveys, plans of services and information on the nature and location of hazardous materials;
- 7.1.6 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.
- 7.1.7 The underground construction employer has been provided with all available descriptions of the site, including drawings, site surveys, plans of services and information on the nature and location of hazardous materials, the nature of building materials and the building or structure's relationship to surrounding properties;
- 7.1.8 All relevant authorities and utility service providers are notified, and all necessary approvals are obtained before work commences;
- 7.1.9 The notification of the owners of adjoining properties of the proposed underground construction work;
- 7.1.10 The location of all utility services is known;
- 7.1.11 Ensure appropriate control measures to prevent cave-in or collapse;
- 7.1.12 Verification of the location and condition of all underground tanks, vaults, wells, voids and structures, and that any chemicals, volatile fuels and gases contained in them are completely removed; and
- 7.1.13 That any historical, archaeological, or geological items are safeguarded or documented;
- 7.1.14 Securing of the site and provision of environment, health and safety control measures until the Contractor takes possession;
- 7.1.15 Informing the contractor and any other relevant parties of the method or methods of underground construction selected and the equipment to be used;

## **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities
- 7.2.2 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
- (a) Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
  - (b) Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 – Training, Awareness and Competence)
  - (c) Prepare for Client approval an emergency response plan aligned with NEOM Element 9 Emergency Planning and response Management)
  - (d) Providing all the required safety and emergency response equipment as identified in the project Construction Phase Plan (CPP) (Refer: NEOM-NLF-NMS-006.002 Occupational Health and Safety Construction Management Plan)
  - (e) Documented safe systems of work are prepared which are designed to ensure that the underground construction works are systematically planned, and appropriate work methods and procedures are in place; (Refer: NEOM NLF-NMS-006.004 Permit to Work Systems)
  - (f) Obtaining all necessary work permits, authorizations and provide all necessary notifications concerning the work;
  - (g) Nominate a person to always supervise the work and implement the underground construction safety operations. This person shall be competent in the type of underground construction work needed for the project and experienced in the implementation of safe work procedures; (Refer: NEOM Element 5 Training, Awareness and Competence)
  - (h) Ensure an inspection of adjacent properties is undertaken when necessary, and ensure that any change in the condition of adjacent properties during the underground construction work is reported to the relevant parties;
  - (i) Erect all appropriate fencing and overhead protection barriers for the protection of employees at the workplace and any others who may be affected by the work; (Refer: NEOM-NLF-NMS-006.012 Barricading of Hazards)
  - (j) Ensure appropriate control measures to prevent cave-in or collapse;
  - (k) Ensure employees are consulted and provided with all the information about the underground construction work, instructions, training, and supervision that they need to perform their work safely;
  - (l) Arrange for the recycling of building waste wherever reasonably practicable and the disposal of all other refuse and debris;
  - (m) Provide appropriate amenities and personal protective equipment for employees; (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment (PPE))
  - (n) Provide appropriate first aid and emergency procedures / services; and
  - (o) Ensure all persons employed have a high standard of physical fitness and that all persons working underground, and all plant operators and banksmen be at least 18 years old.

## **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF -SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any hazard, activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.

- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Carry out their work in accordance with the underground construction procedures;

#### **7.4 Specific Responsibilities**

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers on risks and controls
- 7.4.5 The LP & FS Public Safety department will support the assessments by carrying out compliance checks and supporting and guiding the various safety teams.

### **8 Other Sections Related to Subject**

#### **8.1 Planning**

- 8.1.1 Contractor shall ensure the following:
  - (a) An assessment of the various risks is undertaken, and systems of work are established which are safe to all parties involved or affected including the public; (Refer: NEOM Element 2 Risk and Opportunity Management)
  - (b) That appropriate control measures are implemented to manage activities safely and without risk to health, safety, or the environment;
  - (c) That the management of underground construction requirements are included in the Pre-Tender Environment, Health and Safety Plan in accordance with NEOM-NLF-NMS-006.002 – Safety Construction Management Plan
  - (d) That associated safe systems of work, and site rules are included in the Occupational Health and Safety Construction Management Plan (CPP) are fully implemented.

#### **8.2 Assess the Site**

- 8.2.1 Before any underground construction work is carried out Contractor shall ensure a competent person assesses the work requirements for the site.
- 8.2.2 Following the assessment, the competent person shall prepare documented safe systems of work.

#### **8.3 Documented Safe Systems of Work**

- 8.3.1 Contractor shall ensure that an underground construction risk assessment and appropriate control measures are undertaken through the completion of the documented safe systems of work. (Refer: NEOM Element 2 – Risk and Opportunity Management)
- 8.3.2 Contractor shall ensure the documented safe systems of work are designed to ensure that:
  - (a) Underground construction work is systematically planned; and
  - (b) Appropriate safe work practices and control measures are in place.

## **8.4 Site Survey and Plans**

- 8.4.1 (a) In developing site surveys and plans Contractor shall ensure that:
- (a) The site has been surveyed correctly with markers/confirmation of alignments and boundaries;
  - (b) All available site diagrams, maps, drawings, and specifications and determine the relationships with surrounding properties;
  - (c) Any historical, archaeological, or geological items are safeguarded or documented; and
  - (d) The owners of adjoining property of the proposed excavation are notified.

## **8.5 Services Search**

- 8.5.1 Contractor shall ensure that all services searches are conducted and validated.

## **8.6 Validation Area Risk Assessment**

- 8.6.1 The validation area is the area nominated by the service owner which is the distance from the supposed location of an underground service. The method for determining the exact location of the service within the validation area will be determined by the service owner.
- 8.6.2 Contractor shall ensure a validation area risk assessment is conducted in consultation with the Client / Asset Owner when services are identified, located, and marked on the surface.
- 8.6.3 Where the nominated area differs or overlaps for different authorities or services, the combined areas of the different nominated areas for the different authorities are considered.
- 8.6.4 Validation Area risk assessment and applicable control measures are undertaken through the completion of the document safe systems of work which also includes the controls to be implemented.

## **8.7 Communication - Above Ground Person**

- 8.7.1 Contractor shall ensure that:
- (a) Any time an employee is working underground, the employer shall maintain at least one designated person on duty above ground;
  - (b) The designated person shall maintain a check-in/check-out procedure for keeping an accurate count of persons underground and prevent unauthorized persons from gaining access to the site; and
  - (c) The designated person is responsible for calling for immediate assistance and summoning emergency aid if needed.

## **8.8 Communication - Audible Signals**

- 8.8.1 Contractor shall ensure:
- (a) That audible signals by bell, whistle, or other device shall be used for routine operations such as hoisting and lowering in a shaft;
  - (b) These signals are distinctive and sufficiently loud to avoid confusion with any incidental or accidental noises; and
  - (c) All operatives involved in the operation shall understand what the signals mean.
- 8.8.2 The recommended code is:
- (a) Stop: one extended signal;
  - (b) Lower: two signals;
  - (c) Hoist: three signals;
  - (d) Hoist personnel: four signals; and

- (e) Emergency: continuous.
- 8.8.3 Contractor shall ensure that if natural unassisted voice communication is ineffective at any time, a power-assisted means shall be used to ensure communication between the work face, the bottom of the shaft, and above ground. (Refer: NEOM-NLF-NMS-006.013 – Safety Signage and Signals)

## **8.9 Communication - Visual Signals**

- 8.9.1 Contractor shall ensure signals to machine operators shall be given only by competent banksmen; and all signals are in accordance with NEOM-NLF-NMS-006.013 – Safety Signage and Signals.

## **8.10 Lone Working**

- 8.10.1 Contractor shall ensure that no lone working is permitted when working underground. A team with two persons as a minimum with an intrinsically safe form of communication between them shall be used for the work.
- 8.10.2 Contractor shall ensure that all communication systems are in line with the requirements set out in NEOM-NLF-NMS-006.036 – Lone Working and / or in Remote Locations.

## **8.11 Reporting Hazards and Risks**

- 8.11.1 Contractor shall ensure that any hazardous conditions or occurrences that might affect the safety of employee's shall be recorded, and the employer shall notify all oncoming shifts of occurrences or conditions.
- 8.11.2 These shall include equipment failures, movement/collapse, flooding, fires, or release of gas, any abnormal ground levels, tidal levels, and rainfall.

## **8.12 Control of Access and Egress**

- 8.12.1 Contractor shall maintain safe access to and egress from all underground construction areas at the construction site to protect employees from potential hazards, such as being struck by excavators or other moving equipment.
- 8.12.2 To help control access, all unused openings shall be tightly covered, bulk headed, barricaded, or fenced off, and posted with warning signs that read, "Keep Out" or similar (Refer:NEOM-NLF-NMS-006. 013 – Safety Signs and Signals and NEOM-NLF-NMS-006.012 - Barricading of Hazards).

## **8.13 Heat Stress and Exhaustion**

- 8.13.1 Mechanization, ventilation, and job rotation shall be arranged to reduce the risk of heat stress and exhaustion.
- 8.13.2 Appropriate supplies of cold potable water and areas to rest and cool down shall be made available.

## **8.14 First Aid**

- 8.14.1 Contractor shall ensure:
- (a) Competent personnel, trained in first aid and capable of responding rapidly to any incident are available on each shift during working hours. (Refer: NEOM-NLF-NMS-006.029 – First Aid and Medical Treatment);
  - (b) All personnel shall be instructed that, in the event of serious injury, a casualty shall be moved only by a trained first aider, unless there is the immediate risk of further injury;

- (c) Appropriate first aid boxes are provided, designed to protect the contents as far as reasonably practicable from damp and dirt. They shall be clearly identified, readily accessible to working areas and in the charge of designated first-aiders on each shift;
- (d) Stretchers (and blankets) appropriate for the confined space of a tunnel shall be provided and maintained. They shall be readily accessible for use in working areas in an emergency and shall be protected against dirt and damp. Where access to a tunnel is by a shaft, stretchers shall, where reasonably practicable, be stored at tunnel level; and
- (e) An appropriate means of transporting an injured person to the surface shall be provided. Lifting arrangements in shafts shall take this into account.

## **8.15 Evacuation**

- 8.15.1 Contractor shall ensure a clear plan of action is formulated for the rapid transfer of any injured persons from working areas and to ensure that ambulances can reach shaft tops or other access points quickly.
- 8.15.2 Contractor shall ensure:
  - (a) All employees are given clear instructions on the procedures to be adopted for evacuating tunnels in an emergency;
  - (b) All employees working in the tunnel shall have a portable hand lamp or cap lamp unless natural light or an emergency lighting system provides appropriate illumination;
  - (c) Employees are provided with an escape type breathing apparatus and approved gas monitor if the area they are working may present a gas or smoke hazard;
  - (d) If 25 or more employees work underground at any one time, the Contractor shall provide a fully equipped and trained rescue team together with an appropriate vehicle to transport an injured person to the nearest hospital;
  - (e) If less than 25 employees work underground, there shall be a direct means of communication with the local emergency services; and
  - (f) If a shaft is used as the means of egress, the employer shall arrange for a readily available lifting capability unless the regular lifting means will function in the event of a power failure.

## **8.16 Fire Prevention and Control**

- 8.16.1 Contractor shall ensure:
  - (a) Open flames and fires are prohibited in underground construction areas except as permitted for welding, cutting, or other hot work operations;
  - (b) Smoking is prohibited at all times and notices shall be prominently displayed;
  - (c) Fire extinguishers or extinguishing means shall be available at the head and work areas;
  - (d) All underground structures and those within 30 meters of an opening to the underground shall be constructed of materials with a fire resistance rating of at least one hour. Also, non-flammable or combustible material may not be stored above ground within 30 meters of any access point to an underground operation;
  - (e) Petrol is not kept underground at any time for any purpose;
  - (f) Oil, grease, and diesel fuel stored underground shall be kept in tightly sealed containers in fire-resistant areas away from passageways;
  - (g) Acetylene and liquefied petroleum gas may be used underground for welding, cutting, and other hot work if all requirements/standards pertaining to such activities are met;
  - (h) Only enough fuel gas and oxygen cylinders for welding, cutting, or hot work during a 12-hour period are allowed underground; and
  - (i) Non-combustible barriers shall be installed below such activities if they are performed in or over a shaft or rise.
  - (j) Specific requirements apply to the use of diesel fuel in underground construction operations, and Contractor shall ensure:

- (k) A surface level tank holding diesel fuel to be pumped to an underground storage site shall have a maximum capacity no greater than the amount of fuel required to supply underground equipment for 24 hours;
- (l) A surface level tank shall be connected to the underground fueling station by an acceptable pipe or hose system controlled at the surface by a valve and at the bottom by a hose nozzle;
- (m) The transfer pipe shall remain empty at all times except when transferring diesel fuel; and
- (n) All hoisting operations in the shaft shall be suspended during refueling operations if the supply piping in the shaft is not protected from potential damage.

8.16.2 Ensure compliance to NEOM-NLF-NMS-006.039 – Hot Works.

## **8.17 Noise**

- 8.17.1 Since there is inappropriate space to reduce the level of noise emission by confinement and/or containment retrospectively, Contractor shall ensure all machines and tools are selected based on risk assessment to be designed to eliminate or reduce the noise at source with minimum operator exposure.
- 8.17.2 Contractor shall establish a management system that will:
  - (o) Confirm the appropriateness of the noise and vibration controls;
  - (p) Continually identify significant residual noise sources;
  - (q) Ensure regular maintenance checks and replacement or repair.
  - (r) Ensure compliance to NEOM-NLF-NMS-006.022 – Occupational Noise and NEOM-NLF-NMS-006.023 – Vibration.

## **8.18 Ventilation**

- 8.18.1 Contractor shall ensure:
  - (a) Polluted air is continually removed from tunnels;
  - (b) If natural ventilation does not provide the necessary air quality through appropriate air volume and air flow, the employer shall provide positive mechanical air ventilation to ensure that each employee working underground has at least 5.7 cubic meters (200 cubic feet) of fresh air per minute;
  - (c) The inlet to the ventilation system is positioned away from petrol and diesel engines, hazardous materials, and dust fumes;
  - (d) When performing work that is likely to produce dust, fumes, mists, vapours, or gases (such as manual and mechanized tunnelling, blasting or rock drilling), the linear velocity of air flow in tunnels, shafts, and all other underground work areas must be at least 9.15 m (30 feet) per minute; and
  - (e) The outlet from the ventilation system is positioned such that it is free to disperse any harmful substances away from the entire work area.

## **8.19 Ventilation Systems**

- 8.19.1 Contractor shall ensure the ventilation system is simple, intrinsically safe and designed to be moved forward or extended with the progress of tunnelling.
- 8.19.2 Ventilation systems can include one or more of the following:
  - (a) A forced supply of fresh air, exhaust being through the tunnel and access ways;
  - (b) Extraction of polluted air from the tunnels, fresh air being drawn into the tunnel due to the reduction in pressure caused by the exhaust ventilation;
  - (c) Alteration of forced supply and extraction; and
  - (d) Air movers to assist locally and to eliminate stagnant pockets. If air movers are used locally, care shall be taken to ensure that these will not cause recirculation.

8.19.3 Contractor shall ensure that all ventilation systems are maintained and tested in line with the manufacturers instructions.

## **8.20 Cooling**

8.20.1 Contractor shall ensure the volume of fresh air required for cooling purposes is examined carefully to ensure an appropriate flow of air to keep the working temperature within acceptable limits.

## **8.21 Ventilation Selection**

8.21.1 Contractor shall ensure the methods of ventilation adopted are in accordance with the hazards presented by each tunnelling situation. Factors to be considered include:

- (a) The numbers of face employees;
- (b) The work locations;
- (c) The length, size, and gradient of drive;
- (d) The presence of water, dust, or fumes;
- (e) The presence of methane;
- (f) Whether drilling and firing will be taking place; and
- (g) The amount of waste heat generated by mechanized tunnelling operations.

8.21.2 Where dust is a major problem, Contractor shall ensure the system is designed to control dust and shall incorporate filters to clean the dusty air before readmission to the general body of airflow.

## **8.22 Positioning of Fans**

8.22.1 Contractor shall ensure air intake and exhaust fans on the surface are sited well away from sources of contamination.

## **8.23 Earthing**

8.23.1 The movement of dust and gases through a ventilation system can cause a dangerous build-up of static electricity. Contractor shall ensure all ducts, fan bodies, casings and support structures are appropriately bonded to each other and to an appropriate earth.

8.23.2 Contractor shall ensure air movers and venture devices are earthed.

## **8.24 Methane**

8.24.1 Contractor shall ensure:

- (a) Where an extraction ventilation system is in use and there is a risk of methane being encountered, the design and construction of the system considers the hazard of methane passing through fans and fan motors;
- (b) The methane concentration in the ducts is continuously monitored; and
- (c) If methane is reasonably foreseeable, the fans are explosion-protected.

## **8.25 Dust**

8.25.1 Contractor shall ensure:

- (a) Dust generated from tunnelling works is suppressed at the source as far as is reasonably practicable;
- (b) Its spread is controlled by methods such as water spraying, water infusion and extraction ventilation;

- (c) All efforts shall be made to minimize the problem, and this can be done by dampening down all routes on site, dampening stockpiles and erecting mesh and hoarding to contain materials;
- (d) In dusty conditions, extraction ventilation is provided. Dusty air is usually to be very erosive, and fans and ducts shall be designed accordingly and be appropriately maintained;
- (e) Where extraction ventilation is provided to prevent dust particles migrating back against the main body of airflow, the air velocity in any section of tunnel is not less than 0.5 m/s. Ventilation calculations shall use this as a minimum value; and
- (f) When drilling rock or concrete, dust control measures such as wet drilling, vacuum collectors, and water mix spray systems shall be used to maintain dust levels within limits set for gases, vapours, fumes, dusts, and mists.

## **8.26 General Illumination**

### **8.26.1 Contractor shall ensure:**

- (g) General lighting levels are such that any hazards can readily be seen. Higher lighting levels shall be provided locally, particularly near machinery and in working areas;
- (h) A risk assessment is carried out to help determine whether fixed electric lighting is required and, in the exceptional case where it is not, hand lamps or cap lamps shall be provided;
- (i) Where potentially explosive atmospheres could exist, all lighting shall be explosion-protected;
- (j) Where machinery with moving parts or edges is used, the illumination source shall not create a stroboscopic effect;
- (k) The lighting scheme shall be designed to minimize glare; and
- (l) Where colour recognition is an important factor, the type of light source shall be carefully considered and not affect normal colour perception.

## **8.27 Level of Lighting**

### **8.27.1** Lighting levels shall be measured with a light meter and shall be as high as is reasonably practicable, considering the work to be undertaken in the area. Table 1 below sets out the recommended mean lighting levels.

*Table 4 Lighting Levels*

| <b>Area</b>   | <b>Lighting Level</b>   |
|---|---|
| Walkways  | Minimum 10 lux at walkway level   |
| General working areas                                   | Minimum 100 lux at working surfaces   |
| Tunnel face<br>Excavation areas<br>Crane lifting points | Minimum 100 lux illuminated from at least two widely separated sources to avoid shadows |

8.27.2 The presence of dust or mist in the atmosphere can also have a very significant effect on lighting levels and shall be a consideration in meeting the values in table 1.

8.27.3 Contractor shall ensure regular maintenance including cleaning is conducted and lighting equipment shall be as easily accessible as reasonably practicable.

## **8.28 Type of Lighting**

8.28.1 Floodlights - shall be located at an appropriate height to light areas from above and shall not be directed horizontally. They shall be arranged so that their fields overlap and sited to minimize shadows cast on walkways or workplaces by obstructions or plant etc.

8.28.2 Temporary fixed lighting - considered for longer-term works.

- 8.28.3 Portable lighting – used where no other form of lighting exists for pedestrian access to worksites.
- 8.28.4 Hand lamps or cap lamps – if used it is essential that management procedures be put in place and facilities provided for their appropriate storage, charging, distribution, use, and maintenance.

## **8.29 Emergency Lighting**

- 8.29.1 Because tunnelling is wholly dependent on artificial light, lighting systems shall be made as secure as reasonably practicable, provided with appropriate emergency resources and power supplies.
- 8.29.2 Battery-powered emergency lighting can be used to provide standby lighting. The capacity of the batteries shall be appropriate to maintain the lights for enough time to allow persons in the area to take appropriate action without danger.
- 8.29.3 Emergency lighting shall be installed along the tunnel length at intervals of not more than 10 meters to allow safe egress from the tunnel, and shall be installed at the following locations:
  - (a) Fire and first aid points;
  - (b) Escape routes;
  - (c) Emergency exits;
  - (d) Tunnel access points;
  - (e) Control and communication points; and
  - (f) Locations where particular hazards exist.
- (g) Alternative mains supply or standby generation can also be used to provide emergency lighting.
- (h) Where the emergency lighting is dependent on an alternative supply or standby generator supply, the wiring shall be appropriately protected e.g., resistance to fire, resistance to fire with water, and for resistance to fire with mechanical shock.
- (i) It shall also be protected against mechanical damage.

## **8.30 Atmospheric Conditions**

- 8.30.1 Contractor shall always monitor and control atmospheric conditions within shafts and tunnels with the use of qualified staff and approved atmospheric monitoring devices to be used whilst employees are working in or around shaft or tunnel area.
- 8.30.2 Contractor shall ensure relevant employees are trained in the use of atmospheric monitoring devices, device maintenance, and understanding of gases and other atmospheric conditions that can alter air conditions.
- 8.30.3 The quality of air shall be to the following standards:
  - (a) Not less than 19.5% Oxygen;
  - (b) 79% Nitrogen (includes 0.94% argon);
  - (c) 0.03% carbon dioxide;
  - (d) The total of all other gases shall be less than 0.1%; and
  - (e) Pollutant levels shall not exceed their occupational exposure limits and shall be reduced as low as reasonably practicable.

## **8.31 Lifting Equipment**

- 8.31.1 Contractor shall ensure:
  - (a) Near any shaft, precautions are taken to prepare an appropriate base for positioning a crane to minimize settlement and to spread crane loads as widely as reasonably practicable, and also to avoid excessive lateral thrust from the ground against the shaft lining;

- (b) A reinforced concrete raft, or beams, spanning any sensitive area shall be designed and provided if the ground resistance is locally inappropriate;
- (c) With mobile cranes that are not restricted to predetermined locations, particular care shall be taken to check that loadings imposed upon the ground are kept within safe limits so that they are no greater than the bearing capacity of the ground;
- (d) Where appropriate personnel clearance around a crane (500 mm) cannot be provided, access to areas of restricted clearance shall be prohibited while the crane is operating;
- (e) When long loads need to be slung vertically because of restricted space, the slinging arrangements shall be devised to prevent the load from slipping. This shall be done by providing appropriately designed lifting points;
- (f) If any difficult loads are to be lifted, the shaft is to be cleared of persons other than any essential to the hoisting operation while the lift is in progress and these persons shall be safely positioned;
- (g) Hoists used in underground construction shall be equipped with a limit switch to prevent over travel at the top and bottom of the hoist way; and
- (h) The limit switch shall only be used when operational controls malfunction. Hoist controls shall be arranged so the operator can reach all controls and the emergency power cut-off without reaching beyond his normal operating position.
- (i) Ensure compliance to NEOM-NLF-NMS-006.006 – Safe Use of Lifting Equipment and Lifting Accessories.

### **8.32 Shaft Sinking Methods and Controls - Shafts under Construction**

- 8.32.1 Where mechanical means of excavation are used, it is essential that control measures are implemented to ensure the safety of personnel;
- 8.32.2 If grabs are to be used, personnel shall be either protected within the shaft, or removed from the shaft before grabbing commences;
- 8.32.3 The number of persons in the shaft bottom area shall be kept to a minimum whilst operations are in progress;
- 8.32.4 Control measures shall be established to avoid persons being underneath suspended loads;
- 8.32.5 In small diameter shafts, particular care shall be taken due to the limited scope for refuge, and persons are to be alerted to any loads being sent down;
- 8.32.6 All skips used in shafts shall have positive fixings so that they cannot tip while being hoisted. Other potential hazards, such as material falling off the top due to overfilling, or loose material becoming stuck to the bottom, shall be assessed, and minimized;
- 8.32.7 Larger shafts are often excavated by a 360° hydraulic excavator working within the shaft. Control measures shall be implemented to minimize the risk of persons being struck or trapped by moving plant;
- 8.32.8 When handling loads with a crane or hoist, precautions shall be taken to ensure that:
  - (a) The load or skip does not swing or twist causing it to strike the lining of the shaft or other structure;
  - (b) The load or skip does not catch a ledge, either in lowering or in hoisting, causing it to tip over and spill out its contents (whether persons or materials);
  - (c) The rope does not become slack when the load is resting on the bottom or on a stage and catch in some part of the shaft structure, with resultant damage when tightened;
  - (d) All plant regularly transferred down the shaft shall be designed for hoisting and be tested and certificated for such work; and
  - (e) As a standard procedure in lifting, the load shall be lifted a short distance then stopped, steadied and inspected before hoisting continues.

## **8.33 Permanently Disused Shafts**

8.33.1 Contractor shall ensure:

- (a) When a shaft is to be decked over on completion of its use, the decking used shall be specifically designed for that purpose and shall be installed for its intended use; and
- (b) If a void is left, it shall be ventilated. Traceable records shall be kept of all disused shafts or access tunnels giving details of the shaft or tunnel, and the method of capping or filling.

## **8.34 Temporarily Disused Shafts**

8.34.1 Contractor shall ensure:

- (a) When a shaft is temporarily disused following sinking, it shall be securely covered to prevent unauthorized access;
- (b) To enable escape or to allow access for inspection purposes it is advisable to maintain a lockable opening in the cover; and
- (c) That the cover shall be vented.

## **8.35 Tunnel Eye**

8.35.1 Contractor shall ensure:

- (a) A shaft through which any opening is to be formed shall be designed to facilitate the safe construction and use of that opening;
- (b) When a tunnel eye is to be provided near the shaft bottom through which the tunnel or heading is to be formed, the shaft structure shall be supported as for a tunnel opening;
- (c) The actual operation of breaking out shall be carried out with the utmost care because the ground is inevitably disturbed by the sinking of the shaft, and it is probable that water has followed down the side of the shaft however carefully grouting has been done. Contractor shall provide immediate close support of all ground around the opening; and
- (d) In bad ground, Contractor shall fix the first setting of a heading, or build the first ring of iron or concrete, within the shaft. Alternatively, a small heading can be driven out of the shaft, from which a break-up for the full-size access tunnel is constructed at a safe distance in undisturbed ground, the heading or tunnel being subsequently enlarged back to the shaft.

## **8.36 Shaft Top Layout**

8.36.1 Contractor shall ensure:

- (a) The layout and detail at the top of the shaft shall be designed to prevent the accidental fall of persons, plant, spoil, or material into the shaft;
- (b) The area immediately around each shaft shall be level, clear of obstructions and appropriately drained; it shall generally provide a safe working area, and shall be appropriately lit;
- (c) Stacking and storage of materials shall be arranged at a distance from the shaft top so that excessive ground pressures are not imposed on the shaft;
- (d) The shaft shall be guarded using, for example, additional segmental rings or substantial steelwork and/or solid barriers and mesh, which shall reach a height of at least 1.2 meters above adjacent ground level;
- (e) Surface water shall be excluded from the shaft by the provision of run-off barriers and by drainage and pumping if necessary. Special precautions shall be taken against inundation; and
- (f) As mobile plant poses a particular hazard, either it shall be physically prevented from working near a shaft, or barriers shall be erected that are robust enough to prevent the equipment from falling into the shaft.

## **8.37 Personnel Access**

8.37.1 Contractor shall ensure:

- (a) Personnel access in shafts shall be by fixed access equipment such as a mast climbing hoist or man-riding crane where it is reasonably practicable to provide such equipment;
- (b) In all cases where the normal means of access is by mechanical means (hoist or crane), there shall be a secondary means of egress to cover plant breakdown;
- (c) Fixed access shall be provided in every shaft as early as reasonably practicable, and in any case on completion, except where an alternative route provides safe pedestrian access to the base of the shaft. Fixed access includes stairways, ladder-ways, or vertical ladders with protective hoops; (Refer: NEOM-NLF-NMS-006.014 Ladders)
- (d) Ladders shall be securely fixed at its base and at the upper landing. It shall extend at least 1.1 meters above the upper landing unless another appropriate handhold is provided;
- (e) Vertical ladders fixed to shaft walls shall be made of steel (rather than light alloy or timber). Vertical ladders shall have protective hoops and straps fixed above a height of 2.5 meters from a landing;
- (f) The foothold at every rung on all ladders shall be unobstructed. Landings shall be at intervals not exceeding 9 meters. They shall be solidly constructed with handrails, guard rails and toe boards. Openings for ladders shall be as small as is practicable and sited clear of the foot of the upper ladder. Every landing shall be appropriately lit;
- (g) Stair bays and ladder bays in shafts shall be protected by substantial barriers against swinging loads being handled in the shaft; and
- (h) All means of access including hoists shall be inspected weekly, and maintenance carried out where necessary. (Refer to NEOM-NLF-NMS-006.014 - Ladders and NEOM-NLF-NMS-006.007 – Working at Heights).

## **8.38 Pipe Jacking**

8.38.1 Contractor shall ensure:

- (a) The high thrusts necessary to propel the pipe forward shall be resisted by an appropriately designed and constructed abutment or thrust wall at the shaft base;
- (b) Hydraulic rams and any load-spreading rings, spacing blocks or packers shall be carefully secured, with all loaded surfaces precisely aligned perpendicular to the thrust;
- (c) As far as reasonably practicable, persons shall be protected from and withdrawn from the vicinity of highly stressed equipment during thrusting;
- (d) Hydraulic pipes and flexible hoses, shall be appropriately protected from crushing and impact damage;
- (e) When jacking pipes through loose or water-bearing soils, a slurry machine or an earth-pressure balance machine shall preferably be used to contain the face safely;
- (f) When using an open shield, precautions shall be taken against a run of loose material into the face of the shield, which could lead to the collapse of the overlying ground;
- (g) When jacking pipes into firm or stiff clays, the techniques adopted shall consider any displacement of the soil caused by entry of the pipes, and reasonably practicable heave of the ground surface; and
- (h) Jacking pipes are installed via a working shaft and joined using hydraulic jacks. It is essential that all persons seek shelter or protection within the part-completed pipeline or elsewhere whilst pipes are lowered.

## **8.39 Ground Support - Ground Support of Portal and Subsidence Areas**

8.39.1 Subsidence areas shall be similarly guarded by shoring, filling in, or placing barricades and warning signs to prevent entry.

- 8.39.2 Portal openings and access areas shall be guarded by shoring, fencing, head walls or equivalent protection to ensure that employees and equipment have a safe means of access to these areas.
- 8.39.3 Adjacent areas shall be scaled or secured to prevent loose soil, rock, or fractured materials from endangering portal, subsidence, and access areas.

#### **8.40 Ground Support of Underground Areas**

- 8.40.1 A competent person shall inspect the roof, face, and walls of the work areas at the beginning of each shift and as often as necessary, also any loose ground considered to be hazardous to employees shall be scaled, supported, or taken down.
- 8.40.2 A competent person shall determine how often rock bolts need to be tested to ensure that they meet the necessary torque, taking into consideration ground conditions, distance from vibration sources and the specific bolt system in use. Only torque wrenches shall be used when torsion-dependent bolts are used for ground support.
- 8.40.3 Employees involved in installing ground support systems shall be appropriately protected from the hazards of loose ground.
- 8.40.4 The bottoms of any support sets installed shall have appropriate anchorage to prevent ground pressures from dislodging the support base.
- 8.40.5 Lateral bracing (including collar bracing, tie rods, or spreaders) shall be provided between immediately adjacent sets to increase stability.
- 8.40.6 Any dislodged or damaged ground supports that create a hazardous condition shall be promptly repaired or replaced. The new supports shall be installed before removing the damaged supports. Some type of support, such as a shield, shall be used to maintain a safe travel way for employees working in dead-end areas ahead of any support replacement operations.

#### **8.41 Ground Support of Shafts**

- 8.41.1 Shafts and wells more than 1.5 meters deep and entered by employees shall be supported by steel casing, concrete pipe, timber, solid rock, or other appropriate material.
- 8.41.2 The full depth of the shaft shall be supported except where it penetrates solid rock that will not change as a result of being exposed.
- 8.41.3 Where the potential for shear exists, where the shaft passes through earth into solid rock in either direction, or where the shaft ends in solid rock, the casing or bracing shall extend at least 1.5 meters into the solid rock.
- 8.41.4 The casing or bracing shall also extend a minimum of 1.2 meters above ground level unless a standard railing is installed, the adjacent ground slopes away from the shaft collar and barriers exist to prevent mobile equipment operating near the shaft from jumping over the bracing.
- 8.41.5 If these conditions are met, the casing or bracing may be reduced to 300mm (12 inches) above ground.

#### **8.42 Piling Operations - Underground services**

- 8.42.1 Contractor shall ensure that prior to any piling operation all underground services in the area shall be located, clearly marked and rendered safe.
- 8.42.2 Contractor shall consult the relevant utility service providers where underground services are expected or known to exist.
- 8.42.3 Contractor shall conduct a ground survey to identify any underground storage tanks, culverts or other underground spaces that could present a hazard during piling operations.

## **8.43 Piling Operations - Piling Rigs**

- 8.43.1 Contractor shall ensure that piling rigs are subject to the requirements of NEOM-NLF-NMS-006.006 – Safe Use of Lifting Equipment and Lifting Accessories.
- 8.43.2 Contractor shall ensure that all piling rigs with a SWL more than 1 ton are provided with a fully operational 'Automatic Safe Load Indicator' (ASLI).
- 8.43.3 Contractor shall ensure the following:
  - (a) Piling mats shall be used where necessary to provide a firm and level surface with an appropriate bearing value for the piling rig(s);
  - (b) All piling rig movements shall be under the supervision of a trained and competent banksman;
  - (c) Barriers shall be erected around piling rig operations to prevent access to hazardous areas by unauthorized persons. Barriers shall be provided in accordance with NEOM-NLF-NMS-006.012 – Barricading of Hazards;
  - (d) All piling rigs shall be maintained in accordance with the manufacturer's manual and recommendations.

## **8.44 Piling Activities**

- 8.44.1 Contractor shall ensure the following:
  - (a) Where reasonably practicable pile cases shall extend between 1.2 meters and 1.5 meters above the ground level to provide edge protection to the shaft;
  - (b) Spoil from auger piling activities shall be cleared from around the pile casing regularly, the accumulation of spoil shall be avoided;
  - (c) Work shall be organized to allow piles to be concreted on the same day. Where piles are not filled, they shall be securely covered at the end of each shift;
  - (d) An effective means of cleaning the auger as it is being withdrawn shall be implemented to prevent spoil falling from the top of the extracted auger onto persons working below;
  - (e) Care shall be taken when raising and lowering sheet piles to ensure that the load on the crane hook is kept vertical;
  - (f) The lifting of steel reinforcement cages shall be under the direction of a competent engineer. Lifting points shall be designed into the steel reinforcement cage construction with an appropriate safety factor;
  - (g) Sheet piles and pile cases shall not be left in the vertical position and unsupported unless at least one third of the length has been driven into the ground;
  - (h) Access by any person into a pile shaft is strictly prohibited; and
  - (i) The extraction of sheet piles shall be subject to the recommendations of a competent engineer considering the ground conditions and frictional forces imposed by the soil.

## **8.45 Requirements Relating to the Use of Tripods**

- 8.45.1 Contractor shall ensure the following:
  - (a) No tripod shall be used unless the rig is tested and the legs marked with a unique identification number. The numbers on the items shall coincide with the numbers on the test and examination records;
  - (b) Wire ropes shall be secured with appropriate fastenings, e.g., Bulldog clips;
  - (c) Where appropriate, appropriately constructed saddles or hard eyes shall be used;
  - (d) Base plates shall be appropriate and secured to prevent any accidental movement of the rig;
  - (e) Tripod legs shall not be overspread or overloaded;
  - (f) Only the correct pins shall be used in the sheerleg's;
  - (g) The safe working load shall be clearly marked on the winch, and records kept of test and thorough examination;

- (h) All parts of the winch shall be guarded;
- (i) Constant attention shall be paid to the condition of ropes, which shall be replaced when worn outside the manufacturer's limits;
- (j) When a rope/chain block is being used to extract the casings, the capacity of the block shall not exceed the capacity of the rig; and
- (k) Under no circumstances shall there be less than 2 full turns of the rope on the winch drum at any time.

## **8.46 Training and Competency**

8.46.1 Contractor shall ensure that Safety training complies with the requirements of:

- (a) NEOM-Element 5 – Training, Awareness and Competency;
- (b) NEOM-NLF-NMS-006.001 – SMS Organisation, Practitioner Registration and Appointment of Contractor.

8.46.2 Contractor shall ensure personnel required to implement the requirements of this NMS are trained in underground construction and understand the risks associated with underground construction and the control measures are implemented by the employer.

8.46.3 Contractor shall ensure all employees involved in underground construction shall be trained to recognise and respond to hazards associated with this type of work.

8.46.4 Training shall be tailored to the specific requirements of the jobsite and include any unique issues or requirements and the following subjects shall be part of the employee underground construction training program:

- (a) Identified hazards and risks;
- (b) Site rules and prohibited activities;
- (c) Confined space operations;
- (d) Devised safe methods of working;
- (e) Air monitoring and ventilation;
- (f) Access and egress;
- (g) Illumination;
- (h) Communications;
- (i) Flood control;
- (j) Personal protective equipment;
- (k) Emergency procedures, including evacuation;
- (l) Check-in/check-out procedures;
- (m) Fire prevention and protection; and
- (n) Mechanical equipment.

8.46.5 Contractor shall maintain a record of the required training that contains the following information:

- (a) Name and ID number;
- (b) Subject(s) of training;
- (c) Training provider;
- (d) Date(s) of training; and
- (e) Person(s) providing the training.

## 9 Appendices

### 9.1 Appendix A: Forms, Signs and Checklists



## 9.2 Appendix B: Audit Criteria UNDERGROUND CONSTRUCTION

### Audit Criteria/ Checklist

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria              |   | Requirements  | Verification | Area of Concern |
|-----------------------------|---|---|--------------|-----------------|
| ISO<br>45001:2018<br>Clause | NMS Ref.  |   |              | Yes/ No         |
| 5.3                         | 7.1.3   | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2             | 7.1.4   | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                         | 7.2.1(b),<br>8.46   | Persons appointed to manage /oversee work operations have the skills, knowledge, experience   |              |                 |
| 8.1.2 (e)                   | 7.2.2(m),   | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2          | 7.1.5,<br>7.2.5,<br>8.2.2,<br>8.1.1(a),<br>8.6,<br>8.11.1 | Hazards Identification Plan (HIP), the contractor shall collect all relevant information on the work areas to be excavated, including site surveys, plans of services and information on the nature and location of hazardous materials   |              |                 |
|                             |   | Assessment of the various risks shall be undertaken, any hazardous conditions or occurrences that might affect the safety of employee's shall be recorded, and the employer shall notify all oncoming shifts of occurrences or conditions   |              |                 |
| 8.1.2                       | 7.2.2(i)  | Erect all appropriate fencing and overhead protection barriers for the protection of employees at the workplace and any others who may be affected by the work  |              |                 |
| 8.2                         | 7.2.2(n)  | Provide appropriate first aid and emergency procedures / services   |              |                 |
| 5.3                         | 8.7.1   | Any time an employee is working underground, the employer shall maintain at least one designated person on duty above ground to maintain a check-in/check-out procedure for keeping an accurate count of persons underground and prevent unauthorized persons from gaining access to the site |              |                 |
| 7.4.2                       | 8.8   | Contractor shall provide audible signals by bell, whistle, or other device for routine operations such as hoisting and lowering in a shaft  |              |                 |
| 6.1.3,<br>8.1.2             | 8.10.1  | Contractor shall ensure that no lone working is permitted when working underground. A team with two persons as a minimum with an  |              |                 |

| Audit Criteria                                |          | Requirements  | Verification | Area of Concern |
|---|----------|---|--------------|-----------------|
| ISO 45001:2018 Clause                         | NMS Ref. |   |              | Yes/ No         |
|   |          | intrinsically safe form of communication between them shall be used for the work  |              |                 |
| 6.1.2.3,<br>6.1.2.2,<br>8.1.2                 | 8.13.1   | Mechanization, ventilation, and job rotation shall be arranged to reduce the risk of heat stress and exhaustion   |              |                 |
| 7.2,<br>10.2                                  | 8.14     | Competent personnel, trained in first aid and capable of responding rapidly to any incident are available on each shift during working hours  |              |                 |
| 8.1.2,<br>6.1.4                               | 8.16.1   | Open flames and fires are prohibited in underground construction areas except as permitted for welding, cutting, or other hot work operations   |              |                 |
|   | 8.19.1   | Contractor shall ensure the ventilation system is simple, intrinsically safe and designed to be moved forward or extended with the progress of tunnelling   |              |                 |
| 6.1.1,<br>6.1.2,<br>6.2.1,<br>8.1.2,<br>9.1.2 | 8.30.1   | Contractor shall always monitor and control atmospheric conditions within shafts and tunnels with the use of qualified staff and approved atmospheric monitoring devices to be used whilst employees are working in or around shaft or tunnel area                          |              |                 |
|   | 8.32.1   | Where mechanical means of excavation are used, it is essential that control measures are implemented to ensure the safety of personnel  |              |                 |
|   | 8.37     | Personnel access in shafts shall be by fixed access equipment such as a mast climbing hoist or man-riding crane, in all cases where the normal means of access is by mechanical means (hoist or crane), there shall be a secondary means of egress to cover plant breakdown |              |                 |
|   | 8.42.1   | Contractor shall ensure that prior to any piling operation all underground services in the area shall be located, clearly marked and rendered safe  |              |                 |
|   |          |   |              |                 |

### **9.3 Appendix C: Guidance Information**

OSHA Standard 1926.800 which are quite exhaustive on the subject of underground construction and other work underground. Guidance is also available from UK HSG 47 regarding safe excavation and buried services.

Further advice and guidance is found in Chief Fire and Rescue Advice (CFRA) regarding operational guidance for incidents in tunnels and underground structures.

Other guidance and information can be found in the UK Quarries Regulations 1999 and the Mines and Quarries Act of 1954. In America the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA) are separate Department of Labour agencies.

MSHA is responsible for regulating and enforcing the Federal Mine Safety and Health Act of 1977 (Mine Act) as amended by the MINER Act of 2006. Much guidance and information are available from MSHA regarding underground working.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
SAFE USE of LIFTING EQUIPMENT  
and LIFTING ACCESSORIES**

NEOM-NLF-NMS-006.006 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety risks associated with the safe use of Lifting Equipment and Lifting Accessories.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

It applies to the use of all types of Lifting Equipment and Lifting Accessories

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with the work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions  |
|--------------------------------|--|
| NEOM Co                        | NEOM Company   |
| Client                         | NEOM Sector /Department responsible for management and oversight of the Contractor   |
| Employer                       | The person or organisation that employs personnel to complete the work   |
| Contractor                     | The organisation contracted to carry out the works   |
| Lifting Operation              | The operation of lifting or lowering a load using lifting equipment;   |
| Lifting Equipment              | Any device used for lifting or lowering a load and typically includes mobile cranes, tower cranes, gantry cranes, crawler cranes, hoists and elevating work platforms;   |
| Common Lift                    | Refers to any routine or regular lifting operation that is carried out where the lifting equipment, lifting accessory and the load are the same in each case. An example of a common lift is the unloading of steel reinforcement from a delivery lorry at the same radius, using the same crane and lifting accessory   |
| Special Lift                   | Any lifting operation which is carried out infrequently or as a 'one-off' on the site and there is change in either the lifting equipment used or the lifting accessory. An example of a special lift is the lifting of air conditioning plant onto the roof of a building which will only be carried out once and will require a detailed lifting assessment; |
| Lifting Accessory'             | Any accessory connected to lifting equipment used in connection with lifting or lowering a load, it includes chains, slings, shackles, wire ropes and any accessory that may be used to carry a load such as a concrete skip or man riding basket;   |
| Signaller/Slinger              | Any employee connecting a load to lifting equipment or any employee providing directions to the operator of any lifting equipment. Can also be known as 'Rigger'; and  |
| Appointed Person               | A trained and competent person in the use and control of lifting equipment appointed by the employer.  |
| Safety Management System (SMS) | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard   |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| NMS           | NEOM Minimum Standard                          |
| OHS           | Occupational Health and Safety                 |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| MEWP          | Mobile Elevated Work Platform                  |

| Abbreviations | Descriptions                 |
|---------------|------------------------------|
| IBC           | International Building Codes |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance                      |
| NEOM Element 4              | Personal Safety   |
| NEOM-Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM Element 9              | Emergency Planning and Response Management                                |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors   |
| NEOM-NLF-NMS-006.001        | SMS Organisation, Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | Safety Construction Management Plan                                       |
| NEOM-NLF-NMS-006.003        | Scaffolding   |
| NEOM-NLF-NMS-006.007        | Working at Heights  |
| NEOM-NLF-NMS-006.008        | Overhead and Underground Services   |
| NEOM-NLF-NMS-006.011        | Excavation Work   |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards  |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals  |
| NEOM-NLF-NMS 006.016        | Electrical Safety   |
| NEOM-NLF-NMS-006.020        | Hazardous Materials   |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                       |
| NEOM NLF- NMS-006.022       | Occupational Noise  |
| NEOM NLF- NMS-006 .023      | Vibration   |
| NEOM-NLF-NMS-006.024        | Occupational Health Screening and Medical Surveillance                    |
| NEOM-NLF-NMS-006.028        | Lock Out / Tag Out  |
| NEOM-NLF-NMS-006.029        | First Aid and Medical Treatment   |
| NEOM-NLF-NMS-006.030        | Machine Guarding  |
| NEOM-NLF-NMS-006.042        | Workplace Wellness  |

## **7 Roles and Responsibilities**

### **7.1 Client**

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 OSH Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.
- (a) Client shall undertake their specific roles and responsibilities in accordance with the following:
- 7.1.6 That contractors have all available descriptions of the site, including design drawings, site surveys, plans of services and information on the nature and location of hazardous materials, the nature of building materials and the building or structure's relationship to surrounding properties;
- 7.1.7 Implement control measures to check that lifting operations carried out on their site are undertaken safely;
- 7.1.8 All relevant authorities and utility service providers are notified, and all necessary approvals are obtained before work commences; and
- 7.1.9 The workplace is secured to prevent unauthorised access.

### **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM–NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)

- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management Management)
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available. (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
- 7.2.7 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
- (a) Lifting plans are prepared and as regularly as necessary updated to reflect the type of lifting operations being carried out at the site;
  - (b) Specific lifting plans are developed when special (complex) lists are to be undertaken;
  - (c) All lifting operations are planned and carried out in accordance with the specific control measures identified in the lifting plan;
  - (d) All employees undertaking lifting operations are trained and competent;
  - (e) The place where lifting operations are undertaken is safe;
  - (f) Where an employer is to use lifting equipment or lifting accessories provided by another employer, they shall ensure that it is inspected by a competent person and declared safe and appropriate for use;
  - (g) Employees undertaking lifting operations have received appropriate medical screening and surveillance as required by NEOM-NLF-NMS 006.024 – Occupational Health Screening and Medical Surveillance;
  - (h) Shall ensure that lifting equipment used in operations is fit for purpose, appropriately maintained and serviceable, and that any associated risks in using the equipment are identified and mitigated or appropriately controlled.

### **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NLF-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Employees shall undertake their specific roles and responsibilities with regards to the use of lifting equipment and lifting accessories in accordance with the following:
- (a) Following any training or certification provided for the use of lifting equipment;
  - (b) Comply with information provided by the employer regarding general health and safety rules governing the use of lifting equipment and lifting accessories;
  - (c) Observe exclusion zones provided by the employer where lifting operations are being carried out;
  - (d) Report any damage or defect noted or suspected in any item of lifting equipment or lifting accessory; and

- (e) Take reasonable care to ensure that neither lifting equipment nor lifting accessories are overloaded or used incorrectly.

## **7.4 Appointed Person**

- 7.4.1 Appointed persons shall undertake their specific roles and responsibilities with regards to the use of lifting equipment and lifting accessories by ensuring the following:
  - (a) Appropriate planning of all lifting operations;
  - (b) That a lifting plan is prepared and regularly updated;
  - (c) Provide advice and guidance to signaller/slingers and lifting equipment operators on the identified safe system of work;
  - (d) That a schedule of common lifts is developed detailing the means of lifting common loads on the site; and
  - (e) Develop procedure to ensure that where special lifts are undertaken arrangements are in place to ensure that lifting operations can be carried out safely.

## **7.5 Signaller/Slingers**

- 7.5.1 Signaller/slingers shall undertake their specific roles and responsibilities with regards to the use of lifting equipment and lifting accessories by ensuring the following:
  - (a) Follow a safe system of work when lifting operations are being carried out;
  - (b) Report any condition or situation to the employer immediately that could affect lifting operations being undertaken safely;
  - (c) Visually inspect lifting accessories prior to each use and immediately report any damage or suspicion of damage to the employer;
  - (d) Not use any damaged or defected lifting equipment or undertake any lifting operations that are not safe to do so;
  - (e) Ensure that lifting accessories are used in accordance with the lifting plan and their individual Safe Working Load (SWL)
  - (f) Suspend immediately any lifting operation where there is a loss of and/or breakdown in communication with the operator of the lifting equipment.

## **7.6 Banksman / Signallers**

- 7.6.1 Banksman / Signaller shall follow the instructions shown in Appendix A

## **7.7 Specific Responsibilities**

- 7.7.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.7.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.7.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.7.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.7.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Training and Competency**

8.1.1 Contractors/Employers shall ensure that OSH training complies with the requirements of:

- (a) NEOM-Element 5 – Training, Awareness and Competency.
- (b) NEOM-NLF-NMS-006.001 – OSH-MS Organisation, Practitioner Registration and Appointment of Contractor.

8.1.2 Contractors/Employers shall ensure that employees required to implement the requirements of this NMS are trained in the use of lifting equipment and lifting accessories in accordance with the following:

- (a) That all employees involved in using lifting equipment and lifting accessories are trained to recognise and respond to hazards associated with this type of work.
- (b) Ensure that all employees who operate lifting equipment hold the appropriate licences
- (c) Ensure that all employees operating lifting equipment are trained and approved specifically in the use of that type of equipment through an approved training provider.(Refer: NEOM Element 5 Training, Awareness and Competency)
- (d) All employees working as signallers/slingers shall be trained specifically in signalling and slinging techniques through an approved training provider (Refer: NEOM-NLF-NMS-006.013 Safety Signage and Signals)
- (e) Clear detailed instruction shall be provided for those working directly with lifting equipment and lifting accessories; and
- (f) Details on the care and inspection requirements of lifting equipment and lifting accessories.

8.1.3 Employers shall maintain a record of the required training that contains the following information:

- (a) Name and ID number;
- (b) Subject(s) of training;
- (c) Date(s) of training; and
- (d) Person(s) providing the training.

### **8.2 Appointed Person Requirements**

8.2.1 Where any type of crane is being used for lifting operations an appropriately qualified competent person shall be appointed as the ‘Appointed Person’;

8.2.2 Qualifications for the Appointed Person shall include consideration of the following:

- (a) Previous experience in the use of a similar type of crane(s);
- (b) Minimum 5 years' experience in working with lifting equipment;
- (c) Trained and competent signaller/slinger in possession of a certificate from an approved third-party training provider;
- (d) Previous experience operating cranes or managing lifting operations in a supervisory role; and

8.2.3 Workplace / site specific induction and experience related directly to the actual lifting equipment in operation at that time.

8.2.4 The appointment of the ‘Appointed Person’ shall be in writing and recorded in the lifting plan.

## **8.3 Planning and Assessment**

8.3.1 The planning and assessment shall be carried out in accordance with the following:

- (a) An assessment of the various risks is undertaken, and systems of work are established, which are safe to all parties involved or affected including the public; (Refer: NEOM Element 2 Risk and Opportunity Management)
- (b) That effective procedures and control measures are in place, which are implemented in order to manage activities safely and without risk to health;
- (c) That the management of lifting operations requirements are included in the Pre-Tender Safety and Health Plan in accordance NEOM-NLF-PRC-006 Occupational safety, health, and Fire Safety requirements for Contractors: and
- (d) That associated safe systems of work, and site rules are included in the Safety and Health Construction Management Plan NEOM-NLF-NMS-006.002 (CPP) and with NEOM-NLF-PRC 006 Occupational safety, health, and Fire Safety requirements for Contractors

## **8.4 Risk Assessment**

8.4.1 Employers shall ensure that prior to the undertaking of lifting operations; a risk assessment is conducted to ensure the selection of appropriate control measures. Refer to NEOM-Element 2 Risk and Opportunity Management.

8.4.2 Risk assessments carried out for lifting operations involving cranes shall form part of the lifting plan and be reviewed and updated regularly.

8.4.3 Employers shall ensure that risk assessments consider the following general hazards and risks associated with the use of lifting equipment and lifting accessories which shall include, but not be limited to:

- (a) Competency requirements of operators / signaller / slingers; (Refer: NEOM Element 5 Training, Awareness and Competence)
- (b) Lifting equipment and accessories testing and certification requirements;
- (c) Unauthorised use of lifting equipment;
- (d) Failure of lifting equipment or lifting accessories;
- (e) A load being dropped whilst suspended;
- (f) Unstable ground conditions;
- (g) Collision of lifting equipment where 2 or more devices are being used near each other;
- (h) Visibility;
- (i) Lifting of people;
- (j) Communication;
- (k) Fatigue; (Refer: NEOM-NLF-NMS-006.042 Workplace Wellness)
- (l) Employees being struck by the load or lifting equipment;
- (m) Striking overhead power cables or other services; (Refer: NEOM-NLF-NMS-006.008 Overhead and Underground Services)
- (n) Falls during the erection of cranes; (Refer: NEOM-NLF-NMS-006.007 Working at Height)
- (o) Manual handling risks associated with lifting and moving heavy equipment; (Refer: NEOM Element 4 Personal Safety)
- (p) Health risks from oils, solvents, and greases; (Refer: NEOM-NLF-NMS-006.020 Hazardous Materials)

- (q) Contact with moving machinery parts during maintenance. (Refer NEOM-NLF-NMS-006.030 Machine Guarding)

## 8.5 Lifting Plan Requirements

- 8.5.1 A lifting plan shall be prepared by the Contractor using the lifting equipment or in the case of construction work where multiple employers may use the equipment the lifting plan shall be prepared by the Main Contractor.
- 8.5.2 The Appointed Person (see section 8.2) shall assist in the preparation of the lifting plan. The lifting plan shall include information on the following:
  - (a) Details of the person in overall charge of all lifting operations (the Appointed Person), including relevant experience of this person in planning lifting operations;
  - (b) A list of responsibilities of those involved in lifting operations including, person in overall control, crane operator and signaller / slinger;
  - (c) An overview procedure detailing how lifting operations shall be planned, supervised, monitored, and reviewed;
  - (d) Details of the crane(s) capacities at various radius;
  - (e) Diagrammatic representation / Sketch of the lift – including equipment and personnel placement, distances, maximum weight capacity, radii, and other relevant measurements;
  - (f) Copies and a register of all crane operator competency certificates issued by an approved third-party training provider;
  - (g) Copies and a register of all signaller/slinger competency certificates issued by an approved third-party training provider;
  - (h) Copies of all test certificates for the lifting equipment and accessories to be used, issued by a third-party engineer;
  - (i) A schedule of common lifts to be undertaken by the crane detailing what is to be lifted, weight of load and how connection between the load and the crane shall be made;
  - (j) A written procedure detailing how special lifts shall be planned to ensure they can be carried out safely;
  - (k) A written procedure detailing the planned maintenance requirements of each type of crane and the inspections and checks that shall be carried out; and
  - (l) Copies of all risk assessments undertaken for crane lifting operations.

## 8.6 Selection of Lifting Equipment

- 8.6.1 During the planning of lifting operations consideration shall be given to the type of equipment that is required to carry out the lifting operation safely. The Appointed Person shall be consulted during the selection process and the decision on the type of crane shall be based on the following factors:
  - (a) Weight of the load;
  - (b) Frequency and duration of the work;
  - (c) The working environment (ground conditions, access restrictions, etc.);
  - (d) Mobility of the crane (will lifting operations be carried out in one place or several different locations); and
  - (e) Lifting radius.

- 8.6.2 The selection of cranes shall be carried out following the principles of risk assessment selecting the best option for each lifting operation based on the above factors.

## **8.7 Safe Working Load (SWL)**

- 8.7.1 Ensure that the Safe Working Load (SWL) of every item of lifting equipment is known and clearly understood by lifting equipment operators and signaller/slingers. SWL shall be clearly marked on the lifting equipment in a prominent position.
- 8.7.2 Ensure that the SWL of every lifting accessory is clearly marked on the lifting accessory or on a metal tag fixed securely to the lifting accessory. Any lifting accessory without its SWL clearly marked on it shall be removed from service.
- 8.7.3 Lifting accessories shall be used in accordance with manufacturer or supplier specifications. As the angle between legs on slings and chains affects its capacity (SWL) employers shall ensure that lifting accessory safe angles of use are clearly understood by signaller/slingers.
- 8.7.4 Where it is known or suspected that the SWL of any lifting accessory has been exceeded, employers shall ensure that that lifting accessory is removed from use until it has been thoroughly examined by an approved third-party engineer.

## **8.8 Load Radius Indicators**

- 8.8.1 Ensure that all cranes with a variable radius are provided with a load radius indicator. The load radius indicator shall be clearly visible to the crane operator and show the operating radius and the corresponding safe working load.
- 8.8.2 Load radius indicators may be incorporated into safe load indicators of the type which display the safe working load.

## **8.9 Safe Load Indicators**

- 8.9.1 Ensure that every crane with a SWL of 1 tonne or more is fitted with a safe load indicator which emits an audible warning when the crane approaches its safe working load.
- 8.9.2 Safe load indicators shall be clearly visible to the crane operator and calibrated to the specific requirements of the crane.
- 8.9.3 Consider using safe load indicators that prevent a crane from exceeding its SWL by restricting the radius operation when the SWL is reached (often referred to as automatic safe load indicators).

## **8.10 Means of Communication**

- 8.10.1 Ensure that there is an agreed and recognised means of communication between the operator of the lifting equipment and the signaller/slinger. The agreed means of communication shall be documented in the lifting plan and followed by all those involved in lifting operations.
- 8.10.2 Where hand signals are used as the means of communication the signaller/slinger shall be within easy viewing distance of the crane operator. Where there is no clear line of site between the signaller/slinger and the crane operator, radio communication shall be used. Refer to NEOM-NLF-NMS-006 .013 – Safety Signs and Signals.
- 8.10.3 On tower cranes where the drivers cab is more than 35 metres from the ground level radio communication shall be the mandatory means of communication between the crane operator and the signaller/slinger.
- 8.10.4 Provide clear instruction to all employees that only the appointed signaller/slingers are to communicate with the crane operator. Crane operators shall also be instructed not to accept signals from any person other than the appointed signaller/slinger.

## **8.11 Wind Speed**

- 8.11.1 Ensure that an anemometer is available on each worksite, where cranes are used, to measure wind speed. This shall be fitted to the highest point of the crane were reasonably practicable. Handheld anemometers shall only be used as a secondary means of measuring wind speed at ground level.
- 8.11.2 That provisions are in place to determine wind direction.
- 8.11.3 Ensure that the manufacturer or supplier specifications are available for each crane and that the wind-off speed of each crane is communicated to the crane operator and appointed person.
- 8.11.4 Regularly obtain (at least daily) meteorological reports for the area where cranes are being used for lifting operations.
- 8.11.5 In all cases ensure that lifting operations cease when the recorded wind speed reaches or gusts more than 38 km/h (20.5 knots).

## **8.12 The Lifting Operation**

- 8.12.1 Ensure that lifting accessories are attached to the load only by a trained and competent signaller/slinger holding a recognised approved training certificate.
- 8.12.2 Ensure that slinging techniques consider the following:
  - (a) Where lifting chains are used on metal (e.g., Steel reinforcement bars or steel beams) the competent person shall ensure that they are protected (e.g., Double wrapped and timber bites or packers);
  - (b) Cradle lifting shall be prohibited;
  - (c) Lifting accessories shall be used in accordance with the SWL stamped on the lifting accessory or the metal tag secured to the lifting accessory; and
  - (d) Prior to the load being moved into position by the crane the signaller/slinger shall raise the load slightly off its resting level and check that the lifting accessory is secure on the load.
- 8.12.3 Ensure that all lifting operations are carried out in accordance with the lifting plan.
- 8.12.4 Ensure that as far as reasonably practicable loads shall not be lifted over employees or others working on the site. Employers shall never lift loads over members of the general public.

## **8.13 Collision of Lifting Equipment**

- 8.13.1 Ensure that where two or more pieces of lifting equipment are used within the same radius measures are taken to prevent collision. The lifting plan shall set out the working procedures and all crane operators and signaller/sliders shall be briefed on the specific arrangements.
- 8.13.2 In the case of tower cranes working within the same radius employers shall consider the use of an appropriate electronic anti-collision device as far as practicable.
- 8.13.3 Where tower cranes are working within the same radius employers shall ensure that an agreed means of radio communication exists between crane operators.
- 8.13.4 Ensure that in the case of tower cranes working within the same radius an emergency radio is provided in the cab of each crane. This radio is to be used in case of emergency only (collision) and shall not be used for general communication.

## **8.14 Emergency Procedures**

- 8.14.1 Develop emergency plans that take account of all creditable emergency scenarios that could arise from lifting operations, in compliance with the requirements of NEOM-Element 9 – Emergency Planning & Response Management.

8.14.2 As a minimum, consider the following scenarios when planning emergency procedures:

- (a) Recovery of a collapsed crane operator or erector from a tower crane;
- (b) Employee becoming suspended by their safety harness following a fall during the erection or maintenance of a tower crane;
- (c) Overturning of a crane / lifting equipment whilst lifting;
- (d) Load being snagged during lifting operations;
- (e) Security of the load being compromised during lifting operations; and
- (f) Any other foreseeable emergency that may occur.

## 8.15 Crane Type Specific Requirements

8.15.1 Tower Cranes : Ensure the following with regards to the erection and use of tower cranes:

- (a) Crane bases shall be checked and signed off by a competent engineer before the erection of crane mast sections commences;
- (b) Only competent tower crane erectors are to be employed in the erection of tower cranes;
- (c) All electrical connections to the tower crane shall be made by a competent electrician in accordance with NEOM-NLF-NMS 006.016 – Electrical Safety.
- (d) All electrical cables feeding the tower crane distribution board shall be steel wire armour protected;
- (e) Tower crane erectors shall wear safety harnesses and clip on when working at height, in accordance with NEOM-NLF-NMS-006.007 – Working at Heights, during the erection of tower cranes;
- (f) All erection components such as temporary platforms shall be removed from the crane by the crane erector prior to handover in accordance with the manufacturer's instructions;
- (g) A hand over certificate shall be provided by the tower crane erector when the erection work is completed;
- (h) Prior to use and after the issuance of the hand over certificate from the crane erector a full test of the crane shall be undertaken by an approved third-party engineer;
- (i) The crane manufacturer's erection and operating manual shall be available on site;
- (j) Where an anemometer is fitted to a tower crane a repeater shall be fitted at the base of the crane or in the project site office;
- (k) Rest platforms shall be provided throughout the mast at a frequency of at least every 9 meters. Rest platforms shall be provided with appropriate edge protection in accordance with NEOM-NLF-NMS-006.007 Working at Height; and
- (l) Where self-climbing tower cranes are used the climbing section shall be lowered after use in accordance with the manufacturer's instructions.

8.15.2 Excavators used as Cranes ; Ensure the following with regards to excavators used as cranes:

- (a) Any excavator used as a crane with a safe working load greater than one tonne shall have check valves fitted to the boom and outward reach of the excavator arm;
- (b) If used as a crane with a variable safe working load greater than one tonne the excavator shall be fitted with an automatic safe load indicator;
- (c) Excavators used as cranes shall be subject to annual thorough examination and testing requirements;
- (d) Lifting shall only be carried out with the excavator arm in the outward reach mode only;

- (e) Any excavator used as a crane shall have the safe working load clearly marked on the machine or displayed in the cab; and
  - (f) Lifting operations shall be permitted only from the certified lifting point of the excavator boom, under no circumstance are the teeth of an excavator bucket to be used to lift loads.
- 8.15.3 Truck Mounted Mobile Cranes : Ensure the following with regards to the setting up and use of truck mounted mobile cranes:
- (a) Truck mounted mobile cranes shall be set up on ground that is level, stable and compacted;
  - (b) Where truck mounted mobile cranes are to be set up near excavations, culverts, made-up-ground or close-by to building foundations a competent engineer shall be consulted for advice on crane location and control measures to be taken; (Refer NEOM-NLF-NMS-006.011 Excavation Work)
  - (c) Outrigger and base plates shall always be used with truck mounted mobile cranes in accordance with the manufacturers operating manual;
  - (d) The area around the truck mounted mobile crane shall be set up as an exclusion zone for all unnecessary personnel;
  - (e) Control measures implemented to eliminate the risk of crushing persons between the counterweight and any other surface during slewing operations;
  - (f) Truck mounted mobile cranes shall never be used free-on-wheels to move loads around the site unless specifically permitted and detailed in the manufacturer's operating manual;
  - (g) When left unattended truck mounted mobile cranes shall be switched off and the key shall be removed from the ignition to isolate the crane;
  - (h) Safe access for the truck mounted mobile crane operator shall be provided and the area around where the crane is used shall be kept clear of obstruction; and
  - (i) Windows and windscreen shall be maintained in good condition, if glass is broken the crane shall be taken out of service until it can be repaired.

- 8.15.4 Crawler Cranes : Ensure the following with regards to the setting up and use of crawler cranes:
- (a) Whilst crawler cranes are tracking the jib shall be reduced to the minimum radius;
  - (b) Where work on the jib is carried out such as adding or removing sections and the jib is laid flat in the horizontal position it shall be appropriately supported with props to prevent collapse;
  - (c) Crawler crane tracks shall be regularly maintained in accordance with the manufacturer's operating manual; and
  - (d) Barriers and warning signs shall be set up around crawler cranes to prevent personnel accessing areas where lifting operations are being carried out.

4.8.5 Gantry Cranes : Ensure the following with regards to the use of gantry cranes:

- (a) Where gantry cranes are used in the same bay and there is the possibility of collision between cranes an anti-collision system shall be installed; and
- (b) In the design of gantry crane installations employers shall consider all reasonably practicable means to ensure the safety of the lifting zone in relation to persons and plant.
- (c) Ensure that the rated load capacity of the crane, hoist, chain, cable, slings, or other components will not be exceeded.
- (d) The rated load of all cranes shall be plainly marked on each side of the crane. If the crane has more than one hoisting MSU, each hoist load block shall be marked with its rated load. This marking shall be clearly legible from the ground floor.
- (e) Each overhead crane shall have the directions of its bridge and trolley movements displayed on the underside of the crane.

- (f) That nobody pushes or pulls on the load. The load shall always hang vertically below the hoist.
- (g) That the hoist is located directly above the load to be lifted. Slings, load chains and other lifting devices are securely seated on the hook and no twist that could cause the load to swing.
- (h) That the load will not be suspended over personnel at any time and under no circumstances may anyone ride the hook or load.
- (i) Ensuring that an appropriate lock-out/tag-out system, in line with the requirements of NEOM-NLF-NMS-006.028 – Lock Out / Tag Out, shall be established and used throughout the installation to indicate equipment that is not to be used due to inspection discrepancies, on-going maintenance operations, or other reasons.
- (j) Ensure that the gantry cranes shall not be operated until all safety devices have been activated and tested/adjusted if involved in the maintenance work.
- (k) Ensure that remote emergency stops are installed for cranes used for critical lifts where the crane operator's view is restricted/ obstructed.
- (l) Ensure that only certified (licensed) and trained operators shall be authorized to use/operate cranes.
- (m) During periods of inactivity the crane operating mechanisms shall be appropriately disabled by the operator (powered off, ignition key removed etc.). Only licensed operators or appointed personal shall be able to power up and operate the crane.

#### 8.15.5 Goods and Passenger Hoists :

- (a) Plan the use of hoists on site and ensuring that hoists are appropriate for purpose and erected in accordance with the manufacturers/supplier's recommendations.
- (b) Ensure that all persons involved with erecting hoists are competent and experienced in carrying out the work.
- (c) Where working at height is carried out by those erecting hoist masts and hoists employers shall ensure that the requirements of NEOM-NLF-NMS-006.007 – Working at Height are complied with.
- (d) Prior to the hoist being used for the first-time employers shall ensure that a handover certificate is provided by the hoist installer and a thorough examination and test of the hoist is carried out by an approved third-party engineer.
- (e) Always ensure the following:
  - I. Hoist mast sections are tied to the structure in accordance with the manufacturers/supplier's recommendations;
  - II. Safety devices are provided to prevent the over-run of the hoist at the top of the mast section;
  - III. The hoist base is securely fenced to prevent persons being struck by the descending hoist;
  - IV. Material hoists are used only for the carriage of materials, it is strictly prohibited to carry persons on a hoist designed only for material use;
  - V. Landing points shall as far as reasonably practicable be provided with
  - VI. Interlocking gates fitted at each level;
  - VII. The SWL of each hoist shall be clearly marked on the hoist and communicated to the hoist operator;
  - VIII. Hoist operators shall be trained on safe working procedures and emergency procedures for the hoist(s) they are operating;
  - IX. Passenger hoists shall be thoroughly examined and tested every six months in accordance with Section 8.20 of this NMS;

- X. The hatch in the roof of a passenger hoist shall be kept closed and where reasonably practicable be fitted with an interlock to prevent the hoist being used with the hatch in the open position; and
- XI. Under no circumstances shall materials be allowed to protrude through the open hatch in the roof of passenger hoists.

## **8.16 Other Lifting Equipment**

- 8.16.1 Ensure that any other equipment used for lifting such as pump trucks, manual lift pallet jacks, hydraulic and screw jacks and winches are used in accordance with this NMS. Employers shall ensure:
- 8.16.2 Correct selection and suitability of other lifting equipment;
- 8.16.3 Employees are trained to use other lifting equipment and understand the safe working load requirements and safe operating procedures; and
- 8.16.4 Other lifting equipment shall be subject to thorough examination and testing requirements.

## **8.17 Mobile Elevating Work Platforms**

- 8.17.1 Ensure the following with regards to the use of mobile elevating work platforms (MEWPs):
  - (a) Operators of MEWPs shall be trained and competent to use the equipment;
  - (b) The training given shall be specific to the type of equipment the person is operating and shall be in accordance with internationally recognized training, such as The International Powered Access Federation – Powered Access License (PAL) or equivalent.
  - (c) MEWPs shall be subject to a 6 monthly thorough examination and testing;
  - (d) Working platforms of MEWPs shall comply with the requirements of NEOM-NLF-NMS-006.007 – Working at Height.
  - (e) Safety harnesses shall always be worn by employees working from the platform of a MEWP.
  - (f) MEWPs shall only be used when the ground conditions are favourable for this type of device;
  - (g) Step ladders or hop-ups shall never be used from the working platform of a MEWP;
  - (h) Employees shall not be allowed to leave the working platform whilst in an elevated position, e.g., climbing off the platform to gain access to an elevated place of work.
  - (i) Wind speeds shall be monitored, and the wind-off speed shall be in accordance with the manufacturer's instructions;
  - (j) MEWPs shall have the safe working load of the platform clearly marked on the equipment; and
  - (k) MEWPs shall be fitted with an emergency lowering devise in the event of power failure or another malfunction.
- 8.17.2 Ensure that a detailed risk assessment is prepared for the use of MEWPs which shall include identification of the hazards associated with using the equipment as well as detailed procedures to be taken in the event of an emergency.

## **8.18 Inspection of Lifting Equipment and Lifting Accessories**

- 8.18.1 Ensure that a register of all lifting equipment and lifting accessories in use is maintained at each work site.
- 8.18.2 Ensure the following inspections are carried out:
  - (a) Daily visual inspections of lifting equipment carried out by the lifting equipment operator in accordance with the manufacturer's recommendations;

- (b) Weekly detailed inspections of lifting equipment carried out by the lifting equipment operator recorded formally in the lifting equipment inspection register;
  - (c) Daily visual inspections of lifting accessories carried out by the signaller/slinger or other competent employee; and
  - (d) Weekly detailed inspections of lifting accessories carried out by the signaller/slinger or other competent employee and recorded formally in the lifting accessory inspection register.
- 8.18.3 Ensure that periodic inspections by the lifting equipment supplier / owner are undertaken in accordance with the lifting equipment manufacturer's recommendations.

## **8.19 Maintenance of Lifting Equipment and Lifting Accessories**

- 8.19.1 In order to reduce the risks associated with wear and/or deterioration employers shall ensure:
- (a) A planned and preventative maintenance programme is developed for lifting equipment and lifting accessories based on the manufacturer's recommendations; and
  - (b) The maintenance schedule is reviewed frequently based on maintenance and failure findings.

## **8.20 Thorough Examination and Testing**

- 8.20.1 Each Sector, Organisation, Division, department and or Contractor shall ensure only independent, competent 3<sup>rd</sup> Party Inspection and Testing engineers are allowed to undertake the inspection and testing works
- 8.20.2 In accordance with NEOM-SMS, employers shall ensure that all lifting equipment is thoroughly examined and tested at least every 12 months. or 6-MONTHS IF LIFTING PEOPLE
- 8.20.3 Ensure that only third-party competent testing engineers are used to thoroughly examine and test lifting equipment and thoroughly examine lifting accessories.
- 8.20.4 In the case where lifting equipment is used for lifting persons it shall be thoroughly examined and tested at least every 6 months.
- 8.20.5 In the case of cranes with a variable radius a maximum SWL test is carried out at least once in every 4 years in line with the manufacturer's instructions:
- 8.20.6 Ensure that cranes are thoroughly examined and tested before they are brought into service after being erected in a new location (e.g., tower cranes) or after a modification is made to any structural component of the crane (e.g., adding jib sections to a crawler crane).
- 8.20.7 Ensure that lifting accessories are thoroughly examined by an approved third-party engineer at least every 6 months.

## **8.21 Record Keeping**

- 8.21.1 Maintain records in accordance NEOM Element 3 Control of Documented Information & Legal Compliance
- 8.21.2 Appropriate records for the following activities shall be maintained:
  - (a) Licenses of operators;
  - (b) Lifting equipment and accessories third party testing and certification evidence;
  - (c) Records of repairs / servicing / maintenance; and
  - (d) Logbooks and inspection check sheet

## **8.22 Compliance**

- 8.22.1 NEOM LP&FS Public Safety department shall conduct compliance audits against this NMS.

## 9 Appendices

### 9.1 Appendix A: Banksman Instruction



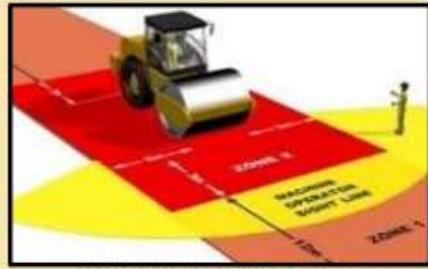
**SAFE WORKING PRACTICE**

#### FLAGMAM

| Companies Must....  | Flagmen Must....  |
|---|---|
| Provide Training  |  Use the training                |
| Provide PPE  |  Use the PPE                     |
| Provide Flags or Batons   |  Use the Tools Correctly         |
| Allow for rest areas  |  Follow the work / rest schedule |
| Explain heat stress   |  Follow the Heat stress rules   |

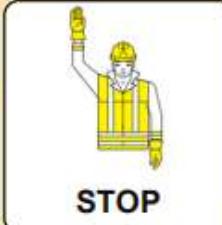
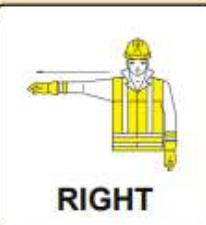
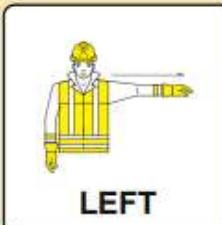
**Flagmen Must ....**

-  Stop work if it is unsafe
-  Maintain Eye contact with the operator
-  Stop pedestrians from entering danger zone
-  Make sure you are standing in a safe place



KNOW WHERE TO STAND  
TO BE SAFE

**Hand Signals for Communication....**

|   |   |   |  |   |
|---|---|---|--|---|
|  |  |  |  |  |
| START   | STOP  | END   | FORWARD  | BACKWARD  |
|  |  |  |  |  |
| RIGHT   | LEFT  | DISTANCE  | DANGER / SLOW  |   |

DOCUMENT CODE : NEOM-NLF-NMS-006.006

REVISION CODE: 02.00

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## 9.2 Appendix B: Audit Criteria SAFE USE OF LIFTING EQUIPMENT AND LIFTING ACCESSORIES Audit Criteria/ Checklist

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria                      |   | Requirements  | Verification | Area of Concern |
|-------------------------------------|---|---|--------------|-----------------|
| ISO 45001:2018 Clause               | NMS Ref.  |   |              | Yes/ No         |
| 5.3                                 | 7.1.3   | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2                     | 7.1.4   | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                                 | 7.2.3,<br>7.2.4, 8.1                            | Persons appointed to manage /oversee work operations have the skills, knowledge, experience   |              |                 |
| 8.1.2 (e)                           | 7.2.6,<br>7.3.3                                 | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2                  | 7.2.2,<br>7.2.5<br>8.2.2,<br>8.3.1(a),<br>8.4.1 | Hazards Identification Plan (HIP)<br><br>Employers shall ensure that prior to the undertaking of lifting operations; a risk assessment is conducted to ensure the selection of appropriate control measures           |              |                 |
| 5.3                                 | 7.4.1<br>8.2.4                                  | Appointed persons shall undertake their specific roles and responsibilities with regards to the use of lifting equipment and lifting accessories  |              |                 |
|                                     |   | The appointment of the 'Appointed Person' shall be in writing and recorded in the lifting plan  |              |                 |
|                                     | 7.5.1   | Signaller/slingers shall undertake their specific roles and responsibilities with regards to the use of lifting equipment and lifting accessories   |              |                 |
| 5.4                                 | 8.6.1   | During the planning of lifting operations the Appointed Person shall be consulted during the selection process and the decision on the type of crane and equipment required to carry out the lifting operation safely |              |                 |
| 6.1.2,<br>6.1.4,<br>7.4.2           | 8.7.1   | Ensure that the Safe Working Load (SWL) of every item of lifting equipment is known and clearly understood by lifting equipment operators and signaller/slingers  |              |                 |
| 8.1.2                               | 8.8.1   | The load radius indicator shall be clearly visible to the crane operator and show the operating radius and the corresponding safe working load.   |              |                 |
| 6.1.2,<br>6.1.4,<br>8.1.2,<br>7.4.2 | 8.9.1   | Ensure that every crane with a SWL of 1 tons or more is fitted with a safe load indicator which emits an audible warning when the crane approaches its safe working load  |              |                 |
| 7.4.2                               | 8.10.1  | Ensure that there is an agreed and recognized means of communication between the operator of the lifting equipment and the signaller/slinger  |              |                 |

| Audit Criteria                |                  | Requirements   | Verification | Area of Concern |
|-------------------------------|------------------|--|--------------|-----------------|
| ISO 45001:2018 Clause         | NMS Ref.         |  |              | Yes/ No         |
| 8.1.2                         | 8.11.1           | Ensure that an anemometer is available on each worksite, where cranes are used, to measure wind speed  |              |                 |
| 6.1.2.1,<br>6.1.2.2,<br>8.1.2 | 8.13.1<br>8.13.2 | Ensure that where two or more pieces of lifting equipment are used within the same radius measures are taken to prevent collision                                    |              |                 |
|                               |                  | In the case of tower cranes working within the same radius employers shall consider the use of an appropriate electronic anti-collision device as far as practicable |              |                 |
|                               | 4.8.5(i)         | Ensuring that an appropriate lock-out/tag-out system, in line with the requirements  |              |                 |
| 9.1.1,<br>9.1.2               | 8.18.1<br>8.18.3 | Ensure that a register of all lifting equipment and lifting accessories in use is maintained at each work site and inspections are carried out                       |              |                 |
|                               |                  | Ensure that periodic inspections by the lifting equipment supplier / owner are undertaken in accordance with the lifting equipment manufacturer's recommendations    |              |                 |
|                               | 8.20             | Employers shall ensure that all lifting equipment is thoroughly examined and tested at least every 12 months. 6- MONTHS IF LIFTING PEOPLE                            |              |                 |
|                               |                  |  |              |                 |
|                               |                  |  |              |                 |
|                               |                  |  |              |                 |

### 9.3 Appendix C: Guidance Information and Signs

In OSHA the requirements are very fragmented and rule based; they exist in a number of areas and interpretation letters such as CFR 1926.1441 / 251 / 32 - CFR 1910.184 and 179 to name a few.

For the most comprehensive requirements covering all aspects of lifting equipment and accessories one should reference UK Lifting Operations and Lifting Equipment Regulations (LOLER).

LOLER applies to work equipment used for lifting operations. The Regulations also apply to the safe installation, marking and thorough examination / inspection of lifting equipment.

The recording of examinations and inspections is also required by LOLER, and those conducting them have duties under the Regulations for reporting serious defects - both to the user and to the relevant enforcing authority.

Guidance documents to assist employers understand their responsibilities in regards to Lifting Equipment and Lifting Accessories is freely available on the UK HSE web-site.





نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
WORKING at HEIGHT**

NEOM-NLF-NMS-006.007 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | Sector Review          | Issued for Implementation | 01-02-2022 |

## Document Approval

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## OUR NEOM VALUES



### CATALYST

Make a difference.  
Create a legacy.



### CARE

Leave the environment  
in a better place.



### CURIOUS

Challenge the norm.  
Stay restless.



### PASSIONATE

Be accountable.  
Finish what you start.



### RESPECT

Be authentic.  
Be true. Be bold.



### DIVERSITY

Embrace cultural  
differences.  
Seek to understand.

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## 1 Purpose

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with Work at Height.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## 2 Scope

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS. This NMS encompasses all aspects of managing and carrying out 'Work at Height' including:

*Table 1 : Included in this NMS*

| Included in this NMS requirements for:                             |                      |
|--|----------------------|
| Fall Prevention  | Tower cranes;        |
| Guardrail systems;   | Fall arrest systems; |
| Safety nets;   | Working platforms.   |
| Roof works;  | Ladders;             |
| Existing places of work and means of access for working at height; |                      |

## 3 Expectations

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with the work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Best Practice

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 2 : Table of Definitions

| Terms              | Definitions   |
|--------------------|---|
| NEOM Co            | NEOM Company  |
| Working at heights | Work in which there is a risk of an employee falling from any height, from, through, into, or onto a place or structure   |
| 'At height'        | A place where a person could be injured falling from it, even if it is at or below ground level   |
| "Anchorage"        | A secure point of attachment for lifelines, lanyards, or deceleration devices   |
| Client             | NEOM Sector / Department  |
| Employer           | The person or organisation that employs personnel to complete the work  |
| Contractor         | Organisation contracted and responsible for carrying out the works  |
| Competent Person   | Is a person, designated by the employer, who Is capable of identifying existing and predictable hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them. Shall have undertaken formal validated training in the safety of scaffolds and where appropriate practical training and / or on the job assessment. As a minimum should be able to perform site inspections |
| Scaffolding        | A temporary structure on the inside or outside of a building or structure, made of wooden / metal boards and metal poles. This includes all platforms, irrespective of height, which are assembled from scaffold components in all, or part   |
| OSHA Standards     | An Occupational Safety Health Administration (OSHA) standard is a regulatory requirement to serve as criteria for measuring whether employers are in compliance with the OSH Act laws. OSHA standards are published in Title 29 of the Code of Federal Regulations (CFR)  |

## 5 List of Abbreviations

Table 3 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| ISO           | International Standards Organisation           |
| MEWP          | Mobile Elevated Work Platform                  |
| FAS           | Fall Arrest Systems                            |
| kN            | kil Newton [kN], a unit of force measurement   |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 4 : Related NEOM Documents

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 5              | Training, Awareness and Competency.   |
| NEOM-Element 6              | Contractor Management   |
| NEOM-Element 9              | Emergency Planning & Response Management                                      |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                    |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors       |
| NEOM-NEN-PRC 006.010        | Safety in Design.   |
| NEOM-NLF-NMS-006.001        | Safety Organisation, Practitioner Registration and Appointment of Contractor. |
| NEOM-NLF-NMS 006.002-CPP    | Occupational Health and Safety Construction Management Plan                   |
| NEOM-NLF-NMS-006.003        | Scaffolding   |
| NEOM-NLF-NMS-006.004        | Permit to Work Systems  |
| NEOM-NLF-NMS-006.006        | Safe Use of Lifting Equipment and Lifting Accessories                         |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards  |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals  |
| NEOM-NFL-NMS-006.021        | Personal Protective Equipment (PPE)   |
| OSHA 3146-05R 2015          | Fall Protection in Construction   |
| SG 19 - 17                  | A Guide to Formulating a Rescue Plan  |
| OSHA Reg. 213/91            | Section 17  |
| OSHA 3151-12R               | Personal Protective Equipment   |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process

- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.

## **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM–NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.(Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
- 7.2.7 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Ensure employees working at height are medically fit to carry out the work. That they are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.
  - (b) Ensure that all work at height activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work
  - (c) Ensure that all equipment including personal protective equipment required for use with work at height is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.

## **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.

- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Shall refrain from any work at height unless they have had the requisite work at height training, that all relevant permits/permissions have been obtained and that the required safety measures are understood and have been implemented.

## **7.4 Specific Responsibilities**

- 7.4.1 The Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 The Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers on risks and controls
- 7.4.5 The LP & FS Public Safety department will support the assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Planning and Assessment**

- 8.1.1 Risk Assessment and Method Statements shall be prepared in consultation with the person in control of the work and communicated to those responsible for carrying out the work (Refer to: NEOM Element 2 Risk and Opportunity Management)
- 8.1.2 Risks are to be controlled in accordance with the hierarchy of risk control: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.
- 8.1.3 Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities
- 8.1.4 That effective procedures and control measures are developed and implemented for management of the hazards; (Refer to NEOM-NLF-NMS 006.004 – Permit to Work Systems)
- 8.1.5 Ensure all foreseeable emergency situations are identified, and appropriate emergency procedures developed, and mitigation measures fully implemented, and practiced, (Refer to Section 17 of OSHA Reg. 213/91)
- 8.1.6 That for the management of Work at Height general requirements are included in the Pre-Tender Health and Safety Plan in accordance with NEOM-NLF PRC 006 Occupational Safety, Health and Fire Safety Requirements for Contractors
- 8.1.7 That associated safe systems of work, and site rules are included in the Safety and Health Construction Management Plan NEOM-NLF-NMS 006.002 (CPP)

### **8.2 Rescue Equipment**

- 8.2.1 Contractor shall ensure that:
  - (a) When work at height involves use of fall arrest systems, suitable rescue equipment shall be available in the area to retrieve employees in the event of an incident.
  - (b) Rescuing an injured or unconscious person at height that they act quickly to prevent possible suspension trauma which can cause death very quickly;

- (c) For employees who are working on or near electrical equipment that safety and rescue equipment approved for electrical work is available.

### **8.3 Personal Protective Equipment**

- 8.3.1 Typical personal protection equipment (PPE) for working at height can include work restraint systems, fall arrest systems and horizontal lifelines, e.g., lanyard, anchor, and hook. Suitable work equipment and PPE for work at height should be determined and selected by the risk assessment.
- 8.3.2 All PPE clothing and equipment should be of safe design, construction, and should be maintained in a clean and reliable fashion. Contractor should take the fit and comfort of PPE into consideration when selecting appropriate items for their workplace. (Refer: Personal Protective Equipment OSHA 3151-12R and NEOM-NLF-NMS-006.021– Personal Protective Equipment)

### **8.4 Preventing Injuries from Falling Object**

- 8.4.1 Contractor shall implement the following controls:

- (a) General
  - I. Always wear hard hats when work is being performed overhead or when other work conditions call for it.
  - II. Stack materials securely to prevent them from sliding, falling or collapsing.
  - III. Use toe boards or guardrails on scaffolds to prevent objects from falling.
  - IV. Use debris nets or catch platforms to grab falling objects.
- (b) Overhead work - Establish exclusion zones and enforce them under work at height areas to prevent unauthorized access to the area
  - I. Place warning signs to warn people of hazards, all safety signage shall be in accordance with NEOM-NLF- NMS 006.013 – Safety Signs and Signals.
  - II. Work is to stop while people traverse the exclusion zone.
  - III. Employees working at height are to use bolt bags and tool carriers to carry small items and tools - these are not to impede the employee.
  - IV. Make sure that employees required to be in the exclusion zone wear suitable PPE.

### **8.5 Protection of Public**

- 8.5.1 Contractor shall ensure that any work at height considers necessary protection to the public from potential falls of tools or materials or from use of mechanical platforms. Protection measures shall include, but not be limited to:
  - (a) Divert pedestrian walkways away from any overhead activities. (Refer to NEOM-NLF-NMS-006.012 -Barricading of Hazards and NEOM-NLF-NMS-006.013 Safety Signage and Signals)
  - (b) Temporary closure of footpaths for specific operations (after authorization has been sought and obtained).
  - (c) Provision of a walkway with overhead protection.
  - (d) Use of debris netting to prevent material falling outside the perimeter.
  - (e) Tying down or securing of materials to prevent them from being blown off;
  - (f) Avoidance of work at height during busy times of the day when large numbers of members of the public are in the area.

## **8.6 Guardrail Systems**

### **8.6.1 Provision of Guardrails**

- (a) Contractor shall provide guardrails to all edges where there is a fall potential of 2 meters or more. (Refer to NEOM-NLF-NMS-006.003 Scaffolding)
- (b) In the case where a fall potential of less than 2 meters is identified Contractor shall undertake a risk assessment and determine the level of protection required. As a minimum requirement for edges where a fall potential of less than 2 meters exists Contractor shall provide a single guardrail 950mm from the walking/working level.
- (c) Contractor shall ensure guardrails are used on the edge of working platforms, walkways, stairways, ramps, or landings and at:
  - I. The perimeters of buildings or other structures.
  - II. The perimeters of skylights or other fragile roof materials.
  - III. Openings in floor or roof structures; and
  - IV. Edges of shafts or excavations.
- (d) Contractor shall ensure proprietary systems are to be configured, installed, used, and dismantled in accordance with the manufacturer's instructions.

### **8.6.2 Requirements for Guardrail Systems**

- (a) Ensure that guardrails are provided to all edges where there is a risk of falling 2 meters or more. Guardrails shall be provided a minimum of 950mm above the walking/working platform level. (Refer to NEOM-NLF-NMS-006.003 Scaffolding)
- (b) Toe boards shall be provided at least 150mm high and run continuously along the edge where guardrail protection is provided.
- (c) Mid-rail shall be fitted to all edges where there is a risk of falling 2 meters or more. The mid-rail shall be installed so that the gap between any guardrail and mid-rail or toe board and mid-rail does not exceed 470mm.
- (d) Screens and mesh shall extend from the guardrail to the walking/working level and along the entire opening.
- (e) Structural members such as additional mid-rails and architectural panels shall be installed such that there are no openings in the guardrail system that are more than 470mm wide.
- (f) Guardrail systems shall be capable of withstanding, without failure, a force of at least 1.25 kN point load, in any outward or downward direction, at any point along the top edge.
- (g) When the 1.25 kN point load test specified in this section is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than 900mm above the walking/working level.
- (h) Guardrail systems shall be surfaced to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.
- (i) Top rails and mid-rails shall be at least 60mm nominal diameter or thickness to prevent cuts and lacerations. If wire rope is used for top rails, it shall be flagged at not more than 2 metres intervals with high-visibility material.
- (j) When guardrail systems are used at hoisting areas, a chain, gate, or removable guardrail section shall be placed across the access opening between guardrail sections when hoisting operations are not taking place.
- (k) When guardrail systems are used at holes, they shall be erected on all unprotected sides or edges of the hole.
- (l) When guardrail systems are used around holes used for the passage of materials, the hole shall have not more than two sides provided with removable guardrail sections to allow the passage of materials. When the hole is not in use, it shall be closed over with a cover, or a guardrail system shall be provided along all unprotected sides or edges.
- (m) When guardrail systems are used around holes that are used as points of access (such as ladder ways), they shall be provided with a gate, or be offset so that a person cannot walk directly into the hole.

- (n) Guardrail systems used on ramps and runways shall be erected along each unprotected side or edge.
- (o) Before using a guardrail system, Contractor shall consider the factors that will influence the load on the guardrail. The force applied from the momentum of a falling person, the pitch of the roof and the length of the rafter to which the guardrail is attached will determine whether the guard railing is appropriate.

## **8.7 Safety Nets**

- 8.7.1 The use of safety nets shall only be considered where measures that prevent a fall of persons or objects are not reasonably practicable to implement.
- 8.7.2 Where safety nets are used Contractor shall put in place measures to ensure in so far as is reasonably practicable, they are stored, handled, and installed to prevent damage to the net from occurring.:.
- 8.7.3 Contractor shall regularly inspect nets for any signs of damage and remove nets that show signs of damage or wear and tear from service.
- 8.7.4 Safety nets shall be erected as close as reasonably practicable to the working level, and if on the outside of the structure, shall be slightly higher at the outer edge than at the inner.
- 8.7.5 Two main types of safety nets are available:
- 8.7.6 Personnel nets - 100mm mesh. Intended to catch a person falling from above;
- 8.7.7 Material or debris protection nets - smaller mesh 12mm-19mm, intended to minimize risks to those below from falling objects.

## **8.8 General Requirements**

- 8.8.1 Contractor shall ensure that where safety nets are used the maximum distance a person can fall before encountering a net is 2 meters.
- 8.8.2 Erection of safety nets shall be carried out by competent persons and shall ensure that any supporting framework can withstand impact or shock loadings, and that the framework itself does not present a hazard to personnel who may fall into the net.
- 8.8.3 When erecting nets in the vicinity of electricity lines or overhead power cables, the appropriate authority shall be consulted before work is commenced.
- 8.8.4 Configurations and rigging methods of the safety nets shall never be altered without the erector's consent and then only by persons competent to do so.
- 8.8.5 Nets that have been used to arrest falls shall not be used again until a competent person checks them and advises it is safe to do so.
- 8.8.6 Nets shall be securely attached to support framework with tie cords, hooks rings or thimbles spaced in accordance with the net manufacturer's specification. The actual tie shall be at least double the strength of the net, and if hooks are used, they shall have positive locking of some description.
- 8.8.7 Nets can be outriggered on scaffolding provided that the scaffold structure is appropriately secured into a building or similar.
- 8.8.8 Safety nets shall be installed as close as reasonably practicable under the walking/working surface on which employees are working, but in no case more than 2 meters below such level. When nets are used on bridges, the potential fall area from the walking/working surface to the net shall be unobstructed.

- 8.8.9 Safety nets shall extend outward from the outermost projection of the work surface as follows in table 4:

*Table 5: Distances Required for Safety Nets*

| Vertical distance from the working level to the horizontal plane of the net | Minimum required horizontal distance of outer edge of net from the edge of the working surface |
|---|--|
| Up to 1.5 meters  | 2.5 meter  |
| Between 1.5 and 2.0 meters  | 3.0 meter  |

- 8.8.10 Safety nets shall be installed with appropriate clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified in this section.
- 8.8.11 Safety nets and their installations shall be capable of absorbing an impact force equal to that produced by the drop test specified below.
- 8.8.12 Safety nets and safety net installations shall be drop-tested at the jobsite after initial installation, before being used as a fall protection system, after any fall, whenever relocated, after major repair, and at 6-month intervals if left in one place:
- (a) The drop-test shall consist of a 180 kg bag of sand 750mm ± 50mm in diameter dropped into the net from the highest walking/working surface at which employees are exposed to fall hazards, but not from less than 1 meter above that level.
  - (b) When the Contractor can demonstrate that it is unreasonable to perform the drop-test required by this section, the Contractor shall certify that the net and net installation is in compliance with the provisions of this section by preparing a certification record prior to the net being used as a fall protection system. The certification record shall include an identification of the net and net installation for which the certification record is being prepared; the date that it was determined that the identified net and net installation were in compliance with this section and the signature of the person making the determination and certification;
  - (c) The most recent certification record for each net and net installation shall be available at the jobsite for inspection.
- 8.8.13 Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration. Defective components shall be removed from service. Safety nets shall also be inspected after any occurrence which could affect the integrity of the safety net system.
- 8.8.14 Materials, scrap pieces, equipment, and tools which have fallen into the safety net shall be removed as soon as reasonably practicable from the net and at least before the next shift.
- 8.8.15 The maximum size of each safety net mesh opening shall not exceed 230cm<sup>2</sup> nor be longer than 150mm on any side, and the opening, measured centre-to-centre of mesh ropes or webbing, shall not be longer than 150mm. All mesh crossings shall be secured to prevent enlargement of the mesh opening.
- 8.8.16 Each safety net (or section of it) shall have a border rope for webbing with a minimum breaking strength of 22.2 kN.
- 8.8.17 Connections between safety net panels shall be as strong as integral net components and shall be spaced not more than 150mm apart.

## 8.9 Markings on Safety Nets

- 8.9.1 Contractor shall ensure that the safety net bears a label marked with:

- (a) Name/trademark to identify the manufacturer.
- (b) Normal size of the safety net.
- (c) Recognized international standard.
- (d) Date of manufacture.

- (e) Deflection at centre of net during prescribed test; and
- (f) Maximum distance below the working height at which the net is designed for use.

## **8.10 Test Certificate**

8.10.1 Contractor shall ensure Test Certificates supplied by the manufacturer state the following:

- (a) Type of net.
- (b) Breaking strength of:
  - I. Mesh
  - II. Border cord
  - III. Net to failure.

8.10.2 Height of drop withstood and deflection at centre when proof tested.

## **8.11 Periodic Testing**

- 8.11.1 Safety nets are provided with short lengths of test cord attached, (normally eight lengths).
- 8.11.2 At intervals not exceeding three months one cord shall be tested and a record kept. For net use after two years or if there is any deterioration, advice shall be sought from the manufacturers.
- 8.11.3 Nets shall be inspected and deemed fit for purpose immediately after erection, then weekly for damage, loose ties, etc. together with the framework and anchorage points. All such inspections shall be recorded.
- 8.11.4 Test cords shall never be used as tie cords.

## **8.12 Care of Nets**

- 8.12.1 Care shall be taken to reduce to a minimum unnecessary wear and mechanical damage likely to weaken the net. Materials shall not be stacked on a net, and deliberate jumping onto, or dropping of objects into nets shall be prohibited.
- 8.12.2 The following sources of damage or wear shall be avoided as far as reasonably practicable:
  - (a) Dragging over rough surfaces.
  - (b) Contact with sharp edges.
  - (c) Accumulation of debris in the net.
  - (d) Sparks and other sources of ignition from welding and burning operations, hot gases from blow lamps, hot ash from chimneys or furnaces;
  - (e) Chemical spills / leaks.

## **8.13 Maintenance of Nets**

- 8.13.1 Regular inspection is necessary to ensure the nets remain serviceable. The net manufacturer shall be consulted when there is any doubt about the suitability of nets for use in hazardous conditions, or after any known contamination.
- 8.13.2 It is necessary to wash nets occasionally and always before storing in order to remove grit and soot and to prevent abrasion. If contaminated by acids or alkalis, nets shall be well washed, preferably by hosing and allowed to dry naturally away from heat.

## **8.14 Storage**

- 8.14.1 Wet nets shall be dried naturally.
- 8.14.2 Storage cupboards to be well ventilated (nets hung if reasonably practicable).

- 8.14.3 Man-made fibre nets may be stored wet without loss of strength, but natural fibre nets shall always be dried first.
- 8.14.4 Nets shall be turned periodically to allow air circulation.

## **8.15 Repairs**

- 8.15.1 Only a competent person shall carry out repairs and assess the repaired net for its suitability for continued use. It is good practice to effect repairs away from site to ensure that the quality of repair is in line with the manufacturer's instructions.
- 8.15.2 A tag shall be fixed to each repair, carrying identification of the repairer and date of repair.
- 8.15.3 Any repairs undertaken shall not be detrimental to the strength of the net or impede its performance.
- 8.15.4 Repairs shall only be carried out using materials that are compatible with the net. Any damaged border ropes, coupling ropes or ties shall be scrapped and not repaired.

## **8.16 Fall Arrest Systems (FAS)**

- 8.16.1 Contractor shall ensure when selecting the type of equipment to be used, the following factors shall be considered
  - (a) The type of work.
  - (b) The potential for a fall, and the fall's potential severity.
  - (c) Task mobility requirements;
  - (d) Constraints on fall distances and clearances.
- 8.16.2 Contractor shall ensure when selecting equipment for any task the equipment shall give the wearer: (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment)
  - (a) The maximum degree of comfort and freedom of movement.
  - (b) In the event of a fall, the most reasonably practicable protection against injury from:
    - I. Impact with the ground or other objects below the wearer; or
    - II. Impacting surrounding structures.

## **8.17 Fall Arrest System Users**

- 8.17.1 Shall ensure that the equipment combination is in accordance with the manufacturer's instructions;
- 8.17.2 Cannot make any alterations that may adversely affect safe operation of any part of a FAS.

## **8.18 Inspection and Maintenance**

- 8.18.1 Contractor shall ensure inspections and maintenance in compliance with NEOM-NLF-NMS 006.006– Safe Use of Lifting Equipment and Lifting Accessories that fall arrest equipment is inspected and maintained and that any defective item found during inspection and maintenance shall be segregated, tagged with a cautionary "Out of Service Tag" and not used until it has been repaired and tested, or replaced. Repair of defective equipment shall be carried out by a competent person.
- 8.18.2 Contractor shall ensure that in the event of a fall arrest, each item of equipment involved shall be tested and inspected before re-use. Any items found to have been stretched or damaged shall be replaced before the equipment can be re-used.
- 8.18.3 Users shall inspect the following items before and after each use:
  - (a) Harnesses, lanyards, connectors, fall arrest devices, ropes, slings, and any other mobile attachment devices, e.g., snap-hooks, karabiners, rope grabs.

8.18.4 Contractor shall ensure the inspection shall:

- (a) Be by touch as well as sight.
- (b) Include the opening of any equipment where access for daily inspection is provided, to make sure that internal components are in satisfactory condition.
- (c) Include the opening or removal of temporary rope or line protectors, to enable rope to be appropriately inspected.
- (d) Include operation of the locking mechanism on fall arrest devices.
- (e) For ropes, include running the rope through the hands;
- (f) For portable pole platforms, include checks to make sure that:
  - I. There is no deformation, permanent bending, excessive corrosion, modification, and lack of insulation in recessed screw holes.
  - II. That non-slip surfaces are functional.
  - III. Welds are sound and joints and fastenings are tight; and
  - IV. The safe working load markings are clearly legible.

8.18.5 Contractor shall ensure inspections of belts, harnesses and lanyards are to be conducted every 6 months by a person who has been trained and is competent. Also, items are to be checked in accordance with the manufacturer's instructions to determine whether there is excessive wear or any other fault liable to render the item unsafe during a fall arrest.

8.18.6 Contractor shall ensure anchorages are to be inspected and certified before use after initial installation and inspected every 12 months thereafter by a qualified rigger, scaffolder, or specialist installer. Anchorages are to be visually inspected for signs of deterioration which might make them unserviceable, together with any other requirements contained in the manufacturer's instructions.

8.18.7 Contractor shall ensure the parent structure is visually inspected for modifications or deterioration which might lead to loss of anchorage strength and drilled-in anchorages such as friction or glued in anchorages shall be proof-tested as part of each inspection.

8.18.8 Contractor shall ensure inspections of fall-arrest devices are to be conducted every 3 months by a person who has been trained and is competent.

8.18.9 Contractor shall ensure inspection of horizontal lifelines, vertical lifelines used with fall arrest devices and horizontal or vertical rails is to be undertaken every 12 months.

8.18.10 Contractor shall make sure that:

- (a) Slings are inspected every 3 months by a banksman or equivalent and tested every 12 months by a competent testing organization.
- (b) Ropes used to suspend a person are inspected before and after each use.
- (c) Ropes are inspected every 3 months; and
- (d) Ropes are not pull tested as this can cause damage to the rope.
- (e) Contractor shall ensure fall arrest devices are to be fully serviced if they have been in storage for longer than 12 months.

8.18.11 Contractor shall ensure hardware and mechanical devices are to be maintained in accordance with the manufacturer's instructions.

8.18.12 Contractor shall ensure synthetic textile materials are to be maintained by cleaning with mild soap and water. If more severe cleaning is required reference is to be made to the recommendations of the manufacturer of the item.

8.18.13 Contractor shall ensure that fall arrest equipment is stored and transported in conditions which avoid dampness, heat, and stress on components.

## **8.19 Working Platform**

- 8.19.1 Every open-sided floor or platform 1.2 meters or more above an adjacent floor or ground level shall be guarded by a standard railing on all open sides except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a toe board wherever:
- (a) Employees can pass.
  - (b) There is moving machinery;
  - (c) There is equipment with which falling materials could create a hazard.
- 8.19.2 Every runway shall be guarded by a standard railing on all open sides 1.2 m or more above floor or ground level. Wherever tools, machine parts, or materials are likely to be used on the runway, a toe board shall also be provided on each exposed side.
- 8.19.3 Runways (such as oiling, shafting, or filling tank cars) may have the railing on one side omitted where operating conditions require such omission, providing the falling hazard is minimized by using a runway of not less than 45 cm wide. Employees entering such open runways shall utilize appropriate fall protection meeting the requirements of this NMS.
- 8.19.4 Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, open tanks, and similar hazards shall be guarded with a standard railing and toe board.
- 8.19.5 A standard railing shall consist of top rail, mid-rail, and posts, and shall have a vertical height of 950mm nominal from upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp.
- 8.19.6 The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 90 kg applied in any direction at any point on the top rail.

## **8.20 Protection of Stairs**

- 8.20.1 Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails as provided below:
- 8.20.2 On stairways less than 1 meter wide having both sides enclosed, at least one handrail, preferably on the right-side descending.
- (a) On stairways less than 1 meter wide, having one side open, at least one stair railing on open side;
  - (b) On stairways less than 1 meter wide, having both sides open, one stair railing on each side.
- 8.20.3 A standard stair railing shall be of construction like a standard railing, but the vertical height shall be not more than 860mm or less than 760mm from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.
- 8.20.4 Vertical clearance above any stair tread to an overhead obstruction shall be at least 2.1 meters measured from the leading edge of the tread.

## **8.21 Requirement for Fixed Stairs**

- 8.21.1 Fixed stairs shall be provided for access from one structure level to another where operations necessitate regular travel between levels and for access to operating platforms at any equipment which requires attention routinely during operations.
- 8.21.2 Fixed stairs shall also be provided where access to elevations is required daily or at each shift for purposes such as:
- (a) Gauging, inspection, regular maintenance, etc., where such work may expose employees to hazardous substances; or

- (b) Where carrying of tools or equipment by hand is normally required.

## **8.22 Fall Protection Requirements for Unprotected Edges**

- 8.22.1 Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 2 meters or more above a lower level shall be protected from falling using guardrail systems, safety net systems, or personal fall arrest systems, or other combination of fall protection as addressed in the sections below:
  - (a) Regardless of height above the equipment, each employee above dangerous equipment shall be protected from falling into, or onto the dangerous equipment by guardrail systems or by equipment guards.
  - (b) Each employee engaged in roofing activities on low-slope roofs, with unprotected sides and edges 2 meters or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or a combination of warning line system and guardrail system, warning line system and safety net system, or warning line system and personal fall arrest system, or warning line system and safety monitoring system. On roofs 15.25 meters or less in width the use of a safety monitoring system alone without the warning line system is permitted;
  - (c) Each employee on a steep roof with unprotected sides and edges 2 meters or more above lower levels shall be protected from falling by guardrail systems with toe boards, safety net systems, or personal fall arrest systems.

## **8.23 Inspections**

- 8.23.1 Contractor shall ensure that fall protection systems are ready and able to perform their required tasks. To achieve this, an inspection and maintenance procedure shall be implemented and maintained.
- 8.23.2 The following, as a minimum, shall be included in the inspection and preventive maintenance procedure:
  - (a) Equipment manufacturer's instructions; and
  - (b) A requirement that all fall protection equipment shall be inspected prior to each use, and a documented inspection at intervals not to exceed 6 months, or in accordance with the manufacturer's guidelines.
- 8.23.3 Contractor shall ensure that any item is inspected:
  - (a) After it is assembled and before first use.
  - (b) At regular intervals (at periods not exceeding 7 days).
  - (c) Following any substantial alterations; and
  - (d) Following any impact or extreme conditions that may affect the stability of the platform.
- 8.23.4 For mobile platforms, inspection at the site is appropriate without the need for re inspection every time the platform is moved.
- 8.23.5 Contractor shall keep the report of a platform inspection:
  - (a) At the construction site until the work is completed; and
  - (b) Then at a Contractor office for another three months.
- 8.23.6 The user shall inspect fall protection equipment prior to each use. Before each use and shall include the following:
  - (a) Carefully inspect body belts, safety straps, harnesses, lanyards, lifelines, and connectors for indications of wear and deterioration, or evidence of impact loading and visually inspect for the following:

- I. Webbing or rope cuts, loose stitching, kinks, knots, abrasions, burns, excessive swelling, discoloration, cracks, charring, broken fibers, and chemical or physical exposure.
  - II. Loose, bent or pulled rivets, bent grommets, and broken cuts or burned threads.
  - III. Nicks, cracks, distortion, or corrosion of hardware (buckle, d ring, snap hook).
  - IV. Breakaway jacket on deceleration unit of shock absorbing lanyard is intact and has no broken stitches, tears, stretch marks or other evidence of impact loading.
  - V. Check all equipment for damage, wear, mildew, or distortion.
  - VI. Hardware shall be free of cracks, sharp edges, or burns;
  - VII. Ensure that no straps are cut, broken, torn, or scraped.
- (b) Any fall protection equipment subjected to a fall or impact load shall be removed from service immediately for examination.
- (c) Equipment that is damaged or in need of maintenance shall be tagged as unusable, and shall not be stored in the same area as serviceable equipment; and
- (d) Anchors and mountings shall be inspected before each use by the user and supervisor for signs of damage.

## **8.24 Safe Work on a Roof**

- 8.24.1 Designer Responsibilities (Contractor performing designer's duties) shall consider health and safety in the design of every roof structure. This shall include the health and safety considerations for the construction, maintenance, repair, and demolition of the roof.
- 8.24.2 Contractor performing designers' duties shall consider the following:
- (a) Elimination / reduction of the risk of falling by designing out the fall potential through the construction of permanent walls, cast-in mesh, specification of non-fragile materials or similar.
  - (b) Provision of collective protective measures such as permanent guardrails and toe boards to roof edges.
  - (c) Provision of anchorage points for static lines or built-in fixings for safety nets.
  - (d) Accelerated preparation of the floor level below the roof area to allow for mobile elevated work platforms (MEWP's) to be used for the roof installation process.
  - (e) Where reasonably practicable the provision of safe access in the design such as stairs as opposed to vertical ladders;
  - (f) Consideration of off-site assembly or prefabrication to reduce the amount of work undertaken on site.
- 8.24.3 Contractor acting as designers shall keep a record of the health and safety design risks that they have considered and the measures that they have taken to mitigate these risks were reasonably practicable.

## **8.25 Preparation of Roof Work Areas**

- 8.25.1 Contractor shall ensure the following before allowing roof works to commence:
- (a) Edge protection systems are installed, inspected, and signed off by a competent person.
  - (b) Safety harnesses are available where required and employees are trained in their use.
  - (c) Employees involved with roof working are briefed specifically on the safe system of work.
  - (d) Rescue arrangements are in place to deal with any employee who may fall and become suspended by their safety harness.
  - (e) Areas below where roof works are to be undertaken are barricaded off and warning signs are clearly displayed.

- (f) Weather conditions are assessed and within the limits for work to start safely; and Fragile roof materials are identified and access to these areas are restricted with the use of rigid barriers and warning signs.

## **8.26 Access for Roof Works**

8.26.1 Contractor shall ensure that safe access is provided to each roof work area in accordance with the following:

- (a) Access stairs shall be provided where regular access to the roof is required.
- (b) Ladders shall be used in only where infrequent access to the roof is required.
- (c) Clear designated walkways shall be established on the roof.
- (d) Access requirements shall consider the requirements for employees to carry any necessary tools and materials;
- (e) Signage shall be provided to indicate any special access requirements or warnings.

## **8.27 Working on Fragile Roofs**

8.27.1 Fragile roof materials include any material that is not capable of supporting the weight of a person and are typically molded, or fabricated sheet materials including but not limited to:

- (a) Asbestos cement sheeting / cellulose cement sheet.
- (b) Slate.
- (c) Glass.
- (d) Fiberglass; and
- (e) Acrylic or other similar synthetic materials.

8.27.2 Contractor shall identify fragile roof materials and where work is required on the roof a risk assessment must be undertaken.

8.27.3 Contractor shall ensure that fragile areas of roofs are provided with appropriate walkways including guardrails and toe boards to allow for safe access on the roof.

8.27.4 Contractor shall ensure that warning signs are clearly displayed at the access point to roofs fabricated with fragile materials.

8.27.5 Contractor shall take appropriate precautions where fragile roof lights are present on a roof. Precautions shall include the following:

- (a) A permit to work system for all roofs where fragile roof lights are present.
- (b) All personnel working on roofs where fragile roof lights are present shall be trained in the specific control measures of the access and work requirements.
- (c) Fragile roof lights shall be barricaded off were reasonably practicable. Where this is not reasonably practicable fragile roof lights shall be securely boarded over;
- (d) Proximity restraints may be used in the case of short duration work to prevent access to areas where fragile roof lights are present.

## **8.28 Training and Competency**

8.28.1 Contractor shall ensure that Safety training complies with the requirements of:

- (a) NEOM-Element 5 – Training, Awareness and Competency.
- (b) NEOM-N-NMS 006.001 – SMS Organisation, Practitioner Registration and Appointment of Contractor

- 8.28.2 Contractor shall provide a training program appropriate to ensure that all persons involved in working at heights acquire the understanding, knowledge, and skills necessary for the safe performance of all duties.
- 8.28.3 Training is to be provided to expose employees prior to assignment to jobs where fall hazards exist. Training shall include the following:
- (a) A discussion of the Contractor's Fall Prevention Plan. (Sg :19: 17 and / or OSHA 3146-05R 2015)
  - (b) Types of fall protection equipment to be used at the site.
  - (c) Fall hazards associated with the work to be completed.
  - (d) Procedures for removal of fall protection devices from service for repair or replacement.
  - (e) Fall protection equipment identification methods.
  - (f) Equipment maintenance and inspection requirements.
  - (g) Emergency rescue procedures.
  - (h) Suspension trauma.
  - (i) Equipment donning and doffing procedures, and opportunity for each employee to use the equipment in a field exercise.
  - (j) Equipment strengths and weight limitations.
  - (k) The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, or any other fall protection method to be used at the site.
  - (l) Practical and theoretical training on the actions to be taken in an emergency situation. This shall include rescue from height.
  - (m) The role of each employee in the safety monitoring system if this system is used;
  - (n) The role of employees in fall protection plans.
- 8.28.4 Prior to using fall arrest equipment each employee shall have their competency to use the equipment assessed by the Contractor or appointed competent trainer.
- 8.28.5 Refresher training shall be conducted when the Contractor has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by this NMS. The training content shall be identical to initial training. Circumstances where retraining is required include, but are not limited to, the following conditions:
- (a) Whenever (and prior to) a change in job assignment is made.
  - (b) When there is a change in the type of fall protection equipment used; or
  - (c) When a known hazard is added to the work environment that affects the Fall Prevention Plan.
- 8.28.6 The Contractor shall conduct additional retraining whenever a periodic inspection reveals, or there is reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of fall protection equipment or procedures.
- 8.28.7 The Contractor shall conduct additional retraining whenever a fall protection procedure fails.
- 8.28.8 Contractor shall maintain a record of the required training that contains the following:
- (a) Name and employee ID number.
  - (b) Subject(s) of training.
  - (c) Training provider
  - (d) Dates(s) of training; and
  - (e) Person(s) providing the training.

## 9 Appendices

### 9.1 Appendix A: Forms, Signs and Checklists



## 9.2 Appendix B: Audit Criteria WORKING at HEIGHT Audit Criteria/ Checklist

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria            |                                     | Requirements  | Verification | Area of Concern |
|---------------------------|-------------------------------------|---|--------------|-----------------|
| ISO 45001:2018 Clause     | NMS Ref.                            |   |              | Yes/ No         |
| 5.3                       | 7.1.3                               | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3, 8.1.4.2              | 7.1.4                               | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                       | 7.2.3, 7.2.4, 8.28                  | Persons appointed to manage /oversee work operations have the skills, knowledge, experience   |              |                 |
| 8.1.2 (e)                 | 7.2.6, 7.3.3, 8.3                   | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2        | 7.2.2,<br>7.2.5,<br>8.2.2,<br>8.1.1 | Hazards Identification Plan (HIP)   |              |                 |
|                           |                                     | Assessment of the various risks shall be undertaken,  |              |                 |
| 6.1.1,<br>6.1.2,<br>8.1.2 | 8.2.1                               | Contractor shall ensure that when work at height involves use of fall arrest systems, suitable rescue equipment shall be available in the area to retrieve employees in the event of an incident  |              |                 |
|                           | 8.4.1                               | Contractor shall implement controls preventing injuries from Falling Object, like wearing hard hats, stack materials securely to prevent them from sliding, falling or collapsing, use toe boards or guardrails on scaffolds to prevent objects from falling and use debris nets or catch platforms to grab falling objects |              |                 |
|                           |                                     | Establish exclusion zones and enforce them under work at height areas to prevent unauthorized access to the area  |              |                 |
| 6.1.1,<br>6.1.2,<br>8.1.2 | 8.5                                 | Necessary protection to the public from potential falls of tools or materials or from use of mechanical platforms   |              |                 |
|                           | 8.6                                 | Provide guardrails to all edges where there is a fall potential of 2 meters or more, in consideration of the factors that will influence the load on the guardrail  |              |                 |
|                           | 8.7.1                               | The use of safety nets shall only be considered where measures that prevent a fall of persons or objects are not reasonably practicable to implement, under the walking/working surface on which employees are working, but in no case more than 2 meters below such level  |              |                 |
| 8.1.2,<br>9.1.2           | 8.10.1                              | Contractor shall ensure Test Certificates supplied by the manufacturer state the type of net, breaking strength and height of drop  |              |                 |

| Audit Criteria              |          | Requirements   | Verification | Area of Concern |
|-----------------------------|----------|--|--------------|-----------------|
| ISO<br>45001:2018<br>Clause | NMS Ref. |  |              | Yes/ No         |
|                             |          | withstood and deflection at centre when proof tested   |              |                 |
|                             | 8.18.1   | Contractor shall ensure inspections and maintenance of Lifting Equipment and Lifting accessories that fall arrest equipment is inspected and maintained and that any defective item found during inspection and maintenance shall be segregated, tagged with a cautionary "Out of Service Tag" and not used until it has been repaired and tested, or replaced |              |                 |
| 6.1.1,<br>6.1.2,<br>8.1.2   | 8.19.1   | Every open-sided floor or platform 1.2 meters or more above an adjacent floor or ground level shall be guarded by a standard railing on all open sides except where there is entrance to a ramp, stairway, or fixed ladder   |              |                 |
|                             | 8.20.1   | Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails   |              |                 |
|                             | 8.21.1   | Fixed stairs shall be provided for access from one structure level to another where operations necessitate regular travel between levels and for access to operating platforms at any equipment which requires attention routinely during operations   |              |                 |
|                             | 8.22.1   | Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 2 meters or more above a lower level shall be protected from falling using guardrail systems, safety net systems, or personal fall arrest systems, or other combination of fall protection  |              |                 |
|                             | 8.27.2   | Contractor shall identify fragile roof materials and where work is required on the roof a risk assessment must be undertaken   |              |                 |
|                             |          |  |              |                 |
|                             |          |  |              |                 |
|                             |          |  |              |                 |

### **9.3 Appendix C: Guidance Information**

9.3.1 OSHA in CFR 1926 looks in detail of all aspects and impacts of construction work. However, no specific stand-alone work at height regulations exists within OSHA. 1926.500-503 requires the employer to take precautions to protect employees working at heights.

9.3.2 OSHA when dealing with work at height has specific requirements regarding fall protection and walking surfaces.

9.3.3 OSHA requires that;

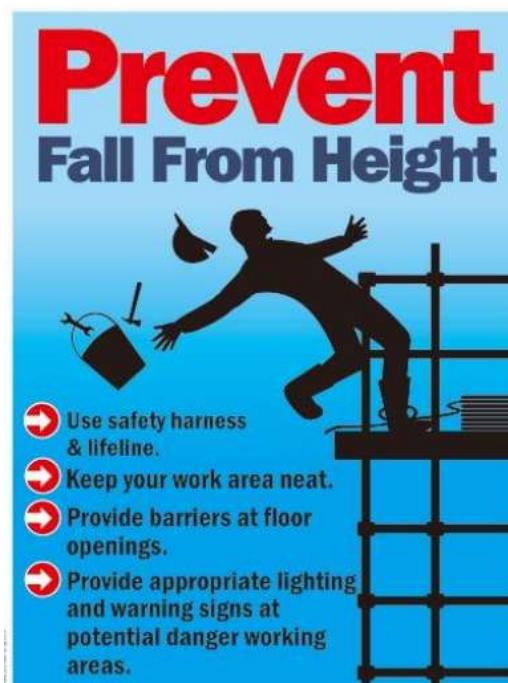
- General Industry - fall protection be provided at elevations over 4 feet
- Shipyards this is at 5 feet
- Construction Industry this is 6 feet and
- Longshoring operations this is 8 feet.

9.3.4 OSHA guidance can be found in;

OSHA 3146-05R 201 (Fall Protection in Construction)

9.3.5 In the UK system specific Regulations exist and are extremely informative on this subject under the Work at Height Regulations 2005. Specific guidance and educational documents include HSG 150 (Health and Safety in Construction);

- HSG 33 (Health and Safety in Roof Work);
- GEIS 5 (Fragile Roofs);
- GEIS 6 (management and use of mobile elevating work platforms);
- CONIAC -Safety Steps working at height guidance.
- SG19:17 - A Guide to Formulating a Rescue Plan





نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
OVERHEAD and UNDERGROUND SERVICES**

NEOM-NLF-NMS-006.008 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02.00     | Sector Review          | Issued for Implementation | 01-02-2022 |

## Document Approval

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with Overhead and Underground Services.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross Reference Audit Table)

## **2 Scope**

This NMS applies to all Sectors, Organisations within NEOM; and any Contractors working for NEOM. It applies to all activities involving Overhead and Underground Services, including:

- (a) Overhead power cables; and
- (b) Underground:
  - I. Power cables;
  - II. Water pipelines;
  - III. Fibre optic cables;
  - IV. Telecommunications cables;
  - V. Sewage lines
  - VI. Gas pipelines; or
  - VII. Petroleum and fuel oil pipelines.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that all risks are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities involving overhead and underground services.

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions  |
|--------------------------------|--|
| NEOM Co                        | NEOM Company   |
| SMS                            | Safety Management System   |
| Client                         | NEOM Sector / Department responsible for management and oversight of the Contractors |
| Employer                       | The person or organisation that employs personnel to complete the work               |
| Contractor                     | The organisation contracted to carry out the works                                   |
| Lock-out / Tag-out (Isolation) | The introduction of a device to isolate energy sources                               |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| NOC           | No Objection Certificate                       |
| OSHA          | Occupational Safety and Health Administration. |
| CPP           | Construction Phase Plan                        |
| PPE           | Personal Protective Equipment                  |
| NOC's         | No Objection Certificates                      |
| GRP           | Glass Reinforced Plastic                       |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name  |
|-----------------------------|--|
| NEOM Element 2              | Risk and Opportunity Management  |
| NEOM-Element 5              | Training, Awareness and Competency.  |
| NEOM-Element 6              | Contractor Management  |
| NEOM-Element 9              | Emergency Planning & Response Management   |
| NEOM-SMS                    | NEOM Safety Management System  |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                       |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table  |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors          |
| NEOM-NEN-PRC 006.010        | Safety in Design.  |
| NEOM-NLF-NMS-006.001        | Safety Organisation and Practitioner Registration and Appointment of Contractor. |
| NEOM-NLF-NMS 006.002-CPP    | Safety Construction Management Plan  |
| NEOM-NLF-NMS-006.003        | Scaffolding  |
| NEOM-NLF-NMS-006.004        | Permit to Work Systems   |
| NEOM-NLF-NMS-006.006        | Safe Use of Lifting Equipment and Lifting Accessories                            |
| NEOM-NLF-NMS 006.007        | Working at Heights   |
| NEOM-NLF-NMS-006.011        | Excavation Work  |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards   |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals   |
| NEOM-NLF-NMS-006 .016       | Electrical Safety  |
| NEOM-NFL-NMS-006.021        | Personal Protective Equipment (PPE)  |
| NEOM NLF-NMS-006.032        | Site Traffic Management and Logistics  |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF -SM – Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.

- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 OSH Construction Management Plan) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6 - Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.

## **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities
- 7.2.2 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
  - (b) Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities
  - (c) All work in the vicinity of overhead or underground services must be appropriately planned, organized, and appropriately supervised;
  - (d) Those working close to overhead and underground services are trained and competent; (Refer: NEOM Element 5 – Training, Awareness and Competence)
  - (e) That all appropriate control measures such as exclusion zones and restrictive goalposts (in the case of overhead services) are in place and appropriately maintained;
  - (f) All safety equipment associated with working with overhead or underground services is inspected and tested where appropriate; and
  - (g) The risks associated with overhead and underground service are appropriately controlled through recognized and agreed safe systems of work. (Refer: NEOM Element 2 Risk and Opportunity Management and NEOM-NLF-NMS-006.004 Permit to Work Systems)

## **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management System - Roles and Responsibilities.
- 7.3.2 Employees shall, as required follow all Site Rules, Permit to Work, Work Instructions and Training requirements (Refer: NEOM-NLF-NMS-006.004 Permit to Work Systems)

- 7.3.3 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.4 Shall use appropriate equipment or safety devices provided for the work in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment (PPE))

## **7.1 Specific Responsibilities**

- 7.1.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.1.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.1.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.1.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.1.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Planning and Assessment**

- 8.1.1 Contractor shall evaluate each site or work activity to determine if the hazards associated with overhead or underground services are present and ensure the workplace is assessed using risk management practices as required by NEOM-Element 2 – Risk and Opportunity Management.
- 8.1.2 Where overhead or underground service hazards are present, appropriate control measures shall be implemented. These control measures shall include obtaining No Objection Certificate's (NOC) and Permit to Work clearances from the relevant Service Provider. (Refer: NEOM-NLF-NMS-006.004 Permit to Work Systems)
- 8.1.3 Contractor shall ensure:
  - (a) Assessment of the various risks and establishment of systems of work and effective control measures which are safe to employees, other contractors, and the public; (Refer: NEOM Element 2 – Risk and Opportunity Management)
  - (b) The management of overhead and underground services are included in the Pre-Tender Safety and Health Plan in accordance with NEOM-Element 6 – Contractor Management
  - (c) That associated safe systems of work, and site rules are included in the Occupational Health and Safety Construction Management Plan NEOM-NLF-NMS-006.002(CPP)

### **8.2 Emergency Planning**

- 8.2.1 Contractor shall ensure that detailed procedures are developed to deal with any emergency situations that may arise from overhead or underground services.
- 8.2.2 Emergency procedures shall be developed in-line with the specific hazards of the work as described in the risk assessment. (Refer: NEOM Element 2 Risk and Opportunity Management) and in alignment with NEOM Element 9 – . Emergency Planning & Response Management)
- 8.2.3 Ensure appropriate communication of the emergency plan to all relevant persons.

## **8.3 Overhead Services**

### **8.3.1 General Requirements**

- (a) Contractor shall ensure that where any electrically charged overhead cable or apparatus is liable to be a source of danger to persons employed on site, all reasonably practicable precautions shall be taken to prevent such danger by the provision of appropriately placed barriers and warning signs. (Refer: NEOM-NLF-NMS-006013 Safety Signage and Signals and NEOM-NLF-NMS-006.012 Barricading of Hazards).

## **8.4 Site Surveys**

- 8.4.1 Contractor shall ensure that site surveys are carried out onsite to determine the location of overhead lines within the vicinity of site. Before any work commences the Contractor shall contact the service provider to obtain details on the size of the overhead lines and the restrictions that apply when working in their vicinity;
- 8.4.2 That where work is to be carried out close to overhead lines or where traffic will be passing under the lines. Written confirmation from the Service Provider shall be attained confirming that lines are fully isolated before any work is commenced;
- 8.4.3 In the case where the overhead line cannot be isolated ensure the control measures stipulated by the service provider are strictly followed.

## **8.5 Precautions for Overhead Services**

- 8.5.1 Contractor shall prepare a detailed risk assessment for all works in the vicinity of overhead lines considering the information provided by the service provider. All personnel shall be briefed on the control measures to be adopted and strict levels of supervision shall be applied throughout the works.
- 8.5.2 Where traffic will pass under overhead lines ensure:
  - (a) The crossing shall be at right angles to the line and be restricted to the smallest possible working width for the type of plant using the roadway;
  - (b) Any crossing width shall not exceed 10 meters;
  - (c) The crossings shall be restricted to the smallest possible number and shall be fenced to give a clear indication of the roadway.
  - (d) Goalposts shall be erected on both sides of the overhead line to act both as gateways and height limits. The goalposts are to be made of wood or plastic and be marked with red and white paint or sticker tape;
  - (e) The height and position of such goalposts depends upon the voltage of the overhead line and the service provider commonly advises on these points. There shall be a minimum of 6 meters between the top of goalposts and overhead lines for voltages up to 350kV; For distances required for other higher voltages refer to Table 4 below.

Table 4 : MINIMUM CLEARANCE DISTANCES BASED ON VOLTAGE

| Voltage (kV)     | Minimum clearance distance (feet) |
|------------------|-----------------------------------|
| Up to 50 kV      | 10 ft                             |
| >50 to 200 kV    | 15 ft                             |
| >200 to 350 kV   | 20 ft                             |
| >350 to 500 kV   | 25 ft*                            |
| >500 to 750 kV   | 35 ft*                            |
| >750 to 1,000 kV | 45 ft*                            |
| >1,000 kV        | Determined by the utility/owner   |

\*According to 1926.1409, for power lines over 350 to 1,000 kV, the minimum distance is presumed to be 50 feet. Over 1,000 kV, the utility/owner or a registered engineer must establish it.

- (f) Warning signs shall be erected at 250, 100, 50 and 25 meters either side of the overhead lines. The signs shall state the clearance limits;
- (g) Plant or equipment that could extend beyond the clearance limit (goalpost height) shall strictly be prohibited from use in the area;
- (h) Cranes, excavators shall be fitted with a jib restrictor or other devices to prevent them extending beyond the clearance limit;
- (i) A competent supervisor shall be present for the duration of the works under the lines; (Refer: NEOM Element 5 – Training, Awareness and Competence)
- (j) Danger notices shall be installed which give a clear indication of the working height and instructions given to plant drivers to lower crane jibs, to tip bodies of lorries, etc., to drive carefully;
- (k) If any work takes place after dark, notices and cross bars shall be illuminated.

#### 8.5.3 Upon completion of road works, ensure the following activities:

- (a) The Electrical Isolation Certificate (if applicable) and the Permit to Work shall state (in the “WORK TO BE COMPLETED” Section) that the High Voltage overhead line has been made safe so that work can take place near the Earthed conductors;
- (b) The surface of any highway, street, or sidewalk where the work has been carried out shall be levelled, reinstated in good condition before any barriers and markers are removed;
- (c) Permanent road traffic signs and markings etc., shall be restored, erected, displayed etc., before the road traffic is returned to normal service; and
- (d) All barriers, traffic cones, and other warning devices shall be promptly removed once work has been completed and approved by the relevant authorities.

## 8.6 Underground Services

### 8.6.1 General Requirements

- (a) Contractor shall ensure that prior to any excavation, piling or boring works being carried out, all control measures shall be taken to identify underground services. These control measures shall include but not limited to the use of cable / pipe detectors / locators, followed by manual excavation.
- (b) All excavation, direct piling or boring works are approached with caution and assume the presence of underground services until such reasonably practicable control measures have been taken to demonstrate that the area is safe and free from underground services.

## **8.7 Site Surveys**

- 8.7.1 Contractor shall obtain utility layout plans (approved as built drawings where available) from utility service providers prior to commencement of any excavation, piling or boring works. The utility layout plans shall be used as a guide and shall not negate the Employer from undertaking further investigation of the area where excavation, piling or boring works are to be undertaken;
- 8.7.2 Carry out site surveys focusing on areas where excavation, piling or boring works will be carried out. The surveys shall be carried out by a competent person, and shall include the following methods:
  - (a) The use of an avoidance tool in conjunction with plans to locate underground services which are then marked on the ground with pegs or paint;
  - (b) Hand dug trial holes to determine the depth of services at points where proposed works cross existing services;
  - (c) Visual survey looking for the presence of above ground indicators to suggest underground services are present;
- 8.7.3 All services found shall be considered live and in service and they shall be supported and protected from damage. Their location shall be marked up on site drawings; and
- 8.7.4 If a service is damaged during works, no one shall go near the service, the service shall be considered live, and operatives shall exit the area. The utility provider shall be contacted and informed of the damage and shall attend site to repair the damaged service.

## **8.8 Excavation Work**

- 8.8.1 Contractor shall ensure that all excavations are undertaken in accordance with NEOM-NLF-NMS-006.011– Excavation Work.
- 8.8.2 That prior to any excavations being undertaken, the relevant permits / NOC(s) are obtained from the relevant authorities
- 8.8.3 Contractor shall ensure the following precautions when excavating around known underground services:
  - (a) Mechanical excavators shall not be used within 0.5 meter of known underground services;
  - (b) Where mechanical excavators are used between 3 meters and 0.5 meters of underground services a banksman shall be provided to guide the operator;
  - (c) Hand digging techniques shall be limited to the use of Glass Reinforced Plastic (GRP) shovels and spades not pick-axes, forks, or other similar penetrating/high impact tools;
  - (d) Under no circumstances allow employees to climb on underground services as a means of access;
  - (e) Where required, underground services shall be appropriately supported at regular interval to prevent their deflection and damage;
  - (f) Any damage to underground services shall be reported to the service providers to allow them the opportunity to inspect and check their service;
  - (g) Temporary protection shall be provided to any nearby underground services that may be damaged by the excavation works;
  - (h) Underground services shall be protected if their position in the excavation could cause them to become damaged during the work being carried out;
  - (i) Terminated ends of underground services shall always be assumed in service and must be treated as any other underground service; and

- (j) When backfilling an excavation warning tape shall be laid over the underground service and where reasonably practicable above ground markers shall be used to reduce the risks of any future excavation works;
- 8.8.4 Where oil or gas pipelines are present the specific requirements of the service owner and permit to work are followed and regular communication shall be maintained between the Employer and service owner; (Refer: NEOM-NLF-NMS-006.004 Permit to Work Systems)
- 8.8.5 Stop work immediately if during excavation work an uncharted underground service is discovered. Work shall only restart when it has been determined that the underground service has not been damaged and a risk assessment based safe system of work has been developed for the continuance of work. Contractor shall investigate any such incident and determine how the underground service was missed from the site survey and investigation;
- 8.8.6 Ensure that all communication that could affect the safety of employees is provided in writing by the service provider. This includes isolation notices and other statements made with regards to the suspected location of the underground service.

## **8.9 Use of Underground Services Avoidance Tools**

- 8.9.1 Contractor shall ensure that underground services avoidance tools are calibrated and maintained in accordance with the manufacturer's instructions;
- 8.9.2 That all personnel involved in the use of underground services avoidance tools are trained and competent. Where reasonably practicable the manufacturer shall be contacted to provide training on the use of their equipment. (Refer: NEOM Element 5 Training, Awareness and Competence).
- 8.9.3 That cable avoidance tools are inspected at the beginning of every shift by a competent person.
- 8.9.4 Any underground services avoidance tools suspected of being out of calibration or damaged in any way to give a false reading are removed from service and securely stored to prevent it from being used.

## **8.10 Training and Competency**

- 8.10.1 Contractor shall ensure that OSH training complies with the requirements of:
  - (a) NEOM-Element 5 – Training, Awareness and Competency;
  - (b) NEOM-NLF-NMS-006.001 – Organisation, OSH Practitioner Registration and Appointment of Principle Contractor.
- 8.10.2 Establish an appropriate training program to ensure that all persons in the vicinity of overhead or underground services acquire the understanding, knowledge, and skills necessary for the safe performance of all duties;
- 8.10.3 Provide specific training in the use of equipment provided for the survey and avoidance of underground services in accordance with the manufacturers' recommendations;
- 8.10.4 Refresher training shall be conducted when there is any reason to believe that any affected employee who has already been trained does not have the understanding and skill required by this NMS. The training content will be identical to initial training. Circumstances where retraining is required include, but are not limited to, the following conditions:
  - (a) Whenever (and prior to) a change in job assignment is made; or
  - (b) When a known hazard is added to the work environment that affects the agreed safe system of work.
- 8.10.5 Conduct additional retraining whenever a periodic inspection reveals, or there is reason to believe, that there are deviations from or inadequacies in the employee's knowledge or procedures.

8.10.6 Conduct additional retraining whenever an overhead or underground services procedure fails.

8.10.7 Contractor shall maintain a record of the required training that contains the following:

- (a) Name and ID number;
- (b) Subject(s) of training;
- (c) Date(s) of training;
- (d) Name of trainer(s); and
- (e) Training provider.

## 9 Appendices

### 9.1 Appendix A: Forms, Signs and Checklists

|   |   |
|---|---|
| <p><b>Lockout definition</b></p> <ul style="list-style-type: none"><li>• Lockout is the process of preventing the flow of energy from a power source to a piece of equipment.</li><li>◦ Accomplished when an authorized employee installs a lock, block, or chain on the machine's disconnect switch or other electrical control switch, valve or lever that will keep it in the off position.</li><li>◦ Authorized employees are the only employees who can apply/remove lock.</li></ul> | <p><b>Tagout definition</b></p> <ul style="list-style-type: none"><li>• Tagout is the process of placing a tag on the power source.</li><li>◦ Tag acts as a warning not to restore energy-it is not a physical restraint.</li><li>◦ Tag must clearly state "Do Not Operate"</li><li>◦ Tag should only be used when the machine won't accept a lock.</li><li>◦ Tag must be applied/removed by an authorized employee.</li></ul> <p>If a tag is used on an energy isolating device that is capable of being locked out, the tag must be attached at the same location that the lock would have been attached.</p> |
|---|---|



## 9.2 Appendix B: Audit Criteria OVERHEAD and UNDERGROUND SERVICES

### Audit Criteria/ Checklist

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria            |  | Requirements  | Verification | Area of Concern |
|---------------------------|--|---|--------------|-----------------|
| ISO 45001:2018 Clause     | NMS Ref.                                 |   |              | Yes/ No         |
| 5.3                       | 7.1.3                                    | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2           | 7.1.4                                    | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                       | 7.2.2 (b,<br>d), 8.10                    | Persons appointed to manage /oversee work operations have the skills, knowledge, experience   |              |                 |
| 8.1.2 (e)                 | 7.2.6,<br>7.3.4                          | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2        | 7.2.2(a,g),<br>8.1.1,<br>8.1.3,<br>8.5.1 | Hazards Identification Plan (HIP)<br><br>Assessment of the various risks shall be undertaken,   |              |                 |
| 6.1.2.2,<br>8.1.2         | 8.4.1                                    | Contractor shall ensure that site surveys are carried out onsite to determine the location of overhead lines within the vicinity of site  |              |                 |
| 9.1.2                     | 8.5.3(a)                                 | Upon completion of road works, ensure Electrical Isolation Certificate (if applicable) and the Permit to Work shall state (in the "WORK TO BE COMPLETED" Section) that the High Voltage overhead line has been made safe so that work can take place near the Earthed conductors                          |              |                 |
| 6.1.1,<br>8.1.1,<br>8.1.2 | 8.6.1(a)                                 | Contractor shall ensure that prior to any excavation, piling or boring works being carried out, all control measures shall be taken to identify underground services. These control measures shall include but not limited to the use of cable / pipe detectors / locators, followed by manual excavation |              |                 |
|                           | 8.7.1                                    | Contractor shall obtain utility layout plans (approved as built drawings where available) from utility service providers prior to commencement of any excavation, piling or boring works  |              |                 |
| 7.4                       | 8.7.4                                    | If a service is damaged during works, no one shall go near the service, the service shall be considered live, and operatives shall exit the area. The utility provider shall be contacted and informed of the damage and shall attend site to repair the damaged service                                  |              |                 |
| 7.4                       | 8.8.4                                    | Where oil or gas pipelines are present the specific requirements of the service owner and permit to work are followed and regular   |              |                 |

| Audit Criteria              |          | Requirements   | Verification | Area of Concern |
|-----------------------------|----------|--|--------------|-----------------|
| ISO<br>45001:2018<br>Clause | NMS Ref. |  |              | Yes/ No         |
|                             |          | communication shall be maintained between the Employer and service owner   |              |                 |
| 8.1.2                       | 8.9.1    | Contractor shall ensure that underground services avoidance tools are calibrated and maintained in accordance with the manufacturer's instructions |              |                 |
|                             |          |  |              |                 |
|                             |          |  |              |                 |
|                             |          |  |              |                 |
|                             |          |  |              |                 |
|                             |          |  |              |                 |
|                             |          |  |              |                 |

### 9.3 Appendix C: Guidance Information

Power lines must be assumed to be energized until they are confirmed to be de-energized and visibly grounded. Warnings about electrocution hazards must be posted conspicuously in the crane cab and outside the cab in view of the operator (except for overhead gantry and tower cranes).

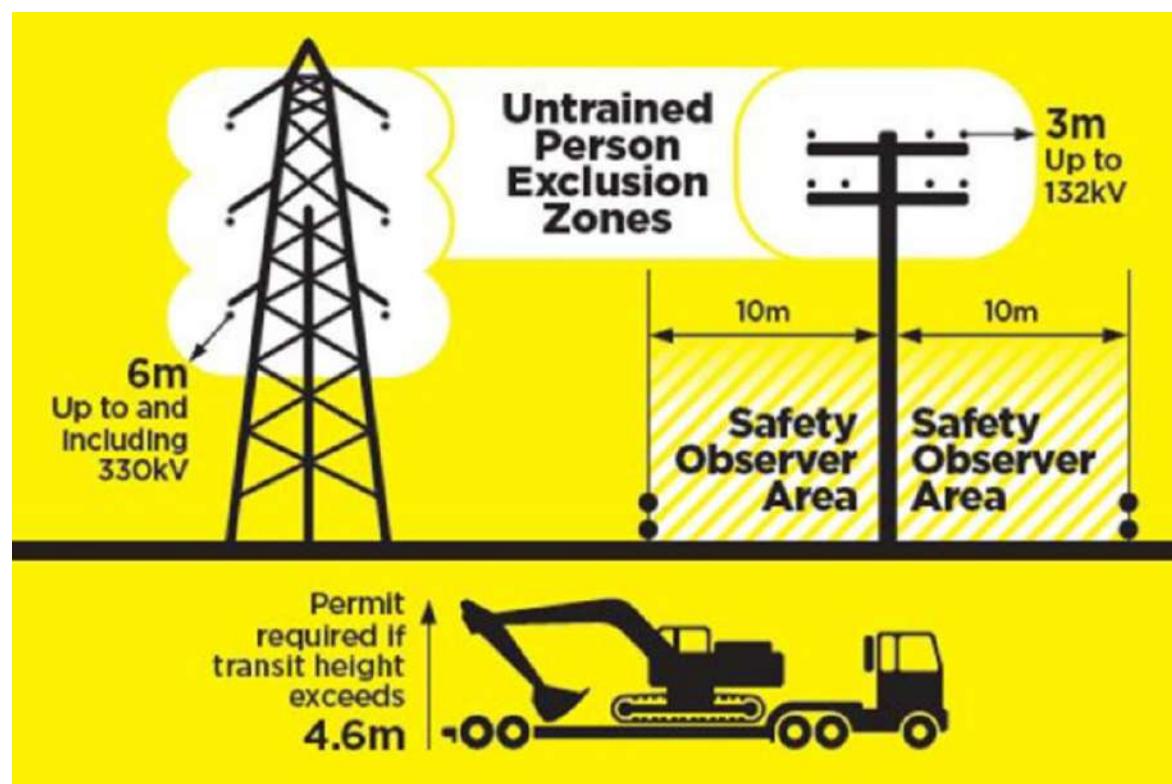
The work zones must be demarcated 360 degrees around the equipment to prevent encroachments within 20 feet of a power line. If the line is not de-energized, a meeting must also be held with the crew before operations begin to review the location of the lines and procedures to prevent encroachment. Measures similar to those required during assembly/disassembly must be taken to prevent encroachment, but in this case an insulating link between the load line and the load is also an option.

Under OSHA Regulations in 29 CFR 1926.1410 many safety requirements can be found a general rule of thumb is shown below for distances to be kept clear.

OSHA has established the following guidelines to help keep you safe when you have to work near power lines:

Keep a distance of 10 feet or more between you, your equipment and any power lines. Survey the site for overhead power lines before you begin working. Keep a minimum distance of 10 feet plus 1/2 inch for each 1,000 volts over 50,000 volts between power lines and any part of a crane if the energized power lines are 50,000 volts or more.

Request an observer to assist you where it is difficult to maintain the desired clearance by visible means. Be sure that the observer's only job is to help you maintain the safe clearance. Treat overhead power lines as if they were energized whenever you are working near them. Call the electric company to find out what voltage is on the lines if you are not sure. Ask the electric company to either de-energize and ground the lines or install insulation while you are working near them. Make sure ladders and tools are nonconductive.





نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
PRE-CAST CONSTRUCTION**

NEOM-NLF-NMS-006.009 - Rev 02.00 – February 2022

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## Document History

|           |               |                           |            |
|-----------|---------------|---------------------------|------------|
| Rev 00.00 | First Issue   | Issued for Implementation | 27/07-2020 |
| Rev 02,00 | Sector Review | Issued for Implementation | 01-02-2022 |

## Document Approval

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety risks associated with pre-cast construction.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Standard (Refer NEOM-NLF-PRC–006- Section 2 ISO 14001 Cross Reference Table)

## **2 Scope**

This NMS applies to all sectors, organizations within NEOM; and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS. This NMS covers the requirements for Pre-cast Construction during:

- Design.
- Prefabrication and Casting.
- Handling, Storage, Transportation.
- Erection.

**NOTE:**

*Concrete pipes, bridge beams and culverts are not covered in this NMS*

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with pre-cast construction.

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements.
- (b) ANSI requirements.
- (c) NFPA Standards and requirements.
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                 | Definitions   |
|-----------------------|---|
| NEOM Co               | NEOM Company  |
| Pre-Cast Construction | In this NMS pre-cast construction includes concrete panels or other pre-cast concrete units, made in either an on-site or off-site casting yard that is cast and then lifted into position to form part of a structure / building / services infrastructure.  |
| Client                | NEOM Sector /Department responsible for management and oversight of the Contractor  |
| Employer              | The person or organization that employs personnel to complete the work  |
| Contractor            | The organization contracted to carry out the works  |
| Shop Detailer         | The person responsible for preparing the shop drawings of the units. (The shop detailer may also be the pre-caster or a company or person responsible to the pre-caster).   |
| Shop Drawing          | A detailed drawing of a tilt-up or pre-cast concrete unit used in the manufacturing process.  |
| Tilt-up               | An essentially flat pre-cast concrete panel cast in a horizontal position, (usually on site); initially lifted by rotation about one edge until in a vertical or near vertical position   |
| Safety File           | The safety file is prepared by the principal designer (with input from the principal contractor and the rest of the project team). It contains all relevant health and safety information needed to allow future construction work, and future use of the building (including cleaning and maintenance) to be carried out safely. |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System.                      |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 5              | Training, Awareness and Competency.   |
| NEOM-Element 6              | Contractor Management   |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                    |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors       |
| NEOM-NEN-PRC 006.010        | Safety in Design.   |
| NEOM-NLF-NMS-006.001        | OSH Organisation and Practitioner Registration and Appointment of Contractor. |
| NEOM-NLF-NMS 006.002-CPP    | Occupational Health and Safety Construction Management Plan                   |
| NEOM-NLF-NMS-006.003        | Scaffolding   |
| NEOM-NLF-NMS-006.004        | Permit to Work Systems  |
| NEOM-NLF-NMS-006.006        | Safe Use of Lifting Equipment and Lifting Accessories                         |
| NEOM-NLF-NMS 006.007        | Working at Heights  |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards  |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals  |
| NEOM-NFL-NMS-006.021        | Personal Protective Equipment (PPE)   |
| NEOM-NLF-NMS-006.024        | Occupational Health Screening and Medical Surveillance                        |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM – Safety Management Manual -Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) which will form part of the Contractor review and selection process.
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM Element 6- Contractor Management). To ensure that only Competent organizations capable of meeting the requisite safety standards associated with project are contracted.

7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:

- (a) Safety performance monitoring and measuring.
- (b) Managing change.
- (c) Continuous improvement.

7.1.6 Client shall undertake their specific roles and responsibilities in accordance with the following:

- (a) Ensure that Contractor has all available descriptions of the site, including design drawings, site surveys, plans of services and information on the nature and location of hazardous materials, the nature of building materials and the building or structure's relationship to surrounding properties.
- (b) Relevant authorities and utility service providers are notified, and all necessary approvals are obtained before work commences; and

## 7.2 Designers

7.2.1 Designers shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NEN-PRC 006.010 – Safety in Design.

- (a) Take account of any pre-construction information provided by the client.
- (b) Eliminate foreseeable health and safety risks to anyone affected by the project (if possible);
- (c) Take steps to reduce or control any risks that cannot be eliminated
- (d) Provide design information to the Client and Contractor to help them comply with their duties, such as ensuring a Construction Phase Plan is prepared and Safety File Prepared and maintained.

7.2.2 Designers shall undertake their specific roles and responsibilities in accordance with the following:

- (a) The structural design shall consider the requirements of precast concrete structures to ensure that the pre-cast concrete unit can be erected safely, for example: design in fall protection tie off points.
- (b) Special care is taken during design and construction to guard against progressive collapse.
- (c) The slenderness and stability of tilt-up and pre-cast concrete unit is considered.
- (d) The specification of the strength of concrete considers the strength required at lifting, as well as the requirements for in-service loading, durability, and ease of construction.
- (e) The concrete strength required at lifting is in accordance with the lifting insert manufacturer's specifications, (Refer:NEOM-NLF-NMS-006.006 Safe Use of Lifting Equipment and Lifting Accessories)
- (f) Concrete specifications are clearly shown on the drawings and include any special requirements which may include cement content and water-cement ratio.

## 7.3 Contractor

7.3.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM–NLF-SM – Safety Management Manual - Roles and Responsibilities

- (a) That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- (b) Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organizational capability to plan and manage work safely and without risk to those who may be affected by the activities
- (c) Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)

- (d) That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.
- 7.3.2 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
- (a) Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
  - (b) Ensuring relevant authorities and utility service providers are notified, and all necessary approvals are obtained before work commences.
  - (c) Ensuring the workplace is secured.
  - (d) Tilt-up and pre-cast concrete work is appropriately planned, organized, and supervised.
  - (e) Consult with designers and builders to ensure that safety matters are considered in all aspects of the design work for all pre-cast concrete unit construction work.
  - (f) Ensure those involved in tilt-up and pre-cast concrete works and the associated equipment are trained and competent.
  - (g) Ensure the location where tilt-up and pre-cast concrete unit work is conducted is safe.
  - (h) Tilt-up and pre-cast concrete equipment appropriately maintained and inspected.

#### **7.4 Employee**

- 7.4.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- (a) Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
  - (b) Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received. (Refer NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
  - (c) Follow information provided by the employer regarding tilt-up and pre-cast concrete equipment use; and abide by all warning signs. (Refer:NEOM-NLF-NMS-006.013 Safety Signage and Signals)

#### **7.5 Specific Responsibilities**

- 7.5.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.5.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.5.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.5.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.5.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Planning and Assessment**

8.1.1 Contractor shall consider and where required ensure the following:

- (a) An assessment of the various risks is undertaken, appropriate control measures are implemented, and systems of work are established; which are safe to all parties involved or affected including the public; (Refer: NEOM Element 2 Risk and Opportunity Management)
- (b) That the management of tilt-up and precast concrete requirements are included in the Pre-Tender Safety and Health Plan in accordance with NEOM-Element 6 Contractor Management
- (c) That associated safe systems of work and site rules are included in the Occupational Safety and Health Construction Management Plan (Refer: NEOM-NLF-NMS-006.002 - Safety Construction Management Plan) (CPP) and NEOM-NLF-NMS-006.004 Permit to Work Systems)

8.1.2 Hazard identification and risk assessment shall be considered at each stage of the pre-cast concrete unit construction work, (Refer: NEOM Element 2 Risk and Opportunity Management) including:

- (a) Design.
- (b) Prefabrication.
- (c) Handling, storage, and transport.
- (d) Erection and temporary bracing.
- (e) Fixing into final structure.
- (f) Brace removal; and
- (g) Modification and/or demolition.

8.1.3 Contributing hazards may include the features of the site such as sloping ground, rough surfaces, holes and other obstructions.

- (a) Overhead power lines and/or underground utilities.
- (b) Weather conditions, particularly locations that are prone to gusty wind conditions.
- (c) Working at height.
- (d) Manual handling.
- (e) Sites with many activities being undertaken at the same time.
- (f) Hazardous substances including curing compounds and release agents, (Refer: NEOM-NLF-NMS-006.024 -Occupational Health Screening and Medical Surveillance)
- (g) The movement of traffic and mobile plant on and adjacent to the site.

8.1.4 The most significant hazard posed by pre-cast concrete unit is that of severe crush injuries resulting from:

- (a) The uncontrolled collapse of pre-cast concrete unit during handling and erection, including while temporarily braced or when unit are being modified or removed; and
- (b) A person being caught between pre-cast concrete units, between precast concrete unit and mobile plant or between pre-cast concrete unit and other structural components.

8.1.5 Additional factors that may contribute to the likelihood of an uncontrolled collapse and injury include:

- (a) Faulty design, including the use of incorrect components or inappropriate concrete strength.
- (b) Faulty lifting inserts or connectors.
- (c) Poorly secured loads or incorrect methods used for loading or unloading unit for transport.
- (d) Weakness in pre-cast concrete unit due to inappropriate modifications.

- (e) Incorrect lifting and erection practices, including the unsafe use of rigging.
  - (f) Lifting before the pre-cast concrete unit has reached its design strength.
  - (g) Weakness resulting from errors whilst fabricating the pre-cast concrete unit.
  - (h) Inappropriate lifting equipment for the task.
  - (i) Inappropriate or unstable work area for the cranes.
  - (j) Inappropriate structural capacity of footings.
  - (k) Damage to pre-cast concrete unit and/or weakness of subsequent repairs; and
  - (l) Inappropriate temporary storage facilities, including racking systems, suspended floors or beams.
- 8.1.6 Environmental factors may also increase the likelihood of an injury for persons undertaking pre-cast concrete unit construction work and may include:
- (a) The wind speed may exceed specifications for the safe erection of the precast concrete unit.
  - (b) Wet weather may cause instability in the crane standing area or erection area,
  - (c) Extremes in temperature may make it unsafe for those persons erecting the pre-cast concrete unit.

## 8.2 Documented Safe Systems of Work

- 8.2.1 Contractor shall ensure documented safe systems of work are developed, implemented, and as a minimum, include:
- (a) A detailed erection schemes.
  - (b) Phasing of the work, particularly with that of other affected contractors.
  - (c) Special requirements relating to the safe erection of the structure shall be highlighted at the pre-contract stage.
  - (d) Special site conditions such as proximity of other buildings or access
  - (e) Restrictions; (Refer: NEOM-NLF-NMS-006.004 – Permit to Work Systems)
  - (f) Ground conditions particularly with regards to conditions that may need to be considered when positioning a crane.
  - (g) Personal Protective Equipment (PPE) is selected by considering standards and requirements that apply to construction generally and to tilt-up and pre-cast construction in accordance with NEOM-NLF-NMS-006.021 Personal Protective Equipment.
  - (h) Cranes and lifting gear shall be selected and used in accordance with the requirements of NEOM-NLF-NMS-006.006 Safe Use of Lifting Equipment and Lifting Accessories.

## 8.3 Documentation

- 8.3.1 Contractor shall include the following information in the documented systems of work:
- (a) Design documentation including:
    - I. Proprietary documentation.
    - II. Prefabricator's inspection and statement.
    - III. Risk assessment(s).
    - IV. Structural design drawings.
    - V. Unit documentation including marking plans, shop drawings and erection documentation.
  - (b) The proposed sequence of work and the complete construction and erection sequences shall be planned before the pre-cast concrete unit are fabricated.
  - (c) Details of the stabilization methods (temporary and permanent) to be used while pre-cast concrete unit are being erected to guard against the collapse of a pre-cast concrete unit, panel, or structure.

- (d) The methods used need to be appropriate to ensure appropriate structural strength and continuity of the structure and its parts, both during the erection phase and in the finished structure.
- (e) The methods used need to safely transmit applied loads through the structure.
- (f) Crane requirements.
  - I. Signed copies of any changes made to specifications and/or signed instructions, advice or diagrams made or issued by an engineer.
  - II. A copy of any notification to a relevant authority responsible for the regulation of pre-cast concrete unit construction work; and
  - III. A copy of any report, license or authority required to carry out pre-cast concrete unit construction work.

## **8.4 Design Documentation**

### **8.4.1 Proprietary Documentation**

- (a) Where proprietary systems for tilt-up or pre-cast concrete construction are used the manufacturer's specifications and erection procedures should be available on site and briefed to the erection crew.
- (b) Ensure all components used on site, within a system are compatible and that different proprietary components are not mixed without confirmation of compatibility from the supplier and the designer.

### **8.4.2 Structural Design Drawings**

- (a) Ensure that the structural design drawings are prepared by an engineer which details all the structural design considerations including details of the base requirements for the final structure.
- (b) Ensure the structural design drawings, including the approval of any proposed proprietary or manufactured inserts and fixings, are signed off by a competent engineer.

### **8.4.3 Marking Plan**

### **8.4.4 A marking plan (layout plan) should be prepared by the shop detailer showing the location of each pre-cast concrete unit in the final structure along with the erection/assembly sequence.**

### **8.4.5 Erection Documentation**

- (a) Ensure the erection documentation prepared by the engineer covers every aspect of the erection process, including:
  - I. Erection sequence.
  - II. Orientation (position relative to each other) of the pre-cast concrete unit.
  - III. Configuration and size of erection braces and, where applicable, knee braces and cross-bracing.
  - IV. Bracing details including type and angle.
  - V. Requirements for erection brace footings, brace fixings and concrete strength of the brace footings at the time of erection.
  - VI. Levelling shim details for erection.
  - VII. The requirements for grouting.

## **8.5 Design for Handling, Storage and Transport**

### **8.5.1 The design for handling pre-cast concrete unit should consider:**

- (a) The size, weight, and shape of the pre-cast concrete unit.
- (b) Whether the pre-cast concrete unit is to be lifted by the edge or the face.
- (c) Whether the pre-cast concrete unit is to be rotated during erection.
- (d) Cast-in fittings.
- (e) Handling and storage loads, including:

- I. The effect of suction and adhesion during separation from the formwork or casting bed.
  - II. Dynamic and impact loading during transportation.
  - III. Erection and bracing loads.
  - IV. Wind load on the braced panels during erection.
  - V. Construction loads including any backfill and surcharge loads.
  - VI. Permanent, imposed and other loads; and
  - VII. The increase in design loads due to wind load and seismic load.
- (f) Additional reinforcement; and
- (g) The brace footings.

#### 8.5.1 Size and Shape of Pre-Cast Concrete Unit

- (a) When determining the size and shape of pre-cast concrete unit, consideration shall be given to :
  - I. Size, capacity, and configuration of the crane(s) available to undertake lifting and erection.
  - II. Manufacturing restrictions.
  - III. Location and proximity of overhead power supplies.
  - IV. Access to and around the site.
  - V. Bracing, propping, and grouting requirements:
  - VI. The transport restrictions.
- (b) The load capacity of lifting inserts is assessed; and
- (c) When fixed length multi-legged slings are to be used for lifting pre-cast concrete unit, any two of the lifting inserts shall be capable of supporting the total load.

#### 8.5.2 Lifting Inserts

- (a) Ensure lifting inserts are configured in accordance with the manufacturer's recommendations, including component reinforcement for the direction of the applied load.
- (b) Lifting inserts shall be suitable for the task to be undertaken; relevant information shall be included in the shop drawings.
- (c) The number of lifting inserts required is dependent on several factors including the pre-cast concrete unit size and shape, insert capacity and insert location; and
- (d) The location of lifting inserts is interrelated to the reinforcement design and the proposed erection

#### 8.5.3 Cast-in Fixings

- (a) Cast-in fixings such as threaded inserts, weld plates or brackets are to be designed and specified by an engineer and shall be installed as per the manufacturer's recommendations for proprietary items.
- (b) Where reasonably practicable, to minimize the chance of error, fixings shall be standardized for all pre-cast concrete unit on an individual project.
- (c) Where permanent fixings or connections are also intended for temporary use during construction, the erector shall verify that such use will not compromise their long-term performance; and
- (d) Impact driven fixings, including explosive charge driven fixings, shall not be used unless confirmation is received from the engineer that this method of fixing is acceptable.

#### 8.5.4 Wind Loads

- (a) Ensure the wind loading is calculated on pre-cast concrete unit and take into consideration the variances depending on the size of the unit, wind speed and wind direction.

## **8.6 Handling, Storage and Transport**

### **8.6.1 Handling**

- (a) Ensure the rigging system to be used on site for each pre-cast concrete unit is set out in the erection documentation.
- (b) Verify that the pre-cast concrete unit and brace footing concrete has attained the specified strength for lifting and that the brace fixing bolts are available on site.
- (c) During handling, minimize the likelihood of impact between the pre-cast concrete unit; and
- (d) Ensure the transporter is to be made aware of any site-specific hazards prior to the transporting of any pre-cast concrete unit.

### **8.6.2 Storage**

- (a) The pre-cast concrete Unit shall be stored in a position that is safe and does not present a risk to those on site.
- (b) Racking systems, frames and supports shall be designed for the shape, size, and weight of the pre-cast concrete unit.
- (c) Approval/written instructions shall be obtained before a precast concrete unit is stored horizontally or on a suspended floor slab or beam
- (d) During storage, minimize the likelihood of impact between the pre-cast concrete unit and vehicular or plant movement by providing barriers or restricting access.

### **8.6.3 Planning Crane Requirements**

- (a) Ensure that crane selection, access and siting are conducted in accordance with NEOM-NLF-NMS-006.006–Safe Use of Lifting Equipment and Lifting Accessories, which shall include:
  - I. Crane selection, access and siting shall consider the erection sequence of the pre-cast concrete unit to avoid any possibility of the rear of the crane slewing into braces supporting previously erected pre-cast concrete unit.
  - II. Where two or more cranes are operating, they shall be sited to prevent them operating in each other's airspace. Where this is not reasonably practicable, procedures shall be established to prevent contact.
  - III. Written procedures and risk assessment shall cover: Setting up the Crane, Lifting Methodology and Crane dismantling
  - IV. Selection of lifting gear and accessories including, if rotation is to be carried out, the appropriate snatch block for rotation of pre-cast concrete unit while suspended.
  - V. Means to disengage the rigging gear from the concrete panel once it has been temporarily fixed into position.
- (b) Ensure documentation relating to the selection, erection and dismantling of a crane used during concrete construction work is retained for the duration of the Project.

### **8.6.4 Transport**

- (a) Ensure the transporter has been appropriately instructed in the safe transportation of pre-cast concrete unit including panels, with attention given to:
  - I. Overhead power lines and load height restrictions on the site.
  - II. Other activities on the site at the time of transportation.
  - III. Recognized routes for over-dimensional loads.
  - IV. Site limitations and local street access.
  - V. The site-specific traffic management plan; and
  - VI. Differential road cambers as these may induce a torsion load on long pre-cast concrete unit.
- (b) Ensure that at the entrance of the construction site, the transporter is provided with specific information relating to the site roads and any hazards that may be present which could affect the safe transportation of the load.

## 8.6.5 Loading and Unloading

- (a) Employers involved with the transportation of pre-cast concrete unit shall ensure the following.
- I. Pre-cast concrete unit are loaded in a sequence compatible with the required unloading sequence at their intended destination.
  - II. Each pre-cast concrete unit is individually secured as the unloading sequence can lead to instability of loads.
  - III. Pre-cast concrete unit are loaded so that identification marks are visible before and during unloading.
  - IV. When unloading, individual pre-cast concrete unit shall not be released until the crane has taken the initial load of that unit; and
  - V. The location of lifting inserts on pre-cast concrete unit is checked to ensure they are compatible with the lifting system to be used and lifting inserts shall be clearly identified to assist in the loading and unloading stages.

## 8.6.6 Support Frames

- (a) The frames used to support pre-cast concrete unit during transportation shall be designed to withstand the loads and forces which may act on the components during loading, transportation and unloading; and
- (b) Where a frame system that is not an integral part of the transport vehicle or trailer, it shall be appropriately secured and be capable of withstanding any forces applied during loading, transportation and unloading.

## 8.7 Erection Process

### 8.7.1 Planning Considerations

- (a) Before erecting pre-cast concrete unit, the ensure the construction and erection sequences have been planned. The erection sequence of panels shall be specified on the shop drawings and modified for each project as required.
- (b) The planning process shall include consideration of the following:
- I. Casting and delivery sequence.
  - II. Erection sequence and structural stability during erection, including temporary braces, props, and fixings.
  - III. Pre-cast concrete unit sizes.
  - IV. Crane size, configuration, mobility and access.
  - V. Working radius of the crane shown on a crane layout drawing.
  - VI. Height access equipment appropriate to the construction methods.
  - VII. Site limitations and local street access; and
  - VIII. Underground power lines and other utilities.

### 8.7.2 Structural Stability – Preventing Unplanned Collapse

- (a) Ensure progressive collapse is prevented by providing either:
- I. Appropriate structural strength and continuity of the structure and its parts; or
  - II. Alternative load paths that cause applied forces to be safely transmitted through the structure.
- (b) Ensure the following:
- I. Regular inspection of the braces and bracing inserts, fixings, and connections.
  - II. That the torque of the brace bolts is checked 24 hours after erection, unless otherwise instructed by the anchor manufacturer and again at appropriate intervals after installation as determined in the erection planning stage; and
  - III. Daily visual inspection of all braced and bracing pre-cast concrete unit.
- (c) Ensure the stability of the structure is monitored and maintained during the erection phase.

### 8.7.3 'No-Go' zones

- (a) Only persons directly involved (including supervisors and engineers) with the lifting of pre-cast concrete unit are allowed access to an area where lifting is taking place; (Refer: NEOM-NLF-NMS-006.006 – Safe Use of Lifting Equipment and Lifting Accessories and NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- (b) Measures shall be implemented to prevent access to areas where persons could be struck in the event of a pre-cast concrete unit falling or become crushed between a pre-cast concrete unit and any other hard surface.
- (c) Where reasonably practicable, loads are not to be suspended over, or travel over, a person. Where this is not reasonably practicable to achieve an effective back-up slinging system that is designed by an engineer is to be used. The back-up system shall be capable of containing all the suspended pre-cast concrete unit in the event of a failure of the primary slinging system.
- (d) The establishment of a 'no-go' zone will necessitate the erection of appropriate signage and/or barriers depending on the ease of access and the presence of employees, other employees, or members of the public; and
- (e) Where a footpath, road or other access way is in an exclusion zone, all members of the public and all traffic shall be prevented from passing through the zone while pre-cast concrete unit construction work is being undertaken. (Refer: NEOM-NLF-NMS-006.012 Barricading of Hazards)

### 8.7.4 Pre-Cast Concrete Construction Pre-Start Requirements

- (a) Ensure an engineer has provided a certification letter that certifies the temporary support system for the pre-cast concrete unit.
- (b) Ensure that all employees involved in pre-cast concrete construction have been fully briefed on the safe system of work and control measures identified in the risk assessment.
- (c) Confirm that all the pre-cast concrete unit have attained the minimum required concrete strength for lifting and erection as specified on the shop drawings.
- (d) Confirm that the brace footings have attained their required strength before the pre-cast concrete unit are erected.
- (e) Ensure that provision has been made for safe working at heights, in accordance with NEOM-NLF-NMS- 006.007 – Working at Heights and NEOM-NLF-NMS-006.003 - Scaffolding
- (f) Make sure that locating dowels or other horizontal restraints are fitted before pre-cast concrete unit are lowered and that levelling shims are correctly located.
- (g) Confirm that the means of support, including falsework, are appropriate for the intended purpose and are correctly located.
- (h) Check that appropriate clear space is available for the safe propping and bracing of pre-cast concrete unit and ensure that where required braces are pre-fitted to the unit; and
- (i) Determine if weather conditions are acceptable for pre-cast concrete construction work to proceed.

### 8.7.5 Rigging of Pre-Cast Concrete Unit

- (a) Ensure that all rigging of pre-cast concrete unit and associated components is carried out in accordance with the requirements set out in NEOM-NLF-NMS-006.006 – Safe Use of Lifting Equipment and Lifting Accessories.

### 8.7.6 Pre-Cast Concrete Construction Safe Working Requirements

- (a) No person shall work on a pre-cast concrete unit that is leaning towards them or be placed between a pre-cast concrete unit being lifted and another wall or object, where movement of the pre-cast concrete unit could cause crushing.
- (b) In all circumstances where a lift has been stopped, procedures such as wedging, or jacking shall be carried out.
- (c) During the lifting process, any braces that have been pre-fitted shall not hang below the level of the base of the pre-cast concrete unit.

- (d) Where, in unusual circumstances, it is necessary to attach braces to the pre-cast concrete unit after it has been positioned, the pre-cast concrete unit is to be held securely by the crane while the braces are attached; and
- (e) Once erection of the pre-cast concrete unit and bracing has been completed ensure that check braces, brace bolts and pins are inspected at regular intervals to ensure they maintain the required capacity.

#### 8.7.7 Erection Requirements

- (a) One person in the erection crew shall be nominated to be responsible for the direction and coordination of the erection sequence.
- (b) All employees involved in the erection of pre-cast concrete Unit construction shall be trained and competent in working lifting equipment and accessories.
- (c) Crane operator holds a license appropriate for the type and capacity of the crane in use, considering the maximum rated capacity of the crane.

#### 8.7.8 Operating Mobile Plant near Braces and Pre-Cast Concrete Unit

- (a) Where it is necessary to operate mobile plant near braces and pre-cast concrete Unit, control measures are to be implemented, including the use of:
  - I. A spotter, to signal the plant operator to stop the plant in the event of any part of the plant approaching a brace or pre-cast concrete unit.
  - II. Barricades to ensure separation of plant and braces, and
  - III. Temporary hazard warning indicators such as hazard tape, cone and plank barriers and/or signage are provided to make the brace positions obvious, particularly where braces are close to access areas.

#### 8.7.9 Mobile plant is not to be operated or allowed to travel close to, erected pre-cast concrete unit and braces unless there is a sound reason, such as the use of a mobile elevating work platform to assist in the installation or removal of braces.

#### 8.7.10 Installation, Inspection and Removal of Temporary Bracing

- (a) Bracing is installed in accordance with the approved shop drawings unless prior written approval is obtained from an engineer.
- (b) Bracing connected to one pre-cast concrete unit shall not be connected to another braced pre-cast concrete unit for support unless this is clearly specified on the shop drawings.
- (c) Brace locking pins are provided with retaining devices to prevent unintentional dislodgement of the locking pin and due to wind or construction load vibrations, brace locking pins shall be checked on a regular basis while in use.
- (d) Before installation all bracing shall be inspected and checked by a competent person.
- (e) Regular inspections of all bracing, inserts, fixings and connections are undertaken in accordance with the inspection schedule prepared by a competent engineer; and
- (f) Superimposed loads are not to be applied to pre-cast concrete unit in the temporary braced condition unless clearance is obtained from a competent engineer and any such loads shall be specifically allowed for in the design.

### 8.8 Incorporation into Final Structure

- 8.8.1 Where the pre-cast concrete unit are to be attached to structural steel, a competent engineer shall detail all connection methods to be followed during construction.
- 8.8.2 Documentation signed by the engineer shall be provided that clearly shows where materials can be stored, the maximum allowable quantity of stored materials and any other conditions that need to be achieved.

8.8.3 The following factors shall be considered when determining whether the structure is appropriate for storing materials:

- I. The design loadings of the final structure and assurance that the loads applied by stored materials will be less than these loadings.
- II. Consideration of both point and distributed loads applied during the lifting and storage process (e.g., Storing concrete panels on timbers on a suspended slab will transfer concentrated loads to the slab in the area of the timber).
- III. The effect of incomplete bracing and stiffening on the structure's stability compared to the stability that would exist if the building was complete; and
- IV. Additional loading other than the dead weight of the pre-cast concrete unit applied during crane landing of the unit on the structure (e.g., impact loading)

## **8.9 Training and Competency**

8.9.1 Occupational , Health and Safety training shall comply with the requirements of:

- (a) NEOM-Element 5 – Training, Awareness and Competency.
- (b) NEOM-NLF-NMS-006.001 – SMS Organization, Practitioner Registration and Appointment of Contractor.

8.9.2 Ensure all employees involved in the tilt-up and pre-cast concrete unit and activities are trained to recognize and respond to hazards associated with this type of work.

8.9.3 Employers shall maintain a record of the required training that contains the following information:

- (a) Name and ID number.
- (b) Subject(s) of training.
- (c) Date(s) of training; and
- (d) Person(s) providing the training.
- (e) Training provider.

## 9 Appendices

### 9.1 Appendix A: Forms, Signs and Checklists



## 9.2 Appendix B: Audit Criteria PRE-CAST CONSTRUCTION Audit Criteria/ Checklist

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria        |  | Requirements  | Verification | Area of Concern |
|-----------------------|--|---|--------------|-----------------|
| ISO 45001:2018 Clause | NMS Ref.   |   |              | Yes/ No         |
| 5.3                   | 7.1.3  | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2       | 7.1.4  | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                   | 7.2.4,<br>7.4, 8.9                                     | Persons appointed to manage /oversee work operations have the skills, knowledge, experience   |              |                 |
| 8.1.2 (e)             | 7.3.1(a)<br>7.4.1(b)                                   | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2    | 7.3.1(c),<br>7.3.2(a),<br>8.1.1(a),<br>8.1.2,<br>8.1.4 | Hazards Identification Plan (HIP)<br><br>Hazard identification and risk assessment shall be considered at each stage of the pre-cast concrete unit construction work including: <ul style="list-style-type: none"><li>• Design.</li><li>• Prefabrication.</li><li>• Handling, storage, and transport.</li><li>• Erection and temporary bracing.</li><li>• Fixing into final structure.</li><li>• Brace removal; and</li><li>• Modification and/or demolition.</li></ul> , |              |                 |
| 8.1.2                 | 8.5.1  | The design for handling pre-cast concrete unit should consider: <ul style="list-style-type: none"><li>• (The size, weight, and shape of the pre-cast concrete unit.</li><li>• Whether the pre-cast concrete unit is to be lifted by the edge or the face.</li><li>• Whether the pre-cast concrete unit is to be rotated during erection.</li><li>• Cast-in fittings.</li><li>• Handling and storage loads</li></ul>   |              |                 |
| 8.1.2                 | 8.6.4 (a)  | Ensure the transporter has been appropriately instructed in the safe transportation of pre-cast concrete unit including panels  |              |                 |
|                       |  |   |              |                 |
|                       |  |   |              |                 |

### **9.3 Appendix C: Guidance Information**

OSHA Standards for the Construction Industry are covered in the OSHA “Code of Federal Regulations” Title 29 Part 1926.

OSHA regulation 29 CFR 1926.704, “Requirements for Precast Concrete,” states the requirements outlined for precast concrete manufacturing and, more importantly in this case, requirements for lifting apparatuses.

Requirements for cast-in-place Concrete. General requirements for formwork. Formwork shall be designed, fabricated, erected, supported, braced and maintained so that it will be capable of supporting without failure all vertical and lateral loads that may reasonably be anticipated to be applied to the formwork.(Refer: NEOM-NLF-NMS-006.010 Falsework (Form-Work))

OSHA Publication 3221, (2004). Is available on-line and provides information in relation to pre-cast construction - Concrete is one of the most widely used construction materials in the world. Safety issues exist in all phases of concrete production, including the manufacture of portland cement and pre-cast concrete products, as well as during the use of concrete in construction.

In the UK HSE web site HSG 150 – Health and Safety in Construction which contains guidance and advice is freely available.

In the UK guidance is also available through British Precast which is affiliated to the Mineral Products Association. A booklet “A Little Book of Concrete” which gives information regarding precast concrete is freely available.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
FALSEWORK (FORMWORK)**

NEOM-NLF-NMS-006.010 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | Sector Review          | Issued for Implementation | 01-02-2022 |

## Document Approval

|           | Prepared by  | Reviewed by   | Approved by                         |
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## OUR NEOM VALUES



### CATALYST

Make a difference.  
Create a legacy.



### CARE

Leave the environment  
in a better place.



### CURIOS

Challenge the norm.  
Stay restless.



### PASSIONATE

Be accountable.  
Finish what you start.



### RESPECT

Be authentic.  
Be true. Be fair.



### DIVERSITY

Embrace cultural  
differences.  
Seek to understand.

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with Falsework (formwork).

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to the full life cycle of Falsework from planning through to construction, dismantling and disposal. It addresses the design, control measures required for the erection, use, maintenance, alteration and dismantling of Formwork, also to the inspection, and maintenance.

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expects each Sector, Organization, Department or Contractor to ensure that risks are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities.

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements.
- (b) ANSI requirements.
- (c) NFPA Standards and requirements.
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## **4 List of Definitions**

*Table 1 : Table of Definitions*

| Terms   | Definitions  |
|---|--|
| NEOM Co   | NEOM Company   |
| Client  | NEOM Sector /Department responsible for management and oversight of the Contractor   |
| Contractor  | The organization contracted to carry out the works   |
| Sector, Organization, Department or Contractor      | The Sector, Organization, Department or Contractor is the NEOM entity or developer designated by NEOM to accept custody for planning, designing, constructing, or managing and operating a particular asset or a group of assets   |
| Sector, Organization, Department or Contractor Head | The head of the Sector, Organization, Department or Contractor is responsible and accountable for the implementation and supervision of this procedure within the Sector, Organization, Department or Contractor   |
| Responsible Person                                  | The Sector, Organization, Department or Contractor Head may delegate a "Responsible Person" utilizing their approved delegation of authority process. The "Responsible Person" is the senior NEOM employee who has responsibility for the day-to-day management of the work activities, or the contracted party engaged in such activities   |
| Safety Practitioner/ Coordinator                    | The "Safety Practitioner/Coordinator" is an employee working for the Sector, Organization, Department or Contractor Safety Department.   |
| Ladders   | Refers to any metal, wooden, reinforced plastic or composite material ladder that is used for access.  |
| Striking (Formwork)                                 | The process of removal of formwork or shuttering in the process of casting concrete is known as striking. Once the concrete has achieved the initial recommended strength, to support the self-weight and any imposed loads, the shuttering is removed for further curing  |
| Formwork  | Means the surface of the form and framing used to contain and shape wet concrete until it is self-supporting. Formwork includes the forms on or within which the concrete is poured and the frames and bracing which provide stability. Although commonly referred to as part of the formwork assembly, the joists, bearers, bracing, foundations, and footings are technically referred to as falsework   |
| Falsework   | Falsework means the temporary structure used to support a permanent structure, material, plant, equipment, and people until the construction of the permanent structure has advanced to the stage where it is self-supporting. Falsework includes the foundations, footings and all structural members supporting the permanent structural elements.   |
| Competent Person                                    | Is a person, designated by the employer, who is capable of identifying existing and predictable hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them. Shall have undertaken formal validated training in the safety of aspects of the works and where appropriate practical training and / or on the job assessment. As a minimum should be able to perform site inspections |
| OSHA Standards                                      | An Occupational Safety Health Administration (OSHA) standard is a regulatory requirement to serve as criteria for measuring whether Contractor are in compliance with the OSH Act laws. OSHA standards are published in Title 29 of the Code of Federal Regulations (CFR)  |
| Safety Management System (SMS)                      | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard   |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| ISO           | International Standards Organization           |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance                      |
| NEOM-Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM Element 9              | Emergency Planning and Response Management                                |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors   |
| NEOM-NLF-NMS-006.001        | SMS Organization, Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | Safety Construction Management Plan                                       |
| NEOM-NLF-NMS-006.003        | Scaffolding   |
| NEOM-NLF-NMS 006.06         | Safe Use of Lifting Equipment and Lifting Accessories                     |
| NEOM-NLF-NMS-006.007        | Working at Heights  |
| NEOM-NLF-NMS-006.008        | Overhead and Underground Services   |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards  |
| NEOM-NLF-NMS-006.016        | Electrical Safety   |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                       |
| NEOM-NLF-NMS-006.035        | Concrete Placing Equipment  |
| NEOM-NEN-PRC-006            | Safety in design  |
| NEOM-NLF-NMS-004.003        | Manual Handling   |

| Document Code      | Document Name                        |
|--------------------|--------------------------------------|
| SG 19 - 17         | A Guide to Formulating a Rescue Plan |
| OSHA 3146-05R 2015 | Fall Protection in Construction      |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organizations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring.
  - (b) Managing change.
  - (c) Continuous improvement.

### 7.2 Contractor

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM–NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organizational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).

- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.(Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
- 7.2.7 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
- (a) All falsework erection is appropriately planned, organized, and appropriately supervised.
  - (b) Those involved in falsework erection are trained and competent.
  - (c) The place where falsework erection is carried out is safe.
  - (d) Falsework equipment and materials are appropriately inspected.
  - (e) Inform the Client, and any other relevant parties (as required) of the selected method for falsework erection and the equipment to be used.
  - (f) Obtain all necessary work permits and authorizations and provide all necessary notifications concerning the work.
  - (g) Nominate a person to implement the control measures and to always supervise the work. This person shall be competent in the type of falsework erection needed for the project and experienced in the implementation of safe work control measures.
  - (h) When it has been confirmed that the permanent structure has attained appropriate strength, issue formal permission to dismantle the falsework.
- 7.2.8 Ensure that emergency response arrangements are in place and communicated to all affected parties (Refer to NEOM Element 9 Emergency Response)
- 7.2.9 That for management of Falsework (formwork) general requirements are included in the Pre-Tender Safety and Health Plan in accordance with NEOM-NLF-PRC 006 – Occupation Safety Health and Fire Safety Requirements for Contractors
- 7.2.10 That associated safe systems of work requirements are included in the Occupational Safety and Health Construction Management Plan (CPP) NEOM-NLF-NMS 006.002 and NEOM-NLF-PRC 006 Occupation Safety Health and Fire Safety Requirements for Contractors

### **7.3 Designers**

- 7.3.1 Designers shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NEN-PRC-006 Safety in design procedure. They shall undertake their specific roles and responsibilities in accordance with the following:
- (a) Consideration of the risks to environment, health and safety during construction, maintenance, and subsequent demolition, and that the design specifications incorporate requirements for falsework erection to be carried out safely.
  - (b) In the case of falsework used to support in-situ reinforced concrete, specifications are provided as part of the design on the concrete strength to be reached before the falsework can be safely removed. To simplify falsework (formwork) design and minimize risk, designers of the permanent structure can:
    - I. Consider alternative designs e.g., prefabricated concrete elements–columns, beams, and floor panels.(NEOM-NLF-NMS-006.035 Concrete Placing Equipment)
    - II. Minimize the number of columns and cantilevered floor sections
    - III. Reduce variations in the floor depth

- IV. Allow sufficient clearance to adjacent structures and safe methods for moving large and heavy components, materials, and equipment i.e., making allowances for a crane and other mechanical lifting devices to be used.

## 7.4 Employee

- 7.4.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.4.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.4.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.4.4 Shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Shall refrain from any work activities unless they have had the requisite training, that all relevant permits/permissions have been obtained and that the required safety measures are understood and have been implemented.

## 7.5 Specific Responsibilities

- 7.5.1 The Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.5.2 The Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.5.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.5.4 Line Managers / Supervisors are responsible for training their workers on risks and controls
- 7.5.5 The LP & FS Public Safety department will support the NEOM assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## 8 Other Sections related to subject

### 8.1 Assessment

- 8.1.1 Contractor shall ensure the following:

- (a) An assessment of the various risks is undertaken, and systems of work are established which are safe to all parties involved or affected, including the public.

That effective control measures are implemented to manage Falsework (formwork) activities safely and without risk to health. (Refer to NEOM-Element 2 Risk and Opportunity Management)

- (b) When carrying out the Risk Assessment, the following practices should be considered:

- I. Observe the workplace where the formwork and falsework will be constructed and where there is interaction with other work, vehicles, pedestrians, and fixed structures like overhead electric lines. (Refer: NEOM-NLF-NMS-006.016 Electrical Safety)
    - II. Look at the environment in which the formwork and falsework is to be used—check the ground conditions.(Refer: Overhead and Underground Services – NEOM-NLF-NMS-006.008)
    - III. Identify the major functional requirements of the formwork and falsework like the height, maximum live and dead loads and access and fall protection requirements.

- IV. Ask workers about any problems they encounter or anticipate at the workplace when constructing or interacting with formwork and falsework—consider operation, inspection, maintenance, repair, transport, and storage requirements.
- V. Review the inspection, maintenance, incident, and injury records including near misses.

## **8.2 Design and Planning**

- 8.2.1 Client/Contractor shall ensure the planning for falsework erection is commenced at the initial design stage. Ensuring designers consider safety in design to support the safe methods of work during construction. (Refer: NEOM-NEN-PRC-006 Safety in Design Procedure)
- 8.2.2 Contractor shall consider the following during the design process:
  - (a) Stability of the falsework at all stages of erection.
  - (b) The effect of the falsework erection sequence on stability and where this is critical, the sequence shall be stipulated.
  - (c) Provision of safe access to work at height areas and provision of safe working places for those involved in Falsework erection.(Refer: NEOM-NLF-NMS-006.007 – Working at Height)
- 8.2.3 Design specifications shall incorporate requirements and essential information for the scheme to be planned and erected safely and include:
  - (a) Whether the falsework design is provided as a standard or a bespoke design.
  - (b) In the case of a bespoke design detailed loading calculations shall be prepared for the specific design of the falsework.( Refer: NEOM-NEN-PRC-006 Safety in Design Procedure)
  - (c) The estimation of loads to be supported by falsework.
  - (d) The weight of the permanent structure and other factors are to be included in the calculation of loads to be applied to falsework.
  - (e) The loading sequence to prevent the build-up of stresses in individual members of the falsework support structure.
  - (f) Elimination of the possibility of moment reversal and uplift on supports the designer of falsework shall consider the following:
    - I. Sequence of pouring.
    - II. Method of pouring (continuous or in bays placed on different days).
    - III. Type of applied vibration method applied.
    - IV. Magnitude of final permanent deflections in relation to progressive construction above the first supported member (in the case of medium and high-rise construction).
    - V. Method and sequence of designed and specified post-tensioning (where applicable).
  - (g) Causes of dynamic loads which include:
    - I. Dumping concrete on falsework from skips.
    - II. Shock loads resulting from steel or precast units.
    - III. Surge loads reaching to falsework from concrete pump pipelines.
    - IV. Vibration duration and method.
    - V. Moving loads such as placing plant, dumpers, and erection cranes supported on falsework.
    - VI. Openings in falsework to allow for access and service risers.

8.2.4 Any modification of the loading program after designing falsework shall only be carried out after consultation with the falsework designer and it is the responsibility of the site team to notify the designer of any changes.

### **8.3 Documented Safe Systems of Work**

8.3.1 In accordance with NEOM-NLF-SM– Safety Management Manual - Roles and Responsibilities Section Contractor shall ensure documented safe systems of work are developed and implemented which include:

- (a) Details of the falsework erection methodology in accordance with the design drawings.
- (b) Information on the falsework erection sequence to ensure the structural integrity of the falsework during erection.
- (c) Details of inspections and checks that will be made prior to falsework components being used.
- (d) Personal protective equipment requirements, considering standards and requirements that apply to construction generally, and to falsework erection specifically in accordance with NEOM-NLF-NMS-006.021 – Personal Protective Equipment
- (e) Cranes and lifting gear requirements considering the standards and requirements that apply to construction work generally, and to falsework erection specifically in accordance with NEOM-NLF-NMS 006.006– Safe Use of Lifting Equipment and Lifting Accessories
- (f) Details of permit to load requirements and engineering checks required for falsework that will provide temporary support for poured concrete.
- (g) Details of permit to strike requirements once the poured concrete has reached its design strength to allow the falsework to be removed.

8.3.2 Systems of work should be clear but flexible to meet changing circumstances as the work progresses. The system of work should provide for the assessment and control of any new risks arising from proposed changes to the work before they are implemented. For formwork and falsework this could include(but not limited to) consideration of:

- (a) Worker competency and qualification/training requirements
- (b) Consultation and coordination of the work with others
- (c) Access and egress
- (d) Exclusion zones
- (e) Permit-to-work systems
- (f) Fall arrest systems
- (g) Inspection and maintenance
- (h) Emergency arrangements, and
- (i) Changes to the work arrangements.

### **8.4 Erecting, Altering and Dismantling**

8.4.1 Formwork and falsework should be systematically erected and dismantled by competent persons and tied in progressively to stabilize the structure in accordance with the designer's or manufacturer's instructions.

8.4.2 Prefabricated formwork and falsework should be erected and used in accordance with the manufacturer's instructions.

- 8.4.3 Where scaffolding is used to construct formwork and falsework it must comply with the requirements for scaffolding, including using qualified scaffolders. (Refer: NEOM-NLF-NMS-006.003 Scaffolding)
- 8.4.4 Safe systems of work should be developed depending on the type and complexity of the formwork and falsework design. The system of work should seek to eliminate or minimize risks, for example to:
- (a) Minimize working at height by assembling components on the ground
  - (b) Provide safe temporary work platforms where work at height is required
  - (c) Provide for the safe handling and operating of plant and equipment—large structures may require scaffolding or mobile plant to be located on suspended floors
  - (d) Provide suitable plant and material handling, placement, and storage arrangements to minimize manual tasks, and
  - (e) Include regular inspection and maintenance.
- 8.4.5 Erection of falsework shall not proceed unless all appropriate materials and equipment are readily available on site that it is reasonably practicable to be expected to be required for use during that working day.
- 8.4.6 To ensure correct falsework erection control measure are followed, all persons in charge of erecting, inspection and checking activities shall receive copies of the following:
- (a) Design drawings and specifications.
  - (b) Required standard details; and
  - (c) Checklists to ensure that all stages are executed appropriately.
- 8.4.7 All materials and components to be used in the erection of falsework shall be inspected by a competent person prior to use to ensure they are fit for purpose and meet falsework design criteria.
- 8.4.8 Any timber to be used shall comply with the following:
- (a) Type, grade, and size shall be in accordance with the design drawings and specifications.
  - (b) No presence of defects, shakes, splits, winds, lose or large knots and crushed or damaged areas are allowed.
  - (c) No protruding nails or fixings from previous use are allowed.
- 8.4.9 Where proprietary falsework systems are used, the manufacturer's instructions shall be available on site and followed during the erection sequence.
- 8.4.10 The bases of all upright supports used in falsework shall be positioned on a firm level surface (never directly onto sand or soil).
- 8.4.11 During the erection of falsework appropriately boarded working platforms shall be provided to ensure work can be carried out safely, employees are not permitted to climb and work directly from falsework components.
- 8.4.12 When primary and secondary bearing timbers are being placed, work shall be carried out from below the working level using an appropriately boarded working platform.
- 8.4.13 Take steps to prevent employees having contact of concrete mix during mixing and pouring operations.
- 8.4.14 Control measures in accordance with NEOM-NLF-NMS 006.007 Working at Heights shall be implemented when falsework decking is constructed.

## **8.5 Steel Fixing Work**

- 8.5.1 Wherever reasonably practicable mechanical means will be used to move steel reinforcement around the site.
- 8.5.2 Where manual handling of steel reinforcement is necessary Contractor shall ensure the requirements of NEOM-NLF-NMS-004.003 Manual Handling are complied with.
- 8.5.3 The falsework deck is not to be overloaded with steel reinforcement.
- 8.5.4 Bundles of steel reinforcement shall be placed in designated storage areas on the falsework deck in accordance with the engineer's load calculations.

## **8.6 Loading Falsework**

- 8.6.1 No concrete placing work shall take place until a competent engineer has inspected the falsework and signed the falsework off in accordance with the design drawing or specification.
- 8.6.2 Permission to load shall be given by the competent engineer and issued by the Contractor clearly stating that the falsework is completed to a satisfactory level and meets the design requirements.
- 8.6.3 Immediately prior to the placement of concrete the Contractor shall carry out a final inspection of the falsework ensuring all components are secure and screw jacks (where used) are tightly in place.
- 8.6.4 Concrete shall be placed progressively never allowing a large accumulation in one area where overloading could occur:
- 8.6.5 All employees shall be made aware of the permit to load requirements and instructed not to place concrete until instructed by supervision.

## **8.7 Striking Falsework**

- 8.7.1 Prior to striking any falsework Contractor shall ensure that the concrete has reached its required design strength.
- 8.7.2 Concrete strength is checked in accordance with engineering requirements (normally concrete cube tests carried out by a testing laboratory).
- 8.7.3 Once the Contractor is satisfied that the concrete has attained the required strength a permit will be issued to strike the falsework.
- 8.7.4 All employees shall be made aware of the permit to strike requirements and instructed not to strike falsework until instructed by supervision.
- 8.7.5 During the striking of falsework an exclusion zone shall be established to prevent unauthorized access to the striking area.
- 8.7.6 Striking work shall be carried out in a controlled and progressive manner.
- 8.7.7 Timbers shall be de-nailed as work progresses.
- 8.7.8 Timber sheets used to form concrete shall not be left in place once the falsework has been struck and shall be removed progressively with the falsework.

## **8.8 Special Precautions for Permanent Falsework**

- 8.8.1 Where falsework is employed to permanently support structural elements such as pre-cast slabs, Contractor shall ensure:
  - (a) It is designed to take the load of the supported structural element and its own weight in addition to other loads arising from wind and normal casting operations; and with precast elements: (Refer: NEOM-NLF-NMS-006.035 Concrete Placing Equipment)
  - (b) The top and bottom surfaces shall be marked appropriately for identification.

- (c) The lifting system shall be arranged in a way to avoid collision and consequential breaking of pre-cast elements.
- (d) Lateral supports shall be provided before releasing precast elements from the sling, especially in the case of beams with a width to depth ratio exceeding 1:3.

## **8.9 Inspection and Maintenance**

- 8.9.1 All falsework plant and equipment shall be inspected prior to each use by a competent person.
- 8.9.2 Damaged or incomplete plant and equipment shall be removed from service for repair or disposal.
- 8.9.3 Where a working platform is constructed on falsework it shall be treated as a place of work and be subject to a daily visual inspection by a competent person.
- 8.9.4 Falsework decks used by carpenters and steel fixers shall be subject to daily visual inspections and weekly formal documented inspections.

## **8.10 Maintenance of Falsework**

- 8.10.1 Maintenance of falsework and associated component shall only be carried out in accordance with the manufacturer's recommendations.
- 8.10.2 Repairs and modifications are to be in accordance with the manufacturer's guidelines.
- 8.10.3 No unauthorized repairs are to be made on falsework components.
- 8.10.4 Structural repairs requiring welding or riveting are to be checked and approved by a competent engineer.

## **8.11 Training and Competency**

- 8.11.1 Contractor shall ensure that OSH training complies with the requirements of:
  - (a) NEOM-Element 5 – Training, Awareness and Competency.
  - (b) NEOM-NLF-NMS 006.001 – Organization OSH Practitioner Registration and Appointment of Contractor
- 8.11.2 In accordance with NEOM-NLF -SM – Roles and Responsibilities Contractor shall ensure employees required to implement the requirements of this NMS are trained in falsework erection and understand the risks associated with using the equipment and materials and the control measures are implemented by the employer.
- 8.11.3 Contractor shall ensure all employees involved in erecting falsework to provide support to structures under construction are trained to recognize and respond to hazards associated with this type of work.
- 8.11.4 Training shall be tailored to the specific requirements of the jobsite and include any unique issues and requirements.
- 8.11.5 Contractor shall ensure an overall training program is provided for both employees and supervisors which shall include the following with regards to falsework:
  - (a) Reasonably foreseeable hazards and risks.
  - (b) Site rules and prohibited activities.
  - (c) Safe methods of working.
  - (d) Personal protective equipment.
- 8.11.6 Contractor shall maintain a record of the required training that contains the following information:
  - (a) Name and ID number.

- (b) Subject(s) of training.
- (c) Date(s) of training; and
- (d) Person(s) providing the training

## 9 Appendices

### 9.1 Appendix A: Forms, Sign and Checklists



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## 9.2 Appendix B: Audit Criteria FALSEWORK (FORMWORK) Audit Criteria/ Checklist

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria        |                 | Requirements   | Verification | Area of Concern |
|-----------------------|-----------------|--|--------------|-----------------|
| ISO 45001:2018 Clause | NMS Ref.        |  |              | Yes/ No         |
| 5.3                   | 7.1.3           | Pre-Tender Health and Safety Plan has been developed and issued  |              |                 |
| 5.3,<br>8.1.4.2       | 7.1.4           | Selection of Contractors undertaken in accordance with NEOM's policies and procedures  |              |                 |
| 7.2                   | 7.2.4,<br>8.11, | Persons appointed to manage /oversee work operations have the skills, knowledge, experience  |              |                 |
| 8.1.2 (e)             | 7.2.6,<br>7.3.3 | Personal protective equipment required for use are fit for purpose   |              |                 |
| 6.1.2.3<br>6.1.2.2    | 7.2.5           | Hazards Identification Plan (HIP)  |              |                 |
|                       | 8.2.2           | Assessment of the various risks shall be undertaken,   |              |                 |
|                       | 7.3.1           | Designer shall consider the risks to environment, health and safety during construction, maintenance, and subsequent demolition, and that the design specifications incorporate requirements for falsework erection to be carried out safely |              |                 |
| 8.1.2                 | 8.1.1(a)        | Effective control measures are implemented to manage Falsework (formwork) activities safely and without risk to health.  |              |                 |
| 8.1.3                 | 8.2.4           | Any modification of the loading program after designing falsework shall only be carried out after consultation with the falsework designer and it is the responsibility of the site team to notify the designer of any changes               |              |                 |
| 7.2,<br>8.1.2         | 8.4.1           | Formwork and falsework should be systematically erected and dismantled by competent persons and tied in progressively to stabilize the structure in accordance with the designer's or manufacturer's instructions                            |              |                 |
|                       | 8.6.1           | No concrete placing work shall take place until a competent engineer has inspected the falsework and signed the falsework off in accordance with the design drawing or specification   |              |                 |
| 9.1.1                 | 8.7.1,<br>8.7.2 | Prior to striking any falsework Contractor shall ensure that the concrete has reached its required design strength, in accordance with engineering requirements (normally concrete cube tests carried out by a testing laboratory)           |              |                 |

| Audit Criteria        |          | Requirements   | Verification | Area of Concern |
|-----------------------|----------|--|--------------|-----------------|
| ISO 45001:2018 Clause | NMS Ref. |  |              | Yes/ No         |
| 8.1.2                 | 8.7.5    | During the striking of falsework an exclusion zone shall be established to prevent unauthorized access to the striking area  |              |                 |
|                       | 8.8.1    | Where falsework is employed to permanently support structural elements such as pre-cast slabs, Contractor shall ensure, it is designed to take the load of the supported structural element and its own weight in addition to other loads arising from wind and normal casting operations; and with precast elements |              |                 |
| 9.1.1                 | 8.9.1    | All falsework plant and equipment shall be inspected prior to each use by a competent person   |              |                 |
|                       |          |  |              |                 |
|                       |          |  |              |                 |
|                       |          |  |              |                 |

### **9.3 Appendix C: Guidance Information**

Under OSHA requirements and guidance Falsework is covered under CFR 1926.750, and Standard 1926.501 and 451 which give the requirements for steel erection and falsework.

Good guidance which is found in the UK HSE document CIS 56 Safe erection, use and dismantling of falsework.

Guidance can also be freely found in UK HSE executive document UK HSE L 153 Managing Health and Safety in Construction - Guidance on regulations CDM 2015 as in the UK these regulations cover this subject.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
EXCAVATION WORK**

NEOM-NLF-NMS-006.011 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | Sector Review          | Issued for Implementation | 01-02-2022 |

## Document Approval

|           | Prepared by  | Reviewed by   | Approved by                         |
|-----------|--|---|-------------------------------------|
| Name      | Robert Murphy                                      | Talal Al Anazi  | Adel Al Wuhaib                      |
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## **1 Purpose**

This NEOM SMS Minimum Standards document (hereafter referred to as SMS-MS) identifies requirements that need to be followed and information on good safe work practices in relation to excavation works.

It provides guidance to support compliance with the industry best practices and international regulatory safety requirements

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Standard (Refer: NEOM-NLF-SM- 01.00- Section 14 Cross Reference Audit Table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

## **3 Expectations**

To ensure the occupational health and safety (OHS) of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with the work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements.
- (b) ANSI requirements.
- (c) NFPA Standards and requirements.
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms   | Definitions   |
|---|---|
| NEOM Co   | NEOM Company  |
| Client  | NEOM Sector /Department responsible for management and oversight of the Contractor  |
| Employer  | The person or organization that employs personnel to complete the work  |
| Contractor  | The organization contracted to carry out the works  |
| Sector, Organization, Department or Contractor      | The Sector, Organization, Department or Contractor is the NEOM entity or developer designated by NEOM to accept custody for planning, designing, constructing, or managing and operating a particular asset or a group of assets  |
| Sector, Organization, Department or Contractor Head | The head of the Sector, Organization, Department or Contractor is responsible and accountable for the implementation and supervision of this procedure within the Sector, Organization, Department or Contractor  |
| Responsible Person                                  | The Sector, Organization, Department or Contractor Head may delegate a "Responsible Person" utilizing their approved delegation of authority process. The "Responsible Person" is the senior NEOM employee who has responsibility for the day-to-day management of the work activities, or the contracted party engaged in such activities  |
| Safety Practitioner/Coordinator                     | The "Safety Practitioner/Coordinator" is an employee working for the Sector, Organization, Department or Contractor Safety Department.  |
| Excavations   | All processes and activities that move earth or rock or disturb or break ground. Any work that involves driving an object into the ground. Any work, which may impact on underground services (being struck, damaged, undermined, or unsupported) and protective covers, warning tapes or earthing conductors becoming exposed or damaged.  |
| Excavation Activities                               | All digging, including ditches, shafts, wells, and trenching or trench filling. Grading, tunnelling; boring and/or drilling. Post driving, including earth electrodes, fence posts. Any works using caissons or cofferdams  |
| Competent Person                                    | Is an individual, designated by the employer, who has the authorization to take immediate corrective actions to eliminate excavation-related hazards<br>Shall have undertaken formal validated training in the safety of excavations and where appropriate practical training and / or on the job assessment.<br>As a minimum should be able to classify soil, inspect protective systems, design structural ramps, monitor water removal equipment, and perform site inspections<br>Where the technical aspects of the planning or work activities require it, the Competent Person shall require formal documented qualifications to substantiate their ability to conduct or oversee activities (Example: Discipline Engineer) |
| Trenchless Technology                               | Techniques and technical advances that can replace the need for excavation during the laying of pipes or cables   |
| Benching  | A method of protecting employees from cave-ins by shaping the sides of an excavation to form one or a series of horizontal levels or steps, usually with near-vertical surfaces between levels.   |
| Trench  | A narrow excavation below the surface of the ground, less than 4.57 meters (15 feet) wide as measured at the bottom. Its depth cannot be greater than its width.  |
| Safety Management System (SMS)                      | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard  |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| ISO           | International Standards Organization           |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name  |
|-----------------------------|--|
| NEOM Element 2              | Risk and Opportunity Management  |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance                     |
| NEOM-Element 5              | Training, Awareness and Competency.                                      |
| NEOM-Element 6              | Contractor Management  |
| NEOM Element 9              | Emergency Planning and Response Management                               |
| NEOM-SMS                    | Neom Safety Management System  |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                               |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table  |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors  |
| NEOM-NLF-NMS-006.001        | Organization and Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | Safety Construction Management Plan                                      |
| NEOM-NLF-NMS-006.004        | Permit to Work Systems   |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards   |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals   |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                      |
| NEOM-NLF-NMS-006.038        | Confined Spaces.   |
| NEOM-NLF-NMS-006.041        | Work on or Adjacent to a Road  |

## **7 Roles and Responsibilities**

### **7.1 Client**

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM—Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organizations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring.
  - (b) Managing change.
  - (c) Continuous improvement.

### **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organizational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.(Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
- 7.2.7 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
- (a) Validate that personnel nominated to carry out specific tasks are technically competent and have the necessary experience to make informed decisions
  - (b) That an appropriate risk assessment is conducted in consultation with the relevant stakeholders and that services are identified, located, and marked on the surface.
  - (c) That the site has been surveyed correctly with markers. Alignments and boundaries have been confirmed and that all available site diagrams, maps, drawings, specifications, and relationships with surrounding properties are obtained.
  - (d) All services searches are initiated and validated.
  - (e) In consultation with the Client, develop documented safe systems of work for the proposed excavation work, including the method or methods of excavation.
  - (f) Consider ‘Trenchless Technology’ that can replace the need for excavation, reduce risks to personnel and may minimize traffic disruption
  - (g) Inform the Client and any other relevant parties of the methods of excavation selected and the equipment to be used.
  - (h) Obtain all necessary work permits and authorizations and provide all necessary notifications concerning the work.
  - (i) Ensure an inspection of adjacent properties is undertaken when necessary, and that any change in the condition of adjacent properties during the excavation work is reported to the relevant parties.
  - (j) Erect all appropriate fencing and overhead protection barriers for the protection of the public and employees at the workplace.
  - (k) Ensure employees are consulted and provided with all the information, instructions, training, and supervision they need to perform their work safely.
  - (l) Maintain the security of the site to prevent uncontrolled access/trespass.

- (m) Arrange for the recycling of waste wherever reasonably practicable and the disposal of all other refuse and debris.
- (n) Considering technological advances that may introduce new means of controlling working
- (o) All relevant authorities and utility service providers are notified, and all necessary approvals and Non-Objection Certificates (NOCs) are obtained before work commences.
- (p) The notification of the owners of adjoining properties of the proposed excavation work
- (q) The verification of the location, condition and contents of all underground tanks, vaults, wells, voids, and structures. Ensuring that suitable control measures are implemented to manage any risks from hazardous substances/material encountered
- (r) In respect of hazardous materials relevant authorities and utility service providers are notified, all necessary approvals and NOCs are obtained

### **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
  
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Carry out their work in accordance with the documented safe systems of work

### **7.4 Specific Responsibilities**

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers on risks and controls
- 7.4.5 LP & FS Public Safety Department will support by carry out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

Employers and or Contractors are responsible for ensuring that all work requirements are carried out safely. To this end they shall appoint competent personnel to undertake and/or oversee all work activities within their scope of work. The level of competence will be commensurate with the technical aspects of the work and the levels of risk involved

### **8.1 Planning and Assessment**

#### 8.1.1 As required Employer / Contractor shall ensure.

- (a) A Risk Assessment is undertaken, and systems of work are established which are safe to all parties involved or affected including the public
- (b) That effective procedures and control measures are in place (Refer: NEOM-NLF-NMS-006.004 – Permit to Work Systems)
- (c) All foreseeable emergency situations are identified, and appropriate emergency procedures developed, and mitigation measures are fully implemented, and practiced, (Refer: NEOM Element 9 Emergency Planning and Response Management)
- (d) That the management of excavation requirements are included in the Pre-Tender Safety and Health Plan in accordance with NEOM-NLF-NMS-006.002 Occupational Safety, Health Construction Management Plan (CPP)
- (e) Those safe systems of work, and site rules are included in the Safety and Health Construction Management Plan NEOM-NLF-NMS-006.002 and NEOM Element 6 Contractor Management

### 8.2 Prior to excavation

#### 8.2.1 Ensure the following.

- (a) The availability of site diagrams, maps, drawings, specifications
- (b) Confirmation that the site location is correct (alignments, boundaries etc.) in conjunction with the Service/Asset Owners and that all service searches are initiated and have been surveyed/validated by a Competent Persons.
- (c) Relationships with surrounding properties are established.
- (d) That an evaluation of the ground/soil conditions is conducted to provide appropriate information to enable a Competent Person to determine the methods of excavation and supports.
- (e) An appropriate risk assessment is conducted in consultation with the relevant stakeholders taking into consideration all risks associated with work, not only those for which regulations and codes of practice exist.
- (f) Historical, archaeological, or geological items are safeguarded or documented.
- (g) That all the necessary work permits, and authorizations are obtained and provide all necessary notifications concerning the work in accordance with NEOM-NLF-NMS-006.004 – Permit to Work Systems.
- (h) Risk Assessment, Method Statements, Procedures and Control Measures are communicated to all concerned parties and fully implemented.
- (i) All persons involved in excavation work are trained and have the understanding, knowledge, and skills necessary to safely carryout their duties.
- (j) Emergency procedures are communicated to all affected persons and relevant training provided where required to those responsible for implementing emergency arrangements.

### 8.3 Trenchless Technology

- 8.3.1 Trenchless' techniques should be considered as they can replace the need for excavation during the laying of pipes or cables. They also reduce risks to employees and members of the public from open excavations and may minimize traffic disruption.
- 8.3.2 The locating of any obstructions and the control of the cutting head of the machine to avoid them is crucial. Service location plans and location devices should be used to ensure that the route of the bored service does not come into conflict with existing (or planned future) services.
- 8.3.3 Options available include:
  - (a) Micro-tunnelling.
  - (b) Directional drilling.
  - (c) Impact moiling.
  - (d) Auger boring.
  - (e) Pipe re-lining.
  - (f) Pipe bursting

## **8.4 During Excavation**

- 8.4.1 As required ensure the following:
  - (a) There is a nominated Competent Person on-site at all times to supervise the work and monitor that the documented safe systems of work and required precautions are fully implemented.
  - (b) That excavations are inspected, before work/shifts commence and periodically as required to ensure that requisite control measures are in place and adequately maintained.
  - (c) Communication/relationships are maintained with adjacent land/properties, people or personnel who may be affected/impacted by work activities.
  - (d) Periodic inspections of adjacent properties are undertaken when necessary, and that any change in the condition during the excavation work is reported to the relevant parties
  - (e) Work areas have appropriate fencing, overhead protection barriers, signage etc. as required for the protection of or anyone who may be impacted (employees, public, others working in the vicinity).
  - (f) The provision of timbering or shoring for trenches or excavations greater than 1.2 meters deep where there is a danger of any material falling or collapsing.
  - (g) Where required ensure that the workers comply with appropriate requirements of NEOM-NLF-NMS-006.038 Confined Spaces.
  - (h) Ensure a safe means of access and egress to excavations is maintained at all times.
  - (i) Excavations shall be kept clear of suffocating, toxic or explosive gases and where potential exists consider ventilation requirements complying with the requirements of NEOM-NLF-NMS-006.038–Confined Spaces.
  - (j) Where excavation work is carried out on the roads, Traffic Police approval is attained and barricades/warning notices erected, as per the requirement of NEOM-NLF-NMS-006.041 – Work on or Adjacent to a Road and NEOM-NLF-NMS-006.012 Barricading of Hazards.
  - (k) Ensure that all employees are consulted and provided with all the information, instructions, training, and supervision they need to perform their work safely
  - (l) Arrange for the recycling of waste wherever reasonably practicable and the disposal of all other refuse and debris

## **8.5 Ground Conditions**

8.5.1 As required ensure the following:

- (a) That before commencing any excavation work, they identify the type of ground in which the excavation is to be carried out.
- (b) As part of the site investigation, detailed information is made available with the contract documentation, in the form of bore hole or trial pit logs carried out.
- (c) When examining bore holes or trial pit information, importance shall be given to:
  - I. Location of any water table.
  - II. Whether the water table is going to be exposed by the excavation
  - III. How it may affect the stability of the excavation sides
  - IV. Whether the ground that is to be excavated has not been previously contaminated

## 8.6 Ground Water

8.6.1 Depending on the permeability of the ground, water may flow into any excavation below the natural groundwater level.

8.6.2 As required ensure the following:

- (a) The supports to the side of the excavation can be designed to control the entry of groundwater and the design should take any additional water loading into account.
- (b) Particular attention should be given to areas close to lakes, rivers, and the sea.
- (c) Water entering the excavation can be channeled to sumps from where it can be pumped out; however, the effect of pumping from sumps on the stability of the excavation should be considered.
- (d) One of several ground dewatering techniques may be used. Such methods involve either shallow well pumping or well-pointing to lower the ground water table to a level below that to which the excavation is to be taken.
- (e) Where a water bearing strata overlays an impervious one and the depth of these impervious strata are not too great, the use of sheet piling may be more effective.
- (f) When dewatering an excavation care shall be taken not to contaminate any nearby water courses or drains with silty/dirty water.
- (g) Disposal of water through appropriate registered service providers.

## 8.7 Temporary Safe Slopes

8.7.1 As required ensure the following:

- (a) Banks more than 1.52 meters (5 feet) high shall be shored, laid back to a stable slope, or other equivalent means of protection shall be provided where employees may be exposed
- (b) Temporary slopes are adequately designed/constructed to suit the terrain/environment to moving ground or cave-ins.

## 8.8 Support Systems

8.8.1 As required ensure the following:

- (a) Provision of timbering or shoring for trenches or excavations greater than 1.2 meters deep where there is a danger of any material falling or collapsing.
- (b) For larger excavations, a survey of the soil prior is conducted to provide information for appropriate methods of excavation and support to be determined.

- (c) Ensure sufficient supplies of approved support materials are available before the excavation commences.
- (d) Support materials shall be of approved type and standard, free from defects, of appropriate strength, good construction and appropriately maintained.
- (e) Support materials are erected/ altered/ dismantled by competent employees under supervision.
- (f) Support systems must be installed and removed in a manner that protects workers from cave-ins and structural collapses and from being struck by members of the support system.
- (g) Temporary framework on supports, or a protective box or cage are utilized if required to protect employees while they put in permanent supports.
- (h) Removal must begin at, and progress from, the bottom of the excavation.
- (i) Before temporary removal of individual members, additional precautions are required, such as installing other structural members to carry loads imposed on the support system.
- (j) Backfilling must progress together with the removal of support systems from excavations.

## **8.9 Access**

8.9.1 As required ensure the following:

- (a) That a safe means of getting into and climbing out of an excavation shall be provided
- (b) If a risk assessment identifies ladders as acceptable means of access/egress they shall be securely fixed and appropriately maintained and extend to a height of at least 1m above the landing place
- (c) That using the waling's and struts for access and egress purposes shall be prohibited.

## **8.10 Site Lighting**

8.10.1 As required ensure the following:

- (a) The workplace is appropriately lit, at access points and openings, and whenever lifting operations take place.
  - I. General construction area lighting requires Five foot-candles
  - II. Excavations require Three foot-candles

## **8.11 Ventilation**

8.11.1 As required ensure the following:

- (a) That where there is the potential for contamination of the atmosphere regular gas testing shall be carried out and ventilation equipment provided
- (b) Excavations shall be kept clear of:
  - I. Naturally Occurring Toxic Gases
  - II. LPG Leakage
  - III. Combustion gases from construction equipment
- (c) Forced Ventilation of clean air into the excavation in appropriate volume to dissipate any gas accumulation

- (d) In deep and confined excavations, a continuous routine shall be established for testing for noxious gases and deficiency of oxygen (Refer: NEOM-NLF-NMS-006.038 – Confined Spaces).

## **8.12 Barriers around Excavations**

8.12.1 As required reference shall be made to NEOM-NLF-NMS-006.012 Barricading of Hazards and ensure the following:

- (a) A safe means of access and egress
- (b) Where a person may fall more than 2 meters, appropriate rigid barriers shall be erected, below 2 meters a physical demarcation of the excavation edge is required.
- (c) Barriers shall be 950mm high and can also serve to keep materials, plant, and equipment away from the edges of an excavation.
- (d) Barriers may be removed to permit access of employees, plant, and equipment, etc., but shall be replaced as soon as reasonably practicable.
- (e) During darkness, the edges of an excavation shall be marked with hazard warning lights, especially where they are close to public thoroughfares.
- (f) Where excavation work is carried out on the roads, Traffic Police approval is obtained and appropriate barricades and warning notices shall be erected, as per the requirement of NEOM-NLF-NMS-006.041 – Work on or Adjacent to a Road.
- (g) Provide protection against vehicles falling into or driving into excavations, through the use of wheel stops or barriers.

## **8.13 Maintenance Inspections**

Excavations can become unstable and unsafe if not maintained in good order. They can deteriorate rapidly because of environmental conditions and are liable to catastrophic failure. It is essential that they are inspected routinely to ensure they are in a safe condition

8.13.1 Ensure excavations are inspected by a competent person:

- (a) Before the start of every work shift and periodically as required
- (b) After any accidental fall of material.
- (c) After any event likely to affect strength and stability.

8.13.2 Records of inspections should be kept on site and remedial work must be undertaken as soon as possible to repair any defects noted.

## **8.14 Documentation and Records**

*Table 4 Records Retention*

| <b>Documentation / Records</b> | <b>Retention</b>                      |
|--------------------------------|---------------------------------------|
| Inspection Records             | Retained until excavation is closed   |
| Gas Testing Records            | Retained until end of Construction    |
| Training Records               | Retained while individual is employed |

## 9 Appendices

### 9.1 Appendix A:1- Excavation Checklist

#### 9.1.1 Excavation Checklist.

| Excavation CHECKLIST Whilst Work is in Progress   |  |
|---|--|
| 1. Ensure that only sound material is being used.   |  |
| 2. Ensure that approved and safe methods are adopted for the installation of support work in excavations. A competent person should be in attendance at all times.  |  |
| 3. Ensure that all working surfaces are safe.   |  |
| 4. Install timbering as soon as the excavation sides are trimmed. This should be done from a work cage, from ground level, or from inside existing timbering.   |  |
| 5. Ensure that all support work is secure, and that props and wedges are tight and properly maintained.   |  |
| 6. Check for signs of overstress in support work, any damage that may have been caused by plant and, when timber is used, make long-term checks for disease and defects, i.e., dry rot, shakes, etc.                  |  |
| 7. Check for any water or soil which may be seeping through support work.   |  |
| 8. Check for signs of the earth peeling or cracking at unsupported faces.   |  |
| 9. Check that there are adequate ladders, that they are maintained, secured, and used correctly.  |  |
| 10. When pumping, ensure that there are adequate sumps, and that soil is not being drawn from behind support work.  |  |
| 11. Check for unhealthy atmospheres.  |  |
| 12. Ensure that spoil heaps and materials, etc. are kept back from the edges of the excavation.   |  |
| 13. Ensure that there are adequate barriers, notices, and warning lights.   |  |
| 14. Check that the edges of excavations are provided with top- and mid- guard-rails at all places where there is a danger of persons falling 2 metres or more or falling and injuring themselves.                     |  |
| 15. Bridges and gangways should be provided and handrails and toe-boards.   |  |
| 16. Ensure that stops for dumpers, tipping lorries, etc. are well anchored.   |  |
| 17. Ensure that all passing traffic is kept well back from edge of excavation.  |  |
| 18. Ensure that the correct method of withdrawing support work is used; if for any reason it is considered unsafe to remove it, leave it in.  |  |
| 19. Ensure that persons are not working too close to machines or each other. Ensure that the correct protective clothing and protective equipment is being used.  |  |
| 20. Ensure that persons are wearing suitable ear defenders when piling is taking place.   |  |
| 21. Ensure that machine operators have the best possible vision of the work which is in progress.   |  |
| 22. Ensure that services are marked, protected, and adequately supported when exposed in excavations.   |  |
| 23. Ensure that any backfilling is carried out correctly and in a planned sequence and maintained.  |  |
| 24. Carry out inspections daily, prior to each shift, after use of explosives or after inclement weather, particularly frost and rain.  |  |
| 25. Ensure that a proper record of all inspections is made and signed by a competent person. The written report, or a copy, should be provided to the person on whose behalf the inspection was made within 24 hours. |  |

### 9.2 Appendix A-2: Angle of Repose

## FOR SLOPING OF SIDES OF EXCAVATIONS LESS THAN 6.1 METRES (20 FEET) DEEP

Note: **Clays, Silts, Loams or Non-Homogenous Soils Require Shoring or Bracing. The Presence of Ground Water Requires Special Treatment**

### Examples

#### Type A Soils:

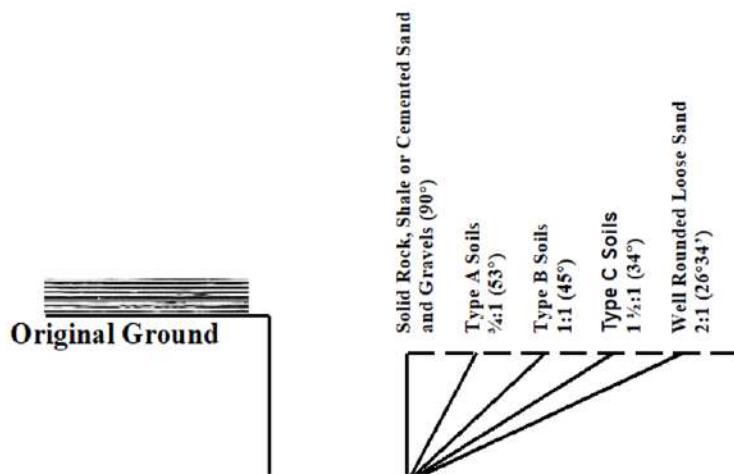
- Clay, silty clay, sandy clay
- Clay loam, caliche and hardpan

#### Type B Soils:

- Angular gravel, silt, silt loam,
- Sandy loam, unstable dry rock

#### Type C Soils:

- Gravel, sand and loamy sand
- Submerged soil and rock



### 9.3 Appendix B: Audit Criteria EXCAVATION WORK

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria               |                    | Requirements  | Verification | Area of Concern |
|------------------------------|--------------------|---|--------------|-----------------|
| ISO 45001:2018 Clause        | NMS Ref.           |   |              | Yes/ No         |
| 5.3                          | 7.1.3              | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2              | 7.1.4              | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                          | 7.2.4,<br>7.4,     | Persons appointed to manage /oversee work operations have the skills, knowledge, experience   |              |                 |
| 8.1.2 (e)                    | 7.2.6,<br>7.3.3    | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2           | 7.2.5,<br>8.1.1(a) | Hazards Identification Plan (HIP)<br><br>Assessment of the various risks shall be undertaken  |              |                 |
| 8.1.2                        | 7.2.2              | Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition                                |              |                 |
| 8.2                          | 8.1.1(c)           | All foreseeable emergency situations are identified, and appropriate emergency procedures developed, and mitigation measures are fully implemented, and practiced     |              |                 |
| 6.1.2.3<br>6.1.2.2,<br>8.1.2 | 8.3.1              | Trenchless' techniques should be considered as they can replace the need for excavation during the laying of pipes or cables  |              |                 |
|                              | 8.4.1(e)           | Work areas have appropriate fencing, overhead protection barriers, signage etc. as required for the protection of or anyone who may be impacted                       |              |                 |
|                              | 8.4.1(i)           | Excavations shall be kept clear of suffocating, toxic or explosive gases and where potential exists consider ventilation requirements complying with the requirements |              |                 |
|                              | 8.6.2(f)           | When dewatering an excavation care shall be taken not to contaminate any nearby water courses or drains with silty/dirty water  |              |                 |
|                              | 8.8.1(b)           | For larger excavations, a survey of the soil prior is conducted to provide information for appropriate methods of excavation and support to be determined             |              |                 |
| 8.1.2                        | 8.9.1(a)           | That a safe means of getting into and climbing out of an excavation shall be provided   |              |                 |

| Audit Criteria              |           | Requirements  | Verification | Area of Concern |
|-----------------------------|-----------|---|--------------|-----------------|
| ISO<br>45001:2018<br>Clause | NMS Ref.  |   |              | Yes/ No         |
| 9.1.1                       | 8.11.1(a) | That where there is the potential for contamination of the atmosphere regular gas testing shall be carried out and ventilation equipment provided |              |                 |
|                             | 8.3       | Excavations shall be inspected routinely to ensure they are in a safe condition   |              |                 |
|                             |           |   |              |                 |
|                             |           |   |              |                 |

## 9.4 Appendix C: Guidance Information

Excavations are covered in OSHA Regulations under CFR 1926.650 / 651 / 652 / 653 these give detailed requirements regarding excavations.

Other regulations that give good guidance can be found in.

- OSHA 2226-10R 2015 deals with Trenching and Excavation Safety,
- OSHA CFR 1926; OSHA stipulates the section [Signs, signals, and barriers]
- KSA Ministry of Transport –Traffic Management Manual

In the UK, Construction Regulations (CDM) 2015 detail requirements regarding excavations in Regulation 22 and 24.

A free issue construction guidance regarding safety including details on safety regarding excavations can be found in HSG 150 Health and Safety in Construction and in HSG 47 Avoiding danger from underground services both available free from the UK HSE web site.





نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
BARRICADING of HAZARDS**

NEOM-NLF-NMS-006.012 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

|           | Prepared by  | Reviewed by   | Approved by                         |
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| Name      | Robert Murphy                                      | Talal Al Anazi  | Adel Al Wuhaib                      |
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## **1 Purpose**

This NEOM SMS Minimum Standards document (hereafter referred to as SMS-MS) identifies requirements that need to be followed and information on good safe work practices in relation to the use of barriers.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the risks associated with working at site are assessed, and that adequate control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Standard (Refer NEOM-NLF-PRC-006- Section 2 ISO 45001 Clauses)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS. It applies to the full life cycle of barricades from procurement, planning through to dismantling and disposal. It addresses the control measures required for the installation, use, maintenance, alteration and dismantling of barricades, also to the inspection, and maintenance.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice:

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms   | Definitions   |
|---|---|
| NEOM Co   | NEOM Company  |
| Client  | NEOM Sector /Department responsible for management and oversight of the Contractor  |
| Employer  | The person or organisation that employs personnel to complete the work  |
| Contractor  | The organisation contracted to carry out the works  |
| Sector, Organization, Department or Contractor      | The Sector, Organization, Department or Contractor is the NEOM entity or developer designated by NEOM to accept custody for planning, designing, constructing, or managing and operating a particular asset or a group of assets  |
| Sector, Organization, Department or Contractor Head | The head of the Sector, Organization, Department or Contractor is responsible and accountable for the implementation and supervision of this procedure within the Sector, Organization, Department or Contractor  |
| Responsible Person                                  | The Sector, Organization, Department or Contractor Head may delegate a "Responsible Person" utilizing their approved delegation of authority process. The "Responsible Person" is the senior NEOM employee who has responsibility for the day-to-day management of the work activities, or the contracted party engaged in such activities  |
| Safety Practitioner/ Coordinator                    | The "Safety Practitioner/Coordinator" is an employee working for the Sector, Organization, Department or Contractor Safety Department.  |
| Competent Person (Barricades)                       | Is a person, designated by the employer, who is capable of identifying existing and predictable hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them. Shall have undertaken formal validated training in the safety of barricading and where appropriate practical training and / or on the job assessment. As a minimum should be able to perform site inspections |
| Safety Management System (SMS)                      | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard  |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| IBC           | International Building Codes                   |

| <b>Document Code</b>        | <b>Document Name</b>  |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance                      |
| NEOM-Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM Element 9              | Emergency Planning and Response Management                                |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety and Fire Safety requirements for Contractors    |
| NEOM-NLF-NMS-006.001        | SMS Organisation, Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | Saafty Construction Management Plan                                       |
| NEOM-NLF-NMS 006.004        | Permit to Work Systems  |
| NEOM-NLF-NMS-006.007        | Working at Heights  |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals  |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                       |
| NEOM-NLF-NMS 006.041        | Working On, or Adjacent to a Road;  |
| <b>Abbreviations</b>        | <b>Descriptions</b>   |
| OHS                         | Occupational Health and Safety  |
| ISO                         | International Standards Organisation                                      |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
  
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.

## **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM–NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.(Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
- 7.2.7 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Maintaining control of access to dangerous or high-risk areas or equipment through the use of barricades.

- (b) Barricades shall be appropriate for the task and in serviceable condition;
- (c) Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities
- (d) Employees working on with barricades are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.
- (e) Ensure that Barricades are inspected on a regular basis by a competent person.

### **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Follow the safe systems of work as instructed by the organisation whilst installing or erecting barricades.
  - (b) Follow the site rules, signage, and emergency arrangements

### **7.4 Specific Responsibilities**

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of this procedure
- 7.4.4 Line Managers / Supervisors are responsible for ensuring barriers are used in a way that reduces risks to their workers and members of the public
- 7.4.5 LP & FS Public Safety Department will support the NEOM by carry out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Planning and Assessment**

8.1.1 Client / Contractor / Employer shall ensure;

- (a) Risk Assessment and Method Statements shall be prepared in consultation with the person in control of the work and communicated to those responsible for carrying out the work (Refer to: NEOM Element 2 Risk and Opportunity Management and NEOM-NLF-NMS 006.007 Work at Height)
- (b) An assessment of the various risks is undertaken and systems of work that are safe to both employees and the public shall be established;
- (c) That effective procedures and control measures are developed and implemented for management of the hazards; (refer to NEOM-NLF-NMS 006.004 – Permit to Work Systems)
- (d) Ensure all foreseeable emergency situations are identified, and appropriate emergency procedures developed, and mitigation measures are fully implemented, and practiced, (Refer: MEOM Element 9 Emergency Planning and Response Management))
- (e) That the management of barricading requirements are included in the Pre-Tender Environment, Health and Safety Plan in accordance with NEOM-NLF-PRC 006 Occupational Safety, Health and Fire Safety Requirements for Contractors
- (f) That associated safe systems of work, and site rules are included in the Safety and Health Construction Management Plan NEOM-NLF-NMS-006.002-(CPP) and in accordance with NEOM-NLF-PRC 006 Occupational Safety, Health and Fire Safety Requirements for Contractors

### **8.2 Assessing the Need for a Barricade**

8.2.1 In accordance with the requirements of NEOM Element 2 –Risk and Opportunity Management. Contractor shall undertake an assessment of the nature of the hazard, the likelihood and consequence of interaction with the hazard and details of the minimum barricading requirements.

8.2.2 Contractor shall assess the site and/or operation to identify if hazards are present that require barricading to be erected. Hazards may include:

- (a) Where there is a danger of a person falling;
- (b) Being struck by falling objects;
- (c) Pedestrians and vehicles entering site;
- (d) Where there is a danger of injury from equipment or processes or for maintenance of equipment;
- (e) To control access to an identified hazard or hazardous areas.

### **8.3 Types of Barricades**

#### **8.3.1 Soft Barricading**

(a) Contractor shall use soft barricading to prevent entry of personnel and equipment as an immediate and short-term control. This barricade type shall be used where risk assessment indicates that the associated risk is low. Examples of soft barricading may include:

- I. Scissor/expanding barricade;
- II. Post and chain;
- III. Plastic cone and plank;
- IV. Flag type bunting; and
- V. Plastic mesh barriers.

### **8.3.2 Hard Barricading**

- (a) Contractor shall use hard barricading to prevent entry of personnel and equipment to areas where a risk assessment indicates the use of solid barricades to provide a physical barrier. Examples of hard barricading may include:
  - I. Construction site barricade e.g., mesh or hoarding fence panels;
  - II. Scaffold tube and fitting;
  - III. Road traffic control barricade;
  - IV. Free standing ridged 'A-Frame' barricade.
- (b) Contractor shall ensure where solid barricades are used, they shall be erected by a competent person and accompanied with signs to communicate the hazard information.
- (c) Contractor shall ensure designated entry and exit points or gateways are included in the barricade design where entry to the controlled area is required.

### **8.4 Method of Barricading**

- 8.4.1 Where a workplace hazard has been identified, barricading and demarcation appropriate to the hazard shall be installed;
- 8.4.2 Barricades shall be constructed of an approved type and shall be used:
  - (a) To provide a visual barrier;
  - (b) To restrict access to unauthorized persons to worksites and restricted areas;
  - (c) To contain equipment and materials; and
  - (d) To prevent interaction with an identified hazard.
- 8.4.3 Barricades are erected to separate the hazardous area either by integration with existing structures or stand-alone installation;
- 8.4.4 Barricades shall be installed in such a way as to eliminate the possibility of accidental entry into barricade zone;
- 8.4.5 Where the public could become exposed to the hazard, physical barriers shall be used and/or a safety observer appointed where appropriate;
- 8.4.6 Entry points in barricading shall be arranged such that personnel entering the area cannot walk directly into the hazard;
- 8.4.7 Barricading may make use of existing structures where reasonably practicable however, barricading shall not be tied off to electric cables, flexible air hoses, etc.;
- 8.4.8 Where solid barricades are used, they shall be accompanied with signs to communicate the hazard information in accordance with the requirements of NEOM-NLF-NMS 006.013 - Safety Signage and Signals.

### **8.5 Barricade Signs**

- 8.5.1 Barricading signs shall be attached in appropriate numbers to ensure visibility under all circumstances and in accordance with NEOM-NLF– NMS 006.013- Safety Signage and Signals.
- 8.5.2 Barricading signs shall provide the contact person/responsible supervisors name and phone number in addition to the expected duration that the barricading shall be in place. Where appropriate, signs shall also have attached specific hazard information e.g. —" Danger no access-persons working above".

### **8.6 Barricade Tape**

|                                      |                      |               |
|--------------------------------------|----------------------|---------------|
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|--------------------------------------|----------------------|---------------|

- 8.6.1 Contractor shall ensure where barricade tape is used to restrict access to an area:
- (a) The barricaded area shall encompass the entire potentially affected area of the hazards – e.g., sparks, falling objects, leaks etc. and take into account reasonably practicable deflection of an object from a structure below if it falls;
  - (b) Where it is used to protect from a trip hazard or unprotected edge, with a fall potential of less than 2 meters, the barricade tape shall be installed at least 2 meters back from the edge or hazard;
  - (c) The barricade tape shall be maintained in good condition ensuring it remains effective as a control measure.

## **8.7 Barricade Materials**

- 8.7.1 Barricading materials such as mesh, and/or tape shall be installed with the top edge at a height between 900 mm to 1200 mm;
- 8.7.2 When using mesh, it shall be appropriately supported to avoid sagging;
- 8.7.3 Where cone and plank type barriers are used planks shall be fixed in place with proprietary brackets;
- 8.7.4 Road barricading or delineation control measures shall be set at a maximum distance in accordance with the requirements of NEOM-NLF-NMS 006.041 – Working On, or Adjacent to a Road;
- 8.7.5 Water filled plastic barricades, where they are used with the potential for a vehicle impact shall be linked together and filled with water.

## **8.8 Lighting**

- 8.8.1 Warning lights, such as amber-flashing beacons, are provided at appropriate intervals where the risk assessment indicates the need to warn people of the presence of a barricade during darkness;
- 8.8.2 Where barricades are installed across roadways and shall remain in place during hours of darkness, the barricade shall be fitted with flashing lights to identify the barricade/traffic obstruction in accordance with the requirements of NEOM-NLF-NMS 006.041 – Working On, or Adjacent to a Road

## **8.9 Prevention of Unauthorized Access**

- 8.9.1 Construction sites shall be secured with fencing to prevent so far as reasonably practicable unauthorized access to the site;
- 8.9.2 Fencing requirements shall be in accordance with Civil Defense – Construction Health and Safety Manual, Section 3.
- 8.9.3 A security guard shall be provided to maintain site security out-of-hours where there is an increased risk of unauthorized access such as:
  - (a) The site is in a residential area and there is a foreseeable risk of children entering the site;
  - (b) Previous experience indicates unauthorized access is reasonably foreseeable in the area where the site is located.

## **8.10 Inspection of Barricading**

8.10.1 Contractor shall ensure the following:

- (a) Barricades shall be kept in a condition that doesn't reduce their effectiveness which includes:

8.10.2 Signed appropriately and clearly visible;

- V. Effective at preventing accidental contact;
- VI. Visible during the hours of darkness where required;
- VII. Removed promptly when the work is completed, or the hazard has been removed.

- (b) Barricade components are to be inspected frequently and those with defects shall be withdrawn from service for repair or disposal and tagged or marked as "Dangerous, Do Not Use";
- (c) As a minimum, a weekly formal inspection shall be undertaken and documented for all barricading carried out under this NMS.

8.10.3 Contractor shall consider the use of inspection tags fixed to each barricade. The inspection tag can be used to record the following information:

- (a) Identification mark of the barricade;
- (b) The date the barricading was first erected;
- (c) Date of the last inspection;
- (d) Result of inspection; and
- (e) Name of the person carrying out the inspection.

## **8.11 Inspection after an Incident or Inclement Weather**

8.11.1 If a barricade is damaged or involved in any form of incident, it is to be inspected to ensure it remains fit for purpose;

8.11.2 If repair to a damaged barricade component is not reasonably practicable, that component is to be removed from service, marked accordingly, and disposed of;

8.11.3 Only serviceable barricades shall be available for use.

## **8.12 Removal of Barricading**

8.12.1 Contractor sure all shall en barricading and tape are removed once they are no longer required (e.g., hazard controlled / work complete)

## **8.13 Training and Competency**

8.13.1 Contractor shall ensure that OSH training complies with the requirements of:

- (a) NEOM Element 5– Training, Awareness and Competency.;
- (b) NEOM-NLF-NMS–006.01 – OSH-MS Organisation, Practitioner Registration and Appointment of Contractor

8.13.2 Contractor shall ensure employees required to implement the requirements of this NMS are trained in the barricading of hazards and understand the risks associated with using the equipment and the control measures implemented.

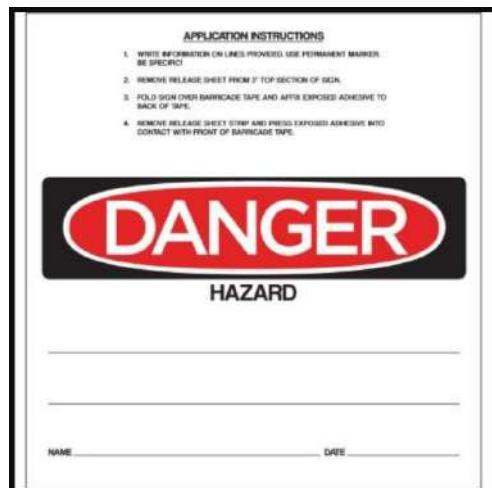
8.13.3 Training for employees shall be competency-based and include:

- (a) Systems of work needed for the safe use of barricades;
- (b) Types and selection of correct barricades;
- (c) Barricade equipment; and
- (d) Care, maintenance, and inspection of barricades.

- 8.13.4 Contractor shall conduct additional retraining whenever a periodic inspection reveals, or there is a reason to believe, that there are deviations from or inadequacies in the employee's knowledge of barricading of hazards.
- 8.13.5 Contractor shall conduct additional retraining whenever a barricading of hazards procedure fails.
- 8.13.6 Contractor shall maintain a record of the required training that contains the following information:
- (a) Name and ID number;
  - (b) Subject(s) of training;
  - (c) Date(s) of training; and
  - (d) Person(s) providing the training.

## 9 Appendices

### 9.1 Appendix A: Forms, Signs and Checklists



## 9.2 Appendix B: Audit Criteria BARRICADING of HAZARDS

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria                   |                                  | Requirements  | Verification | Area of Concern |
|----------------------------------|----------------------------------|---|--------------|-----------------|
| ISO 45001:2018 Clause            | NMS Ref.                         |   |              | Yes/ No         |
| 5.3                              | 7.1.3                            | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2                  | 7.1.4                            | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                              | 7.2.4,<br>8.13                   | Persons appointed to manage /oversee work operations have the skills, knowledge, experience   |              |                 |
| 8.1.2 (e)                        | 7.2.6,                           | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2               | 7.2.5,<br>8.1.1<br>(a,c),<br>8.2 | Hazards Identification Plan (HIP)<br><br>Assessment of the various risks shall be undertaken,   |              |                 |
| 8.2                              | 8.1.1(d)                         | Ensure all foreseeable emergency situations are identified, and appropriate emergency procedures developed, and mitigation measures are fully implemented, and practiced                          |              |                 |
| 8.1.2,<br>6.1.2.3<br><br>6.1.2.2 | 8.3.1(a)                         | Contractor shall use soft barricading to prevent entry of personnel and equipment as an immediate and short-term control  |              |                 |
|                                  | 8.3.2(a)                         | Contractor shall use hard barricading to prevent entry of personnel and equipment to areas where a risk assessment indicates the use of solid barricades to provide a physical barrier            |              |                 |
|                                  | 8.4.4                            | Barricades shall be installed in such a way as to eliminate the possibility of accidental entry into barricade zone   |              |                 |
|                                  | 8.5.2                            | Barricading signs shall provide the contact person/responsible supervisors name and phone number in addition to the expected duration that the barricading shall be in place.                     |              |                 |
|                                  | 8.8.1                            | Warning lights, such as amber-flashing beacons, are provided at appropriate intervals where the risk assessment indicates the need to warn people of the presence of a barricade during darkness; |              |                 |
| 8.1.2,<br>6.1.2.3<br>6.1.2.2     | 8.9.1                            | Construction sites shall be secured with fencing to prevent so far as reasonably practicable unauthorized access to the site  |              |                 |

| Audit Criteria        |           | Requirements  | Verification | Area of Concern |
|-----------------------|-----------|---|--------------|-----------------|
| ISO 45001:2018 Clause | NMS Ref.  |   |              | Yes/ No         |
|                       | 8.10.2(b) | Barricade components are to be inspected frequently and those with defects shall be withdrawn from service for repair or disposal and tagged or marked as "Dangerous, Do Not Use" |              |                 |
|                       |           |   |              |                 |
|                       |           |   |              |                 |
|                       |           |   |              |                 |
|                       |           |   |              |                 |

### **9.3 Appendix C: Guidance Information**

In OSHA CFR 1926 Subpart G; OSHA stipulates the section to be [Signs, signals, and barriers] however, barriers in this section of 1926 only look at the signage used when barriers are in use. Each sign depicts a differing level of hazard; however,

Throughout other parts of CFR 1296 and 1910 requirements for barriers and/or types of barriers are mentioned.

When implemented the requirements found within this NEOM Minimum Standard meet and exceed the requirements of OSHA.

In the UK the HSE web site offers free guidance documents in publication HSG 51 – Protecting the Public. While the Regulations found in the Construction (Design and Management) Regulations 2015 spell out the duties of the Principal Contractor in Regulation 13 while Regulation 15 looks at the duties of the contractor.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
SAFETY SIGNAGE AND SIGNALS**

NEOM-NLF-NMS-006.013 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 01.00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks and the requirements for providing suitable and sufficient Safety Signage and Signals.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures including Safety Signage are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross Reference Table)

## **2 Scope**

This NMS applies to all Sectors, Organisations within NEOM and any Contractors working for NEOM. It is designed to incorporate requirements set by the NEOM-SMS

Signs used in connection with transport, or the supply and marketing of dangerous substances, materials, products, and equipment are excluded from this NMS

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment.

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

That Safety Signage is used as an extension to the existing control measures where there is a significant safety risk that has not been avoided or fully controlled. Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities reducing the requirements for safety signage.

That where signage is required new methods of communication are considered in addition to the traditional Safety Sign or Signboard

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions   |
|--------------------------------|---|
| NEOM Co                        | NEOM Company  |
| Client                         | NEOM Sector / Department responsible for management and oversight of the Contractors  |
| Employer                       | The person or organisation that employs personnel to complete the work  |
| Contractor                     | The organisation contracted to carry out the works  |
| Safety Sign                    | A sign providing information or instruction about Safety at work by means of a signboard, a colour, an illuminated sign or acoustic signal, a verbal communication or hand signal |
| Safety Signboard               | A sign which provides information or instructions by a combination of shape, colour and a symbol or pictogram which is rendered visible by lighting of appropriate intensity.     |
| Safety Management System (SMS) | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard  |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| 5.1 Abbreviations | 5.2 Descriptions                               |
|-------------------|--|
| SMS               | Safety Management System                       |
| NMS               | NEOM Minimum Standard                          |
| SOP               | Standard Operating Procedure                   |
| ANSI              | American National Standards Institute          |
| NFPA              | National Fire Prevention Association           |
| OSHA              | Occupational Safety and Health Administration. |
| CPP               | Construction Phase Plan                        |
| PPE               | Personal Protective Equipment                  |
| OHS               | Occupational Health and Safety                 |
| IBC               | International building Codes                   |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code                  | Document Name   |
|--------------------------------|---|
| NEOM Element 2                 | Risk and Opportunity Management   |
| NEOM Element 3                 | Control of Documented Information & Legal Compliance                                |
| NEOM Element 5                 | Training, Awareness and Competency.   |
| NEOM Element 6                 | Contractor Management   |
| NEOM-Element 9                 | Emergency Planning and Response Management,   |
| NEOM-SMS                       | Neom Safety Management System   |
| NEOM-NLF-SM                    | Safety Manual - Roles and Responsibilities  |
| NEOM-NLF-PRC-006- Section 2    | ISO 14001 Clauses   |
| NEOM-NLF-NMS 006.01            | SMS Organisation, Practitioner Registration and Appointment of Contractor           |
| NEOM-NLF-NMS 006.02-CPP        | Occupational Health and Safety Construction Management Plan                         |
| NEOM-NLF-NMS-006.012           | Barricading of Hazards  |
| NEOM-NLF-NMS-006.021           | Personal Protective Equipment (PPE)   |
| BS 6736;1986                   | Hand Signaling for use in Agricultural Operations ,                                 |
| BS 7121-1:2006                 | Safe Use of Cranes  |
| ISO7010:2003 Graphical Symbols | Safety Colours and Safety Signs - Safety Signs used in Workplaces and Public Areas. |
| OSHA                           | 29 CFR 1910.145   |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM—Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6 - Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.

- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
- (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.

## 7.2 Contractor

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM-Safety Management Manual - Roles and Responsibilities
- 7.2.2 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work
- 7.2.3 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities
- 7.2.4 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks. (Refer: NEOM Element 5 Training, Awareness and Competence)
- 7.2.5 That all equipment including personal protective equipment required is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available. (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment (PPE))

## 7.3 Employee

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NL -SM-Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Shall ensure they follow all the site rules, safety signage and signals.
- 7.3.5 Shall not willfully damage or remove items, such as safety signage, that are provided for the purpose of safety.

## 7.4 Specific Responsibilities

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.4.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Responsibility Holders**

- 8.1.1 Where the responsibility for Safety may change depending on who is in charge of the site or location at a given time. Responsibilities will generally be covered under the title 'Employer' –
- 8.1.2 For the purpose of this NMS 'Employer' is defined as an organisation that employs people and who has responsibility for the Site, Work activity or for Managing the particular aspects of the works being undertaken; this may include, Client, Operator, Contractor, or appointed Duty Holder

### **8.2 Training and Competency**

- 8.2.1 Ensure that Safety training complies with the requirements of:
  - (a) NEOM Element 5– Training, Awareness and Competency.
  - (b) NEOM-NLF-NMS-006.001– SMS Organisation, Practitioner Registration and Appointment of Contractor
- 8.2.2 That appropriate information on the control measures to be implemented in connection with safety signs is provided to all employees.
- 8.2.3 Ensure all employees receive appropriate training in the meaning of safety signs and the control measures to be implemented in connection with safety signs.
- 8.2.4 That specialist training is provided to persons who, through their roles and responsibilities, are required to use hand signals to direct others, e.g., slingers or banksman.
- 8.2.5 Maintain Records of all training provided, including:
  - (a) Employee name and ID Number;
  - (b) Identification of training received;
  - (c) Name of person providing the training; and
  - (d) Date(s) of training.

### **8.3 Planning and Assessment**

- 8.3.1 Each site or work operation shall be evaluated to determine if hazards are present and the workplace shall be assessed using risk management practices, as required by NEOM Element 2 –Risk and Opportunity Management.
- 8.3.2 When the control measures identified in the assessment have been implemented, there may be a 'residual' risk such that employees need to be warned and informed of further necessary control measures. Safety signage is required if it helps to reduce the residual risk.
- 8.3.3 Safety signs are not a substitute for other means of controlling risks; signs are to warn of any remaining significant risk or to instruct persons at risk of the control measures they shall take undertake.

### **8.4 Using Safety Signs**

- 8.4.1 Where to use Safety signs will be determined through consideration of the results of the risk assessment (Refer: NEOM Element 2 –Risk and Opportunity Management).

- 8.4.2 The signs shown in this NMS are to be used where necessary to convey the relevant message or information.
- 8.4.3 If the hearing or sight of any employee is impaired for any reason, for example, by wearing personal protective equipment, additional control measures may need to be implemented to ensure that employees can see or hear the warning sign or signal, for example by increasing the brilliance or volume.
- 8.4.4 In some cases, more than one type of Safety sign may be necessary, for example, an illuminated warning sign indicating a specific risk combined with an acoustic alarm meaning 'general danger' to alert people, or hand signals combined with verbal instructions.
- 8.4.5 Where signboards are used in a workplace ensure that they are sufficiently large and clear so that they can be easily seen and understood.
- 8.4.6 Signage shall be in a language that is appropriate to most of the workforce, including Arabic and English.
- 8.4.7 Signboards shall be durable, securely fastened and appropriately maintained (e.g., washed or resurfaced) to ensure they remain visible.
- 8.4.8 Permanent signboards shall be used, except in cases where the workplace or hazard is temporary. Even in these cases Safety signs still need to be consistent with the requirements of this NMS. For example, use of a portable warning sign by cleaners may be necessary if a hazard such as a slippery floor exists for a short period.
- 8.4.9 Avoid using too many signboards in close proximity to prevent confusion or important information being overlooked. Signboards are only effective if they can be seen and understood.

## **8.5 Maintenance of Safety Signs**

- 8.5.1 Safety signs need to be appropriately maintained so that they can perform the function for which they are intended. This can range from the routine cleaning of signboards to regular checks of illuminated signs and acoustic signals to see that they work appropriately.
- 8.5.2 A guaranteed supply of power or back-up in the event of failure is necessary for safety signs and signals which require some form of power to enable them to operate (unless the hazard is itself eliminated by the power failure).
- 8.5.3 Ensure that safety signage is not obstructed and can be clearly seen in all directions.

## **8.6 Types of Signboards**

- 8.6.1 Signboards can be of the following types shown in Table 4 below;

*Table 4 Types of Safety Signage*

| Type                | Descriptions   |
|---------------------|--|
| Safety Colour       | A colour to which a specific meaning is assigned (e.g., yellow means 'be careful' or 'take precautions')   |
| Symbol or Pictogram | These appear in Appendix 1 although some variation in detail is acceptable provided the meaning is the same. They are for use on a signboard or illuminated sign (e.g., the trefoil ionizing radiation warning sign) |
| Illuminated Sign    | A sign made of transparent or translucent materials which is illuminated from the inside or the rear to give the appearance of a luminous surface (e.g., many "emergency exit" signs)                                |

| Type                 | Descriptions   |
|----------------------|--|
| Acoustic Signal      | A sound signal which is transmitted without the use of a human or artificial voice (e.g., fire alarm);   |
| Verbal Communication | A predetermined spoken message communicated by a human or artificial voice   |
| Hand Signal          | A movement or position of the arms or hands giving a recognized signal and guiding persons who are carrying out maneuvers which are a hazard or danger to people; and  |
| Fire Safety Sign     | Defined as a sign (including an illuminated sign or an acoustic signal) which: <ul style="list-style-type: none"> <li>(a) Provides information on escape routes and emergency exits in case of fire</li> <li>(b) Provides information on the identification or location of firefighting equipment</li> <li>(c) Gives warning in case of fire.</li> </ul> |

|  |  |
|--|--|
| <b>Prohibition Sign</b> – a sign prohibiting behaviour likely to increase or cause danger (e.g., ‘no access for unauthorized persons’)   | <br><b>No unauthorised persons allowed beyond this point</b>                           |
| <b>Hazard Warning Sign</b> – a sign giving warning of a hazard or danger (e.g., ‘danger: electricity’);  |   |
| <b>Mandatory Sign</b> – a sign prescribing specific behaviour (e.g., ‘eye protection shall be worn’)   | <br><b>Eye protection must be worn in this area</b>                                    |
| <b>Emergency escape or First-Aid sign</b> – a sign giving information on emergency exits, first aid, or rescue facilities (e.g., ‘emergency exit/escape route’. Note: signs complying with BS 5499 are also acceptable,) |   |

## 8.7 Safety Colours

- 8.7.1 Certain colours have specific meanings. Table 5 identifies the colours for general safety signs (for fire safety signs, refer to section 8.11 below).

Table 5 - Safety Sign Colours (excluding fire safety signs)

| Colour          | Meaning or Purpose                         | Instruction and Information   |
|-----------------|--|---|
| Red             | Prohibition sign Danger alarm              | Dangerous behaviour; stop; shutdown; emergency cut-out devices, evacuate    |
| Yellow or Amber | Warning sign                               | Be careful; take precautions; examine                                       |
| Blue            | Mandatory sign                             | Specific behaviour or action e.g., wear protective equipment                |
| Green           | Emergency escape<br>First-aid<br>No danger | Doors; exits; escape routes; equipment and facilities Return to normal sign |

## 8.8 Acoustic or Illuminated Signs

- 8.8.1 When acoustic signals or illuminated signs need to be activated (either automatically or in line with other safety arrangements) it is important they remain so for as long as the danger exists or until receipt of any planned acknowledgement.
- 8.8.2 Acoustic signals and illuminated signs need to be checked at regular intervals to ensure that they are functioning correctly. The more hostile the environment, the more frequently they will need to be checked.

## 8.9 Illuminated Signs

- 8.9.1 Illuminated signs shall be bright enough to be seen, without causing glare.
- 8.9.2 Care shall be taken to ensure that several illuminated signs are not used together if this could give rise to confusion. Confusion could also arise if an illuminated sign is placed close to any other similar light source.
- 8.9.3 The luminous area of the sign shall be of a single safety colour or contain a pictogram on a specified background consistent with the requirements of Appendix 1 of this NMS.
- 8.9.4 If an illuminated sign can be either 'on' continuously or operate intermittently (e.g., flash on and off), use the flashing sign to indicate a higher level of danger or a more urgent need for intervention or action.
- 8.9.5 The duration and frequency of flashes for an intermittent illuminated sign shall be such as to ensure the message is appropriately understood, and avoid any confusion with other illuminated signs, including continuous illuminated signs.
- 8.9.6 If a flashing sign is used instead of, or together with, an acoustic signal, it is important to synchronize the two. This means that the duration and frequency of flashes need to be in line with both the pulse length and interval for an acoustic signal.

8.9.7 The choice of equipment and the way it operates shall consider other risks for example:

- (a) Fast flicker rates could be trigger epilepsy in some people;
- (b) Some types of electronic pulse could be a danger in respect of stores containing certain explosives.

8.9.8 Where flashing signs are used to warn of imminent danger, it is particularly important to ensure that control measures are in place to either detect failure of the sign quickly or to prevent its failure (e.g., by fitting duplicate bulbs etc.).

## 8.10 Acoustic Signals

8.10.1 Acoustic signals need to be set at a level which is considerably higher in terms of frequency than the ambient noise, for example 10 dB above the level of ambient noise at that frequency. However, make sure the level is neither excessive nor painful. It is also important for signals to be easily recognizable, particularly in terms of pulse length and the interval between pulses or groups of pulses.

8.10.2 Acoustic signals shall not be used more than one at a time.

8.10.3 If a device can emit an acoustic signal at variable frequencies (this includes an intermittent signal operating on a discrete frequency) or constant frequencies, use the variable frequency set at 10 dB above the ambient level at the appropriate frequency, to indicate a higher level of danger or a more urgent need for intervention or action.

## 8.11 Use of Signs on Containers and Pipes

8.11.1 Ensure that containers, tanks, vessels, and visible pipes that contain dangerous materials/substances or are under pressure, have appropriate signs or labels affixed to warn persons of the dangers within.

## 8.12 Fire Safety Signs

8.12.1 Ensure a Competent Person carries out a fire risk assessment to identify signage requirements (Refer NEOM-Element 9—Emergency Planning and Response Management)

8.12.2 A fire safety sign is defined as a sign (including an illuminated sign or an acoustic signal) which:

- (a) Provides information on escape routes and emergency exits in case of fire;
- (b) Provides information on the identification or location of firefighting equipment;
- (c) Gives warning in case of fire.

8.12.3 Fire Safety Signs shall meet the requirements of NEOM Fire Safety department

## 8.13 Fire Signage Colour

8.13.1 Information on general signage colours relating to fire safety signage

*Table 6 Specific Fire Safety Signage Colours*

| Colour | Meaning or Purpose     | Instruction and Information    |
|--------|------------------------|--------------------------------|
| Red    | Firefighting Equipment | Identification and Location    |
| Green  | Emergency Escape       | Doors, exits and escape routes |

## **8.14 Using Fire Signage**

- 8.14.1 Alternative Exits- (e.g., all emergency exits and any exits not in normal use) shall be clearly indicated so that people know that there are ways to leave other than the way they use to enter.
- 8.14.2 Ensure that the fire exit sign is displayed immediately above the exit opening or, if this is not reasonably practicable, choose a position where the sign can be clearly seen and is least likely to be obstructed or obscured by smoke.
- 8.14.3 Where an exit cannot be seen or where a person escaping may be in doubt about the location of an exit (e.g., in warehouses where goods for transit and other obstructions may prevent a clear view of the exit doors), fire exit signs including directional arrows at appropriate points along the escape route.
- 8.14.4 In buildings with multiple tenants, ensure that the placing of fire signage is coordinated so as not confuse staff when exiting under emergency conditions.

## **8.15 Using Hand Signals to Direct Hazardous Operations**

- 8.15.1 Hand signals can be used to direct hazardous operations such as crane or vehicle maneuvers. Ensure that the signals are precise, simple, and easy to make understand.
- 8.15.2 Ensure that the signaler is competent to make hand signals and is trained in their correct use
- 8.15.3 The signaler shall be able to see all the maneuvers being made by the people receiving the signals without being endangered by them.
- 8.15.4 During manoeuvres, make sure that the duties of the signaler are confined to directing manoeuvres and to other specific control measures aimed at the safety of nearby employees (e.g., keeping people back a safe distance).
- 8.15.5 If with further signalers to require helping co-ordinate the action ensure that the person receiving the signals takes them from one signaler only, unless specific arrangements have been made otherwise by a competent person.
- 8.15.6 When an operator is unable to continue the maneuver safely, the operation needs to be discontinued until further instructions are received from the signaler.

## **8.16 Codes of Hand Signals**

- 8.16.1 Where hand signals are used ensure they are consistent with the signals shown in the Appendices of this NMS or meet the requirements of;
  - (a) BS 6736;1986 –Hand Signaling,
  - (b) BS 7121-1:2006 – Safe Use of Cranes or
  - (c) ISO7010:2003 Graphical Symbols - Safety Colours and Safety Signs - Safety Signs used in Workplaces and Public Areas.
- 8.16.2 There may be situations where these codes of hand signals are insufficient to meet communication needs. In these cases, additional signals can be used based on existing signaling practice.
- 8.16.3 Irrespective of the code of hand signals chosen, it is important that they are used consistently throughout.
- 8.16.4 If employees are unfamiliar with the code in use, then appropriate training is necessary. Care is needed with new employees who have previously used different codes of hand signals

## 9 Appendices

### 9.1 Appendix A: Typical Signage

| Safety sign,<br>reference number<br>and referent | Category   |  |                                  |   |   |
|--|--|--|----------------------------------|---|---|
|  | E  | F  | M                                | P   | W   |
|  | Means of escape<br>and emergency<br>equipment signs<br>(safe condition<br>signs) | Fire safety signs                        | Mandatory action<br>signs        | Prohibition signs   | Warning signs   |
| Safety sign                                      |  |  |                                  |   |   |
| Reference number                                 | E001   | F001                                     | M001                             | P001  | W001  |
| Referent   | Emergency exit<br>(left hand)  | Fire extinguisher                        | General mandatory<br>action sign | General prohibition<br>sign   | General warning<br>sign                                   |
| Safety sign                                      |  |  | —                                |   |   |
| Reference number                                 | E002   | F002                                     | —                                | P002  | W002  |
| Referent   | Emergency exit<br>(right hand)   | Fire hose reel                           | —                                | No smoking  | Warning;<br>Explosive material                            |
| Safety sign                                      |  |  | —                                |   |   |
| Reference number                                 | E003   | F003                                     | —                                | P003  | W003  |
| Referent   | First aid  | Fire ladder                              | —                                | No open flame;<br>Fire, open ignition<br>source and smoking<br>prohibited | Warning;<br>Radioactive material<br>or ionizing radiation |
| Safety sign                                      |  |  | —                                |   |   |
| Reference number                                 | E004   | F004                                     | —                                | P004  | W004  |
| Referent   | Emergency<br>telephone   | Collection of fire<br>fighting equipment | —                                | No thoroughfare   | Warning;<br>Laser beam                                    |

| Safety sign,<br>reference number<br>and referent | Category   |                                     |                           |  |   |
|--|--|-------------------------------------|---------------------------|--|---|
|  | E  | F                                   | M                         | P  | W   |
|  | Means of escape<br>and emergency<br>equipment signs<br>(safe condition<br>signs) | Fire safety signs                   | Mandatory action<br>signs | Prohibition signs  | Warning signs                                 |
| Safety sign                                      |  |                                     | —                         |  |   |
| Reference number<br>Referent                     | E005<br>Direction, arrow<br>(90° increments),<br>safe condition                  | F005<br>Fire alarm call point       | —<br>—                    | P005<br>Not drinking water   | W005<br>Warning;<br>Non-ionizing<br>radiation |
| Safety sign                                      |  |                                     | —                         |  |   |
| Reference number<br>Referent                     | E006<br>Direction, 45° arrow<br>(90° increments),<br>safe condition              | F006<br>Fire emergency<br>telephone | —<br>—                    | P006<br>No access for fork lift<br>trucks and other<br>industrial vehicles | W006<br>Warning;<br>Magnetic field            |
| Safety sign                                      | —  | —                                   | —                         |  |   |
| Reference number<br>Referent                     | —<br>—   | —<br>—                              | —<br>—                    | P007<br>No access for<br>persons with<br>pacemakers                        | W007<br>Warning;<br>Obstacles                 |
| Safety sign                                      | —  | —                                   | —                         |  |   |
| Reference number<br>Referent                     | —<br>—   | —<br>—                              | —<br>—                    | P008<br>No metallic articles<br>or watches                                 | W008<br>Warning;<br>Drop (fall)               |

| Safety sign,<br>reference number<br>and referent | Category   |                   |                           |                   |   |
|--|--|-------------------|---------------------------|-------------------|---|
|  | E  | F                 | M                         | P                 | W   |
|  | Means of escape<br>and emergency<br>equipment signs<br>(safe condition<br>signs) | Fire safety signs | Mandatory action<br>signs | Prohibition signs | Warning signs   |
| Safety sign                                      | —  | —                 | —                         | —                 |  |
| Reference number                                 | —  | —                 | —                         | —                 | W009  |
| Referent   | —  | —                 | —                         | —                 | Warning:<br>Biological hazard   |
| Safety sign                                      | —  | —                 | —                         | —                 |  |
| Reference number                                 | —  | —                 | —                         | —                 | W010  |
| Referent   | —  | —                 | —                         | —                 | Warning:<br>Low temperature/<br>freezing conditions                                 |
| Safety sign                                      | —  | —                 | —                         | —                 |  |
| Reference number                                 | —  | —                 | —                         | —                 | W011  |
| Referent   | —  | —                 | —                         | —                 | Warning:<br>Slippery surface  |

| Reference<br>No.<br>Referent              | Safety sign   | Description/application  |
|---|---|--|
| E001<br>Emergency<br>exit<br>(left hand)  |  | <p><b>Function</b> To signify an escape route to an area of safe condition</p> <p><b>Image content</b> Full view of man moving (to left) through doorway</p> <p><b>Field of application</b> For everyday use in workplaces and public areas</p> <p><b>Format of application</b> Safety signing<br/>Supplementary arrow sign is used to give directional information (E005, E006)<br/>Safety manuals and notices<br/>To improve conspicuity, use with a supplementary sign</p> <p><b>Additional information</b> See ISO 3864-1 for examples of use</p>  |
| E002<br>Emergency<br>exit<br>(right hand) |  | <p><b>Function</b> To signify an escape route to an area of safe condition</p> <p><b>Image content</b> Full view of man moving (to right) through doorway</p> <p><b>Field of application</b> For everyday use in workplaces and public areas</p> <p><b>Format of application</b> Safety signing<br/>Supplementary arrow sign is used to give directional information (E005, E006)<br/>Safety manuals and notices<br/>To improve conspicuity, use with a supplementary sign</p> <p><b>Additional information</b> See ISO 3864-1 for examples of use</p> |

| Reference No.<br>Referent                                     | Safety sign   | Description/application  |  |
|---|---|--|--|
| E005<br>Direction, arrow (90° increments), safe condition     |  | <p><b>Function</b> To indicate direction (the arrow may be rotated in increments of 90° from the vertical)</p> <p><b>Image content</b> Arrow with Belgian head, with angle at apex ranging between 84° and 86°</p> <p><b>Field of application</b> For everyday use in workplaces and public areas</p> <p><b>Format of application</b> Safety signing as supplementary sign<br/>Safety manuals and notices</p> <p><b>Additional information</b> See ISO 3864-1 supplementary sign</p> |  |
| E006<br>Direction, 45° arrow (90° increments), safe condition |  | <p><b>Function</b> To indicate direction (the arrow may be rotated in increments of 90° from 45°)</p> <p><b>Image content</b> Arrow with Belgian head, with angle at apex ranging between 84° and 86°</p> <p><b>Field of application</b> For everyday use in workplaces and public areas</p> <p><b>Format of application</b> Safety signing as supplementary sign<br/>Safety manuals and notices</p> <p><b>Additional information</b> See ISO 3864-1 supplementary sign</p>          |  |

| Reference No.<br>Referent   | Safety sign   | Description/application  |  |
|-----------------------------|---|--|--|
| E003<br>First aid           |  | <p><b>Function</b> To signify the location of first aid equipment or facilities</p> <p><b>Image content</b> A white cross on a green background or an alternative appropriate recognized ethnic element</p> <p><b>Field of application</b> For everyday use in workplaces and public areas</p> <p><b>Format of application</b> Safety signing<br/>Safety manuals and notices</p> <p><b>Additional information</b> Supplementary text sign may be used to increase comprehension</p>                |  |
| E004<br>Emergency telephone |  | <p><b>Function</b> For summoning first aid or rescue</p> <p><b>Image content</b> Telephone receiver in profile, with determinative cross or with another appropriate element evocative for the targeted cultural group</p> <p><b>Field of application</b> For everyday use in workplaces and public areas</p> <p><b>Format of application</b> Safety signing<br/>Safety manuals and notices</p> <p><b>Additional information</b> Supplementary text sign may be used to increase comprehension</p> |  |

| Reference No.<br>Referent                     | Safety sign   | Description/application |  |
|---|---|-------------------------|--|
| F003<br>Fire ladder                           |  | Function                | To signify a fire ladder   |
|   |   | Image content           | Front view of vertical ladder with deterministic flames  |
|   |   | Field of application    | For everyday use in workplaces and public areas  |
|   |   | Format of application   | Fire safety signing<br>Fire safety manuals and notices   |
|   |   | Additional information  | Supplementary text sign may be used to increase comprehension  |
| F004<br>Collection of fire fighting equipment |  | Function                | To signify a collection of fire fighting equipment   |
|   |   | Image content           | Fire helmet with deterministic flames  |
|   |   | Field of application    | For everyday use in workplaces and public areas  |
|   |   | Format of application   | Fire safety signing<br>Fire safety manuals and notices   |
|   |   | Additional information  | The shape of the helmet may be changed to better represent a country's style of fire helmet<br>Supplementary text sign may be used to increase comprehension |

Table 4 — Description and application of referent for fire safety signs (category F)

| Reference No.<br>Referent | Safety sign   | Description/application |   |
|---------------------------|---|-------------------------|---|
| F001<br>Fire extinguisher |  | Function                | To signify a fire extinguisher                                |
|                           |   | Image content           | Front view of fire extinguisher with deterministic flames     |
|                           |   | Field of application    | For everyday use in workplaces and public areas               |
|                           |   | Format of application   | Fire safety signing<br>Fire safety manuals and notices        |
|                           |   | Additional information  | Supplementary text sign may be used to increase comprehension |
| F002<br>Fire hose reel    |  | Function                | To indicate fire hose reel                                    |
|                           |   | Image content           | Fire hose reel in profile with deterministic flames           |
|                           |   | Field of application    | For everyday use in workplaces and public areas               |
|                           |   | Format of application   | Fire safety signing<br>Fire safety manuals and notices        |
|                           |   | Additional information  | Supplementary text sign may be used to increase comprehension |

| Reference No.<br>Referent        | Safety sign   | Description/application |  |
|----------------------------------|---|-------------------------|--|
| F005<br>Fire alarm call point    |  | Function                | To signify a fire alarm call point   |
|                                  |   | Image content           | Hand with projecting finger on push button of call point with determinative flames |
|                                  |   | Field of application    | For everyday use in workplaces and public areas                                    |
|                                  |   | Format of application   | Fire safety signing<br>Fire safety manuals and notices                             |
|                                  |   | Additional information  | Supplementary text sign may be used to increase comprehension                      |
|                                  |   | Function                | To signify fire emergency telephone  |
| F006<br>Fire emergency telephone |  | Image content           | Telephone receiver shown in profile with determinative flames                      |
|                                  |   | Field of application    | For everyday use in workplaces and public areas                                    |
|                                  |   | Format of application   | Fire safety signing<br>Fire safety manuals and notices                             |
|                                  |   | Additional information  | Supplementary text sign may be used to increase comprehension                      |

Table 5 — Description and application of referent for mandatory action signs (category M)

| Reference No.<br>Referent             | Safety sign   | Description/application |   |
|---------------------------------------|---|-------------------------|---|
| M001<br>General mandatory action sign |  | Function                | To signify a mandatory action                           |
|                                       |   | Image content           | Exclamation mark  |
|                                       |   | Field of application    | For everyday use in workplaces and public areas         |
|                                       |   | Format of application   | Safety signing<br>Safety manuals and notices            |
|                                       |   | Additional information  | Requires supplementary sign to give further information |

Table 6 — Description and application of referent for prohibition signs (category P)

| Reference No.<br>Referent        | Safety sign   | Description/application |   |
|----------------------------------|---|-------------------------|---|
| P001<br>General prohibition sign |  | Function                | To signify a prohibited action                          |
|                                  |   | Image content           | None, prohibition shape and colour only                 |
|                                  |   | Field of application    | For everyday use in workplaces and public areas         |
|                                  |   | Format of application   | Safety signing<br>Safety manuals and notices            |
|                                  |   | Additional information  | Requires supplementary sign to give further information |

| Reference No.<br>Referent   | Safety sign   | Description/application |   |
|---|---|-------------------------|---|
| P002<br>No smoking  |  | Function                | To prohibit smoking   |
|   |   | Image content           | Cigarette shown in profile with smoke                         |
|   |   | Field of application    | For everyday use in workplaces and public areas               |
|   |   | Format of application   | Safety signing<br>Safety manuals and notices                  |
|   |   | Additional information  | Supplementary text sign may be used to increase comprehension |
| P003<br>No open flame;<br>Fire, open<br>ignition<br>source and<br>smoking<br>prohibited |  | Function                | To prohibit smoking and all forms of open flame               |
|   |   | Image content           | Match shown in profile with flame                             |
|   |   | Field of application    | For everyday use in workplaces and public areas               |
|   |   | Format of application   | Safety signing<br>Safety manuals and notices                  |
|   |   | Additional information  | Supplementary text sign may be used to increase comprehension |

| Reference No.<br>Referent  | Safety sign   | Description/application |   |
|----------------------------|---|-------------------------|---|
| P004<br>No thoroughfare    |  | Function                | To prohibit a person from using a designated thoroughfare     |
|                            |   | Image content           | Stylized man walking (left hand)                              |
|                            |   | Field of application    | For everyday use in workplaces and public areas               |
|                            |   | Format of application   | Safety signing<br>Safety manuals and notices                  |
|                            |   | Additional information  | Supplementary text sign may be used to increase comprehension |
| P005<br>Not drinking water |  | Function                | To prohibit the drinking of unsuitable water                  |
|                            |   | Image content           | Tap above glass containing water indicated by wavy lines      |
|                            |   | Field of application    | For everyday use in workplaces and public areas               |
|                            |   | Format of application   | Safety signing<br>Safety manuals and notices                  |
|                            |   | Additional information  | Supplementary text sign may be used to increase comprehension |

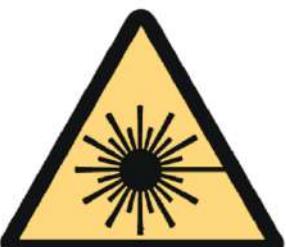
| Reference No.<br>Referent  | Safety sign   | Description/application |  |
|--|---|-------------------------|--|
| P006<br>No access for fork lift trucks and other industrial vehicles |  | Function                | To prohibit the use of fork lift trucks and other industrial vehicles in hazardous areas |
|  |   | Image content           | Truck shown in profile with stylized driver  |
|  |   | Field of application    | For everyday use in workplaces and public areas  |
|  |   | Format of application   | Safety signing<br>Safety manuals and notices   |
|  |   | Additional information  | Supplementary text sign may be used to increase comprehension                            |
| P007<br>No access for persons with pacemakers                        |  | Function                | To prohibit a person from passing through a device that might harm a pacemaker           |
|  |   | Image content           | Stylized heart shape with cable  |
|  |   | Field of application    | For everyday use in workplaces and public areas  |
|  |   | Format of application   | Safety signing<br>Safety manuals and notices   |
|  |   | Additional information  | Supplementary text sign may be used to increase comprehension                            |

| Reference No.<br>Referent               | Safety sign   | Description/application |  |
|---|---|-------------------------|--|
| P008<br>No metallic articles or watches |  | Function                | To prohibit metallic articles and watches in a designated area   |
|   |   | Image content           | Stylized face of an analog wristwatch and the flat side of a key |
|   |   | Field of application    | For everyday use in workplaces and public areas                  |
|   |   | Format of application   | Safety signing<br>Safety manuals and notices                     |
|   |   | Additional information  | Supplementary text sign may be used to increase comprehension    |

Table 7 — Description and application of referent for warning signs (category W)

| Reference No.<br>Referent    | Safety sign   | Description/application |   |
|------------------------------|---|-------------------------|---|
| W001<br>General warning sign |  | Function                | To signify a general warning                            |
|                              |   | Image content           | Exclamation mark  |
|                              |   | Field of application    | For everyday use in workplaces and public area          |
|                              |   | Format of application   | Safety signing<br>Safety manuals and notices            |
|                              |   | Additional information  | Requires supplementary sign to give further information |

| Reference No.<br>Referent  | Safety sign   | Description/application |  |
|--|---|-------------------------|--|
| W002<br>Warning;<br>Explosive<br>material                                    |  | Function                | To warn of a hazard from explosive materials                         |
|  |   | Image content           | Stylized exploding bomb  |
|  |   | Field of application    | For everyday use in workplaces and public areas                      |
|  |   | Format of application   | Safety signing<br>Safety manuals and notices                         |
|  |   | Additional information  | Supplementary text sign may be used to increase comprehension        |
| W003<br>Warning;<br>Radio-<br>active<br>material or<br>ionizing<br>radiation |  | Function                | To warn of a hazard from radioactive materials or ionizing radiation |
|  |   | Image content           | As abstract image shown opposite                                     |
|  |   | Field of application    | For everyday use in workplaces and public areas                      |
|  |   | Format of application   | Safety signing<br>Safety manuals and notices                         |
|  |   | Additional information  | Supplementary text sign may be used to increase comprehension        |

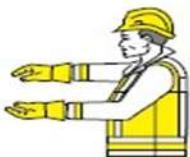
| Reference No.<br>Referent                         | Safety sign   | Description/application |   |
|---|---|-------------------------|---|
| W004<br>Warning;<br>Laser<br>beam                 |  | Function                | To warn of a hazard from a laser beam                         |
|   |   | Image content           | As abstract image shown opposite                              |
|   |   | Field of application    | For everyday use in workplaces and public areas               |
|   |   | Format of application   | Safety signing<br>Safety manuals and notices                  |
|   |   | Additional information  | Supplementary text sign may be used to increase comprehension |
| W005<br>Warning;<br>Non-<br>ionizing<br>radiation |  | Function                | To warn of a hazard from non-ionizing radiation               |
|   |   | Image content           | As abstract image shown opposite                              |
|   |   | Field of application    | For everyday use in workplaces and public areas               |
|   |   | Format of application   | Safety signing<br>Safety manuals and notices                  |
|   |   | Additional information  | Supplementary text sign may be used to increase comprehension |

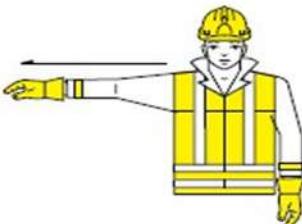
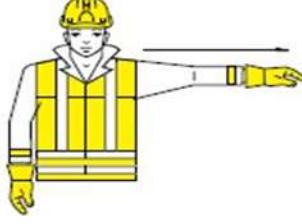
| Reference No.<br>Referent          | Safety sign  | Description/application |   |
|------------------------------------|--|-------------------------|---|
| W006<br>Warning:<br>Magnetic field |  A yellow triangle with a black border. Inside is a stylized magnet symbol consisting of a U-shaped frame with two vertical legs at the ends.                           | Function                | To warn of a hazard from a magnetic field                     |
|                                    |  | Image content           | Stylized magnet with two radiating arcs either side           |
|                                    |  | Field of application    | For everyday use in workplaces and public areas               |
|                                    |  | Format of application   | Safety signing<br>Safety manuals and notices                  |
|                                    |  | Additional information  | Supplementary text sign may be used to increase comprehension |
| W007<br>Warning:<br>Obstacles      |  A yellow triangle with a black border. Inside is a stylized silhouette of a person walking towards the right, tripping over a horizontal bar representing an obstacle. | Function                | To warn of a hazard from obstacles                            |
|                                    |  | Image content           | Stylized man tripping over floor obstacle                     |
|                                    |  | Field of application    | For everyday use in workplaces and public areas               |
|                                    |  | Format of application   | Safety signing<br>Safety manuals and notices                  |
|                                    |  | Additional information  | Supplementary text sign may be used to increase comprehension |

| Reference No.<br>Referent             | Safety sign  | Description/application |   |
|---------------------------------------|--|-------------------------|---|
| W008<br>Warning;<br>Drop (fall)       |  A yellow triangle with a black border. Inside is a stylized silhouette of a person falling forward from the edge of a surface.   | Function                | To warn of a hazard from a drop                               |
|                                       |  | Image content           | Stylized man falling from the edge of a surface               |
|                                       |  | Field of application    | For everyday use in workplaces and public areas               |
|                                       |  | Format of application   | Safety signing<br>Safety manuals and notices                  |
|                                       |  | Additional information  | Supplementary text sign may be used to increase comprehension |
| W009<br>Warning;<br>Biological hazard |  A yellow triangle with a black border. Inside is the international biohazard symbol, which consists of three stylized, symmetrical, organic shapes (often described as flower petals or DNA helixes) arranged in a triangular pattern. | Function                | To warn of a hazard from a biological hazard                  |
|                                       |  | Image content           | As abstract image shown opposite                              |
|                                       |  | Field of application    | For everyday use in workplaces and public areas               |
|                                       |  | Format of application   | Safety signing<br>Safety manuals and notices                  |
|                                       |  | Additional information  | Supplementary text sign may be used to increase comprehension |

| Reference No.<br>Referent                                      | Safety sign   | Description/application |   |
|--|---|-------------------------|---|
| W010<br>Warning;<br>Low temperature/<br>freezing<br>conditions |  | Function                | To warn of a hazard from low temperature                      |
|  |   | Image content           | As abstract image shown opposite                              |
|  |   | Field of application    | For everyday use in workplaces and public areas               |
|  |   | Format of application   | Safety signing<br>Safety manuals and notices                  |
|  |   | Additional information  | Supplementary text sign may be used to increase comprehension |
| W011<br>Warning;<br>Slippery surface                           |  | Function                | To warn of a hazard from a slippery surface                   |
|  |   | Image content           | Stylized man falling on a slippery surface                    |
|  |   | Field of application    | For everyday use in workplaces and public areas               |
|  |   | Format of application   | Safety signing<br>Safety manuals and notices                  |
|  |   | Additional information  | Supplementary text sign may be used to increase comprehension |

## 9.2 Appendix B: Crane - Hand Signals

| <i>Meaning</i>                                 | <i>Description</i>   | <i>Illustration</i>   |
|--|--|---|
| <b>A. General signals</b>                      |  |   |
| <b>START</b><br>Attention<br>Start of Command  | both arms are extended horizontally with the palms facing forwards.                    |     |
| <b>STOP</b><br>Interruption<br>End of movement | the right arm points upwards with the palm facing forwards.                            |    |
| <b>END</b> of the operation                    | both hands are clasped at chest height.  |    |
| <b>B. Vertical movements</b>                   |  |   |
| <b>RAISE</b>                                   | the right arm points upwards with the palm facing forward and slowly makes a circle.   |  |
| <b>LOWER</b>                                   | the right arm points downwards with the palm facing inwards and slowly makes a circle. |   |
| <b>VERTICAL DISTANCE</b>                       | the hands indicate the relevant distance.  |  |

| <i>Meaning</i>                   | <i>Description</i>  | <i>Illustration</i>  |
|----------------------------------|---|--|
| <b>C. Horizontal movements</b>   |   |  |
| <b>MOVE FORWARDS</b>             | both arms are bent with the palms facing upwards, and the forearms make slow movements towards the body.                          |    |
| <b>MOVE BACKWARDS</b>            | both arms are bent with the palms facing downwards, and the forearms make slow movements away from the body.                      |    |
| <b>RIGHT</b><br>to the signalman | the right arm is extended more or less horizontally with the palm facing downwards and slowly makes small movements to the right. |    |
| <b>LEFT</b><br>to the signalman  | the left arm is extended more or less horizontally with the palm facing downwards and slowly makes small movements to the left.   |  |
| <b>HORIZONTAL DISTANCE</b>       | the hands indicate the relevant distance.   |  |
| <b>D. Danger</b>                 |   |  |
| <b>DANGER</b><br>Emergency stop  | both arms point upwards with the palms facing forwards.   |  |
| <b>QUICK</b>                     | all movements faster.   |  |
| <b>SLOW</b>                      | all movements slower.   |  |

### 9.3 Appendix C: Machine Banksman Instructions



**NEOM**

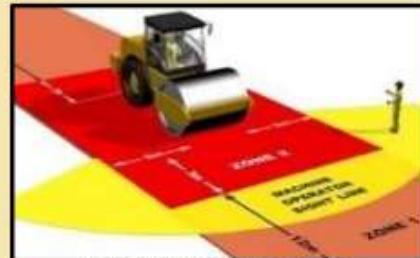
# SAFE WORKING PRACTICE

## FLAGMAM

| Companies Must....  | Flagmen Must....  |
|---|---|
| Provide Training  |  Use the training                |
| Provide PPE  |  Use the PPE                     |
| Provide Flags or Batons   |  Use the Tools Correctly         |
| Allow for rest areas  |  Follow the work / rest schedule |
| Explain heat stress   |  Follow the Heat stress rules    |

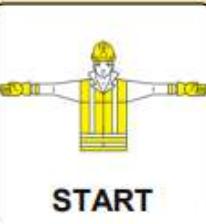
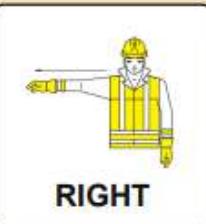
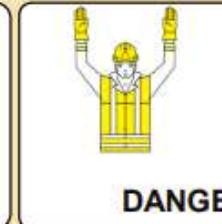
**Flagmen Must ....**

-  Stop work if it is unsafe
-  Maintain Eye contact with the operator
-  Stop pedestrians from entering danger zone
-  Make sure you are standing in a safe place



KNOW WHERE TO STAND  
TO BE SAFE

**Hand Signals for Communication....**

|   |   |   |  |   |
|---|---|---|--|---|
|  |  |  |  |  |
|  |  |  |  |  |

## 9.4 Appendix D: Audit Criteria Safety Signs and Signals

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria        |                          | Requirements   | Verification | Area of Concern |
|-----------------------|--------------------------|--|--------------|-----------------|
| ISO 45001:2018 Clause | NMS Ref.                 |  |              | Yes/ No         |
| 5.3                   | 7.1.3                    | Pre-Tender Health and Safety Plan has been developed and issued  |              |                 |
| 5.3,<br>8.1.4.2       | 7.1.4                    | Selection of Contractors undertaken in accordance with NEOM's policies and procedures  |              |                 |
| 7.2                   | 7.2.4,<br>8.2,           | Persons appointed to manage /oversee work operations have the skills, knowledge, experience  |              |                 |
| 8.1.2 (e)             | 7.2.5,<br>7.3.3          | Personal protective equipment required for use are fit for purpose   |              |                 |
| 6.1.2.3<br>6.1.2.2    | 8.3.1<br>8.2.2,<br>8.4.1 | Hazards Identification Plan (HIP)<br><br>Assessment of the various risks shall be undertaken, safety signs will be determined through consideration of the results of the risk assessment                    |              |                 |
| 8.1.2                 | 8.3.3                    | Safety signs are not a substitute for other means of controlling risks; signs are to warn of any remaining significant risk or to instruct persons at risk of the control measures they shall take undertake |              |                 |
| 8.1.2                 | 8.4.5                    | Signboards in a workplace shall be sufficiently large and clear so that they can be easily seen and understood   |              |                 |
|                       | 8.5.1                    | Safety signs need to be appropriately maintained so that they can perform the function for which they are intended   |              |                 |
| 9.1.1                 | 8.8.2                    | Acoustic signals and illuminated signs need to be checked at regular intervals to ensure that they are functioning correctly   |              |                 |
| 8.1.2                 | 8.9.8                    | Where flashing signs are used to warn of imminent danger, it is particularly important to ensure that control measures are in place to either detect failure of the sign quickly or to prevent its failure   |              |                 |
|                       | 8.10.1                   | Acoustic signals need to be set at a level which is considerably higher in terms of frequency than the ambient noise, for example 10 dB above the level of ambient noise at that frequency                   |              |                 |
| 8.1.2                 | 8.11.1                   | Ensure that containers, tanks, vessels and visible pipes that contain dangerous  |              |                 |

| Audit Criteria        |          | Requirements  | Verification | Area of Concern |
|-----------------------|----------|---|--------------|-----------------|
| ISO 45001:2018 Clause | NMS Ref. |   |              | Yes/ No         |
|                       |          | materials/ substances or are under pressure, have appropriate signs or labels affixed to warn persons of the dangers within   |              |                 |
| 6.1.2.3<br>6.1.2.2    | 8.12.1   | Ensure a Competent Person carries out a fire risk assessment to identify signage requirements   |              |                 |
| 8.1.2                 | 8.14.1   | Alternative Exits- (e.g., all emergency exits and any exits not in normal use) shall be clearly indicated so that people know that there are ways to leave other than the way they use to enter |              |                 |
|                       | 8.15.1   | Hand signals can be used to direct hazardous operations such as crane or vehicle manoeuvres. Ensure that the signals are precise, simple, and easy to make understand                           |              |                 |
| 7.2                   | 8.16.4   | If employees are unfamiliar with the code in use, then appropriate training is necessary  |              |                 |
|                       |          |   |              |                 |

## 9.5 Appendix E: Guidance Information

OSHA specifies when a safety sign is necessary in 29 CFR 1910.145 (f) (3). It states that these: "Shall be used as a means to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations which are out of the ordinary, unexpected, or not readily apparent.

OSHA regulates most workplaces and requires safety signs at most locations where a hazard threatens the safety of a worker. Each safety sign is classified by hazard risk to help determine what sign to use, including DANGER, WARNING, and CAUTION.

Once you've determined that safety signage is necessary, 29 CFR 1910.145 (f) (4) (vi) states that signs must be placed "as close as safely possible" to the nearby hazard. OSHA Outlines Different Guidelines for Placement, Depending on the Type of Sign.

29 CFR 1910.145, OSHA's guideline for signs and tags that identify hazards, outlines design requirements and specifies when safety signs must be used. These design elements are expanded upon in the ANSI Z535 standard, which utilizes alert symbols and pictograms to communicate hazards.

OSHA and ANSI have established three primary severity classifications for safety signs. They are danger signs, warning signs, and caution signs; each relates directly to the severity of hazards present (or potentially present).

**Danger:** Danger signs signal the most serious hazards, where special precautions must be taken. The "DANGER" signal word is printed in white letters on a red background and is preceded by the safety alert symbol, which looks like an exclamation point inside a triangle. This type of sign indicates that death or serious injury is almost certain to occur if the hazard is not avoided.

**Warning:** This sign describes a hazard that may result in death or serious injury, but where the overall risk is not severe enough to need a danger sign. A safety alert symbol precedes the "WARNING" signal word, which is printed in black on an orange background.

**Caution:** The hazards described on a caution sign may result in minor or moderate injuries if not avoided. These typically caution against unsafe practices. On caution signs, the "CAUTION" signal word is printed in black on a yellow background header and is preceded by the safety alert symbol.

Biological hazards are grouped into another hazard classification. These signs alert employees to the presence—or potential presence—of biohazards (including materials, equipment, containers, and rooms) where workers may be at risk of exposure.

29 CFR 1910.145(f)(3) is OSHA's rule for when and where signs should be placed within a facility. The standard points out that labels, tags, and signs:

*"Shall be used as a means to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations which are out of the ordinary, unexpected or not readily apparent. Tags shall be used until such time as the identified hazard is eliminated or the hazardous operation is completed."*

**Danger signs** must be placed where a hazard poses an immediate danger and special precautions must be taken.

**Caution signs** must be posted to warn of potential hazards; they may also be used to caution against unsafe practices.

**Safety instruction signs** should be used wherever general instructions and safety suggestions can help workers perform their tasks in a safe manner.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
LADDERS**

NEOM-NLF-NMS-006.014 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | Sector Review          | Issued for Implementation | 01-02-2022 |

## Document Approval

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## OUR NEOM VALUES



### CATALYST

Make a difference.  
Create a legacy.



### CARE

Leave the environment  
in a better place.



### CURIOS

Challenge the norm.  
Stay restless.



### PASSIONATE

Be accountable.  
Finish what you start.



### RESPECT

Be authentic.  
Be true. Be bold.



### DIVERSITY

Embrace cultural  
differences.  
Seek to understand.

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## 1 Purpose

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with Ladders.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Standard (Refer NEOM-NLF-PRC–006- Section 2 ISO 14001 Clauses)

## 2 Scope

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS. The requirements of this NMS shall be implemented in accordance with NEOM-NLF-NMS 006.07 – Working at Heights, (Refer- : NEOM-NLF-NMS-006.003 Scaffolding - : NEOM-NLF-NMS-006.031 Steel Erection)

NOTE:

1. This NMS does not include for fixed vertical ladders.
2. Self-made / home-made ladders **are prohibited** for use on any NEOM Contract or Asset.

## 3 Expectations

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with the work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities involving the use of ladders

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions   |
|--------------------------------|---|
| NEOM Co                        | NEOM Company  |
| Client                         | NEOM Company – Sector / Department responsible for management and oversight of the Contractor   |
| Employer                       | The person or organisation that employs personnel to complete the work  |
| Contractor                     | The organisation contracted to carry out the works  |
| Ladders and/or Stepladders     | Refers to any metal, wooden, reinforced plastic or composite material Ladder or Stepladder that is used for access  |
| Falsework                      | Falsework means the temporary structure used to support a permanent structure, material, plant, equipment and people until the construction of the permanent structure has advanced to the stage where it is self-supporting. Falsework includes the foundations, footings and all structural members supporting the permanent structural elements. |
| Competent Person               | A person, designated by the employer, who is capable of identifying existing and predictable hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them. Shall have undertaken where appropriate practical training and / or on the job assessment.                           |
| OSHA Standards                 | An Occupational Safety Health Administration (OSHA) standard is a regulatory requirement to serve as criteria for measuring whether employers are in compliance with the OSH Act laws. OSHA standards are published in Title 29 of the Code of Federal Regulations.   |
| Safety Management System (SMS) | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard  |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | NEOM Co Safety Management System               |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code  | Document Name  |
|----------------|--|
| NEOM Element 2 | Risk and Opportunity Management                      |
| NEOM Element 3 | Control of Documented Information & Legal Compliance |

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health Safety and Fire Safety requirements for Contractors     |
| NEOM-NLF-NMS 006.01         | SMS Organisation, Practitioner Registration and Appointment of Contractor |
| NLF-NMS 006.002-CPP         | Occupational Health and Safety Construction Management Plan               |
| NEOM-NLF-NMS-006.003        | Scaffolding   |
| NEOM-NLF-NMS 006.07         | Working at Heights  |
| NEOM-NLF-NMS-006.015        | Powered Lift Trucks   |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                       |
| NEOM-NLF-NMS-006.031        | Steel Erection  |
| OSHA 29 CFR 1910.23         | Ladders   |
| BS EN131 – 2018             | Ladders (Professional)  |
| BS EN131                    | Ladders (Professional) 2018 or equivalent                                 |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 Client General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF -SM – Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6 Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.

## **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities
- 7.2.2 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Safer access systems – e.g., Scaffolding, and elevating work platforms – are used as a first resort and use ladders only if these other systems are not reasonably practicable; (NEOM-NLF-NMS-006.015 Powered Lift Trucks)
  - (b) Ladders shall be appropriate for the task and in good working condition;
  - (c) All work with ladders is appropriately planned, organized, and appropriately supervised;
  - (d) Those involved in use of ladders are trained and competent;
  - (e) Ladders are inspected on a regular basis by a competent person.

## **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF -SM – Safety Management Manual - Roles and Responsibilities:
- 7.3.2 Specific responsibilities include:
  - (a) Carrying out a pre-use check
    - I. the person using the ladder shall inspect it before each use to make sure that it functions correctly and has not deteriorated during use, storage, or transportation
    - II. After something has changed, i.e., a ladder dropped, or moved from a dirty area to a clean area (check state or condition of feet)
- 7.3.3 Shall report any activity or defect relating to ladders which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.4 Shall use appropriate equipment or safety devices provided, to use with ladders, by the Contractor in accordance with any training or instruction received in the use of the work equipment.

## **7.4 Specific Responsibilities**

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.4.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Design**

- 8.1.1 Ladders and stepladders must be designed for heavy duty or industrial use, (not domestic) and must have product conformity certification to a recognized international standard, such as BS EN131 – Ladders (Professional) 2018, OSHA 29 CFR 1910.23 or equivalent.

### **8.2 Planning and Assessment**

- 8.2.1 Ladders can be used for work at height when an assessment of the risk for carrying out a task has shown that using equipment offering a higher level of fall protection is not justified because of the low risk and short duration of use, or there are existing workplace features which cannot be altered. Contractor shall ensure the following:
- That an inspection of each site or operation is conducted to ensure that the suitability and use of ladders is assessed using risk management practices as required (Refer: NEOM ELEMENT 2 Opportunity & Risk Management and NEOM-NLF-NMS 006.07– Working at Heights)
  - That where risks are identified safe systems of work are established which are safe to all persons who could be affected by the work.
  - That effective procedures and control measures are in place which are implemented to manage ladder activities;
  - That for the Building and Construction Sector the safe management of ladder general requirements are included in the Pre-Tender Safety and Health Plan in accordance with NEOM-NLF-PRC-006 – Occupation safety health and Fire Safety Requirements for Contractors;
  - That associated safe systems of work, and site rules are outlined in the Occupational Safety and Health Construction Management Plan CPP -NEOM-NLF-NMS 006.02

### **8.3 Selecting Portable Ladders**

- Ladders must be fit for purpose;
- Industrial rated, (do not use domestic ladders);
- Be able to extend at least 1 meter higher than the highest level that needs to be accessed;
- Capable of supporting the greatest load to be imposed;
- No longer than the lengths specified in table four (4) below:

*Table 4 : Maximum Lengths of Ladders*

| Metal Ladders and Reinforced Plastic Ladders  | Wooden Ladders  |
|---|---|
| <ul style="list-style-type: none"><li>• 6.1 meters for an industrial stepladder;</li><li>• 9 meters for a single industrial ladder;</li><li>• 15 meters for an industrial extension ladder.</li></ul> | <ul style="list-style-type: none"><li>• 5.5 meters platform stepladder;</li><li>• 5.5 meters industrial pole ladder</li></ul> |

## **8.4 Stepladders**

- 8.4.1 Ensure that stepladders are used in the fully open position.
- 8.4.2 Employees can carry out work that requires the simultaneous release of both hands from the stepladder only under the following circumstances:
  - (a) The working height is limited to accessing the ceiling or soffit of the floor above which the stepladder is positioned, or to 1.8 meters as a maximum height;
  - (b) The person and the stepladder are to remain stable throughout the period of work;
  - (c) The person is to have the use of both hands to grip the stepladder when ascending and descending the ladder;
  - (d) Except for stepladders incorporating an appropriately guarded work platform, the person does not work above the third step from the top of the stepladder;
  - (e) The nature of the work allows the person to lean forward towards the stepladder;
- 8.4.3 Where the work involves hand tools:
  - (a) The tools are used as intended in their normal operating position;
  - (b) Tool use does not negate guarding or other safety features on the tools;
  - (c) All tools are supported by the person undertaking the task (e.g., In a tool belt or tool bag) and are not supported from the stepladder, unless designed for the purpose;
  - (d) The tools, and the way they are used, do not cause the centre of gravity of the person operating them to be shifted from the stable position of leaning towards the stepladder;
  - (e) The tools are relatively lightweight.
- 8.4.4 The nature of the work and the position of the stepladder, does not require the person to overstretch;
- 8.4.5 The work does not cause fatigue – it is of short-term duration and conducted in an ergonomic manner;
- 8.4.6 Where the above cannot be complied with Contractor shall ensure stepladders are not used and shall adapt a more appropriate means of access for the work.
- 8.4.7 Contractor shall consider step platforms as an alternative to stepladders where the task involves extended periods of working at height or involves high risk working such as welding or other forms of hot work.
- 8.4.8 Contractor shall ensure step platforms are used on a firm and level surface and are well maintained in accordance with the manufacturer's instructions.
- 8.4.9 Contractor shall ensure that all employees involved in the use of step platforms are given specific instructions on their erection, movement, use and inspection.

## **8.5 Other Hazards / Controls**

- 8.5.1 Where ladders or stepladders are being used outside, they are not used in the event of high winds or inclement weather;
- 8.5.2 Before ladders are used, they are inspected, and that procedures and control measures are implemented to remove defective or damaged ladders from service;
- 8.5.3 Ladders are not used near the edge of an open floor, penetration, or on scaffolding to gain extra height;

- 8.5.4 Ladders are not set up in a passageway, doorway, driveway, or other place where a person, vehicle or crane lifted load might strike it to cause instability or its collapse;
- 8.5.5 Where ladders are set up in a public place appropriate control measures are implemented to protect the public and that ladders are removed when not in use even for short periods of time;
- 8.5.6 Where a ladder is left unattended signs are provided warning against unauthorized use of the ladder;
- 8.5.7 Tools and materials are not carried by hand when climbing ladders, tools and materials which cannot safely be secured on the employees' belt are to be independently transferred or hoisted to the work location;
- 8.5.8 Work from ladders is not carried out directly over people;
- 8.5.9 Overhead power lines or other overhead hazards shall be identified;
- 8.5.10 Ladders are used by one person at a time;
- 8.5.11 Ladders are not modified or used for any other purposes than those designed for;
- 8.5.12 Employees are issued with and wear slip resistant appropriate footwear when using ladders;
- 8.5.13 The combined weight of person plus tools when using a ladder does not exceed 120 kg unless the ladder is designed for such a load as recorded in the ladder manufacturer's instructions.

## **8.6 Setting up Ladders**

- 8.6.1 Contractor shall decide so that heavy ladders (weighing over 20 kg) are handled by at least 2 employees.
- 8.6.2 Ensure ladders are set up so that:
  - (a) Their slope is between 70 degrees and 80 degrees (1 meter horizontally for every 4 meters vertically is ideal);
  - (b) They extend at least 1 meter past the highest point that needs to be accessed;
  - (c) Their base and top are firmly secured by fixing or tying, or by another employee holding the base or top;
  - (d) Ties at the base or top of a ladder are attached to the stiles of the ladder, not the rungs;
  - (e) If necessary, road and pedestrian traffic controls are implemented, doors are locked etc.;
  - (f) Rungs are clean before the ladder is used.
- 8.6.3 Ensure there is appropriate, stable, non-slippery and level support for the base of a ladder. If the ground is soft or uneven, wide planks shall be considered as a base.
- 8.6.4 Implement control measures so that the base of a ladder is not in a pedestrian or road traffic area, or next to a door or gate, unless there are appropriate control measures are implemented.
- 8.6.5 Implement control measures so that the top of single and extension ladders are supported by a structure that is strong enough to bear the loads.
- 8.6.6 When adjusting the height of an extension ladder Contractor shall implement control measures so that people are:
  - (a) Not positioned on the ladder;
  - (b) Not reaching through the ladder; and
  - (c) Careful to avoid injury from sliding guides and other components.

8.6.7 Before climbing an extension ladder after the height has been adjusted Contractor shall implement control measures so that the user must look to make sure that the locking mechanism is appropriately engaged.

## **8.7 Securing Ladders at the Base**

8.7.1 Ensure the following for all ladders 3 meters in length or longer where the ladder is secured at the base:

- (a) When ladders are erected against a structure, ladders are secured at the base before any person ascends them;
- (b) The base rope is to be secured to the structure and the tail of the base rope is tied off to the other stile;
- (c) An appropriate warning device, such as a flag, is to be attached to the rope between the ladder and the structure; and
- (d) If a ladder cannot be secured with the base rope, a person shall steady the base of the ladder to prevent it from slipping.

## **8.8 Securing Ladders at the Top**

8.8.1 Contractor shall ensure the following for all ladders 3 meters in length or longer where the ladder is secured at the top:

- (a) A ladder is to be secured at its top with a rope to the stile and the tail of the rope is to be tied off to the other stile. This is to be done before work from the ladder commences or before people move from the ladder to the structure. While the ladder is being secured a person shall steady the base of the ladder to prevent it from slipping;
- (b) When a ladder is secured at its top it is no longer necessary for a person to steady the ladder base;
- (c) If a ladder cannot be secured at its top, a person shall continue to steady the base of the ladder to prevent it from slipping. In these circumstances, the base is to be also secured with a rope if reasonably practicable;
- (d) A person steadyng a ladder shall firmly grasp the stiles with both hands to prevent any movement or overturn of the ladder.

## **8.9 Using Ladders**

8.9.1 Contractor shall ensure that:

- (a) The decision to use ladders is not governed by time or cost factors but based on the best available means of access for the work in hand;
- (b) A ladder is used for vertical access only, a ladder shall not be used in a horizontal position as a platform, runway, or scaffold;
- (c) Portable ladders shall be placed to prevent slipping, or shall be lashed, or held in position;
- (d) Ladders are not placed on boxes, barrels, or other unstable bases to obtain additional height;
- (e) A ladder is not used if employees need to place their feet higher than the third highest rung;
- (f) A ladder is not used to gain height above the protected edge of a scaffold or an elevating work platform;
- (g) Only one person at a time uses a ladder. If a ladder's base or top is being held by an employee, that employee shall not do other work while there is a person on the ladder;

- 8.9.2 No person shall be on a ladder when it is being moved to a new work location;
- 8.9.3 When climbing or descending a ladder, employees:
- (a) Shall face the normal climbing side of the ladder;
  - (b) Shall always have at least three limbs in contact with the ladder (e.g., Both hands 1 foot, or 1 hand and both feet);
  - (c) Shall grip the stiles or rungs;
  - (d) Shall not carry objects/materials in their hands.
- 8.9.4 Tools are to be carried in a tool belt, holster, or pouch, not in the hands;
- 8.9.5 While on a ladder, employees:
- (a) Shall not to “walk” the ladder (“walk” means cause the ladder to move by moving one’s body at the top of the ladder, thus lifting the ends of the stiles alternately);
  - (b) Shall not to climb so that their feet are higher than the third highest rung;
  - (c) Shall not to reach to either side or away from the ladder, except to hold a stable supporting structure.

## **8.10 Working near Electrical Equipment**

- 8.10.1 Contractor shall ensure that metal ladders or wire-reinforced ladders are not used for work:
- (a) On or near low voltage (110 volts. Or greater) electrical conductors;
  - (b) Within 6 meters of live 1500 volts. Overhead power supplies or high voltage equipment;
  - (c) If there are live electrical conductors nearby, where the conductor could move due to wind load, or the ladder could move due to swaying so that safe distances are not maintained; and
  - (d) Near electrical equipment that needs an electrical work permit

## **8.11 Using Fall Arrest Equipment**

- 8.11.1 Contractor shall consider the following as additional safety precautions when work is being carried out from ladders:
- (a) If an employee accesses a height of more than 2 meters, an appropriate harness and safety line is provided;
  - (b) When working from a ladder accessing a pole (for example telecommunications) a pole strap is provided and used.
- 8.11.2 Fall Arrest Systems shall be used in accordance with NEOM-OSH-GF – NMS 23.0 – Working at Heights, and NEOM-NLF-NMS-006.021 Personal Protective Equipment (PPE)

## **8.12 Care and Maintenance**

- 8.12.1 Contractor shall ensure the correct care and maintenance of ladders by adherence to the following:
- (a) Avoid dropping ladders or damaging them in any other way. Damage to the stiles can weaken the ladder and/or cause a hand injury hazard from splinters;
  - (b) Shall ensure ladders are stored in an appropriate place and ensure that access to ladders is restricted to only authorized persons;

- (c) When cleaning ladders care shall be taken to ensure that neither the substance to be removed nor the solvent damages the ladder. Consideration shall be to the lacquer coating required to maintain the insulating properties of the ladder and to prevent decay of the timber;
- (d) Wooden ladders shall not to be painted. If a preservative is used it is to be transparent during the life of the ladder to enable visual inspections to detect deterioration;
- (e) Ladders shall always be maintained in good condition, the joint between the steps and side rails shall be tight, all hardware and fittings securely attached, and the movable parts shall operate freely without binding or undue play;
- (f) All wood parts shall be free from sharp edges and splinters; sound and free from visual failure, decay, or other irregularity. Low density wood shall not be used;
- (g) Ladders shall not be tied or fastened together to provide longer sections. Ladders shall be equipped with the hardware fittings necessary for support and extension;
- (h) Frayed or badly worn rope shall be replaced;
- (i) Safety feet and other equipment shall be kept in good condition to ensure appropriate performance;
- (j) Ladders with broken or missing steps, rungs, or cleats, broken side rails, or other faulty equipment shall not be used. Improvised repairs shall not be made;
- (k) Rungs shall be kept free of grease and oil.

### **8.13 Inspection and Testing**

- 8.13.1 Contractor shall develop an appropriate inspection program to ensure ladders shall be inspected frequently and those with defects shall be withdrawn from service for repair or disposal and tagged or marked as "Dangerous, Do Not Use".
- 8.13.2 As a minimum, Contractor shall ensure a daily user inspection is carried out for all ladders and a weekly formal inspection shall be undertaken and documented.
- 8.13.3 Contractor shall consider the use of inspection tags fixed to each ladder. The inspection tag can be used to record the following information:

### **8.14 Acceptance Inspection**

- 8.14.1 Contractor shall inspect ladders on initial receipt to make sure they are fit for purpose.
- 8.14.2 A sticker showing the date of receipt and the inspection carried out is to be affixed to the ladder. Contractor shall make sure that the inspection and marking is carried out correctly.

### **8.15 Before Each Use**

- 8.15.1 Contractor shall ensure that the person using the ladder inspects it before each use to make sure that it functions correctly and has not deteriorated during storage or transportation. The inspection is to include checks for:
  - (a) Cracks or other damage to the rungs or treads;
  - (b) Contamination of the rungs or treads with grease, oil or chemicals, cracks, or damage to the stiles;
  - (c) Unauthorized repair or modification to any part of the ladder;
  - (d) Corrosion of any part of the ladder due to chemicals;
  - (e) Cuts or other damage resulting in metal splinters;
  - (f) Loose rivets, joints, nuts, and bolts;

- (g) Damage to hinges;
- (h) Damaged or missing feet;
- (i) The condition of any ropes to be used with the ladder.

## **8.16 After Incidents**

- 8.16.1 Contractor shall ensure that if a ladder is involved in any form of incident, has been dropped or suffered any impact, it is to be inspected, and where necessary tested, to make sure it remains fit for purpose. Any damage is to be repaired before the ladder is used. If repair is not reasonably practicable, the ladder is to be removed from service, marked accordingly (using a caution tag) and disposed of.
- 8.16.2 Contractor shall ensure that only serviceable ladders are available for use.

## **8.17 Record Keeping**

- 8.17.1 Contractor shall maintain records in accordance with NEOM-ELEMENT 3 Control of Documented Information & Legal Compliance
- 8.17.2 Contractor shall keep records of tests, maintenance, inspections carried out on ladders

## **8.18 Training and Competency**

- 8.18.1 Contractor shall ensure that OSH training complies with the requirements of:
  - (a) NEOM-Element 5 – Training, Awareness and Competency.
  - (b) NEOM-NLF-NMS 006.001 – SMS Organisation, Practitioner Registration and Appointment of Contractor
- 8.18.2 Contractor shall ensure personnel required to implement the requirements of this NMS are trained in the use of ladders and understand the risks associated with using the ladders and the control measures are implemented by the employer.
- 8.18.3 Training shall be to an internationally recognised standard, such as that provided by the Ladder Association or equivalent. Those who provide training should be able to demonstrate that their training activity – facilities, equipment, instructor qualifications and CPD, instructor / trainee ration and course content are subject to independent assessment and ongoing audit by a recognised lead industry body, such as the Ladder Association or equivalent.
- 8.18.4 Training for employees shall be competency-based and include:
  - (a) Systems of work needed for the safe use of ladders;
  - (b) Types and selection of correct ladders;
  - (c) Use of ladders;
  - (d) Fall protection equipment; and
  - (e) Storage, care, maintenance, and inspection of ladders.
- 8.18.5 Contractor shall conduct additional retraining whenever a periodic inspection reveals, or there is reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of ladders or procedures.
- 8.18.6 Contractor shall maintain a record of the required training that contains the following information:
  - (a) Name and ID number;
  - (b) Subject(s) of training;
  - (c) Dates(s) of training;
  - (d) Person(s) providing the training.

## 9 Appendices

### 9.1 Appendix A: Forms, Signs and Checklists

# Ladder Safety

A third of all reported fall from height incidents involve ladders and step ladders; this accounts for 14 deaths and 1,200 major injuries to workers each year. Many of these injuries are caused by inappropriate or incorrect use of the equipment.

**Legislation**  
The Work at Height Regulations 2005 states for all work at height where there is a risk of a fall which could cause personal injury:  
That place duties on employers, the self-employed and any person who carries the work or controls their workplace regarding best practice must be assessed.  
Falls from height remain the single biggest cause of workplace deaths and one of the main causes of major injury.

**Do's**

Only use a ladder or stepladder:

- In a safe environment
- At a firm level base
- When you have inspected it before use
- Lean at approximately 75° from horizontal
- For light work
- Where you can maintain 3 points of contact (hands or feet)
- For a maximum of 30 minutes

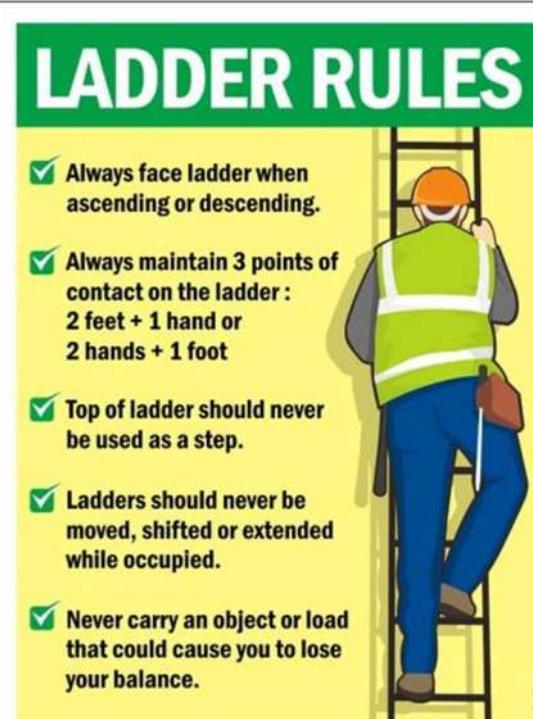
**Don'ts**

On a ladder or stepladder do not:

- Overload it or carry loads on ladders
- Overshoot
- Have more than one person on a ladder at one time
- Stand ladders on movable objects or uneven ground
- Extend ladders whilst standing on rungs
- Use the top two steps on either a ladder or a stepladder

**For more information contact**

Name: \_\_\_\_\_  
Phone No: \_\_\_\_\_  
Email: \_\_\_\_\_  
Org: \_\_\_\_\_



## **9.2 Appendix B: Audit Criteria**

### 9.3 Appendix C: Guidance Information

OSHA 29 CFR 1910 Subpart D sets requirements for the safe use of Ladders. OSHA requirements include the following

- Occupational Safety and Health Administration. Fixed ladders: fall protection must be provided for employees climbing or working on fixed ladders above 24 feet. 29 CFR 1926.1053 (a) (19) states that fall protection must be provided whenever the length of climb on a fixed ladder equals or exceeds 24 feet.
- OSHA ladder inspection requirements are specified in their safety standards. 1926.1053 (b) (2)
  - Ladders shall be maintained free of oil, grease, and other slipping hazards.
- Job-made wooden ladders are permissible, if constructed according to OSHA and ANSI specifications. Must be constructed to ANSI A14.4-2009 standard. Standard contains very specific requirements for type of materials to use, as well as spacing and limitations.

OSHA also has requirements in 29 CFR 1926. Subpart X which are extensive and cover requirements from the use of step ladders through to load ratings.

In the UK the HSE have in place the Work at Height Regulations 2005 which have many requirements regarding the safe use of ladders.

Free to download from the HSE web site is Publication INDG 401 (Rev 2) which gives information and guidance for Working at Height including safe use of ladders





نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
POWERED LIFT TRUCKS**

NEOM-NLF-NMS-006.015 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with the use of Powered Lift Trucks.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross Reference Table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

It sets out the requirements for the use of Powered Lift Trucks including:

- Forklift Trucks
- Rider Trucks
- Motorized or Powered Hand Trucks
- Pallet Trucks and Tugs

*Not included are farm vehicles or vehicles intended primarily for earth moving or over-the-road hauling*

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with the work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities.

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with those set by another regulatory authority, Contractors are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions  |
|--------------------------------|--|
| NEOM Co                        | NEOM Company   |
| Client                         | NEOM Sector /Department responsible for management and oversight of the Contractor   |
| Employer                       | The person or organisation that employs personnel to complete the work   |
| Contractor                     | The organisation contracted to carry out the works   |
| Powered Industrial Truck       | An industrial vehicle used to carry, push, pull, lift or stack material that is powered by an electric motor or an internal combustion engine. |
| Rated Capacity:                | The maximum weight that the truck is designed to lift as determined by the manufacturer.   |
| Safety Management System (SMS) | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard                                       |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| ACOP          | Approved Code of Practice                      |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code  | Document Name  |
|----------------|--|
| NEOM Element 2 | Risk and Opportunity Management                      |
| NEOM Element 3 | Control of Documented Information & Legal Compliance |

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM-Element 5              | Training, Awareness and Competency.   |
| NEOM-Element 6              | Contractor Management   |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                    |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors       |
| NEOM- NLF-NMS-006.001       | Organisation, Safety Practitioner Registration and Appointment of Contractor. |
| NEOM-NLF-NMS-006.002        | Occupational Health and Safety Construction Management Plan (CPP)             |
| NEOM-NLF-NMS 006.004        | Permit to Work Systems  |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards  |
| NEOM-NLF- NMS 006 013       | Safety Signs and Signals.   |
| NEOM-NLF-NMS-006.017        | Plant and Equipment   |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)   |
| NEOM-NLF-NMS 006.024        | Occupational Health Screening and Medical Surveillance                        |
| NEOM-NLF-NMS- 006.032       | Traffic Management and Logistics.   |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6 - Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;

- (b) Managing change;
- (c) Continuous improvement.

## 7.2 Contractor

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM–NLF-SM – Safety Management Manual -Roles and Responsibilities
- (a) Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competency).
  - (b) That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work
  - (c) Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks. (Refer: NEOM Element 2 Risk and Opportunity Management)
  - (d) That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available. (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
  - (e) Maintain control of access to dangerous or high-risk areas or equipment using suitable barricades and Signage that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.2 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
- (a) That all persons who are required to use a powered lift truck are trained, competent and licensed to do so.
  - (b) Ensure that a system is implemented to prevent untrained employees from using powered lift trucks.
  - (c) That all powered lift trucks are maintained and inspected in line with legal and manufacturers requirements. (Refer: NEOM-NLF-NMS-006.017 Plant and Equipment)
  - (d) So far as is reasonably practicable, separate the movements of pedestrians and powered lift trucks
  - (e) That all traffic routes are safe and in accordance with the requirements of NEOM-NLF-NMS-006.032 – Traffic Management and Logistics.

## 7.3 Employee

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NLF-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Employee shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Shall only use powered lift trucks that they have been trained in the use of and are authorized to use by the Contractor.
  - (b) Shall only use powered lift truck for the tasks they have received training in and shall not undertake any task that the lift truck is not appropriate for.
  - (c) Shall ensure that any defect on the powered lift truck is reported immediately and the truck taken out of service until such times as a competent engineer has inspected the lift truck and declared it fit for use.
  - (d) Shall ensure that they immediately report any hazard or information that may affect, adversely or otherwise, the works being undertaken.
  - (e) Employees shall not undertake any type of repair unless competent and authorised by the Contractor.

#### **7.4 Specific Responsibilities**

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.4.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

### **8 Other Sections related to subject**

#### **8.1 Training and Competency**

- 8.1.1 Contractor shall ensure that training complies with the requirements of:
  - (a) NEOM-Element 5 – Training, Awareness and Competency;
  - (b) NEOM- NLF-NMS-006.001 –SMS Organisation, Practitioner Registration and Appointment of Contractor.

- 8.1.2 Specific training programs are to be developed for each different type of lift truck.
- 8.1.3 Operators of powered lift trucks shall hold the appropriate vehicles operator's license as required by the Police Traffic Department.
- 8.1.4 Training shall include a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video, written material), practical training (demonstrations performed by the trainer, and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.
- 8.1.5 Operator training and evaluation shall be conducted by competent persons, certified by an independent third party, who have the knowledge, training, and experience to train powered industrial truck operators and evaluate their competence, meeting the requirements of NEOM-Element 5 Training, Awareness, and Competence.
- 8.1.6 Training on Lift Trucks shall include three stages:
- (a) **Basic** – the basic skills and knowledge required to operate the powered industrial truck;
  - (b) **Specific** – operating principles and controls of the truck, use of the truck in work specific conditions and the type of work to be undertaken; and
  - (c) **Familiarization** – application of skills learned under normal conditions, with close supervision by a competent person / trainer.
- 8.1.7 The training program shall incorporate a complete presentation of issues and information on powered industrial truck operations as prescribed by the Regulatory Authority, regarding:
- (a) The truck(s) to be operated;
  - (b) Their operation and limitations; and
  - (c) Workplace related topics.
- 8.1.8 Refresher training in relevant topics shall be provided to the operator when:
- (a) The operator has been observed to operate the vehicle in an unsafe manner;
  - (b) The operator has been involved in an incident or near-miss incident;
  - (c) The operator has received an evaluation that reveals that the operator is not operating the truck safely;
  - (d) The operator is assigned to drive a different type of truck;
  - (e) A condition in the workplace changes in a manner that could affect safe operation of the truck;
  - (f) As required by risk assessment and/or legal requirements.
- 8.1.9 An evaluation of each powered industrial truck operator's performance shall be conducted at least once every year.
- 8.1.10 A record the training and evaluation required by this section shall be maintained. The record shall include;
- (a) The name and ID number of the operator;
  - (b) The date of the training;
  - (c) The date and results of the evaluation; and
  - (d) The identity of the person(s) performing the training or evaluation.
- 8.1.11 Training records required by this section are to be maintained by the Contractor for the duration of employment plus 1 year.

## 8.2 Operator Selection

- 8.2.1 Ensure that all persons selected to operate powered lift trucks are medically fit to do so and have shown a reliable and mature attitude to work.
- 8.2.2 Ensure appropriate medical screening prior to authorizing any person to use a powered lift truck. The minimum checks are highlighted in Table 4. Refer to NEOM-NLF-NMS 006.024 – Occupational Health Screening and Medical Surveillance for further information on medical screening.

*Table 4 Minimum Health Screening Checks Prior to Authorisation to Operate a Powered Lift Truck*

| Issue                | Reasoning  |
|----------------------|--|
| Health questionnaire | To identify any pre-existing condition which may affect the ability to operate a lift truck safely; to identify any medication which is taken which may affect the ability to operate a lift truck safely.                                       |
| Eyesight testing     | Eyesight shall comply with the Group1 standard, which is the ability to read a vehicle license plate at a distance of 20.5 meters. Complete field of vision and good depth perception are also required.   |
| Blood pressure       | Raised blood pressure increases the risk of heart disease and stroke.  |
| Mobility             | Operators shall have appropriate flexibility and mobility to enable them to look behind them and to maintain good control over the vehicle.  |
| Height/weight        | Being very overweight may restrict mobility and may also make it difficult to operate the lift truck comfortably.  |
| Hearing              | Appropriate hearing may be required to ensure that the operator is able to hear warning shouts or alarms. Good conversational hearing will usually be considered appropriate, but audiometry may be conducted where there are specific concerns. |

## 8.1 Planning and Assessment

- 8.1.1 Risk Assessment shall be carried by a Competent Person to evaluate each Site or Operation to determine any hazards present in relation to the use of powered lift trucks (Refer: NEOM-Element 2 – Risk and Opportunity Management)
- 8.1.2 That effective procedures and control measures are developed and implemented for management of the hazards; (Refer: NEOM-NLF-NMS 006.004 – Permit to Work Systems)
- 8.1.3 The Risk Assessment shall be carried out in consultation with the person in control of the work and communicated to Operators responsible for carrying out the work

## 8.2 Powered Lift Trucks

- 8.2.1 Only industrial trucks approved for the class of hazard shall be operated in hazardous locations.
- 8.2.2 Powered industrial trucks used in the workplace shall be in good condition, well maintained and appropriate for the type of service required. (Refer: NEOM-NLF-NMS-006.017 Plant and Equipment)
- 8.2.3 If at any time a powered industrial truck is found to be defective or in need of repair, or in any way unsafe, it shall be removed from service until it has been restored to safe operating condition in accord with the manufacturer or supplier's requirements;
- 8.2.4 Modifications shall not be made to the powered lift truck without prior written approval from the manufacturer. Capacity, operation and maintenance instruction plates, tags or decals shall be updated to reflect any changes.
- 8.2.5 Fuel tanks shall not be filled when the engine is running. No truck shall be operated with a leak in the fuel system until the leak has been corrected.
- 8.2.6 Open flames shall not be used to check the level of fuel in fuel tanks or the level of electrolyte in storage batteries.
- 8.2.7 Powered lift truck batteries shall be stored, and changed by competent trained person(s), in accordance with both the vehicle and battery manufacturer requirements.
- 8.2.8 Attachments shall not be fitted to fork trucks unless appropriate for the type of truck and loads carried. Fitting of attachments may alter the rating and stability of the lift truck.
- 8.2.9 Contractor shall ensure that powered industrial trucks are operated in compliance with the following operating procedures.
  - (a) Industrial trucks shall be inspected by the operator before each use or each shift, whichever is greater;
  - (b) That a written checklist for the inspection is developed. The checklist shall specify the specific truck inspected and the appropriate inspection items for that class of truck;
  - (c) Completed checklists shall be maintained for a period of one year.
- 8.2.10 Unauthorized personnel shall not be permitted to ride on powered industrial trucks. A safe place to ride shall be provided where riding of trucks is authorized;
- 8.2.11 When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, keys removed, and brakes set. Wheels shall be blocked if the truck is parked on an incline;
- 8.2.12 A powered industrial truck is unattended when the operator is 10 meters or more away from the vehicle which remains in view with the brakes set and the load engaging means left in a safe condition, or whenever the operator leaves the vehicle, and it is not in view;
- 8.2.13 There is to be appropriate headroom under overhead installations, lights, pipes, sprinkler system, etc.;
- 8.2.14 An overhead guard shall be used as protection against falling objects. It shall be noted that an overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load;
- 8.2.15 Powered lift trucks shall be fitted with:
  - (a) Audible and visual reverse alarms; and
  - (b) Appropriate mirrors (rear view and wing);
  - (c) Appropriate headlights if required to work in reduced visibility conditions;

- 8.2.16 The driver shall be required to look in the direction of, and keep a clear view of the path of travel;
- 8.2.17 All traffic regulations shall be observed, including authorized workplace speed limits. A safe distance shall be maintained, approximately three truck lengths, from the truck ahead, and the truck shall be always kept under control;
- 8.2.18 Under all travel conditions the truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner;
- 8.2.19 Brakes shall be set, and wheel blocks shall be in place to prevent movement of trucks, trailers, or railroad cars while loading or unloading. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks, trailers, and railroad cars shall be checked for breaks and weakness before they are driven onto;
- 8.2.20 Dock board or bridge plates shall be appropriately secured before they are driven over. Dock board or bridge plates shall be driven over carefully and slowly, and their rated capacity never exceeded;
- 8.2.21 Powered lift trucks shall not be used for lifting people to and from a height unless authorized and appropriate fit for purpose attachments are fitted to the truck;
- 8.2.22 Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-centre loads which cannot be centred; and
- 8.2.23 Only loads within the rated capacity of the truck shall be handled.

### **8.3 The Working Area**

- 8.3.1 So far as is reasonably practicable ensure, that pedestrians are separated from vehicle routes through the provision of physical barriers. Physical barriers shall be of appropriate construction and strength to withstand collision from a lift truck and continue to provide a safe route, (Refer: NEOM-NLF-NMS 006.012 – Barricading of Hazards).
- 8.3.2 Ensure that all powered lift trucks are fitted with audible and visual warning devices to ensure that pedestrians are aware of their presence.
- 8.3.3 Where it is not reasonably practicable to segregate through physical barriers, the Contractor shall ensure that pedestrian routes are clearly marked and employees who are required to use these walkways are fully aware of the hazards.
- 8.3.4 Ensure that all areas where lift trucks are working are appropriate and safe for the tasks being undertaken.
- 8.3.5 Ensure that all aisles/passageways or roads where lift trucks are used are kept in good repair, with appropriate safety signage and clearly marked. Safety signage shall follow NEOM-NLF-NMS 006 013 – Safety Signs and Signals.
- 8.3.6 Ensure that the concentration of vehicle emissions is monitored and controlled within the work environment to ensure they are within safe limits

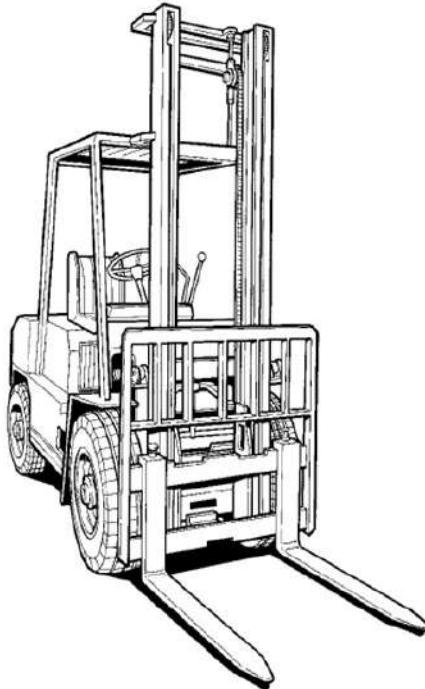
### **8.4 Record Keeping**

- 8.4.1 Appropriate records shall be maintained, including but not limited to:
  - (a) Valid and up to date test and inspection certificates for Powered Lift Trucks undertaken by approved third party;
  - (b) Inspection records shall be maintained on site for a minimum period of one year;
  - (c) Maintenance records shall be maintained on site for the lifespan of the vehicle;

- (d) Training records for operators shall be kept on site for the duration of their employment; and a copy of operator's vehicle operator license shall be kept on site for the duration of their employment. (Refer: NEOM-Element 3 Control of Documented Information & Legal Compliance)

## 9 Appendices

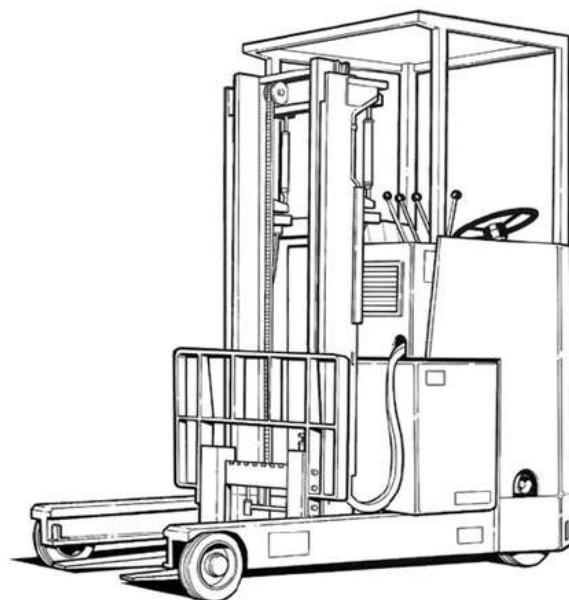
### 9.1 Appendix A: Examples of Powered Lift Trucks and Safety Signs



#### Industrial counterbalance lift truck

This has a counterweight to balance the load on the fork arms. The fork arms and load project out from the front of the machine. Loads can be raised or lowered vertically and the mast may be tilted forwards or backwards up to 15° (but in practice more usually about 5°). This type of lift truck is only suitable for use on substantially firm, smooth, level and prepared surfaces. A wide range of attachments is available.

Figure 1 Industrial counterbalance lift truck



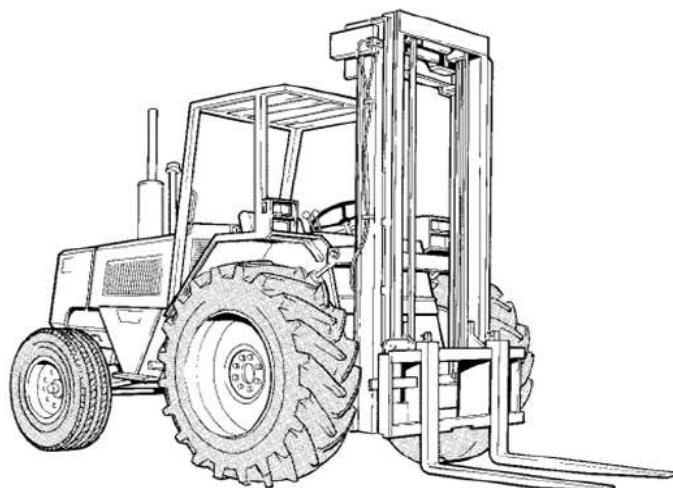
#### Industrial reach truck

This is so called because the mast is moved forwards or reached out to pick up the load. For travelling, the load is reached back and carried within the wheelbase. This allows greater manoeuvrability in areas where space is restricted. This type of lift truck is only suitable for use on substantially firm, smooth, level and prepared surfaces and is particularly used in warehouses.

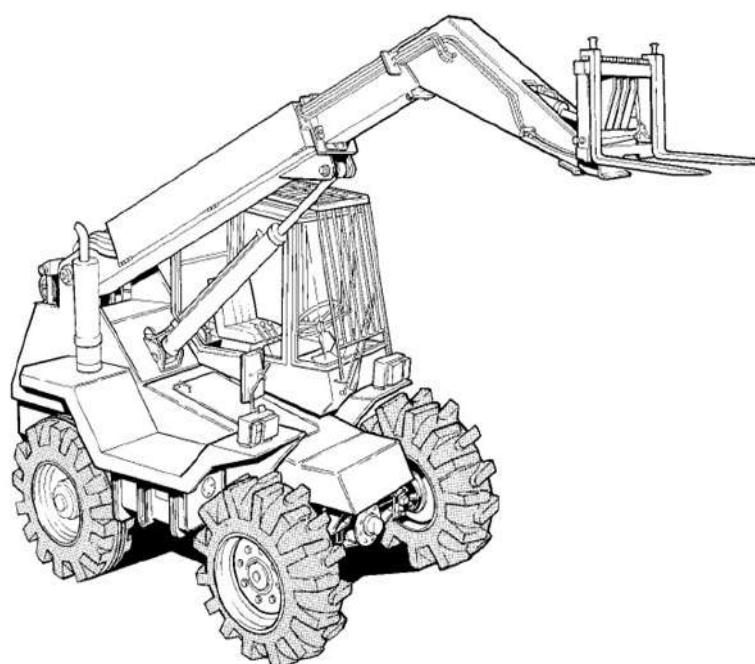
Figure 2 Industrial reach truck

### Rough-terrain counterbalance lift truck

This is similar in design to the industrial counterbalanced lift truck but is equipped with larger wheels and pneumatic tyres, giving it greater ground clearance. It has greater ability to operate on uneven and soft ground and is mainly used in the construction industry and in agriculture. It may be used with a range of attachments.



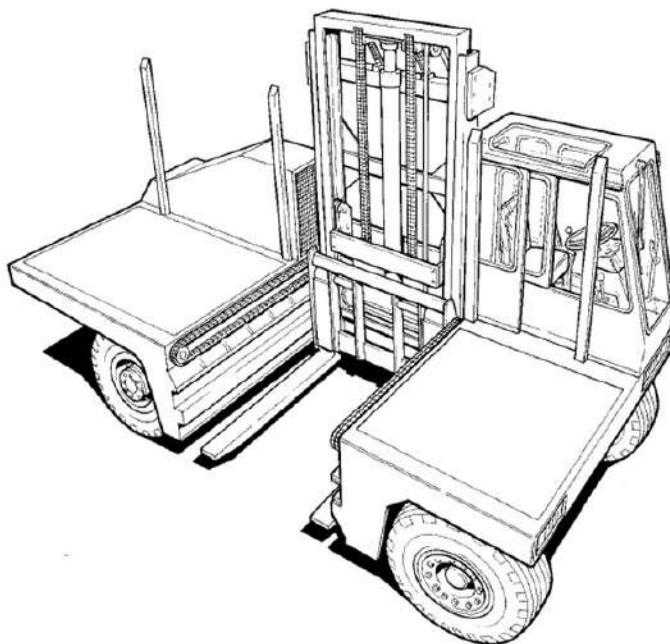
**Figure 3** Rough-terrain counterbalance lift truck



**Figure 4** Telescopic materials handler

### Telescopic materials handler

This is fitted with a boom that is pivoted at the rear of the machine. The boom is raised and lowered by hydraulic rams. In addition, the boom can be extended or retracted (telescoped) to give extra reach or height. These machines may be two- or four-wheel drive, and have two-wheel, four-wheel or crab steering. They are used mainly in agriculture and the construction industry. A range of attachments may be used with them.



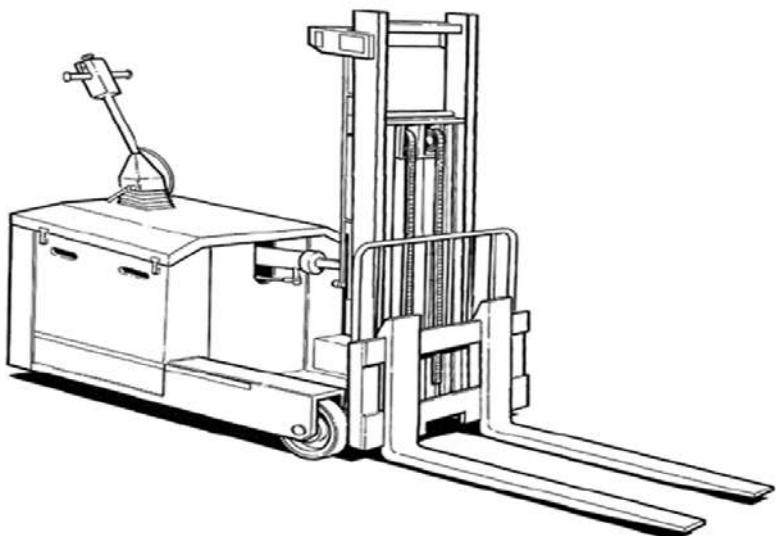
### Side-loading lift truck

The operator is positioned at the front and to one side of the lift truck. The load is carried on the deck, the mast being traversed out sideways to pick up or set down the load. This type of lift truck is used for stacking and moving long loads such as bales of timber and pipes, and may be fitted with stabilisers for use when picking up or setting down loads.

**Figure 5** Side-loading lift truck

### Pedestrian-controlled lift truck

This has a limited lift height, usually not greater than two metres. It may be electrically or manually powered for lifting and for traction. The operator walks with the machine and controls it with a handle.



**Figure 6** Pedestrian-controlled lift truck

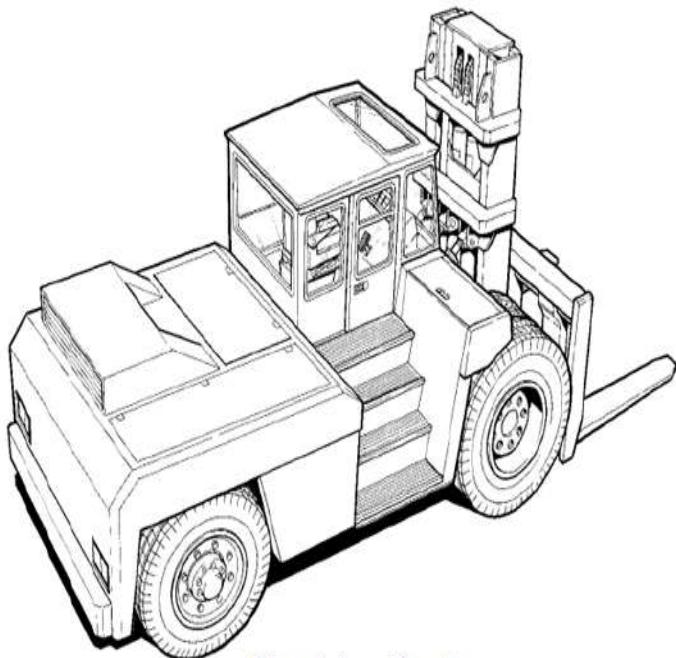
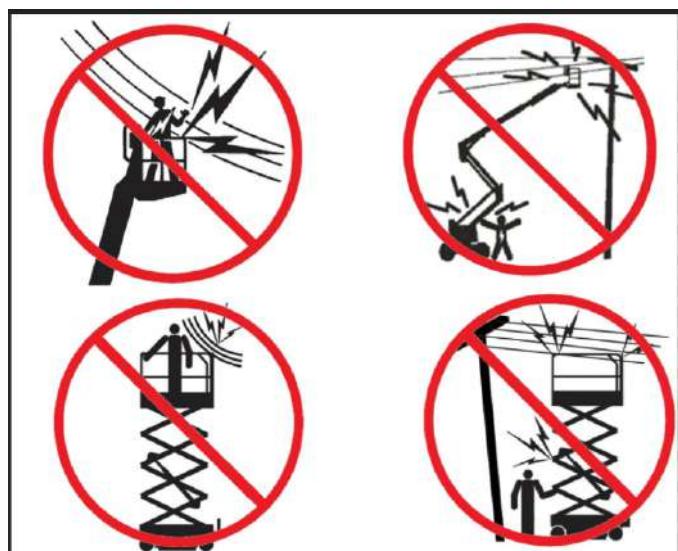


Figure 7 Large lift truck

### Large lift truck

This may be either masted or telescopic, and is often fitted with a spreader for lifting freight containers. The spreader may attach to the side or top of the container. These are specialist lift trucks used mainly in container terminals.



## 9.2 Appendix B: Banksman Instructions


NEOM

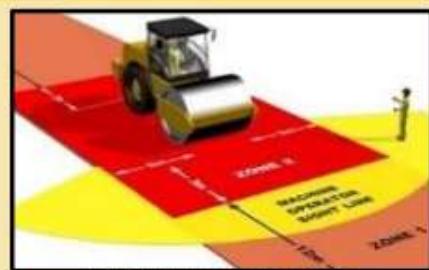
# SAFE WORKING PRACTICE

## FLAGMAM

| Companies Must....  | Flagmen Must....  |                                 |
|---|---|---------------------------------|
| Provide Training  |  | Use the training                |
| Provide PPE  |  | Use the PPE                     |
| Provide Flags or Batons   |  | Use the Tools Correctly         |
| Allow for rest areas  |  | Follow the work / rest schedule |
| Explain heat stress   |  | Follow the Heat stress rules    |

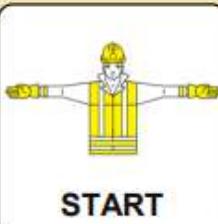
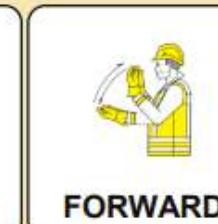
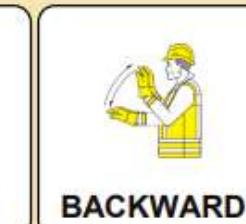
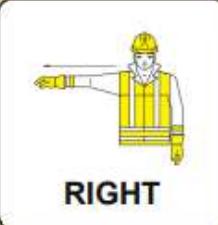
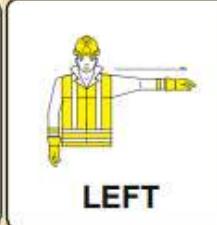
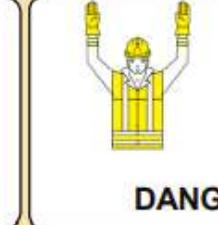
**Flagmen Must ....**

-  Stop work if it is unsafe
-  Maintain Eye contact with the operator
-  Stop pedestrians from entering danger zone
-  Make sure you are standing in a safe place



**KNOW WHERE TO STAND  
TO BE SAFE**

**Hand Signals for Communication....**

|   |  |  |  |  |
|---|--|--|--|--|
| <br><b>START</b> | <br><b>STOP</b> | <br><b>END</b>      | <br><b>FORWARD</b>       | <br><b>BACKWARD</b> |
| <br><b>RIGHT</b> | <br><b>LEFT</b> | <br><b>DISTANCE</b> | <br><b>DANGER / SLOW</b> |                     |

### 9.3 Appendix C: Audit Criteria POWERED LIFT TRUCKS

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria            |                            | Requirements  | Verification | Area of Concern |
|---------------------------|----------------------------|---|--------------|-----------------|
| ISO 45001:2018 Clause     | NMS Ref.                   |   |              | Yes/ No         |
| 5.3                       | 7.1.3                      | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2           | 7.1.4                      | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                       | 7.2.1 (a),<br>8.1<br>8.1.5 | Persons appointed to manage /oversee work operations have the skills, knowledge, and experience   |              |                 |
|                           |                            | Operator training and evaluation shall be conducted by competent persons  |              |                 |
| 8.1.2 (e)                 | 7.2.1(d),<br>7.3.3         | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2        | 7.2.1(c),<br>8.1           | Hazards Identification Plan (HIP)<br><br>Assessment of the various risks shall be undertaken  |              |                 |
| 8.1.1,<br>9.1.1,<br>9.1.2 | 7.2.2 (c)                  | All powered lift trucks are maintained and inspected in line with legal and manufacturers requirements  |              |                 |
| 6.1.4                     | 7.2.2 (e)                  | All traffic routes are safe and in accordance with the requirements of NEOM-NLF-NMS-006.032 – Traffic Management and Logistics  |              |                 |
| 8.1.1,<br>8.1.2           | 8.2.2                      | Ensure appropriate medical screening prior to authorizing any person to use a powered lift truck  |              |                 |
| 8.1.1,<br>8.1.2           | 8.2.1                      | Only industrial trucks approved for the class of hazard shall be operated in hazardous locations  |              |                 |
|                           | 8.2.17                     | All traffic regulations shall be observed, including authorized workplace speed limits  |              |                 |
|                           | 8.3.1,<br>8.3.3            | Ensure, that pedestrians are separated from vehicle routes through the provision of physical barriers and all powered lift trucks are fitted with audible and visual warning devices to ensure that pedestrians are aware of their presence |              |                 |
|                           |                            |   |              |                 |
|                           |                            |   |              |                 |

## **9.4 Appendix D: Guidance Information**

Powered industrial trucks (PITs), also known as forklifts or lift trucks, are important tools in many workplaces. They perform a variety of material handling tasks and can facilitate moving, raising, lowering, or removing heavy or bulky materials or several smaller objects on pallets or in boxes, crates, or other containers. This makes it easier for the employee to move materials. During the movement of materials, there are numerous opportunities for injuries and property damage to occur.

Under Federal Law in the US, all employees who operate a powered industrial truck as part of their job must be at least eighteen (18) years of age and successfully completed either online or classroom training and practical training. It is a violation of Federal law for anyone UNDER 18 years of age to operate a forklift or also, for anyone OVER 18 years of age who is not properly trained and authorized to do so.

OSHA CFR 1910.178 details all safety requirements for fire protection, design, maintenance, and use of fork trucks, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electric motors or internal combustion engines.

This requirement relies heavily on and are required to meet the design and construction requirements for powered industrial trucks established in the "American National Standard for Powered Industrial Trucks, Part II, ANSI B56.1-1969".

CFR 1917.43 and CFR 1915 and 1918 also contain requirements related to this subject which applies to every type of powered industrial truck used for material or equipment handling. The construction standard 1926.602(d), states that the requirements applicable to construction work are identical to those set forth at CFR 1910.178(l) this standard also has specific requirements regarding training.

OSHA compliance information that applies to specific activities related to Powered Lift Trucks is available from OSHA, including Loading and Unloading, Working with Hazardous Materials, and Vehicle Maintenance.

Under UK HSE Executive Guidance is given in the free publication L 117 (ISBN 978 0 7176 6441 2) Rider-operated lift trucks Operator training and safe use. Approved Code of Practice and guidance.

This sets the minimum standard of basic training people should receive before they are allowed to operate certain types of lift truck - even if they only operate the equipment occasionally. It also provides detailed guidance about how they can meet this standard.

The ACOP covers stacking rider-operated lift trucks, including articulated steering trucks. 'Rider-operated' means any truck that can carry an operator and includes trucks controlled from both seated and stand-on positions.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
ELECTRICAL SAFETY**

NEOM-NLF-NMS-006.016 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

|           | Prepared by  | Reviewed by  | Approved by                         |
|-----------|--|--|-------------------------------------|
| Name      | Robert Murphy                                      | Talal Al Anazi   | Adel Al Wuhaib                      |
| Job Title | Loss Prevention Specialist<br>LP/FS -Public Safety | Director, Loss Prevention/Fire<br>Safety (LP/FS) Public Safety | Executive Director<br>Public Safety |

## OUR NEOM VALUES



### CATALYST

Make a difference.  
Create a legacy.



### CARE

Leave the environment  
in a better place.



### CURIOUS

Challenge the norm.  
Stay restless.



### PASSIONATE

Be accountable.  
Finish what you start.



### RESPECT

Be authentic.  
Be true. Be bold.



### DIVERSITY

Embrace cultural  
differences.  
Seek to understand.

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with Electrical Work.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

It establishes the requirements and standards so that the risks associated with electricity can be safely managed.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities involving electricity.

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements.
- (b) ANSI requirements.
- (c) NFPA Standards and requirements.
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions  |
|--------------------------------|--|
| NEOM Co                        | NEOM Company   |
| Client                         | NEOM Sector /Department responsible for management and oversight of the Contractor   |
| Employer                       | The person or organization that employs personnel to complete the work   |
| Contractor                     | The organization contracted to carry out the works   |
| Licensed Contractor            | when used in this NMS refers to a company which has been assessed by the Distribution Company as competent to work on Electrical Installations and issued a Competency License by that Distribution Company.       |
| Owner                          | when used in this NMS refers to the legal owner of a building or property in which an Electrical Installation is installed and connected to a supply of electricity  |
| Customer                       | when used in this NMS refers to the end user of the supply of electricity and may be private or commercial.<br><b>Note:</b> in some cases, an Owner may also be a customer.  |
| Safe System of Work            | A set of documented management and operational processes and procedures which are based on identified hazards, and are designed, as far as reasonably practicable, to prevent Danger.                              |
| Vicinity                       | Used in this document as "work in the Vicinity" shall mean any work activities which may impact, or be impacted by an Electrical System, where such works are being conducted in close proximity to such a System. |
| Safety Management System (SMS) | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard   |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions  |
|---------------|---|
| SMS           | Safety Management System  |
| NMS           | NEOM Minimum Standard   |
| SOP           | Standard Operating Procedure  |
| ANSI          | American National Standards Institute   |
| NFPA          | National Fire Prevention Association  |
| CPP           | Construction Phase Plan   |
| OSHA          | Occupational Safety and Health Administration.  |
| PPE           | Personal Protective Equipment   |
| ATEX          | "Atmosphere Explosible" - Certification (a requirement for all companies who manufacture electrical equipment that is used in hazardous environments) |
| IBC           | International Building Codes  |

| Abbreviations | Descriptions                   |
|---------------|--------------------------------|
| OHS           | Occupational Health and Safety |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance                      |
| NEOM-Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM Element 9              | Emergency Preparedness and Response Management                            |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Management Manual - Roles and Responsibilities                     |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors   |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-NMS 006.01         | SMS Organization, Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS 006.02-CPP     | Occupational Health and Safety Construction Management Plan               |
| NEOM-NLF-NMS-006.004        | Permit to Work Systems.   |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards  |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals)   |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                       |
| NEOM-NLF-NMS-006.028        | Lock Out / Tag Out (isolation)  |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organizations capable of meeting the requisite safety standards associated with project are contracted.
  
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring.
  - (b) Managing change.
  - (c) Continuous improvement.

## **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM–Safety Management Manual-Roles and Responsibilities
  - (a) That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
  - (b) Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organizational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
  - (c) Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks (Refer: NEOM Element 2 Risk and Opportunity Management)
  - (d) That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
    - (a) Maintain control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.2 Contractor shall undertake their specific roles and responsibilities related to Electrical Safety and ensure the following:
  - (a) Only persons having appropriate competency shall be authorized and individually licensed by the Contractor to undertake works on, or in the vicinity of electrical systems.

- (b) Risk assessments shall be undertaken to identify all hazards that may be present from working on or in the vicinity of electrical systems.
- (c) Safe systems of work and Safety (Local) Rules are to be developed and implemented for all work activities involving electrical systems, such that identified risks are reduced to acceptable levels.
- (d) Emergency Response Plans are to be developed, implemented ,and regularly tested which address the specific risks involved in Electrical Works and the control measures required to manage these risks. (Refer: NEOM Element 9 Emergency Preparedness and Response Management)
- (e) Emergency response equipment shall be provided and kept readily available at work sites where electrical work is being conducted.

### **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.3.1 Employees shall undertake their specific roles and responsibilities related to Electrical Safety and ensure the following:
- 7.3.2 Not to work in the vicinity of electrical systems unless they have the required competency and are authorized and individually licensed by the Contractor to do so.
- 7.3.3 Co-operate with the Contractor so far as is reasonably practicable to enable any duty placed on that Contractor by the provisions of this NMS to be complied with.
- 7.3.4 Comply with the provisions of this NMS in so far as they relate to matters which are within their control.
- 7.3.5 Report to the Contractor all instances of actual and potential noncompliance with any aspect of this NMS.

### **7.4 Specific Responsibilities**

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.4.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.



## **8 Other Sections related to subject**

### **8.1 Planning and Assessment**

8.1.1 Contractor shall ensure the following:

- (a) Assess the risk arising from electrical circuits and systems using risk management practices as required by NEOM Element 2 –Risk and Opportunity Management
- (b) Assessments shall be undertaken in consultation with the personnel in control of the work and communicated to those responsible for carrying out the work
- (c) Contractor shall develop, implement, and maintain a Safe System of Work and Safety Rules for all work on or in the vicinity of electrical systems. This shall be based on the results of documented Risk Assessments for all work activities.

8.1.2 Contractor shall ensure that effective procedures and control measures are documented and implemented to manage the risks associated with working on or in the vicinity of electrical systems.

8.1.3 Control measures identified shall include provisions for personal protective equipment, and the use of ‘electrical danger’ warning signs as and when required. (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment and NEOM-NLF-NMS-006.013 Safety Signage and Signals)

8.1.1 The management of electricity general safety requirements for building and construction are included in the Pre-Tender OSH Construction Management Plan in accordance with NEOM-NLF-NMS-006.002 OSH Construction Management Plan (CPP).

8.1.2 Associated safe systems of work, and site rules for working on or in the vicinity of electrical systems are included in the CPP.

### **8.2 Electrical Systems, Work Activities and Protective Equipment**

8.2.1 All electrical systems and circuits shall always be designed, constructed, operated, inspected, tested, and maintained in accordance with applicable local and international standards, as to prevent, so far as is reasonably practicable, Danger.

8.2.2 Every work activity, including operation, use and maintenance of an electrical system and work near an electrical system, shall be carried out in such a manner as not to give rise, so far as is reasonably practicable, to Danger.

8.2.3 Specific precautions are required to be implemented for electrical work in known or potentially explosive environments. These shall include as a minimum:

- (a) Only electrical and non-electrical equipment and installations designed for such service are used (Ex-rated).
- (b) Equipment is specifically identified, assessed, and marked as suitable in accordance with international standards, such as ATEX.
- (c) Equipment is maintained in accordance with international standards to ensure its continued suitability and certification is maintained.
- (d) Gas monitoring shall be deployed before and during works to detect the presence of potentially explosive atmosphere; and
- (e) Appropriate emergency response provisions are identified and implemented throughout the duration of the work. (Refer: NEOM Element 9 Emergency Preparedness and Response Management)

- 8.2.4 Any equipment provided for the purpose of protecting persons at work on or near electrical equipment shall be appropriate for the use for which it is provided, be maintained in a condition appropriate for that use, and be appropriately used. (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment)
- 8.2.5 No electrical equipment shall be put into use where its strength and capability may be exceeded in such a way as may give rise to Danger.
- 8.2.6 Means shall be provided to disconnect all conductors in a building or other structure from the service-entrance conductors. The service disconnecting means shall clearly indicate whether it is in the open or closed position and shall be installed at a readily accessible location nearest the point of entrance of the service-entrance conductors:
- (a) Conductors and equipment shall be protected from over-current in accordance with their ability to safely conduct current.
  - (b) Over-current devices (circuit breakers or fuses) shall be available and readily accessible. These over-current devices shall not be located where they will be exposed to physical damage or in the vicinity of easily ignitable material.
  - (c) Each protective device shall be capable of detecting and interrupting all values of current that can occur at its location in excess of its trip setting or melting point; and
  - (d) Each service, feeder, and branch circuit, at its disconnecting means or overcurrent device, shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.
- 8.2.7 Each service, feeder, and branch circuit, at its disconnecting means or over-current device, shall be legibly marked to indicate its purpose. (Refer: NEOM-NLF-NMS-006.013 Safety Signage and Signals)
- 8.2.8 Motors, equipment, and appliances shall have a disconnecting means installed. The service disconnecting means shall plainly indicate whether it is in the open or closed position and shall be capable of being locked in the off position.
- 8.2.9 Each disconnecting means shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.
- 8.2.10 This requirement shall not apply to equipment connected by means of flexible cord and plug.
- 8.2.11 Each service, feeder, and branch circuit, at its disconnecting means or over-current device, shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.
- 8.2.12 Emergency power generators shall be equipped with a transfer switch or other appropriate control measures to ensure that power is not back fed to the utility supplying power to the circuit when the generator is in operation.
- 8.2.13 Each cord set, attachment cap, plug, and receptacle of cord sets, and any equipment connected by cord and plug, shall be regularly inspected for external defects and for indications of reasonably foreseeable internal damage. Equipment found damaged or defective shall not be used until repaired.
- 8.2.14 Insertion of bare conductors into receptacles is prohibited.
- 8.2.15 Safety of equipment shall be determined using the following considerations:
- (a) Exposed conductors, joints, connections, and other electrical equipment, located so as to present a potential hazard to employees or others, shall be insulated.
  - (b) No conductors or equipment shall be located in damp or wet locations; where exposed to gases, fumes, vapors, liquids, or other agents that have a deteriorating effect on the conductors or equipment; or where exposed to excessive temperatures, unless specifically 'rated' for such duties and/or environment
  - (c) Unused openings in boxes, raceways, cabinets, equipment cases, or housings shall be effectively closed to afford protection substantially equivalent to the wall of the equipment.

- (d) Internal parts of electrical equipment, including busbars, wiring terminals, insulators, and other surfaces, may not be damaged or contaminated by foreign materials such as paint, plaster, cleaners, abrasives, or corrosive residues.
- (e) There shall be no damaged parts that may adversely affect safe operation or mechanical strength of the equipment, such as parts that are broken, bent, cut, or deteriorated by corrosion, chemical action, or overheating.
- (f) Conductors shall be spliced or joined with propriety splicing devices or by brazing, welding, or soldering with a fusible metal or alloy.
- (g) Soldered splices shall first be spliced or joined to be mechanically and electrically secure without solder and then soldered. All splices and joints and the free ends of conductors shall be covered with an insulation equivalent to that of the conductors or with an insulating device identified for the purpose.
- (h) Parts of electrical equipment that in ordinary operation produce arcs, sparks, flames, or molten metal shall be enclosed or separated and isolated from all combustible material.

### **8.3 Insulation, Protection and Placing of Conductors**

#### **8.3.1 All Conductors in a System which may give rise to Danger shall either:**

- (a) Be suitably covered with insulating material and as necessary protected to prevent, so far as is reasonably practicable, Danger; or
- (b) Have such precautions taken in respect of them (including, where appropriate, their being suitably placed) as will prevent, so far as is reasonably practicable, Danger.

### **8.4 Earthing or other Appropriate Precautions**

- 8.4.1 Precautions shall be taken, either by earthing or by other appropriate means, to prevent Danger arising when any Conductor (other than a Circuit Conductor) becomes charged as a result of either the use of a System, or a fault in a System; and a Conductor shall be regarded as earthed when it is connected to the general mass of earth by Conductors of appropriate strength and current-carrying capability to discharge electrical energy to earth.
- 8.4.2 All non-current carrying metal parts of portable equipment and fixed equipment, including their associated housings, enclosures, and supporting structures, shall be earthed.
- 8.4.3 The path to earth from circuits, equipment, and enclosures shall be permanent, continuous, and effective.
- 8.4.4 The circuit wiring shall include or provide an equipment earthing conductor to which the earthing contacts of the receptacle or cord connector shall be connected.
- 8.4.5 The earthing contacts of receptacles and cord connectors shall be grounded by connection to the equipment earthing conductor of the circuit supplying the receptacle or cord connector.
- 8.4.6 A conductor used as an earthing conductor shall be identifiable and distinguishable from all other conductors.
- 8.4.7 No earthing conductor may be attached to any terminal or lead to reverse designated polarity.
- 8.4.8 Earthing conductors shall be inspected regularly.
- 8.4.9 Where used in construction (or activities with similar hazards) all receptacle outlets that are not part of the permanent wiring of the building or structure and that are in use by personnel shall, so far as is reasonably practicable, have earth - fault circuit - protection via residual current devices (RCD) and power supply in 110v.

## **8.5 Integrity of Referenced Conductors**

- 8.5.1 If a Circuit Conductor is connected to earth or to any other reference point, nothing which might reasonably be expected to give rise to Danger by breaking the electrical continuity or introducing high impedance shall be placed in that Conductor unless appropriate control measures are implemented to prevent that Danger.

## **8.6 Connections**

- 8.6.1 Where necessary to prevent Danger, every joint and connection in an electrical system shall be mechanically and electrically appropriate for use.

## **8.7 Means for Protecting from Excess of Current**

- 8.7.1 Means for Protecting from Excess of Current shall be determined through risk assessment, shall be appropriately located, and provided for protecting from excess of current in every part of an electrical system as may be necessary to prevent Danger.

## **8.8 Means for Cutting-Off the Supply and for Isolation**

- 8.8.1 Live parts to which an employee may be exposed shall be de-energized before the employee works on or near them unless the Contractor can demonstrate that deenergizing introduces additional or increased hazards or isn't feasible due to equipment design or operational limitations.
- 8.8.2 Where necessary to prevent Danger, appropriate control measures (including, methods of identifying circuits) shall be available for:
- (a) Cutting off the supply of electrical energy to any electrical equipment.
  - (b) The isolation of any electrical equipment; and
  - (c) The proving of electrical equipment as isolated prior to commencement of work.
- 8.8.3 Section 8.9 shall not apply to electrical Equipment which is itself a source of electrical energy but, in such a case as is necessary, precautions shall be taken to prevent, so far as is reasonably practicable, Danger.
- 8.8.4 If the exposed live parts are not de-energized (e.g., for reasons of increased or additional hazards or infeasibility), appropriate control measures shall be used to protect employees who may be exposed to the electrical hazards involved.
- 8.8.5 As a minimum, approval for working on live equipment shall include documented authorization(s) obtained from a competent authority and endorsed by senior management. Such deviations shall be supported by appropriate risk assessment.
- 8.8.6 Precautions to be taken shall comply with the requirements of NEOM-NLF-NMS-006.028 Lock Out / Tag Out (isolation) and NEOM-NLF-NMS-006.004 Permit to Work Systems.

## **8.9 Precautions for Work on Equipment Made Dead (isolation)**

- 8.9.1 "Isolation" means the disconnection and separation of the Electrical Equipment from every source of electrical energy in such a way that this disconnection and separation is secure.
- 8.9.2 Appropriate precautions shall be taken to prevent Electrical Equipment, which has been isolated (dead) while work is carried out on nearby equipment, from becoming electrically charged. Example: Lock out/tag out.

## **8.10 Work on or Near Live Conductors**

- 8.10.1 No person shall be engaged in any work activity on or so near any live Conductor (other than one suitably covered with insulating material to prevent Danger) that Danger may arise unless:
- (a) It is not reasonably practicable in all the circumstances for it to be dead.
  - (b) It is reasonably practicable in all the circumstances for the employee to be at work on or near it while it is live; and
  - (c) Appropriate control measures (including where necessary the provision of appropriate protective equipment) are taken to prevent Injury.

## **8.11 Working Space, Access, and Lighting**

- 8.11.1 Appropriate working space means of access, and appropriate lighting shall be provided at all electrical equipment on which or near which work is being done in circumstances which may give rise to Danger.
- 8.11.2 Appropriate access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment. Working space required by this standard may not be used for storage.
- 8.11.3 The depth of the working space in the direction of access to live parts shall be appropriate to avoid danger to personnel working on adjacent equipment.
- 8.11.4 Illumination shall be provided for all working spaces about service equipment, switchboards, panel boards, and motor control centers installed indoors.
- 8.11.5 Except as elsewhere required or permitted by this standard, live parts of electrical equipment operating at 50 volts or more shall be guarded against accidental contact by use of approved cabinets, or other forms of approved enclosures, or by other approved and appropriate means of separation.
- 8.11.6 Entrances to rooms and other guarded locations containing exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter.
- 8.11.7 Entrances to rooms and other guarded locations containing exposed live parts shall be secure from unauthorized entry at all times unless they are under the observation of a competent person.

## **8.12 Temporary Electricity Supplies**

- 8.12.1 The design, installation and operation of temporary electrical systems shall be in accordance with Saudi Building Codes and international best practice.
- 8.12.2 All temporary electrical supplies to be in 110 volts. This shall be extended to all electrical tools and equipment to be used, except equipment which requires more voltage (e.g., welding machines, etc.).

## **8.13 Maintenance, Inspection and Testing**

- 8.13.1 All owners of electrical systems shall ensure that appropriate inspection, maintenance, and testing arrangements are in place for all systems. This shall be demonstrated through the development of a register(s) of all physical assets which require to be maintained and a series of maintenance, inspection and test activities based on documented risk assessment.
- 8.13.2 Inspection, testing and maintenance programs shall be documented, and take account of:
- (a) Risk levels related to the equipment in question.
  - (b) Equipment criticality (safety and reliability).
  - (c) Previous failure modes, past experience and maintenance history.

- (d) Manufacturers' recommendations, where available.
  - (e) Regulatory requirements.
  - (f) Insurance requirements.
  - (g) Method statements and procedures for undertaking the work; and
  - (h) Frequency.
- 8.13.3 Contractor shall establish and maintain a planning and scheduling system for all maintenance, inspection, and testing activities. Results shall be recorded and trended for use in continuous improvement of the overall program.
- 8.13.4 Overdue, postponed, or cancelled activities shall be supported by a documented risk assessment and where this assessment reveals the requirement for additional control measures, these shall be implemented and verified before work (re)commences. The ongoing status of overdue, postponed, or cancelled work shall be regularly monitored and reported to management, as a means of monitoring non-compliance with the established program.
- 8.13.5 Maintenance, inspection, and testing of all private (customer) electrical systems shall be undertaken only by Licensed Contractors.
- 8.13.6 Maintenance, inspection and testing of all temporary systems shall be conducted by licensed contractors.
- 8.13.7 Contractor shall periodically review the effectiveness of their maintenance, inspection and testing provisions to determine on-going asset performance / condition, and maintenance effectiveness.

## **8.14 Training and Competency**

- 8.14.1 Detailed training, Contractor shall ensure that training complies with the requirements of:
- (a) NEOM Element 5– Training, Awareness and Competency.
  - (b) NEOM-NLF-NMS-006.001 – SMS Organization, Practitioner Registration and Appointment of Contractor
- 8.14.2 Contractor shall ensure that no person is engaged in any work activity on or in the vicinity of electrical systems unless such person has the competency gained from training, technical knowledge, and experience of the precautions to be taken against the risk of death or personal injury and is under such degree of supervision as may be appropriate having regard to the nature of the work. Such competency will be assessed and awarded based on a licensing scheme as per section 2(f).
- (c) Contractor shall ensure employees required to implement the requirements of this NMS are demonstrated to have the required competency to work on or in the vicinity of electrical systems and structures in question, and understand the risks associated with such activities and the required control measures put in place by the Organizations.
  - (d) Contractor shall ensure that a competency assurance process is implemented for all staff working on or in the vicinity of electrical systems, and that required competency levels are identified by documented Training Needs Analysis.
- 8.14.3 Training for employees shall be competency-based and include:
- (a) Hazards and risks associated with electrical systems and task(s).
  - (b) Information on the safe systems of work identified in the risk assessment.
  - (c) Specific control measures to be followed by those involved working with any electrical circuit or system.
  - (d) Specific control measures to be followed for the circuit or system to be worked on; and
  - (e) Reporting procedure in the event of incidents involving electrical systems.

- 8.14.4 Contractor shall maintain a record of required training and attained competency with respect to electrical safety for all persons working on or in the vicinity of electrical systems.
- 8.14.5 Individual electrical safety competency levels shall be verified regularly by the Contractor, and ongoing competency shall be assessed. Where necessary, additional training and (re) assessment shall be provided. Individual Licenses shall be issued as a demonstration of attained competency in accordance with the Contractor's Safety Rules.
- 8.14.6 Contractor shall maintain a record of the required training that contains the following:
- (a) Name and ID number.
  - (b) Subject(s) of training.
  - (c) Date(s) of training; and
  - (d) Person providing the training.

## 9 Appendices

### 9.1 Appendix A: Forms, Signs and Checklists



## 9.2 Appendix B: Audit Criteria Electrical Safety

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria                    |                               | Requirements  | Verification | Area of Concern |
|-----------------------------------|-------------------------------|---|--------------|-----------------|
| ISO 45001:2018 Clause             | NMS Ref.                      |   |              | Yes/ No         |
| 5.3                               | 7.1.3                         | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2                   | 7.1.4                         | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                               | 7.2.1 (b)<br>, 8.14           | Persons appointed to manage /oversee work operations have the skills, knowledge, experience   |              |                 |
| 8.1.2 (e)                         | 7.2.1 (d),<br>7.3.3,<br>8.1.3 | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2                | 7.2.1 (c)                     | Hazards Identification Plan (HIP)<br><br>Assessment of the various risks shall be undertaken, assess the risk arising from electrical circuits and systems using risk management practices                                      |              |                 |
| 4.4,<br>5.1,<br>6.1.1             | 8.1.1(c)                      | Contractor shall develop, implement, and maintain a Safe System of Work and Safety Rules for all work on or in the vicinity of electrical systems   |              |                 |
|                                   | 8.2.2                         | Every work activity, including operation, use and maintenance of an electrical system and work near an electrical system, shall be safely carried out   |              |                 |
| 5.4,<br>6.1.1,<br>6.1.2,<br>6.1.3 | 8.2.5<br>8.2.6                | No electrical equipment shall be put into use where its strength and capability may be exceeded in such a way as may give rise to Danger  |              |                 |
|                                   |                               | Means shall be provided to disconnect all conductors in a building or other structure from the service-entrance conductors  |              |                 |
|                                   |                               | Over-current devices (circuit breakers or fuses) shall be available and readily accessible  |              |                 |
| 8.1.1,<br>8.1.2                   | 8.2.9                         | Each disconnecting means shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident   |              |                 |
|                                   | 8.2.12                        | Emergency power generators shall be equipped with a transfer switch or other appropriate control measures to ensure that power is not back fed to the utility supplying power to the circuit when the generator is in operation |              |                 |

| Audit Criteria            |          | Requirements   | Verification | Area of Concern |
|---------------------------|----------|--|--------------|-----------------|
| ISO 45001:2018 Clause     | NMS Ref. |  |              | Yes/ No         |
| 8.1.1,<br>8.1.2           | 8.3.1    | All Conductors in a System which may give rise to Danger shall be suitably covered with insulating material and as necessary protected   |              |                 |
|                           | 8.4.3    | The path to earth from circuits, equipment, and enclosures shall be permanent, continuous, and effective   |              |                 |
|                           | 8.8.2    | Where necessary to prevent Danger, appropriate control measures (including, methods of identifying circuits) shall be available  |              |                 |
| 8.1.1,<br>8.1.2,<br>6.1.2 | 8.11.2   | Appropriate access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment                                  |              |                 |
|                           | 8.11.7   | Entrances to rooms and other guarded locations containing exposed live parts shall be secure from unauthorized entry at all times unless they are under the observation of a competent person              |              |                 |
|                           | 8.12.2   | All temporary electrical supplies to be in 110 volts. This shall be extended to all electrical tools and equipment to be used, except equipment which requires more voltage (e.g., welding machines, etc.) |              |                 |
|                           | 8.13.1   | All owners of electrical systems shall ensure that appropriate inspection, maintenance, and testing arrangements are in place for all systems  |              |                 |
|                           |          |  |              |                 |
|                           |          |  |              |                 |

### **9.3 Appendix C: Guidance Information**

Electricity has long been recognized as a serious workplace hazard. OSHA's electrical standards are designed to protect employees exposed to dangers such as electric shock, electrocution, fires, and explosions. Electrical hazards are addressed in specific standards for the construction industry.

OSHA 29 CFR 1910 Subpart R deals with electric power generation, transmission and distribution. While 29 CFR 1926 Subparts K (Electrical) and V (Electric Power Transmission and Distribution) refer specifically to the Construction Industry.

Many workers are unaware of the potential electrical hazards present in their work environment, which makes them more vulnerable to the danger of electrocution. According to 29 CFR 1926.21(b)(2), "The Contractor shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury." The following references aid in recognizing hazards associated with electrical work.

A good source of information is available in - Construction - Pocket Guide. OSHA Publication 3252, (2005)

Electrical Safety in the UK is regulated under the Electricity at Work Regulations 1989 and a number of guidance documents are available of the UK HSE web site.

HSR 25 (2015) The Electricity at Work Regulations 1989 - Guidance on Regulations is freely available this document will be of interest and practical help to all dutyholders, particularly engineers (including those involved in the design, construction, operation or maintenance of electrical systems), technicians and their managers.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
PLANT, MACHINERY,  
EQUIPMENT AND APPLIANCES**

NEOM-NLF-NMS-006.017 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

|           | Prepared by  | Reviewed by   | Approved by                         |
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## OUR NEOM VALUES



### CATALYST

Make a difference.  
Create a legacy.



### CARE

Leave the environment  
in a better place.



### CURIOUS

Challenge the norm.  
Stay restless.



### PASSIONATE

Be accountable.  
Finish what you start.



### RESPECT

Be authentic.  
Be true. Be fair.



### DIVERSITY

Embrace cultural  
differences.  
Seek to understand.

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with Plant, Machinery, Equipment and Appliances.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all Neom Sectors, Personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

It applies to the overall management of plant/equipment and defines associated responsibilities.

It includes the requirements for maintenance, servicing, cleaning, repairs, modifications, inspection, and auditing.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with work activities are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating risks.

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions  |
|--------------------------------|--|
| NEOM Co                        | NEOM Company   |
| Client                         | NEOM Sector /Department responsible for management and oversight of the Contractor                       |
| Employer                       | The person or organisation that employs personnel to complete the work                                   |
| Contractor                     | The organisation contracted to carry out the works   |
| Safety Management System (SMS) | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM Element 9              | Emergency Planning and Response Management                                |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Management Manual - Roles and Responsibilities                     |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors   |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-NMS 006.01         | SMS Organisation, Practitioner Registration and Appointment of Contractor |

| Document Code           | Document Name   |
|-------------------------|---|
| NEOM-NLF-NMS 006.02-CPP | Occupational Health and Safety Construction Management Plan |
| NEOM-NLF-NMS-006.012    | Barricading of Hazards                                      |
| NEOM-NLF-NMS-006.013    | Safety Signage and Signals                                  |
| NEOM-NLF-NMS-006.018    | Local Exhaust Ventilation                                   |
| NEOM-NLF-NMS-006.021    | Personal Protective Equipment (PPE)                         |
| NEOM NLF-NMS-006.022    | Occupational Noise.   |
| NEOM-NLF-NMS-006.023    | Vibration   |
| NEOM-NLF-NMS--006.028   | Lock-out / Tag-out (Isolation).                             |
| NEOM-NLS-NMS-006.030    | Machine Guarding  |
| NEOM-NLF-NMS-006.032    | Traffic Management and Logistics                            |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6 Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.

### 7.2 Contractor

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
  
- 7.2.3 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
- 7.2.5 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available. (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
- 7.2.6 Maintain control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.7 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) They shall provide environment, health and safety information to employees which shall include:
    - I. Purpose of the plant;
    - II. Testing and inspections required;
    - III. Installation, commissioning, operation, maintenance, cleaning, transport, storage, and dismantling information;
    - IV. Systems of work needed for the safe use of the plant;
    - V. Knowledge, training, or skill needed for persons undertaking inspection and testing;
    - VI. Emergency procedures.

### **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work or equipment which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor/Employer in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)

### **7.4 Specific Responsibilities**

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.4.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Plant / Equipment**

- 8.1.1 Plant/Equipment is a general term referring to machinery, equipment, and appliances this falls into 2 main categories Fixed and Mobile..
- 8.1.2 Common types of fixed plant found in many workplaces include, but are not limited to:
  - (a) Static or fixed plant / equipment / machinery such as a compressor, woodworking machine; steel press, appliance, pressure vessel, implement / tool, steel press;
  - (b) A component of plant and a fitting, connection, accessory, or adjunct to plant.
- 8.1.3 Mobile Plant and Equipment can include , but not be limited to;
  - (a) Loading shovels, diggers, earth moving equipment, cranes, face shovels, trenching equipment, rock crushing equipment etc.
  - (b) Mobile Plant is a common term used to address all heavy mobile equipment used in general construction, road building and repairs, earth moving, quarrying, rock crushing, excavations and lifting operations etc.
- 8.1.4 Employers and or owners of the plant and equipment shall ensure all personnel who operate the plant and or equipment are competent and qualified and meet all legal requirements to operate such plant and or equipment.

### **8.2 Planning and Assessment**

- 8.2.1 Plant Owners shall ensure the following:
  - (a) Assess the risk arising from use of plant and equipment using risk management practices as required by NEOM Element 2 –Risk and Opportunities Management
  - (b) Risk Assessments be undertaken in consultation with the personnel in control of the work and communicated to those responsible for carrying out the work
  - (c) That effective procedures and control measures are in place, which are implemented to manage activities safely and without risk to health;
  - (d) That the management of all plant and equipment requirements are included in the Pre-Tender Safety and Health Plan; and
  - (e) That associated safe systems of work, and site rules are included in the NEOM Occupational Safety and Health Construction Management Plan (NEOM-NLF-NMS-006.002) (CPP)

### **8.3 Risk Management**

- 8.3.1 Plant owners shall ensure the risk management process in relation to plant at the workplace includes identification of appropriate control measures. (Refer to NEOM Element 2 Risk and Opportunity Management). In addition, they shall:
- (a) Carefully observe the task being performed including short cuts and improvisations;
  - (b) Consider what occurs when things go wrong, not just when the procedures are correctly followed;
  - (c) Conduct a risk assessment following changed work methods; and
  - (d) Involve those who work with the plant in risk management activities.

### **8.4 Design and Manufacture**

- 8.4.1 Plant Owners shall Review designer and manufacturer specifications to ensure that plant or equipment is suitable for its intended use. The information supplied by the designer, manufacturer or supplier should outline any residual risks and provide information on eliminating or controlling the risks
- 8.4.2 Where plant has been in service prior to purchase (e.g., second hand) and information regarding safe use is not available, a competent person shall be responsible to:
- (a) Develop this information; and
  - (b) Assess and provide guidance on updating to meet current safety standards.
- 8.4.3 Prior to purchasing or obtaining plant the following shall be considered:
- (a) Control devices such as start/stop switches shall satisfactorily perform their intended function;
  - (b) Guarding of moving components shall adequately controls the risks associated with accessible hazards; (Refer: NEOM-NLS-NMS-006.030 Machine Guarding)
  - (c) Availability of warning lights/alarms to indicate motion.
  - (d) Release of hazardous substances from plant shall be controlled to minimize risk;(Refer: NEOM-NLF-NMS-006.018 Local Exhaust Ventilation)
  - (e) Noise and vibration levels shall not be a risk to hearing or health. If the noise and vibration levels are not controlled, or cannot be controlled at the source, serious consideration shall be given to ways of controlling the effects of noise and vibration. (Refer: NEOM-NLF-NMS-006.022 Occupational Noise and NEOM-NLF-NMS-006.023 Vibration)

### **8.5 Positioning Plant in the Workplace**

- 8.5.1 Employers shall ensure a risk assessment is carried out to identify risks in locating or operating plant and the plant shall be positioned so that:
- (a) Risks from hot plant (e.g., Friction, molten material, hot gases, etc.) Are controlled, for example, through restricted access, guarding or insulation; (Refer: NEOM Element 2 Risk and Opportunity Management)
  - (b) Areas in which mobile plant and equipment is being used shall ensure the machine and human interfaces are suitably guarded and sufficient safe distances are maintained between men and machinery.

- 8.5.2 Employers shall ensure ergonomically safe design of the plant and work area;
- (a) There is appropriate space (suggested 600 mm, the minimum width of a walkway) for safe access to the plant for operation, cleaning, maintenance, inspection, and emergency evacuation; (Refer: NEOM Element 9 Emergency Planning and Response Management)
  - (b) Plant and equipment do not obstruct doorways and emergency exits;
  - (c) Proximity to other plant does not have a negative effect on the operation of the plant or on work processes;
  - (d) Fixed plant and equipment rests on an appropriate foundation, for example, on a floor or other support that ensures the plant is stable and secure according to designer's or manufacturer's instructions;
  - (e) Emergency shutdown / off controls are easily accessible;
  - (f) Ventilation is appropriate to the nature and volume of emissions from the plant; and
  - (g) Employees and others are not exposed to noise levels greater than those stated in NEOM NLF-NMS-006.022 – Occupational Noise.

## **8.6 Operation**

- 8.6.1 Employer shall ensure that plant/equipment is used only where it can perform safely within the design criteria and manufacturer's instructions. Where commissioning is applicable, the results of commissioning shall support this.
- 8.6.2 Plant shall be used in accordance with the manufacturer's specifications, including:
- (a) Design conditions;
  - (b) Design pressure;
  - (c) Design load;
  - (d) Production rate;
  - (e) Control capabilities;
  - (f) Maintenance schedule; and
  - (g) Replacement period.
- 8.6.3 Employers shall consider and address the risks that may result from such things as:
- (a) Operator fatigue;
  - (b) The performance of routine (repetitive) tasks;
  - (c) Misuse of plant; and
  - (d) Local conditions and working procedures.

## **8.7 Damaged Plant**

- 8.7.1 When plant and or equipment has been damaged, the employer shall withdraw it from service until any risks to environment, health and safety have been assessed and controlled.

## **8.8 Dismantled / Stored Plant**

- 8.8.1 Where plant is to be dismantled the employer shall ensure that:
- (a) The plant is clearly identified as not in use;
  - (b) The plant is dismantled safely; and

- (c) It is dismantled in accordance with the designer's and manufacturer's instructions by a competent person.

8.8.2 Where plant is to be placed in storage, the employer, shall:

- (a) Ensure relevant environment, health and safety information supplied by the designer or manufacturer is provided to the person who is to dismantle or store the plant; and
- (b) When preparing dismantling plans, develop control measures which prevent or minimize the risks of damage to plant during storage, for example, from corrosion because of exposure, residues of hazardous substances and deterioration of consumables.

8.8.3 Where plant is taken out of storage with the intention of resuming use, the plant shall be treated as 'new' plant with respect to risk management, erection, installation, and commissioning.

## **8.9 Designers of Plant and Equipment**

8.9.1 Obligations

- (a) Designers includes anyone who designs plant, or who modifies the design of existing plant in a way that may change how the plant is used or affect the existing safety controls of the plant.
- (b) A designers of plant shall ensure that:
  - I. The plant is designed to be safe and without risk to health when used appropriately; and
  - II. Clear information about the way the plant shall be used safely shall be provided as part of the design process.

## **8.10 Risk Management**

8.10.1 Designers shall undertake the risk management process to ensure control measures to prevent or minimise exposure to environment health and safety risks are in place and are appropriate for the plant being designed. Refer to NEOM– Element 2 Risk and Opportunity Management.

8.10.2 Designers shall consider all the activities and operations that form part of the complete life cycle of the plant when developing control measures for the design of plant. This shall include the following as a minimum:

- (a) Manufacture;
- (b) Transportation;
- (c) Installation;
- (d) Use;
- (e) Cleaning;
- (f) Adjustment;
- (g) Inspection;
- (h) Maintenance and servicing;
- (i) Repair or modification; and
- (j) Dismantling / disposal.

## **8.11 Standards**

8.11.1 Plant shall be designed in accordance with engineering principles and standards applicable to international standards.

## **8.12 Intended use and Reasonably Foreseeable Misuse**

8.12.1 The designer shall, as far as reasonably practicable, anticipate operator error and modify the design to eliminate or reduce the risk. This shall be done in consultation with users to ensure that the range of requirements such as environment, conditions, loads, and tasks to which the plant will be exposed will be considered.

## **8.13 Information about the Safe use of Plant**

8.13.1 Designers have an obligation to provide information about the way plant is to be used, when giving the design to another employer that is to give effect to the design. For example, if plant is to be sited a certain distance from other plant, instructions in writing and in appropriate language, shall be provided to the manufacturer, erector, installer, supplier, and end user.

8.13.2 Information may take the form of written text or visual information such as signs, symbols, or diagrams. Where visual information is provided, it shall conform to the standards applicable to NEOM (Refer: NEOM-NLF-NMS-006.013 Safety Signage and Signals)

8.13.3 Information that shall be provided by the designer include but not be limited to:

- (a) Information relating to transport, handling, and storage of plant; (Refer:NEOM-NLF-NMS-006.032 Traffic Management and Logistics)
- (b) Information relating to commissioning, installing, inspecting, and testing of plant;
- (c) The comprehensive range of uses for which the plant is intended, including prohibited usages;
- (d) Requirements for maintenance and repair;
- (e) De-commissioning, dismantling and disposal of plant;
- (f) Information for emergency situations; (Refer: NEOM Element 9 Emergency Planning and Response Management)
- (g) The results or documentation of tests and examinations carried out on the plant and design;
- (h) Any known residual risks, that is, those that cannot be eliminated or reduced by design and against which guarding is appropriately effective;
- (i) Control measures, for example, personal protective equipment, that shall be used to further reduce the risks associated with plant; (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment)
- (j) Guidance, if required, on administrative control measures such as notices, signs, and procedures; and
- (k) Requirements for special tools required to use or maintain plant.

8.13.4 Information to manufacturers shall include but not be limited to:

- (a) Specific conditions relating to the method of manufacture. Where a specific manufacturing method or material is nominated, the possibility of hazards associated with that specification shall be considered;
- (b) Instructions regarding high risks which could arise from the manufacturing process itself;
- (c) Instruction to the manufacturer for fitting or refitting plant parts and their location on the larger components of the plant or their housings where:
  - I. The direction of movement shall be known in order to avoid a risk;

- II. Associated errors which could be made in installation; and
- III. Instruction where hot or cold parts or material may create a hazard.

## **8.14 Manufacturers of Plant and Equipment**

### **8.14.1 Obligations**

- (a) Manufacturers of plant have an obligation to ensure that:
  - I. The plant is manufactured to be safe and without risk to health when used appropriately;
  - II. The plant, when manufactured, is tested, and examined to ensure it has been manufactured to be safe and without risk to health when used appropriately; and
  - III. The plant, when supplied to another person or employer is accompanied by information about the way the plant shall be used to ensure environment, health and safety risks can be managed.
- 8.14.2 Manufacturers shall undertake risk management to ensure control measures to prevent or minimise exposure to environment, health and safety risks are in place and are appropriate for the plant being designed. Refer to NEOM– Element 2 Risk and Opportunity Management.
- 8.14.3 If a manufacturer or any other person modifies the design of plant, that person assumes the additional obligations of a designer.
- 8.14.4 All modifications shall be approved by the original designer or a competent person, e.g., substitution of metals in a manufacturing process shall be approved by the original designer or a metallurgist.

## **8.15 Plant Construction**

- 8.15.1 Manufacturers have obligations to ensure plant is constructed appropriately and that the designer's instructions are followed. It is good management practice for manufacturers and designers to consult, in order to confirm the areas each is responsible for.
- 8.15.2 Connected, fabricated, or machined materials are reasonably foreseeable to be required in the construction of plant. Manufacturing processes require that design specifications are followed, e.g., crane booms of a particular lifting capacity shall have the particular grade of steel specified.
- 8.15.3 The grade of steel or other metal used in the manufacture shall be clearly identified on the finished product.

## **8.16 Testing and Examination of Plant**

- 8.16.1 A testing and examining system shall be implemented to ensure the plant and equipment was designed and manufactured to be safe when used appropriately.
- 8.16.2 Details of the testing and examination carried out shall be documented and made available. Typical testing may include but will not be limited to:
  - (a) Electrical testing;
  - (b) Safety function testing;
  - (c) Temperature rise tests; and
  - (d) Abnormal condition tests.
- 8.16.3 Tests and examinations shall include:
  - (a) All critical components;
  - (b) The suitability of selected components;

- (c) Mechanical devices;
- (d) Pneumatic devices;
- (e) Hydraulic devices;
- (f) Sources of emissions e.g., Lasers;
- (g) Guarding and interlocking arrangements;
- (h) Structural integrity; and
- (i) Material types and properties.

8.16.4 Records of tests and examinations shall be maintained and shall be made available by the supplier or manufacturer of the plant.

8.16.5 When carrying out testing and examination of plant consideration shall be given to:

- (a) Simulation of the normal range of operational capabilities;
- (b) Testing of design features incorporated to ensure 'fail-safe' operation;
- (c) Measurement of imposed stresses on critical components to ensure maximum design stresses are not exceeded;
- (d) Testing of critical safety features such as over-speed and over-pressure devices under both normal and adverse operational conditions; and
- (e) Development of overload testing procedures to ensure plant safety during foreseeable misuse conditions.

## **8.17 Information about the Safe use of Plant**

8.17.1 Manufacturers shall provide information about the way plant is to be used to ensure environment, health and safety risks can be managed. This shall include the information provided by the designer plus additional information on risks created in the manufacturing process.

8.17.2 Information may take the form of written text or visual information such as signs, symbols, or diagrams. Where visual information is provided, it shall conform to the relevant standard. (Refer: NEOM-NLF-NMS-006.013 Safety Signage and Signals)

8.17.3 Information that shall be provided shall include but not be limited to:

- (a) Information relating to transport, handling, and storage of plant;
- (b) Information relating to commissioning, installing, inspecting, and testing of plant;
- (c) The comprehensive range of uses for which the plant is intended, including prohibited usages;
- (d) Requirements for maintenance and repair;
- (e) De-commissioning, dismantling and disposal of plant;
- (f) Information for emergency situations;
- (g) Effects of environmental conditions on the use of the plant;
- (h) The results or documentation of tests and examinations carried out on the plant and design;
- (i) Any known residual risks, that is, those that cannot be eliminated or appropriately reduced by design and against which guarding is not totally effective;
- (j) Recommendations, if available, on administrative control measures;
- (k) Requirements for special tools needed to use or maintain plant; and

- (l) The control measures, for example, personal protective equipment, that shall be used to further reduce the risks associated with plant.
- 8.17.4 Instructions shall be trialled to ensure the intent of the instructions is achieved and that carrying out the instructions does not pose a risk to environment, health and safety.

## **8.18 Suppliers of Plant and Equipment**

### **8.18.1 Supply of Plant**

- (a) 'Supply' includes but is not restricted to the sale, leasing, or hiring of plant. 'A person who supplies plant' is not restricted to a person whose usual business is supplying plant, but also applies to any person, including a manufacturer, importer, or employer, who supplies an item of plant.

### **8.18.2 Obligation**

- (a) Suppliers of new plant have an obligation:
  - I. To examine and test the plant to ensure the plant is safe and without risk to health when used appropriately; or
  - II. To ensure the manufacturer of the plant has given an assurance that the plant has been examined and tested to ensure it is safe and without risk to health when used appropriately; and
  - III. To ensure the plant is accompanied by information about the way the plant shall be used to ensure environment, health and safety risks can be managed.
- (b) Suppliers of used plant have an obligation:
  - I. To examine and test the plant to ensure the plant is safe and without risk to health when used appropriately; and
  - II. To ensure the plant is accompanied by information about the way the plant shall be used to ensure environment, health and safety risks can be managed.

## **8.19 Hire of Plant and Equipment**

- 8.19.1 Employer (a hirer) which hires out used plant to an end user has the same obligations as a supplier of plant. A hirer shall take all reasonable steps to ensure that the plant is safe and without risk to health when used appropriately.
- 8.19.2 Hirers shall ensure the plant is accompanied by information about the way the plant shall be used to ensure environment, health and safety risks can be managed.
- 8.19.3 Hirers of plant shall ensure the plant is inspected between hires and that any maintenance and repairs are carried out to minimise the risk to environment, health, and safety.

## **8.20 Examining and Testing of Plant and Equipment**

- 8.20.1 Suppliers of plant has an obligation to ensure that the manufacturer of the plant has given an assurance that the plant has been examined and tested to ensure it is safe and without risk to environment, health and safety when used appropriately.
- 8.20.2 Suppliers of plant shall obtain documented evidence of examination and testing from the manufacturer along with appropriate information for safe operation and maintenance of the plant.
- 8.20.3 Plant Owners shall ensure that all statutory testing requirements are identified and incorporated into a robust inspection program for the employer.

## **8.21 Provision of Appropriate Information**

- 8.21.1 Suppliers of plant has an obligation to provide information about the way plant is to be used to ensure environment, health and safety risks can be managed.
- 8.21.2 Information may take the form of written text or visual information such as signs, symbols, or diagrams. Where visual information is provided, it shall conform to the relevant standard.
- 8.21.3 Information shall include but not be limited to:
- (a) Information from designers and manufacturers relating to transport, handling, and storage of plant;
  - (b) Information relating to commissioning, installing, inspecting, and testing of plant;
  - (c) The comprehensive range of uses for which the plant is intended, including prohibited usages;
- 8.21.4 Requirements for maintenance and repair;
- (a) De-commissioning, dismantling and disposal of plant;
  - (b) Information for emergency situations;
  - (c) Effects of environmental conditions on the use of the plant;
  - (d) The results or documentation of tests and examinations carried out on the plant and design;
  - (e) Any known residual risks, that is, those that cannot be eliminated or appropriately reduced by design and against which guarding is not totally effective;
  - (f) Guidance, if available, on administrative control measures;
  - (g) Requirements for special tools needed to use or maintain plant; and
  - (h) The control measures that shall be used to further reduce the risks associated with plant, including residual risks.
- 8.21.5 Instructions shall be trialled to ensure the intent of the instructions is achieved and that carrying out the instructions does not pose a risk to environment, health and safety.

## **8.22 Erectors and Installers of Plant and or Equipment**

- 8.22.1 Erector or Installer
- (a) Erector or installers of plant is any person who sets up, assembles, places in position, and connects or otherwise makes plant ready for use.
  - (b) Erection, installation, and commissioning of plant shall be carried out by a competent person.

## **8.23 Obligations**

- 8.23.1 Erectors or installers of plant at a relevant place for the plant has an obligation to:
- (a) Abide by environment, health and safety rules set by the controller of the premises where the plant is being installed;
  - (b) Erect or install the plant in a way that is safe and without risk to health; and
  - (c) Ensure that nothing about the way the plant was erected or installed makes it unsafe and a risk to health when used appropriately.

## **8.24 Risk Management**

8.24.1 Erectors and installers shall include the designer's and manufacturer's instructions when undertaking the risk management process to ensure the control measures, they choose to eliminate or minimise the risk involved regarding the plant's erection, installation, and use. Refer to NEOM Element 2 Risk and Opportunity Management.

## **8.25 Maintenance, Services and Cleaning General Requirements**

8.25.1 Owners' responsibilities include ensuring that repairs, modifications, inspection, and auditing are carried out. The responsibility for carrying out the work activities will generally rest with an appointed Contractor

8.25.2 Owners shall ensure preparation of a maintenance schedule for plant that is used at their premises or worksite.

8.25.3 A preventative maintenance schedule shall be based on the plant manufacturers or suppliers' maintenance manual or, in the absence of such specifications, in accordance with other proven and tested procedures. This schedule shall include arrangements for maintenance, servicing, and cleaning.

8.25.4 Owners/Contractor shall ensure that plant is isolated before maintenance, service or cleaning commences. Where plant is isolated and plant shutdown will result, any total or partial shutdown shall not allow a hazardous situation to be created. Where plant cannot be isolated, alternate means of preventing accidental operation shall be implemented. In these situations, work shall be conducted under controlled procedures to allow for maintenance, service, and cleaning such as a permit to work in maintenance areas. (Refer: NEOM-NLF-NMS--006.028– Lock-out / Tag-out (Isolation)).

8.25.5 Owners/operators shall ensure that control measures are implemented which are effective;

- (a) To prevent access to any dangerous part of machinery or to any rotating stock bar; and/or
- (b) To stop the movement of any dangerous part of machinery or rotating stock-bar before any part of a person enters a danger zone; and/or
- (c) The measures shall be in accordance with the requirements and principles of NEOM-NLF-NMS - 006.030– Machine Guarding.

8.25.6 Owner/contractor shall ensure that those employees engaged in maintaining, servicing, or cleaning plant are competent and briefed in the safe system of work to be followed.

8.25.7 Owner/contractor shall ensure that risk assessments are prepared to deal with reactive or breakdown maintenance and the specific hazards that can arise from such operations.

8.25.8 Owner/Contractor shall ensure where cleaning and maintenance of filtering equipment or dangerous contaminant producing plant is to be carried out, manufacturers' instructions or proven procedures shall be carefully followed.

8.25.9 Owner/contractor shall ensure that records of all maintenance carried out for plant are kept readily available for inspection for a period of not less than five years from the date of the maintenance, servicing or cleaning being carried out.

## **8.26 Repairs and Modifications**

### **8.26.1 Repairs**

- (a) Owner/Contractor shall ensure that before repairs commence, safety issues are considered, plant shall be isolated, and repairs made:
  - I. As recommended by the manufacturer or in documented procedures;
  - II. By a competent person; and
  - III. According to any relevant standards.

## **8.26.2 Modifications**

- (a) Prior to undertaking modifications ensure that the modifier consults with the designer and manufacturer to ensure all relevant safety issues have been considered. Where the original designer and manufacturer cannot be contacted (older plant), the modifications shall be designed by a competent person. (Refer: NEOM Element 5 Training, Awareness and Competency)
- (b) Plant shall be modified:
  - I. As recommended by the manufacturer or in documented procedures;
  - II. By a competent person; and
  - III. According to any relevant standards.
- (c) Before being returned to service, modified/ altered plant shall:
  - I. Have control measures in place to prevent or minimize any risks created by the modification; and
  - II. Be inspected and tested having regard to the modified design specifications and relevant standards.

## **8.27 Inspection**

- 8.27.1 Employers shall ensure a regular inspection program is developed and implemented for plant. The program shall document:
  - (a) Standards against which plant shall be inspected;
  - (b) The frequency of inspections;
  - (c) Critical safety instructions to be followed during inspection; and
  - (d) The procedures for types of inspections including:
    - I. Periodic inspections.
    - II. Specific tests.
    - III. Repaired plant; and
    - IV. Modified plant.
- 8.27.2 Employers shall ensure that all employees or contractors involved in undertaking inspections of plant are competent. In the case of contractors being used to inspect specialist plant the competency assessment shall be based on a letter of undertaking or maintenance agreement with the contracting organisation.
- 8.27.3 Employers shall ensure that inspections are undertaken and independent from production or maintenance functions.

## **8.28 Auditing**

- 8.28.1 Owners/Contractor shall ensure an audit program is developed and implemented to examine and verify from existing records kept, that the risk management processes have been conducted effectively and that all workplace environment, health and safety obligations are being met.
- 8.28.2 An audit shall call upon all available information including but not limited to:
  - (a) Incident records and investigation reports;
  - (b) Past audit reports;
  - (c) Past plant inspection reports;
  - (d) Past maintenance and servicing reports;

- (e) Repair records;
- (f) Training records and qualifications for supervisors and employees;
- (g) Hiring and recruitment criteria for plant operators;
- (h) Task analysis and procedures associated with plant;
- (i) Inspection of plant;
- (j) Communication between line management and employees involved with the use
- (k) Of plant;
- (l) Shutdown/emergency procedures;
- (m) Procurement guidelines for new plant purchases;
- (n) Participation from people with relevant expertise such as an ergonomist or an environment health and safety consultant; and
- (o) The audit shall include discussions with employees regarding the implementation of control measures to ensure consultation.

#### 8.28.3 The audit program may include:

- A periodic review of control measures, involving people in the workplace who have accountabilities for environment, health, and safety;
- (p) Ensuring that all items of plant are regularly inspected and maintained;
- (q) If work practices are modified or new work practices introduced, or if plant is moved, reviewing the control measures to make sure they are still appropriate;
- (r) Reviewing the control measures currently in place if new information is obtained about a previously unknown design or manufacturing fault, or an unidentified hazard found; and
- (s) If an incident (injury, illness or 'near miss') involving plant occurs, reviewing the procedures in place, and making changes to prevent a recurrence.

### 8.29 Record Keeping

- 8.29.1 Owners/Contractor shall maintain employee training records required by this NMS
- 8.29.2 Employers shall make and keep for the operating life of the plant, records of any tests, maintenance, inspections, commissioning, or alteration of plant relevant to controlling risks arising from the plant.

#### 8.29.3 Records on items of plant shall include:

- (a) The unique plant or equipment identification number;
- (b) Plant design registration information;
- (c) Final and approved design drawings and calculations;
- (d) Relevant data from commissioning;
- (e) Compliance statements and/or test certificates;
- (f) Manufacturer's specifications;
- (g) Results of inspections, and tests on safety devices;
- (h) Information on maintenance carried out;
- (i) Information on major repairs carried out; and
- (j) Information on major modifications or ratings to original design.

8.29.4 Records on matters relating to plant shall include:

- (a) Results of risk assessments carried out on plant;
- (b) Information, instruction, training given to employees about how to use plant and the risks associated with plant;
- (c) Work practices used where plant is involved;
- (d) Procedures for consulting with employees; and
- (e) Competencies of operators.

## 9 Appendices

### 9.1 Appendix A: Forms, Signs and Checklists





## 9.2 Appendix B: Audit Criteria

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria  |                        | Requirements  | Verification | Area of Concern |
|---|------------------------|---|--------------|-----------------|
| ISO 45001:2018 Clause                                     | NMS Ref.               |   |              | Yes/ No         |
| 5.3   | 7.1.3                  | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2   | 7.1.4                  | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2   | 7.2.4,<br>7.4,         | Persons appointed to manage /oversee work operations have the skills, knowledge, experience   |              |                 |
| 8.1.2 (e)   | 7.2.5                  | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2  | 7.2.6<br>8.3,<br>8.5.1 | Hazards Identification Plan (HIP)   |              |                 |
|   |                        | Plant owners shall ensure the risk management process in relation to plant at the workplace includes identification of appropriate control measures   |              |                 |
|   |                        | Employers shall ensure a risk assessment is carried out to identify risks in locating or operating plant and the plant shall be positioned  |              |                 |
| 4.2,<br>5.1,<br>5.3,<br>5.4,<br>6.1.1,<br>8.1.3,<br>8.1.4 | 8.4.1                  | Plant Owners shall Review designer and manufacturer specifications to ensure that plant or equipment is suitable for its intended use   |              |                 |
|   | 8.5.2                  | Employers shall ensure ergonomically safe design of the plant and work area   |              |                 |
|   | 8.12.1                 | The designer shall, as far as reasonably practicable, anticipate operator error and modify the design to eliminate or reduce the risk. This shall be done in consultation with users to ensure that the range of requirements such as environment, conditions, loads, and tasks to which the plant will be exposed will be considered |              |                 |
|   | 8.15.1                 | Manufacturers have obligations to ensure plant is constructed appropriately and that the designer's instructions are followed   |              |                 |
| 9.1.1   | 8.16.1                 | A testing and examining system shall be implemented to ensure the plant and equipment was designed and manufactured to be safe when used appropriately  |              |                 |
| 6.1.1,<br>8.1.1,<br>8.1.4,                                | 8.17.1                 | Manufacturers shall provide information about the way plant is to be used to ensure environment, health and safety risks can be managed   |              |                 |
| 4.2,  | 8.19.1                 | Employer (a hirer) which hires out used plant   |              |                 |

| Audit Criteria                    |          | Requirements  | Verification | Area of Concern |
|-----------------------------------|----------|---|--------------|-----------------|
| ISO 45001:2018 Clause             | NMS Ref. |   |              | Yes/ No         |
| 5.1,<br>5.3,                      | 8.26.1   | to an end user has the same obligations as a supplier of plant  |              |                 |
| 5.4,<br>6.1.1,<br>8.1.3,<br>8.1.4 |          | Owner/Contractor shall ensure that before repairs commence, safety issues are considered, plant shall be isolated, and repairs made   |              |                 |
| 9.1.1                             | 8.27.1   | Employers shall ensure a regular inspection program is developed and implemented for plant  |              |                 |
| 9.2.2                             | 8.28.1   | Owners/Contractor shall ensure an audit program is developed and implemented to examine and verify from existing records kept, that the risk management processes have been conducted effectively and that all workplace environment, health and safety obligations are being met |              |                 |
|                                   |          |   |              |                 |
|                                   |          |   |              |                 |

### **9.3 Appendix C: Guidance Information**

Under OSHA 29 CFR 1926 Subpart O Motor Vehicles, Mechanized Equipment, and Marine Operations are covered in 1926.600

The OSHA Requirements for Heavy Equipment Safety says heavy equipment operators are no different to many other workplaces in that OSHA safety requirements are enforced. This includes mandatory safety training relevant to the equipment being used, the work being done, and the site where the work is being done. Heavy equipment operators working on suspected hazardous waste sites will, for example, require HAZWOPER training. If you are working on a construction site, you may need specific construction induction training.

SHA requires that the employer instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury. (29 CFR 1926.21 (b) (2))

In the UK HSE this subject is covered by PUWER 1998: Provision and Use of Work Equipment Regulations 1998.

A free guidance document available on the UK HSE web site is L 22 Safe use of work equipment Provision and Use of Work Equipment Regulations 1998 Approved Code of Practice and Guidance

This Approved Code of Practice and guidance is aimed at employers, duty holders and anyone who has responsibility for the safe use of work equipment, such as managers and supervisors.

It sets out what is needed to comply with the Provision and Use of Work Equipment Regulations 1998. The Regulations, commonly known as PUWER, place duties on people and companies who own, operate, or have control over work equipment. PUWER also places responsibilities on businesses and organisations whose employees use work equipment, whether owned by them or not.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
LOCAL EXHAUST VENTILATION**

NEOM-NLF-NMS-006.018 - Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

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## OUR NEOM VALUES



### CATALYST

Make a difference.  
Create a legacy.



### CARE

Leave the environment  
in a better place.



### CURIOS

Challenge the norm.  
Stay relentless.



### PASSIONATE

Be accountable.  
Finish what you start.



### RESPECT

Be authentic.  
Be true. Be bold.



### DIVERSITY

Embrace cultural  
differences.  
Seek to understand.

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety risks associated with Local Exhaust Ventilation.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

This NMS sets requirements on how to control gas, vapour, dust, fume, and mist in workplace air using Local Exhaust Ventilation (LEV) to extract contaminants before they contaminate the workplace environment.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities.

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms  | Definitions   |
|--|---|
| NEOM Co  | NEOM Company  |
| Client   | NEOM Sector /Department responsible for management and oversight of the Contractor  |
| Employer                                       | The person or organisation that employs personnel to complete the work  |
| Contractor                                     | The organisation contracted to carry out the works  |
| Airborne contaminants                          | Particles, gases or vapours and combinations of these. ‘Particles’ include dusts, fumes, mists and fibres   |
| Air cleaner or arrestor                        | A device to remove contaminants from air (e.g., filters, cyclone, sock, wet scrubber, electrostatic precipitator (EP))  |
| Air mover                                      | Devices that move air- Fan, Turbo exhauster. The ‘engine’ that powers the extraction system, usually a fan.   |
| Breathing Zone                                 | The region around operators from which they draw air for breathing. Commonly defined as being within 300 mm of nose/mouth   |
| Inspirable dust                                | Any dust which can be inhaled   |
| Particulate-filter respirator                  | An air purifying respirator commonly referred to as a dust or a fume respirator, which removes most of the dust or fume from the air passing through the device   |
| Protective Coating                             | The application of a protective coating to protect metal surfaces from corrosion, or to improve the appearance of a product.  |
| Respirable dust:                               | Is only that dust which is small enough to be inhaled into the lungs. Airborne dust in sizes capable of passing through the upper respiratory system to reach the lower lung passages.  |
| Receiving Hood:                                | The entry point into the LEV that helps direct contaminants away from the breathing zone of an employee.  |
| Sash:  | A movable glass panel that covers the face area of a fume hood. Sashes can be vertical, horizontal, or a combination of the two.  |
| Working Zone:                                  | The location in the workplace where an activity is generating contamination that could enter an employee’s breathing zone.  |
| Sector, Organization, Department or Contractor | The Sector, Organization, Department or Contractor is the NEOM entity or developer designated by NEOM to accept custody for planning, designing, constructing, or managing and operating a particular asset or a group of assets        |
| UL-Listed                                      | Means that UL has tested representative samples of a product and determined that the product meets specific, defined requirements. These requirements are often based on UL's published and nationally recognized Standards for Safety. |
| Safety Management System (SMS)                 | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard  |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| EP            | Electrostatic Precipitator                     |
| VAV           | Variable Air Volume                            |
| LEV           | Local Exhaust Ventilation                      |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance                      |
| NEOM-Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors   |
| NEOM-NLF-NMS-006.001        | SMS Organisation, Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | Safety Construction Management Plan                                       |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards  |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals  |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                       |
| NEOM-NLF-NMS-006.037        | Spray Finishing   |

## **7 Roles and Responsibilities**

### **7.1 Client**

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.

### **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM–NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.(Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE).

### **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Employees shall report any activity or defect relating to LEVs which they know is reasonably practicable to endanger their safety or that of another person.
  - (b) Employees shall use appropriate equipment or safety devices provided by the employer in accordance with any training or instruction received in the use of the work equipment or device concerned.
  - (c) Employees shall not perform any task requiring training until they have received the required training.
  - (d) Employees shall not operate any piece of equipment that they are not familiar with, competent to operate and/or appropriately trained on its use.

### **7.4 Specific Responsibilities**

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.4.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

### **7.5 General Training and Competency**

- 7.5.1 Employers shall ensure that training complies with the requirements of:
  - (a) NEOM Element 5 – Training, Awareness and Competency;
  - (b) NEOM-NLF-NMS-006.001 – SMS Organisation, Practitioner Registration and Appointment of Contractor.
- 7.5.2 Employers shall ensure all relevant employees and contractors that perform tasks that require LEV are trained on:
  - (a) Hazards associated with the operations being completed that requires LEV;
  - (b) Design specification, capabilities and limitations of LEV used at their work site;
- 7.5.3 Methods and procedures that will prevent contamination of clothing and contamination of the employee's breathing zone;
  - (c) The importance of LEV as a control measure;

- (d) Safe work practices; and
- (e) Operator maintenance requirements to ensure LEV is working appropriately.

7.5.4 Employers shall ensure managers and supervisors of operations requiring LEV shall be trained on:

- (a) Requirements of this NMS;
- (b) Maintenance requirements to ensure LEV is working appropriately and within specifications;
- (c) Relevant design and installation principles for LEV systems to ensure that provisions are fit for purpose;
- (d) How to recognize when LEV is not being used appropriately; and
- (e) How to identify when the LEV is not working appropriately.

## 7.6 Training for LEV Use whilst Welding

7.6.1 Training for workers, especially those new to the job, should include:

- (a) Health risks associated with welding fume including information that fume and dust from welding and cutting can cause lung cancer and other lung conditions, if not properly controlled.
- (b) Advice on health effects and likely exposures
- (c) How to do the job properly, including where to stand and how to angle the weld
- (d) What pre-use checks you should make to check your welding equipment is working correctly
- (e) How to use controls and check that they are working
- (f) How local exhaust ventilation (LEV) systems work, for example:
- (g) How to position movable LEV to make sure it is in the right place as you work
- (h) How to ensure fume is not passing through your breathing zone
- (i) What pre-use checks you should make to ensure LEV is working correctly
- (j) How to ensure you are working within the 'capture zone' of the hood
- (k) How to use and look after respiratory protective equipment and personal protective equipment
- (l) What to do if something goes wrong
- (m) Safety risks associated with welding activities

## **8 Other Sections related to subject**

The Employer responsibilities in this NMS relate to Sector, Organization, Department or Contractor

### **8.1 Local Exhaust Ventilation**

- 8.1.1 Each year workers contract lung disease or asthma because they have breathed in too much dust, fume, or other airborne contaminants at work (for example flour dust in bakeries, mist from paint spraying, fumes from welding or solvents from painting). A properly designed, maintained, and operated local exhaust ventilation (LEV) system can remove airborne contaminants before people breathe them in and will protect workers' health.
- 8.1.2 Local exhaust ventilation is an extract ventilation system that takes airborne contaminants such as dusts, mists, gases, vapour or fumes out of the workplace air so that they can't be breathed in. Properly designed LEV will:
  - (a) Collect the air that contains the contaminants
  - (b) Make sure they are contained and taken away from people
  - (c) Clean the air (if necessary) and get rid of the contaminants safely

### **8.2 LEV Hierarchy of Risk Control**

- 8.2.1 Prior to installing LEV consider other options where it's reasonably practicable to do so, such as:
  - (a) Change the method of work so exposure to hazardous substances can no longer occur;
  - (b) Substitute the material being used to something safer;
  - (c) Reduce the amount of the contaminant released;
  - (d) Modify the process to reduce the duration or frequency that the contaminant is released;
  - (e) Reduce the number of employees involved with a process;
  - (f) Apply simple controls, e.g., fitting lids to equipment;
- 8.2.2 When installing LEV may be because it's the wrong type or because it's not properly installed or maintained.

### **8.3 Requirements of LEV Systems**

- 8.3.1 LEV shall be designed to prevent dispersion into the air of dusts, fumes, mists, vapours, and gases in concentrations causing harmful exposure at any point of fallout.
- 8.3.2 LEV shall be designed to ensure no dusts, fumes, mists, vapour, or gases are drawn through the work areas or walkways.
- 8.3.3 Exhaust fans, jets, ducts, hoods, separators, and all necessary equipment, including refuse receptacles, shall be designed, constructed, maintained, and operated as to ensure the required protection by maintain volume and velocity of exhaust air sufficient to gather dust, fumes, vapours or gases from equipment or processes.
- 8.3.4 Air outlet from every LEV shall be discharged to the outside atmosphere. Systems designed to collect non-hazardous materials (e.g., wood dust) can return air back into the work area as long as it has a filtration system that removes repairable dusts and particles and does not result in a harmful exposure to employees.

- 8.3.5 Exhausts of LEV shall not be located in an area that will expose other employees or near air intakes for building ventilation and/or climate control systems.
- 8.3.6 Exhausted material shall be subject to regular emissions monitoring where appropriate, and as a minimum where exhaust material may be harmful to the environment.
- 8.3.7 The exhaust system shall be in operation continually during all operations which it is designed to serve. If the employee remains in the contaminated zone, the system shall continue to operate after the cessation of said operation, until the contaminants are removed. Employees wearing respiratory protection shall not remove it until the atmosphere is clear of contaminants.
- 8.3.8 LEV systems need to be designed for the material which they are intended to remove from the work environment.
- 8.3.9 When contaminants could create a combustible or explosive hazard, the LEV system shall be designed to take this into account and reduce the potential for a fire or explosion.
- 8.3.10 LEVs shall have inspection or clean-out doors not to exceed 4 meters of running length.
- 8.3.11 A clean-out door shall be provided for servicing the fan and where necessary a drain shall be provided.
- 8.3.12 LEV ductwork shall be appropriately supported though its length to sustain its weight plus any normal accumulation of contaminants in the interior during normal operating conditions and any negative pressure exerted upon it.
- 8.3.13 Joints and seams shall be sealed to prevent loss of contaminants during use and prevent contamination of other work areas.
- 8.3.14 Where ductwork passes through a combustible roof or wall, the roof or wall shall be protected at the point of penetration by open space or fire-resistive material between the duct and the roof or wall.
- 8.3.15 Duct work shall not pass-through firewalls unless no other practicable alternative is available. An assessment shall be undertaken to identify the risks of the duct work passing through the firewall to determine any compromise to the integrity of the firewall.
- 8.3.16 LEV systems shall be designed to produce as little noise as reasonably practicable. (Refer: NEOM-NLF-NMS-006).
- 8.3.17 Makeup air in the work area shall be sufficient to prevent the creation of negative pressure in the room that will reduce the effectiveness of the LEV.
- 8.3.18 Where LEV systems require continuous positive pressure to be effective, appropriate means of access and egress shall be provided, including where necessary air-lock doors and / or operational access control.

#### **8.4 Maintenance and Use of LEV**

- 8.4.1 Once an LEV system has been installed there are a number of steps that need to be undertaken to ensure the ongoing effectiveness of control:
  - (a) The system must be commissioned to prove it is working correctly and capable of providing protection to the employees. The results of the commissioning should be used as a benchmark against the future performance of the system and a copy kept with the system until it is decommissioned and removed.
  - (b) Employees shall be trained in how to use the system, how to check it is operating correctly, any limitations of the system and how they should carry out the work activity to ensure maximum control of the contaminants.
  - (c) The LEV system should be maintained in line with the manufacturer's recommendations. The user manual should specify daily, weekly, or monthly checks on the performance and

condition of the system to help ensure its effective control. These may include checks on the following:

- I. Hoods - including airflow indicators, physical damage, and blockages
  - II. Ducts - including damage, wear, and partial blockage
  - III. Dampers - position
  - IV. Filters - including damage, static pressure across the cleaner, and failure alarms
- (d) All user checks, maintenance and servicing should be recorded in the system's log book.
- (e) Every LEV system requires a statutory thorough examination and test by a competent person, at least every 12 months. A thorough examination and test is a detailed and systematic examination to make sure that the LEV can continue to perform as intended and will contribute to the adequate control of exposure.
- (f) All user checks, maintenance and servicing should be recorded in the system's log book.

## **8.5 Employers Specific Responsibilities**

- (a) Employers shall implement the Occupational Health and Safety hierarchy of controls as defined in NEOM Element 2 – Risk and Opportunity Management, when developing control measures to remove or reduce employee exposure to hazards.
- (b) Ensure that LEV systems are designed and installed such that identified hazards are managed and controlled to an acceptable level.
- (c) Ensure that when LEV is not enough to achieve full compliance, protective equipment or other control measures shall be used to keep the exposure of employees to hazardous materials/chemicals within limits
- (d) Conduct air quality monitoring at regular intervals to provide on-going assurance that LEV systems are working to an acceptable level.
- (e) Develop a preventative maintenance plan to ensure LEV works efficiently and according to manufacture specifications.
- (f) Perform flow tests and inspect the LEV system on a regular basis (at a minimum annually) and document the findings along with any maintenance requirements.
- (g) Ensure LEV are designed to the specification set by the American Standards Institute: ANSI/AIHA Z9.2-2006, Fundamentals Governing the Design and Operation of Local Exhaust Ventilation System; or equivalent international standard.
- (h) Monitor the use of LEV to ensure employees are using LEV appropriately

## **8.6 Paint Booths / Spray Finishing Booths**

- 8.6.1 Booths shall provide a continuous, uniform and evenly distributed supply of air flow throughout the spray-painting area to the exhaust outlets. There shall be no pockets of still air in the booth.
- 8.6.2 The source of air supply shall be pulled from an area that is not contaminated with hazardous substances or chemicals as to prevent excess accumulation of airborne contaminants or unnecessary exposures to employees.
- 8.6.3 Employees (e.g., spray painters) shall not be positioned between the spray gun and the ventilation exhaust duct.
- 8.6.4 Booths shall maintain an internal negative pressure during operation to prevent leakage of contaminants into surrounding work areas.

- 8.6.5 Booths shall be equipped with a negative pressure gauge and a gauge or alarm to indicate if airflow drops below the minimum set air flow rate to capture contaminants.
- 8.6.6 Booth ventilation system shall remain on for five (5) minutes after completing spraying operations to purge the chamber.
- 8.6.7 Booths shall provide a level of air velocity at any point within the booth that complies with the following requirements:
  - (a) Minimum air velocity for downdraft booths and cross-draft booths where drafts from outside the booth is equal to or less than 0.2 meters per second: 0.5 meters per second;
  - (b) Minimum air velocity for downdraft booths and cross-draft booths where drafts from outside the booth is more than 0.2 meters per second: 0.8 meters per second; and
  - (c) Minimum air velocity for electrostatic spray painting and spray finishing without operator: 0.4 meters per second. (Refer: NEOM-NLF-NMS-006.037 Spray Finishing)

## **8.7 Chemical Fume Hoods / Laboratory Hoods**

### **8.7.1 Work Area (room) Design:**

- (a) Work areas with chemical fume hoods or laboratory hoods shall be designed to have no recirculation of air to the lab or any other spaces;
- (b) Fume hoods and laboratory hoods shall be located so that person entering or exiting the work area will not have to pass in front of the hood;
- (c) In rooms where there are fume hoods or laboratory hoods installed, there shall be a minimum of two exits from the room. If this is not reasonably practicable, the hood shall be located on the side of the room farthest from the door;
- (d) Fume hoods and laboratory hoods shall not be directly opposite occupied work stations;
- (e) Windows in laboratories containing fume hoods or laboratory hoods shall be fixed closed; and
- (f) HVAC systems in laboratory areas shall be designed such that they automatically close (or as a minimum, that dampers can be locally controlled) to avoid ingress of toxic materials into heating, ventilation, and air conditioning systems.

### **8.7.2 Supply Air:**

- (a) Before a new fume hood or laboratory hood is put into operation, a survey shall be conducted to ensure there is appropriate make-up air;
- (b) Supply and exhaust volumes shall be such that the laboratory is under slightly negative pressure, even when hoods are not operational, to prevent the escape of contaminants;
- (c) Ceiling and wall diffusers for the building ventilation system shall be directed so that the incoming supply of air flow does not affect the air flow at the fume hood or laboratory hood; and
- (d) Supply air intake shall be a minimum of 15 meters from any fume hood or laboratory hood exhaust

### **8.7.3 Variable Air Volume (VAV) Systems:**

- (a) VAV systems shall be designed by a competent engineer with experience in designing VAV systems;
- (b) VAV systems shall maintain a minimum air velocity of 18 meters/min during periods of non-use; and
- (c) Existing LEVs shall not be converted to VAV systems unless designed by a competent engineer and tested to ensure it meets the minimum requirements for capturing contaminants.

#### 8.7.4 Construction and Installation:

- (a) Chemical fume hoods and laboratory hoods shall maintain an average minimum air velocity of 19 meters/min when in use. For VAV systems, the system shall maintain this velocity when the sash is fully open;
- (b) A minimum of 9 measurements shall be taken in various locations of the working area of the chemical fume hood or laboratory hood to ensure minimum average air velocity is met. No result shall be less than 13.5 meters/min;
- (c) A competent person in the design of chemical fume hoods and laboratory hoods shall determine the minimum number of air changes per hour required depending on the use of the system. At a minimum, six air changes per hour will be required for hazardous materials laboratories, but this can be increased depending on the materials used in the laboratory;
- (d) Chemical fume hoods and laboratory hoods and associated ductwork and fans shall be constructed of a material compatible with the materials/contaminants captured by the hood. All areas of potential leaks shall be sealed;
- (e) Portable, non-ducted fume hoods (e.g., use a filter to clean the air) are not acceptable for use with hazardous chemicals;
- (f) All hoods shall have a working airflow indicator installed. Airflow indicators shall be checked during regular maintenance of the hood to ensure it is working appropriately and calibrated annually;
- (g) Hood exhaust stacks shall extend at least two meters above the roof and one meter above any parapet walls, whichever is greater;
- (h) hood exhausts shall be a minimum of 15 meters and preferable downwind from any air intakes. This distance can be increased as needed to prevent re-entrainment of exhaust fumes;
- (i) Rain caps and other such devices are not allowed if they divert the exhaust towards the roof;
- (j) All plumbing utilities shall have shut-off valve or cock adjacent to the hood;
- (k) Electrical outlets shall be outside the hood;
- (l) Lighting fixtures shall be compatible with the contaminants captured by the system. It is suggested to use fluorescent fixtures when feasible;
- (m) Lighting fixtures shall be sealed and vapour tight, UL-listed, and protected by a transparent impact resistant shield; and
- (n) Sashes shall be made of safety glass. Polycarbonate sashes shall not be used for chemical contaminants.

#### 8.7.5 Safe Work Practices

- (a) All work involving hazardous or odorous chemicals shall be performed in a chemical fume hoods or laboratory hood;
- (b) All equipment and materials shall be placed at least 15 centimetres back from the face of the hood and they shall not obstruct the movement of air into the hood;
- (c) When sashes are used, they shall be kept as low as reasonably practicable when the hood is in use;
- (d) Employee's heads shall not be placed into the hood when contaminants are present;
- (e) Hoods shall not be used as a storage area or overloaded with unnecessary equipment and materials;
- (f) Hoods shall not be used to for storage of hazardous chemical wastes;
- (g) Foot traffic shall be minimized when the hood is in use;

- (h) The interior of the ventilation system shall be kept clean and tidy; and
- (i) No work shall be conducted in a malfunctioning hood.

#### 8.7.6 Test and Inspection

- (a) Hoods shall have their performance tested and certified on an annual basis (NEOM approved third party Organisation);
- (b) Hood testing shall be based on manufacture recommendations, applicable international standards, and international best practices;
- (c) A competent person shall be responsible for performing the annual testing and Certification of hoods;
- (d) All identified deficiencies shall be reported and corrected. Hoods found unable to provide appropriate airflow or leaking contaminants shall be taken out of service until repairs are made;
- (e) LEV systems shall undergo a daily visual pre-operation check and inspection; and
- (f) LEV systems shall undergo monthly inspection of air cleaning and filtration components and maintenance as required.

### 8.8 Requirements: Hoods and Enclosure Type, Local Exhaust Ventilation Systems

8.8.1 In addition to the requirements set in this NMS, the following operational specific requirements for ventilation systems apply.

#### 8.8.2 Hood and Enclosure Design

- (a) All grinding and abrasive cutting-off wheel shall have manufacture supplied hoods in place to protect the operator from the hazards of bursting wheels, as well as to provide a means for the removal of dust and dirt generated. Equipment shall not be used unless a hood is in place.
- (b) Hoods shall be located as close as reasonably practicable to the operation.
- (c) Exhaust hoods for floor stands, pedestals, and bench grinders shall be designed in accordance with applicable standard requirements. The adjustable tongue shall be kept in working order and shall be adjusted within one-quarter inch of the wheel periphery at all times.
- (d) Portable grinding operations, whenever the nature of the work permits, shall be conducted within a partial enclosure. The opening in the enclosure shall be no larger than is actually required in the operation and an average face air velocity of not less than 200 cubic feet per minute shall be maintained.
- (e) Hoods for polishing and buffing and scratch-brush wheels shall be constructed to conform as closely to standard requirements as the nature of the work will permit.
- (f) Cradle grinding and polishing operations shall be performed within a partial enclosure meeting standard requirements. The operator shall be positioned outside the working face of the opening of the enclosure. The face opening of the enclosure shall not be any greater in area than that actually required for the performance of the operation and the average air velocity into the working face of the enclosure shall not be less than 150 feet per minute.
- (g) Hoods for horizontal single-spindle disc grinders shall be constructed to conform as closely as reasonably practicable to the hood. It is essential that there be a space between the back of the wheel and the hood, and a space around the periphery of the wheel of at least 25.4mm in order to permit the suction to act around the wheel periphery. The opening on the side of the disc shall be no larger than is required for the grinding operation but shall never be less than twice the area of the branch outlet.
- (h) Horizontal double-spindle disc grinders shall have a hood encircling the wheels and grinding chamber. The openings for passing the work into the grinding chamber shall be kept as small as reasonably practicable but shall never be less than twice the area of the branch outlets.

- (i) Vertical-spindle disc grinders shall be encircled with a hood so constructed that the heavy dust is drawn off a surface of the disc and the lighter dust exhausted through a continuous slot at the top of the hood.
- (j) Grinding and polishing belt hoods shall be constructed as close to the operation as reasonably practicable. The hood shall extend almost to the belt, and 1-inch-wide openings shall be provided on either side.

#### 8.8.3 Enclosures

- (a) Temporary enclosures shall be used when the object or structure is unable to be transported. Any object measuring greater than 2.5m x 2.5m x 3.0m shall be considered large in consideration with applicable local / national regulations or the international standard. Temporary enclosures are also used for fixed structures, e.g., Bridges or water tanks.
- (b) Where monitoring indicates that persons in surrounding areas may be exposed to dust levels in excess of the national exposure standards, they shall be excluded from the area, where reasonably practicable, by warning signs and barricading, or provided with personal protective equipment (PPE). (Refer: NEOM-NLF-NMS-006.012 Barricading of Hazards and NEOM-NLF-NMS-006.013 Safety Signage and Signals and NEOM-NLF-NMS-006.021 Personal Protective Equipment)
- (c) Grinding Wheels: Ventilation systems for grinding wheels on floor stands, pedestals, benches, and special-purpose grinding machines and abrasive cutting-off wheels shall have not less than the minimum exhaust volumes shown in Table 4, with a recommended minimum duct velocity of 4,500 feet per minute in the branch and 3,500 feet per minute in the main. The entry losses from all hoods except the vertical-spindle disc grinder hood shall equal 0.65 velocity pressure for a straight take-off and 0.45 velocity pressure for a tapered take-off.

*Table 4 - Grinding and Abrasive Cutting-Off Wheels*

| Wheel diameter(inches) | Wheel width (inches) | Minimum exhaust volume (feet <sup>3</sup> /min) |
|------------------------|----------------------|---|
| To 9                   | 1 1/2                | 220   |
| Over 9 to 16           | 2                    | 390   |
| Over 16 to 19          | 3                    | 500   |
| Over 19 to 24          | 4                    | 610   |
| Over 24 to 30          | 5                    | 880   |
| Over 30 to 36          | 6                    | 1,200   |

**Note:** For any wheel wider than wheel diameters shown in the above table, increase the exhaust volume by the ratio of the new width to the width shown.

**Example:** If wheel width = 4 1/2 inches, then 4.5 divided by 4 X 610 = 686 (rounded to 690).

- (d) Scratch-brush, buffing, and polishing wheels: Scratch-brush wheels and all buffing and polishing wheels mounted on floor stands, pedestals, benches, or special-purpose machines shall have not less than the minimum exhaust volume shown in below Table 5.

Table 5 - Scratch-brush, buffing, and polishing wheels

| Wheel diameter (inches) | Wheel width (inches) | Minimum exhaust volume (feet <sup>3</sup> /min) |
|-------------------------|----------------------|---|
| To 9                    | 2                    | 300   |
| Over 9 to 16            | 3                    | 500   |
| Over 16 to 19           | 4                    | 610   |
| Over 19 to 24           | 5                    | 740   |
| Over 24 to 30           | 6                    | 1040  |
| Over 30 to 36           | 6                    | 1,200   |

- (e) Grinding wheels/discs for horizontal single-spindle disc grinders: Grinding wheels or discs for horizontal single-spindle disc grinders shall be hooded to collect the dust or dirt generated by the grinding operation and the hoods shall be connected to branch pipes having exhaust volumes as shown in Table 6.

Table 6 - Horizontal Single-Spindle Disc Grinder

| Disc diameter(inches) | Minimum exhaust volume (feet <sup>3</sup> /min) |
|-----------------------|---|
| Up to 12              | 220   |
| Over 12 to 19         | 390   |
| Over 19 to 30         | 610   |
| Over 30 to 36         | 880   |

- (f) Grinding wheels/discs for horizontal double-spindle disc grinders: Grinding wheels or discs for horizontal double-spindle disc grinders shall have a hood enclosing the grinding chamber and the hood shall be connected to one or more branch pipes having exhaust volumes as shown in Table-7.

Table 7 - Horizontal Double-Spindle Disc Grinder

| Disc diameter(inches) | Minimum exhaust volume (feet <sup>3</sup> /min) |
|-----------------------|---|
| Up to 19              | 610   |
| Over 19 to 25         | 880   |
| Over 25 to 30         | 1200  |
| Over 30 to 53         | 1770  |
| Over 53 to 72         | 6280  |

- (g) Grinding wheels/discs for vertical single-spindle disc grinders: Grinding wheels or discs for vertical single-spindle disc grinders shall be encircled with hoods to remove the dust generated in the operation. The hoods shall be connected to one or more branch pipes with exhaust volumes as shown in Table 8.

Table 8 - Vertical Spindle Disc Grinder

| Disc diameter(inches) | One-half or more of disc covered |                      | Disc not covered      |                                |
|-----------------------|----------------------------------|----------------------|-----------------------|--------------------------------|
|                       | Number <sup>(1)</sup>            | Exhaust foot (3)/min | Number <sup>(1)</sup> | Exhaust foot <sup>3</sup> /min |
| Up to 20              | 1                                | 500                  | 2                     | 780                            |
| Over 20 to 30         | 2                                | 780                  | 2                     | 1,480                          |
| Over 30 to 53         | 2                                | 1,770                | 4                     | 3,530                          |
| Over 53 to 72         | 2                                | 3,140                | 5                     | 6,010                          |

<sup>(1)</sup> Number of exhaust outlets around periphery of hood, or equal distribution provided by other means.

- (h) Grinding and Polishing Belts: Grinding and polishing belts shall be provided with hoods to remove dust and dirt generated in the operations and the hoods shall be connected to branch pipes having exhaust volumes as shown in Table 9.

*Table 9- Grinding and Polishing Belts*

| <b>Belts width (inches)</b> | <b>Exhaust volume (feet <sup>3</sup>/min)</b> |
|-----------------------------|---|
| Up to 3                     | 220   |
| Over 3 to 5                 | 300   |
| Over 5 to 7                 | 390   |
| Over 7 to 9                 | 500   |
| Over 9 to 11                | 610   |
| Over 11 to 13               | 740   |

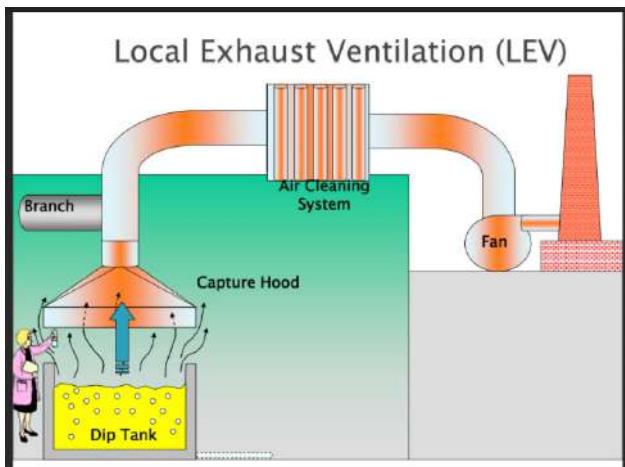
- (i) Cradles and swing-frame grinders. Where cradles are used for handling the parts to be ground, polished, or buffed, requiring large partial enclosures to house the complete operation, a minimum average air velocity of 150 feet per minute shall be maintained over the entire opening of the enclosure. Swing-frame grinders shall also be exhausted in the same manner as provided for cradles.

## 8.9 Record Keeping

- 8.9.1 Employers shall ensure they keep appropriate records as required including, but not limited to valid and up to date test and inspection certificates for LEV systems. These shall be maintained on site for the lifetime of the LEV system. (Refer: NEOM-Element 3 Control of Documented Information & Legal Compliance)

## 9 Appendices

### 9.1 Appendix A: Forms and Checklists



## 9.2 Appendix B: Audit Criteria

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria                |                 | Requirements   | Verification | Area of Concern |
|-------------------------------|-----------------|--|--------------|-----------------|
| ISO<br>45001:2018<br>Clause   | NMS Ref.        |  |              | Yes/ No         |
| 5.3                           | 7.1.3           | Pre-Tender Health and Safety Plan has been developed and issued  |              |                 |
| 5.3,<br>8.1.4.2               | 7.1.4           | Selection of Contractors undertaken in accordance with NEOM's policies and procedures  |              |                 |
| 7.2                           | 7.2.4,<br>7.4,  | Persons appointed to manage /oversee work operations have the skills, knowledge, experience  |              |                 |
| 8.1.2 (e)                     | 7.2.6,<br>7.3.3 | Personal protective equipment required for use are fit for purpose   |              |                 |
| 6.1.2.3<br>6.1.2.2            | 7.2.5<br>8.2.2  | Hazards Identification Plan (HIP)<br>Assessment of the various risks shall be undertaken,  |              |                 |
| 6.1.2.1                       | 7.3.4<br>(a, b) | Employees shall report any activity or defect relating to LEVs   |              |                 |
| 8.1.2                         | 8.1             | A properly designed, maintained, and operated local exhaust ventilation (LEV) system, removes airborne contaminants before people breathe them in and will protect workers' health   |              |                 |
| 8.1.2,<br>6.1.2.3,<br>6.1.2.2 | 8.3             | The exhaust system shall be in operation continually during all operations which it is designed to serve   |              |                 |
|                               |                 | Employees wearing respiratory protection shall not remove it until the atmosphere is clear of contaminants, the system shall continue to operate after the cessation of said operation, until the contaminants are removed   |              |                 |
|                               | 8.4             | The LEV system should be maintained in line with the manufacturer's recommendations include checks on the following:<br>a) Hoods - including airflow indicators, physical damage, and blockages<br>b) Ducts - including damage, wear, and partial blockage<br>c) Dampers – position<br>d) Filters - including damage, static pressure across the cleaner, and failure alarms |              |                 |
|                               | 8.8.3           | Temporary enclosures shall be used when the object or structure is unable to be transported  |              |                 |
|                               |                 |  |              |                 |
|                               |                 |  |              |                 |

| Audit Criteria              |          | Requirements | Verification | Area of Concern |
|-----------------------------|----------|--------------|--------------|-----------------|
| ISO<br>45001:2018<br>Clause | NMS Ref. |              |              | Yes/ No         |
|                             |          |              |              |                 |

### 9.3 Appendix C: Guidance Information

OSHA 29 CFR 1926 Subpart D is explicit in requirements for LEV this is seen throughout Subpart D especially in

1926.57(a)

"General." Whenever hazardous substances such as dusts, fumes, mists, vapors, or gases exist or are produced in the course of construction work, their concentrations shall not exceed the limits specified in 1926.55(a). When ventilation is used as an engineering control method, the system shall be installed and operated according to the requirements of this section.

1926.57(b)

"Local exhaust ventilation." Local exhaust ventilation when used as described in (a) shall be designed to prevent dispersion into the air of dusts, fumes, mists, vapors, and gases in concentrations causing harmful exposure. Such exhaust systems shall be so designed that dusts, fumes, mists, vapors, or gases are not drawn through the work area of employees.

1926.57(c)

"Design and operation." Exhaust fans, jets, ducts, hoods, separators, and all necessary appurtenances, including refuse receptacles, shall be so designed, constructed, maintained and operated as to ensure the required protection by maintaining a volume and velocity of exhaust air sufficient to gather dusts, fumes, vapors, or gases from said equipment or process, and to convey them to suitable points of safe disposal, thereby preventing their dispersion in harmful quantities into the atmosphere where employees work.

Under UK legislation LLEV's are required by the Control of Substances Hazardous to Health requirements and freely available on the UK HSE web site is a document HSG 258 which gives employers excellent information in regard to Local Exhaust Ventilation and Controlling Airborne Contaminates at Work





نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
PORTABLE POWER TOOLS**

NEOM-NLF-NMS-006.019 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

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## OUR NEOM VALUES



### CATALYST

Make a difference.  
Create a legacy.



### CARE

Leave the environment  
in a better place.



### CURIOUS

Challenge the norm.  
Stay restless.



### PASSIONATE

Be accountable.  
Finish what you start.



### RESPECT

Be authentic.  
Be true. Be fair.



### DIVERSITY

Embrace cultural  
differences.  
Seek to understand.

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with Portable Power Tools.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the NEOM Safety Management System (SMS) and the requirements of the ISO 45001 Health and Safety Management (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

It identifies the requirements for safe use and maintenance of Portable Power Tools.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities.

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions   |
|--------------------------------|---|
| NEOM Co                        | NEOM Company  |
| Client                         | NEOM Sector /Department responsible for management and oversight of the Contractor  |
| Employer                       | The person or organisation that employs personnel to complete the work  |
| Contractor                     | The organisation contracted to carry out the works  |
| Portable Power Tools           | A general term referring to several types of power tools, based on the power source they use - electric power operated tools (e.g., circular saws, drill machines), pneumatic power tools (e.g., hammers, chippers, and compressed air guns), hydraulic power tools (jacks), and powder-actuated tools (nail guns). |
| Safety Management System (SMS) | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard  |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| RCD           | Residual Current Device                        |
| mA            | milli Amp                                      |
| PAT           | Portable Appliance Test                        |
| PSI           | Pounds per Square Inch                         |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code | Document Name |
|---------------|---------------|
|               |               |

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM-SMS                    | NEOM Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors   |
| NEOM-NLF-NMS-006.001        | SMS Organisation, Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | Safety Construction Management Plan                                       |
| NEOM-NLF-NMS-006.006        | Safe Use of Lifting Equipment and Lifting Accessories                     |
| NEOM-NLF-NMS-006.012 –      | Barricading of Hazards  |
| NEOM-NLF-NMS-006.016        | Electrical Safety   |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                       |
| NEOM-NLF-NMS-006.028        | Lock-out / Tag-out (Isolation)  |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.

## **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.(Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
- 7.2.7 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Portable power tools shall be appropriate for the task and maintained in good working condition;
  - (b) All work involving the use of portable power tools shall be appropriately planned, organized, and appropriately supervised;
  - (c) Those involved in use of portable power tools are trained and competent; and
  - (d) All portable power tools are inspected and maintained to manufactures specifications on a regular basis by a competent person.

## **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Employees shall inspect portable power tools before use, report any activity or defect relating to the power tool which they believe is reasonably foreseeable to endanger their safety or the safety of another person; and
  - (b) Employees shall use safety devices provided with portable power tools in accordance with the training or instruction received from the employer.

## **7.4 Specific Responsibilities**

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.4.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Employer**

- 8.1.1 Responsibilities in this section referring to ‘Employers’ shall be undertaken by the Client, Contractor, or Appointed Duty Holder with responsibility for the site, work activities and/or workforce at any given time.

### **8.2 Training**

- 8.2.1 Employers shall ensure that training complies with the requirements of:

- (a) NEOM Element 5 – Training, Awareness and Competency;
- (b) NEOM-NLF-NMS-006.001 – SMS Organisation, Practitioner Registration and Appointment of Contractor.

- 8.2.2 Training for employees shall be competency-based and include:

- (a) Systems of work needed for the safe use of portable power tools;
- (b) Type and selection of correct portable power tools; and
- (c) Care, maintenance, and inspection of portable power tools.

- 8.2.3 Retraining shall be conducted when a periodic inspection reveals, or there is reason to believe, that there are deviations from or inadequacies in the employee’s knowledge of the correct use of portable power tools.

- 8.2.4 Additional retraining shall be conducted when it is evident that portable power tool safe operating procedures are not being complied with.

- 8.2.5 Training Records shall be maintained containing the following information:

- (a) Name and ID Number;
- (b) Subject(s) of training;
- (c) Date(s) of training; and
- (d) Person(s) providing the training.

### **8.3 Planning and Assessment**

- 8.3.1 Employers shall evaluate each site or operation to determine if hazards are present from portable power tools, which shall be assessed using risk management practices as required by NEOM Element 2 – Risk and Opportunity Management.
- (e) Effective procedures and control measures shall be developed and implemented in order to manage the risks associated with the use of portable power tools;
  - (f) The general requirements to manage portable power tool are included in the Pre-Tender Safety and Health Plan in accordance with NEOM-NLF-NMS-006.002 Construction Management Plan (CPP) ; and
  - (g) That associated safe systems of work, and site rules are included in the NEOM-NLF-NMS-006.002 Occupational Safety and Health Construction Management Plan and in accordance with NEOM-NLF-PRC-006; Occupation safety health and Fire Safety requirements for Contractors.
- 8.3.2 When assessing the risks associated with portable power tools the following shall be considered:
- (a) Risk of shocks, burns, and electrocution if tools are not disconnected before servicing or maintenance;
  - (b) Employees not using the correct personal protective equipment;
  - (c) Incorrect plugs or connections being used resulting in an earth continuity failure;
  - (d) ‘Residual Current Devises’ (RCDs) being by-passed;
  - (e) Unplanned energizing of portable power tools during maintenance operations;
  - (f) Risk of injury by moving parts due to accidental release of hydraulic/pneumatic energy of the tool;
  - (g) Damage of the portable power tool casing exposing a source of energy;
  - (h) Risk of injury by high-pressure fluid from hydraulic tools;
  - (i) Vibration and noise hazards associated with many types of portable power tool; and
  - (j) Risk of burn from hot oil in hydraulic tools.

### **8.4 Electrically Operated Portable Power Tools -General Requirements**

- 8.4.1 Employers shall ensure the following:
- (a) Consideration of the following hierarchy when planning to use electrically operated portable power tools:
    - I. Battery or cordless tools (low voltage);
    - II. Use of 110v tools using a step-down transformer; or
    - III. Use of 240v tools protected with a 30mA RCD.
  - (b) Electrically operated portable power tools shall be in good condition and appropriately maintained;
  - (c) Hand-held portable power tools shall be fitted with a constant pressure switch that requires constant pressure to energize the tool;
  - (d) Freestanding or bench mounted portable power tools may be fitted with positive on/off controls provided an emergency stop device is fitted;

- (e) Where 110v portable power tools are not available or it is not reasonably practicable to be provided, 240v electrically operated portable power tools shall be used with a 30mA RCD;
- (f) Electrically operated portable power tools shall be double insulated;
- (g) All electrically operated tools are used within their design limitations;
- (h) Employees are provided with the necessary personal protective equipment in accordance with the requirements of NEOM-NLF-NMS-006.021 – Personal Protective Equipment
- (i) All electrically operated portable power tools and electrical installations shall comply with the requirements of NEOM-NLF-NMS-006.016 – Electrical Safety;

## **8.5 Use of Electrically Operated Portable Power Tools**

- 8.5.1 Employers shall ensure the following practices are followed when using electrically operated portable power tools:
- (a) Cables from electrically operated portable power tools shall be organized so as not to present a tripping hazard;
  - (b) Tools and power socket-outlets shall be switched off before plugging in or unplugging;
  - (c) Appropriate lighting levels shall be maintained in areas where electrically operated portable power tools are used;
  - (d) Electrical cables or connections shall not be routed through wet areas or areas that are reasonably foreseeable to become wet;
  - (e) Guards on electrically operated portable power tools are to be kept in place at all times whilst in use;
  - (f) Industrial connectors/plugs and sockets shall be used for both 110v and 240v electrically operated portable power tools;
  - (g) Under no circumstances are domestic 3 pin plugs and sockets to be used in an industrial or construction environment.

## **8.6 Maintenance of Electrically Operated Portable Power Tools**

- 8.6.1 Employers shall ensure the following:
- (a) No maintenance, cleaning or adjusting shall be undertaken on electrically operated portable power tools unless the equipment has been unplugged from the mains power supply;
  - (b) Suspect or faulty equipment shall be taken out of use and labelled 'DO NOT USE', in accordance with NEOM-NLF-NMS-006.028 – Lock-out / Tag-out (Isolation);
  - (c) Maintenance and repair work shall only be undertaken by a competent electrician.

## **8.7 Inspection and Testing of Electrically Operated Portable Power Tools**

- 8.7.1 Employers shall ensure visual checks are carried out daily by users and that formal inspections are carried out weekly by a competent person. Inspections shall include the following checks:
- (a) All cables are sheathed;
  - (b) The cable outer sheathing is not damaged;
  - (c) The plug is in good condition;
  - (d) There are no taped or other non-standard joints in the cable;
  - (e) The cable sheathing is gripped where it enters the plug or tool;

- (f) The outer casing of the equipment is not damaged or loose; and
  - (g) There are no signs of overheating on the plug.
- 8.7.2 Employers shall ensure that all electrically operated portable power tools undergo a Portable Appliance Test (PAT) at a frequency determined by the following factors:
- (a) Environmental conditions;
  - (b) Frequency of use;
  - (c) Frequency of being plugged and un-plugged; and
  - (d) The equipment construction:
    - I. Safety of Class 1 equipment is dependent upon the fixed electrical connection to earth;
    - II. Safety of Class 2 equipment is not dependent upon the fixed electrical connection to earth.
- 8.7.3 A PAT test is conducted every 3 months on all electrically operated portable power tools used on construction sites.
- 8.7.4 Ensure PAT testing is performed by a person who is competent in the safe use of the test equipment and who knows how to interpret the test results obtained. This person shall be capable of inspecting the equipment and, where necessary, dismantling it to check the cable connections.

## **8.8 Cartridge Tools - General Requirements**

- 8.8.1 Employers shall ensure the following:
- (a) All cartridge tools are in good condition and appropriately maintained;
  - (b) Issue of cartridge tools and cartridges shall be strictly controlled;
  - (c) Cartridge tools and cartridges shall remain in the possession of the person to whom they are issued;
  - (d) When not in use, cartridge tools shall be kept under lock in a controlled storeroom;
  - (e) All cartridges shall be clearly labelled to indicate their strength;
  - (f) Employees using cartridge tools are provided with the personal protective equipment necessary to protect them from any specific hazards associated with using cartridge tools in accordance with the requirements of NEOM-NLF-NMS-006.021 – Personal Protective Equipment; and
  - (g) No person shall operate a cartridge-operated tool or powder-actuated tool unless they are trained on the specific tool and demonstrated competency in the use of the tool. (Refer: NEOM Element 5 Training, Awareness, and Competence)

## **8.9 Use of Cartridge Tools**

- 8.9.1 Employers shall ensure the following when using cartridge tools:
- (a) An exclusion zone shall be formed around the area where the cartridge tool is to be used;
  - (b) Cartridge tools shall not be used in an area where flammable gases, vapours or explosive dusts may be present;
  - (c) All guards designed for use with a cartridge tool shall be used;
  - (d) When not in use cartridge tools shall be locked in a safe and controlled place and shall never be left unattended.

## **8.10 Maintenance and Inspection of Cartridge Operated Portable Power Tools**

8.10.1 Employers shall ensure the following:

- (a) No maintenance, cleaning or adjusting shall be undertaken on cartridge tools unless all cartridges have been removed;
- (b) Suspect or faulty equipment shall be taken out of use, labelled 'DO NOT USE' and kept secure until examined by a competent person, in accordance with NEOM-NLF-NMS-006.028 – Lock-out / Tag-out (Isolation);
- (c) Maintenance shall only be undertaken by persons who are competent;
- (d) Any problems with cartridge tools or cartridges shall be reported to the person who issued them;
- (e) Cartridge tools shall be dismantled and examined for defects by a competent person every seven days and taken out of service if any defects are found;
- (f) Cartridge tools are examined before each use for defects by a competent person; and
- (g) A record of the cartridge tool dismantling and examination carried out every 7 days shall be maintained.

## **8.11 Compressed Air Tools - General Requirements**

8.11.1 Employers shall ensure the following:

- (a) All compressed air tools shall be in good condition and appropriately maintained;
- (b) Compressors shall be supervised by a competent person who will ensure guards, hoses and couplers are in place and that ventilation is appropriate;
- (c) Employees using compressed air tools shall be provided with the personal protective equipment necessary to protect them from any specific hazards associated with using compressed air tools in accordance with the requirements of NEOM-NLF-NMS-006.021 – Personal Protective Equipment;
- (d) No person shall operate a compressed air tool unless they are trained in the use of the specific tool and demonstrate competency in the use of that tool; and
- (e) Air receivers shall be marked with their safe working pressure and distinguishing number; they shall also be fitted with a safety valve, pressure gauge, and drain cock.

## **8.12 Use of Compressed Air Tools**

8.12.1 Employers shall ensure the following when using compressed air tools:

- (a) Air compressors shall be to be operated and maintained in accordance with the original equipment manufacturer's instructions;
- (b) Air compressors shall be positioned on a firm and level surface prior to starting;
- (c) The air intake for the compressor shall not be exposed to atmospheric contaminants, exhaust fumes or excessive dust;
- (d) Petrol operated air compressors shall be used in a well-ventilated location;
- (e) A shut off valve shall be fitted at the connection between the hose and the tool;
- (f) Whip-check fittings shall be used to secure all connections;

- (g) Compressed air shall not be used for cleaning purposes
- (h) The manufacturers safe operating pressure for hoses and accessories shall not be exceeded;
- (i) All hoses exceeding 12mm inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure; and
- (j) Air supply lines shall be protected from damage by vehicles and materials.

## **8.13 Maintenance and Inspection of Compressed Air Portable Power Tools**

8.13.1 Employers shall ensure the following:

- (a) Suspect or faulty equipment shall be taken out of use, labelled 'DO NOT USE' and kept secure until examined by a competent person, in accordance with NEOM-NLF-NMS-006.028 – Lock-out / Tag-out (Isolation);
- (b) Maintenance shall only be undertaken by persons who are competent;
- (c) No maintenance work shall be undertaken on air compressors or compressed air tools unless the equipment has been completely de-energized and pressure release valves are left open; and
- (d) A maintenance program shall be implemented for compressors which should, in addition to the manufacturer's recommendations, include the following:
  - I. Inspect, clean, or replace inlet filter cartridges;
  - II. Clean out debris and check operation of drain traps;
  - III. Compressor lubricant level shall be inspected daily and top-up or replace compressor lubricant and change lubricant filter;
  - IV. Air lubricant separators (lubricant-injected rotary screw compressors) shall be changed as per the manufacturer specifications, or when the pressure drop exceeds 10 P.S.I., whichever is less;
  - V. Check belts for wear and check/adjust tension;
  - VI. Verify that the operating temperature is as per the manufacturer specification;
  - VII. Replace airline filters when pressure drop exceeds 2 to 3 P.S.I.;
  - VIII. For water-cooled systems check water quality, flow and temperature, and clean/replace filters and heat exchangers;
  - IX. Check compressed air lines including fittings, clamps, valves, regulators, filters, lubricators, gauge connections, and end-use equipment for leaks; and
  - X. Check system for compressor and motor lubricant leaks and cleanliness.

8.13.2 Employers shall ensure the regular inspection of compressors and air powered tools which should include:

- (a) Daily checks for oil leaks and correct fitting of guards;
- (b) Daily checks of tools, damage to hoses and dirty, inoperable, or damaged fittings and connections;
- (c) Verification of correct operation of pressure relief valves; and
- (d) Periodic inspection of the pressure vessels as prescribed by the manufacturer's specifications.

## **8.14 Hydraulic Power Tools - General Requirements**

8.14.1 Employers shall ensure the following:

- (a) All hydraulic power tools shall be in good condition and maintained in accordance with the manufacturer's instructions;

- (b) No person shall operate hydraulic power tools unless they are trained in the use of the specific tool and found to be competent in the use of that tool;
- (c) Employees using hydraulic tools shall be provided with the personal protective equipment necessary to protect them from any specific hazards associated with using hydraulic tools in accordance with the requirements of NEOM-NLF-NMS-006.021 Personal Protective Equipment;
- (d) The fluid used in hydraulic power tools shall be an approved fire-resistant fluid and must retain its operating characteristics at the most extreme temperatures to which it will be exposed;
- (e) The manufacturer's recommended safe operating pressure for hoses, valves, pipes, filters, and other fittings shall not be exceeded;
- (f) All jacks including lever and ratchet jacks, screw jacks, and hydraulic jacks shall have a stop indicator and the stop limit must not be exceeded; and
- (g) The manufacturer's load limit shall be permanently marked in a prominent place on the jack and the load limit must not be exceeded.

## **8.15 Use of Hydraulic Tools**

8.15.1 Employers shall ensure the following when using hydraulic tools:

- (a) Before making or breaking any hydraulic connection the system shall be depressurized;
- (b) Jacks shall always be positioned on a firm base of appropriate bearing strength;
- (c) A jacking base such as a steel plate or timber spreader shall be used to
- (d) Distribute the load;
- (e) Once the load has been lifted it shall be blocked in place wherever reasonably practicable so that the jack is not supporting the load;
- (f) Oil connections should be kept clean;
- (g) Couplers should be wiped before connecting;
- (h) Dust caps should be used to keep dirt out;
- (i) Cylinder mounting threads should be protected; and
- (j) Protectors should be used to prevent damage to the thread.

## **8.16 Maintenance and Inspection of Hydraulic Portable Power Tools**

8.16.1 Employers shall ensure the following:

- (a) No maintenance, cleaning or adjusting shall be undertaken on hydraulic power tools unless the equipment has been completely de-energized;
- (b) Suspect or faulty equipment shall be taken out of use and labelled 'DO NOT USE' and kept secure until examined by a competent person;
- (c) Maintenance of hydraulic power tools shall only be undertaken by persons who are competent, in accordance with NEOM-NLF-NMS-006.028 Lock-out / Tag-out (Isolation);
- (d) Jacks shall be tested in accordance with NEOM-NLF-NMS-006.006 Safe Use of Lifting Equipment and Lifting Accessories; and
- (e) Maintenance of hydraulic power tools shall be carried out in accordance with the manufacturer's recommendations.

## **8.17 Inspection of Portable Power Tools**

8.17.1 In addition to the specific inspection requirements detailed in this NMS, employers shall ensure:

- (a) Visual checks shall be carried by users on portable power tools out before use;
- (b) Formal inspections shall be carried out by competent persons at regular intervals; and
- (c) Any portable power tool that is malfunctioning shall immediately be removed from service and labelled 'DO NOT USE' and kept secure until examined by a competent person, in accordance with NEOM-NLF-NMS-006.028 – Lock-out / Tag-out (Isolation).

## **8.18 Maintenance of Portable Power Tools**

8.18.1 Employers shall ensure the following:

- (a) A schedule of all portable power tools shall be maintained at each workplace;
- (b) All portable power tools shall be included in a maintenance program which consider the following factors:
  - I. Type of tool and power source;
  - II. Manufacturer's instructions and recommendations;
  - III. Age of the tool;
  - IV. Frequency of use and the work cycle of the tool;
  - V. Working environment in which the tool is used (e.g., Wet or dusty), or likelihood of mechanical damage.
  - VI. Foreseeable misuse of the tool;
  - VII. Effects of any modifications or repairs to the tool; and
  - VIII. Analysis of previous records of maintenance.

## 9 Appendices

### 9.1 Appendix A: Forms, Signs and Checklists



## 9.2 Appendix B: Audit Criteria PORTABLE POWER TOOLS

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria              |               | Requirements   | Verification | Area of Concern |
|-----------------------------|---------------|--|--------------|-----------------|
| ISO<br>45001:2018<br>Clause | NMS Ref.      |  |              | Yes/ No         |
| 5.3                         | 7.1.3         | Pre-Tender Health and Safety Plan has been developed and issued  |              |                 |
| 5.3,<br>8.1.4.2             | 7.1.4         | Selection of Contractors undertaken in accordance with NEOM's policies and procedures  |              |                 |
| 7.2                         | 7.2.4,<br>8.2 | Persons appointed to manage /oversee work operations have the skills, knowledge, experience  |              |                 |
| 8.1.2 (e)                   | 7.2.6         | Personal protective equipment required for use are fit for purpose   |              |                 |
| 6.1.2.3<br>6.1.2.2          | 7.2.5         | Hazards Identification Plan (HIP)<br><br>Assessment of the various risks shall be undertaken, to protect all personnel, including visitors       |              |                 |
| 8.1.2                       | 8.3.1(a)      | Effective procedures and control measures shall be developed and implemented to manage the risks associated with the use of portable power tools |              |                 |
|                             | 8.4.1(b)      | Electrically operated portable power tools shall be in good condition and appropriately maintained   |              |                 |
| 8.1.3                       | 8.7.1         | Employers shall ensure visual checks are carried out daily by users and that formal inspections are carried out weekly by a competent person     |              |                 |
|                             | 8.12.2(a)     | Air compressors shall be to be operated and maintained in accordance with the original equipment manufacturer's instructions                     |              |                 |
|                             |               |  |              |                 |
|                             |               |  |              |                 |
|                             |               |  |              |                 |
|                             |               |  |              |                 |
|                             |               |  |              |                 |
|                             |               |  |              |                 |
|                             |               |  |              |                 |

### **9.3 Appendix C: Guidance Information**

OSHA regulations again are diverse and in-depth regarding their regulations on this subject as the regulations sit in various areas of 29 CFR.

For General Industry 29 CFR 1910 Subparts P, R and T are used.

In the maritime side the requirement for tools and related equipment is found in 29 CFR 1915, 1917 and 1918.

Specific requirements for the Construction Industry are found in 29 CFR 1926 Subpart I (1926.300 to 307)– Tools – Hand and Power.

In the UK the use of portable power tools are regulated for, in the

- Provision and Use of Work Equipment Regulations 1998 (PUWER) and
- Provision and Use of Work Equipment Regulations 1998.
- Approved Code of Practice and guidance L 22 2014 Safe use of work equipment.

There is also guidance available for Portable Appliance Testing (PAT) requirements under the Electricity at Work Regulations 1989.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
HAZARDOUS MATERIALS**

(CONTROL of SUBSTANCES HAZARDOUS to HEALTH)

NEOM-NLF-NMS-006.020 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

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## OUR NEOM VALUES



### CATALYST

Make a difference.  
Create a legacy.



### CARE

Leave the environment  
in a better place.



### CURIOUS

Challenge the norm.  
Stay restless.



### PASSIONATE

Be accountable.  
Finish what you start.



### RESPECT

Be authentic.  
Be true. Be bold.



### DIVERSITY

Embrace cultural  
differences.  
Seek to understand.

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with Hazardous Substances.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

This procedure applies to all workplaces and substances at NEOM locations, which are hazardous to health or the environment.

## **3 Expectations**

To ensure the occupational health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with hazardous substances are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities.

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements.
- (b) ANSI requirements.
- (c) NFPA Standards and requirements.
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                                 | Definitions  |
|---------------------------------------|--|
| NEOM Co                               | NEOM Company   |
| Client                                | NEOM Sector /Department responsible for management and oversight of the Contractor   |
| Employer                              | The person or organization that employs personnel to complete the work   |
| Contractor                            | The organization contracted to carry out the works   |
| Sector, Organization or Department    | The NEOM responsible department with overall authority for a specific project, location asset and operational function.  |
| Sector, Organization, Department Head | The head responsible and accountable for the implementation and function of this procedure within the Sector, Organization, Department or Contractor.  |
| Responsible Person                    | A person utilizing their approved delegation of authority process. The "Responsible Person" is the senior NEOM employee who has responsibility for the day-to-day management of the work activities, or the contracted party engaged in such activities. |
| COSHH Coordinator                     | An appointed person who is appointed by the Proponent Organization Head that will manage the day-to-day issues related to COSHH substances at a location level and to ensure compliance with the requirements of this procedure.                         |
| Proponent Organization                | The organization responsible and accountable for the implementation and function of this procedure within the Sector. Can be Client (Organization, Department) or Contractor.  |
| Safety Management System (SMS)        | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard   |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| MSDS          | Material Safety Data Sheet                     |
| SDS           | Safety Data Sheet                              |

| Abbreviations | Descriptions                              |
|---------------|---|
| PEL           | Permissible Exposure Limit                |
| TLV           | Threshold Limit Values                    |
| COSHH         | Control of Substances Hazardous to Health |
| OHS           | Occupational Health and Safety            |
| IBC           | International Building Codes              |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM Element 3              | Control of Documented Information & Legal Compliance                      |
| NEOM-Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM Element 9              | Emergency Planning and Response Management                                |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors   |
| NEOM-NLF-NMS-006.001        | SMS Organization, Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | Safety Construction Management Plan                                       |
| NEOM-NLF-NMS-006.012 –      | Barricading of Hazards  |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals  |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                       |
| NEOM-NLF-NMS-006.024        | Occupational Health Screening and Medical Surveillance                    |
| NFPA 704.                   | Standard System for the Identification of Hazardous Materials             |

## **7 Roles and Responsibilities**

### **7.1 Client**

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to understand their role and responsibilities and make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organizations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring.
  - (b) Managing change.
  - (c) Continuous improvement.
- 7.1.6 Client shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Appoint a COSH� Coordinator (Responsible Person) that will manage the arrangements for COSHH substances in accordance with the requirements of this procedure.
  - (b) Ensure that Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS) documents relating to Hazardous Substances and where required COSHH assessments associated with their business and/or undertakings are readily available in the site/workplace and are communicated to any Company, Contractor, or persons who may be at risk or require the information.

### **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM–NLF-SM–Safety Management Manual-Roles and Responsibilities
  - (a) That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
  - (b) Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organizational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
  - (c) Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)

- (a) That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.(Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
  - (b) Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.2 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
- (a) Contractor shall appoint a Responsible Person to establish and implement a procedure that will control hazardous substances.
  - (b) The appointed person shall be responsible for receiving standard COSHH assessments, informing employees of risks, implementing control measures for storage, use and disposal, and meeting the requirements of this NMS.
  - (c) A hazardous waste management plan shall be developed specific to the location, hazardous substances and activities being undertaken

### **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment (tools, PPE) or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NLF-NMS-006.021 Personal Protective Equipment)

### **7.4 Head of Sector, Organization, Department or Contractor**

- 7.4.1 The Proponent Organization Head shall appoint a COSHH Coordinator that will manage the arrangements for COSHH substances in accordance with the requirements of this procedure.

### **7.5 Responsible Person**

- 7.5.1 The Responsible Person shall support this procedure and shall ensure that any contractor organization working for, or on behalf of, the Sector, Organization, Department or Contractor shall establish and implement a procedure that will control hazardous substances.

### **7.6 Safety Practitioner/Coordinator**

- 7.6.1 The Safety Practitioner/Coordinator shall assist the Sector, Organization, Department or Contractor Head in the implementation of this procedure and provide the necessary safety recommendations to ensure compliance.

### **7.7 LP & FS Public Safety Department**

- 7.7.1 The LP & FS Public Safety department will support the NEOM COSHH process and will carry out compliance checks against the sector elements to ensure COSHH is implemented.

### **7.8 COSHH Coordinator**

- 7.8.1 The appointed person who is responsible for receiving standard COSHH assessments, informing employees of risks, implementing control measures for storage, use and disposal, and meeting the requirements of this procedure, shall develop a specific hazardous waste management plan

## **8 Other Sections related to subject**

### **8.1 Appointing a COSH Coordinator**

- 8.1.1 The Sector, Organization, Department or Contractor Head shall appoint the COSHH Coordinator who shall identify any potential hazardous substances that have a COSHH implication and may affect employees and or the environment. (Refer NEOM Element 5 Training, Awareness, and Competency)
- 8.1.2 The COSHH Coordinator shall assess the health hazards and implement appropriate control measures to reduce the risk and hazards to health to as low a level as is reasonably practicable.(Refer NEOM Element 2 Risk and Opportunity Management)

**Note:** Suppliers are required to provide adequate information. Package labels and material safety data sheets (MSDS) or safety data sheets (SDS) shall be examined for hazard information.

**Note** MSDS / SDS are not COSHH risk assessments-they provide the information for the Risk Assessment

### **8.2 Risk Assessment**

- 8.2.1 Having gathered the necessary information about a substance with a COSHH implication, the risk shall be analyzed and assessed by examining working methods and work practices. Refer NEOM Element 2 Risk and Opportunity Management)
- 8.2.2 The task of completing a new COSHH risk assessments may not be necessary where the substance and its use have been used historically without incident.
- 8.2.3 All hazardous substances will be marked and identified in accordance with the global harmonized system as it relates to classification and labeling.
- 8.2.4 Labeling shall include the chemical's name, pictogram, signal word, as well as applicable precautionary statements. (Refer: NEOM-NLF-NMS-006.013 Safety Signage and Signals)

### **8.3 Central Register of Assessments**

- 8.3.1 A central copy of all COSHH assessments and MSDS/SDS shall be held by the Safety Practitioner / Coordinator, together with a register that indicates the revision status of each assessment. This should be instantly available in case of accidents / incidents.
- 8.3.2 Where a first aid room and /or nurse are provided, a second copy of the MSDS/SDS must be provided and kept up to date.
- 8.3.3 A copy of the register and COSHH assessments shall be issued to the Sector, Organization, Department or Contractor Safety Department and kept up to date.
- 8.3.4 The location of this register and name and contact details of the person responsible for updating the list shall be included in the location specific Fire and Emergency Plan.(Refer: NEOM Element 9 Emergency Planning and Response Management)

### **8.4 Issuing Assessment Sheets**

- 8.4.1 COSHH assessment sheets may be photocopied and must be issued to users of hazardous substances and other staff, or operatives as required along with the relevant instruction for safe working procedures.
- 8.4.2 It is the responsibility of Contractor to produce assessments for any substances they bring onto the locations. This shall include any special requirements for storage and waste disposal.
- 8.4.3 Contractor assessments shall be conducted prior to bringing any substances onto the work site.
- 8.4.4 Contractor shall ensure the risk assessment be transmitted to the COSHH coordinator and added to the on-site register immediately upon arriving on site.

## **8.5 Assessing the Risk**

8.5.1 A wide range of hazardous substances may be used on location. The following factors shall be considered when assessing the extent of the health risk:

- (a) The nature of the substance and its potential harm
- (b) The Permissible Exposure Limit (PEL ) or Threshold Limit Values (TLV )
- (c) The amount of exposure
- (d) Number of persons likely to be exposed
- (e) The location of the work and conditions of use e.g., confined space.
- (f) The effectiveness of existing control measures
- (g) Chemical incompatibility and environmental restrictions
- (h) Storage requirements (Ventilation / cooling etc.)
- (i) Restricted access where required

## **8.6 Hazardous Materials / Hazardous Waste Management Plan**

8.6.1 Sector, Organization, Department or Contractor Head shall ensure through the appointed COSHH Coordinator that there is a hazardous materials / hazardous waste management plan in place at the Sector, Organization, Department or Contractor location that includes the following:

- (a) A schematic / plan of any store showing the location(s) of where hazardous materials / wastes are stored, the location(s) of emergency and fire-fighting equipment, and the access and escape routes (Refer: NEOM Element 9 Emergency Planning and Response management)
- (b) Appropriate storage compatibility risk assessments that have been undertaken (Refer: NEOM Element 2 Risk and Opportunities)
- (c) Limitations on quantities of the materials / wastes stored
- (d) Storage conditions / procedures to be implemented
- (e) An updated and accurate inventory of the materials / wastes stored, including the following:
  - I. Name of the hazardous material / waste
  - II. Manufacturer of the hazardous material
  - III. Location of the hazardous material / waste
  - IV. Quantity of the hazardous material / waste on site (expected or average quantity)
  - V. If applicable, expiration date of the hazardous material
- (f) copies of current MSDS/SDS/profile sheets for all hazardous materials / wastes stored:
  - I. In hardcopy or electronic copy for access by employees and emergency responders
  - II. In language/s understood by the workforce
- (g) An emergency response plan for any store of hazardous materials / wastes (Refer: NEOM Element 9 Emergency Planning and Response Management)
- (h) Hazardous information signs indicating stored substances shall be placed on the outside of the building in which they are stored.(Refer: NEOM-NLF-NMS-006.013 Safety Signage and Signals)
- (i) Labels shall be affixed to the containers in which the substances are stored. Both placard and label shall be designed in accordance with NFPA 704.

## **8.7 Measures for Preventing or Controlling Exposure**

- 8.7.1 The Coshh Coordinator shall study the master list of Coshh assessments relevant to the Project / Office / facility, understand the necessary control measures needed to reduce the health hazards to an acceptable level, and implement the necessary procedures.
- 8.7.2 Should health surveillance be necessary, the Coshh Coordinator shall arrange for the surveillance to be conducted and appropriate records kept. (Refer: NEOM-NLF-NMS-006.024 Occupational Health Screening and Medical Surveillance)
- 8.7.3 Health records, if required, should be returned to the Medical / HR Department for retention in the individual's personnel file.
- 8.7.4 Advice may be sought from the Medical / HR Department on health surveillance.
- 8.7.5 The measures for preventing or controlling exposure consist of either exclusively, or in a combination of the following:
  - (a) For preventing exposure:
    - I. Elimination of the use of the substance
    - II. Substitution by a less hazardous substance or by the same substance in a less hazardous form
    - III. Selecting appropriate PPE top protect against substance
  - (b) For controlling exposure:
    - I. Completely enclosed process and handling systems
    - II. Plant, processes, or systems of work which minimize generation of, suppress or contain, the hazardous dust, fume, micro-organisms etc. and which limit the area of contamination in the event of spills and leaks
    - III. Partial enclosure, with local exhaust ventilation
    - IV. Local exhaust ventilation
    - V. Sufficient general ventilation
    - VI. Reduction of numbers of employees exposed and non-essential access
    - VII. Reduction in the period of exposure for employees
    - VIII. Regular cleaning of contamination from, or disinfection of, walls, surfaces etc.
    - IX. Provision of means for safe storage and disposal of substances hazardous to health
    - X. Suitable personal protective equipment
    - XI. Prohibition of eating, drinking, smoking etc. in contaminated areas
    - XII. Provisions for adequate facilities to accommodate washing, changing and storage of clothing including arrangements for laundering contaminated clothing
    - XIII. Type of bunding requirements and size requirements to prevent any spill, i.e., 110 percent to ensure adequate containment of any spill

## **8.8 Measures for Preventing or Controlling Exposure**

- 8.8.1 The Coshh Coordinator shall conduct routine inspections of hazardous materials in storage / use and replace expired or damaged materials.
- 8.8.2 Expired or damaged materials will be handled in accordance with applicable regulations.
- 8.8.3 The Coshh Coordinator shall ensure that unclear or damaged labels are replaced.

## **8.9 Emergency Controls**

|                                      |                      |               |
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- 8.9.1 In the event of leaks, spills, or uncontrolled releases of a hazardous substance, means shall be available for limiting the extent of risks to health and for regaining adequate control as soon as possible. (Refer: NEOM Element 9 Emergency Planning and Response Management)
- 8.9.2 Requirement for appropriate spill kits and training of employees in responses to chemical spills
- 8.9.3 The means should include, where appropriate, established emergency procedures, safe disposal of the substance and sufficient suitable personal protective equipment to enable the source of the release to be safely identified and repairs made. (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment)
- 8.9.4 Facilities to address emergencies such as chemical splashes i.e., chemical showers, eye wash stations, lighting requirements, should be made available.
- 8.9.5 All persons not concerned with the emergency action should be removed from the area of contamination.

## **8.10 Disposal of Hazardous Materials**

- 8.10.1 The COSHH Coordinator will ensure that expired and waste chemicals and hazardous materials are disposed of using methods or contractors that are approved in accordance with the Waste Management Processes.
- 8.10.2 The COSHH Coordinator will maintain a copy of the basic characteristics of hazardous waste being disposed of, together with a register of all hazardous waste shipment disposals.
- 8.10.3 All COSHH Coordinators will familiarize themselves with the lists of hazardous materials that are banned or restricted by applicable laws and regulations. Sector, Organization, Department or Contractor will:
  - (a) Not import, produce, store, export or otherwise handle any banned materials
  - (b) Obtain any import permits / approvals required by the relevant authorities before proceeding to import any restricted materials
  - (c) Comply in the handling of each restricted material with the corresponding special requirements and conditions set by the relevant authorities

## **8.11 Records**

- 8.11.1 All records / documentation relating to this procedure will be maintained at the Sector, Organization, Department or Contractor Safety Department and shall always be made available for auditing.(Refer: NEOM Element 3 Control of Documented Information & Legal Compliance)

## **8.12 Training Requirements**

- 8.12.1 All team members involved in the COSHH process shall familiarize themselves with this procedure to ensure an effective management review takes place.(Refer: NEOM Element 5 Training, Awareness and Competence)
- 8.12.2 Contractor shall ensure that training complies with the requirements of:
  - (a) NEOM-Element 5 – Training, Awareness and Competency.
  - (b) NEOM-NLF-NMS-006.001 – Organization, OSH Practitioner Registration and Appointment of Contractor

- 8.12.3 Where risk assessment indicates that employees are/or likely to be exposed to hazardous substances, at or above the action level, the Contractor shall:
- (a) Provide training on COSHH exposure limit values and action levels.
  - (b) Identify the significant findings of the risk assessment, including any measurements taken, with an explanation of those findings.
  - (c) Inform and educate employees on the signs and symptoms of COSHH related injuries and the process for reporting and getting treatment for COSHH related injuries.
  - (d) Inform employees on their entitlement to appropriate health surveillance as required by this NMS and NEOM NLF-NMS-006.024— Occupational Health Screening and Medical Surveillance; and
  - (e) Provide training on safe working practices and other control measures to minimize exposure to and injury from exposure to any hazardous substances.
- 8.12.4 The information, instruction, and training shall take account of significant changes in the type of work carried out or the work methods used by the Contractor.
- 8.12.5 Contractor shall ensure that any visitors, contractors, or temporary employees are trained as needed to minimize exposure to hazardous substances.
- 8.12.6 Employees who are/or likely to be exposed to hazardous substances at or above the action level shall receive annual refresher training.

### **8.13 Monitor & Review**

- 8.13.1 This procedure must be reviewed as a minimum, every third year from the last date of approval, unless there is a suitable business risk identified, change in local or international legislation/standards or an incident occurs, which requires an amendment to the processes.

## 9 Appendices

### 9.1 Appendix A: Forms, Signs and Checklists



## 9.2 Appendix B: Audit Criteria CONTROL of SUBSTANCES HAZARDOUS to HEALTH)

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria        |                               | Requirements  | Verification | Area of Concern |
|-----------------------|-------------------------------|---|--------------|-----------------|
| ISO 45001:2018 Clause | NMS Ref.                      |   |              | Yes/ No         |
| 5.3                   | 7.1.3                         | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2       | 7.1.4                         | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                   | 7.2.1 (b)                     | Persons appointed to manage /oversee work operations have the skills, knowledge, experience   |              |                 |
| 8.1.2 (e)             | 7.2.6,<br>7.3.3(c)            | Personal protective equipment required for use are fit for purpose, must comply with the relevant recognized national and/or international standards  |              |                 |
| 6.1.2.3<br>6.1.2.2    | 7.2.1(c),<br>7.2.2(c),<br>8.5 | Hazards Identification Plan (HIP)<br><br>Assessment of the various risks shall be undertaken  |              |                 |
| 8.1.4.2               | 7.1.6 (b)                     | Material Safety Data Sheets (MSDS) documents relating to Hazardous Substances and where required COSHH assessments associated with their business and/or undertakings are readily available in the site/workplace and are communicated to any Company, Contractor, or persons who may be at risk or require the information |              |                 |
| 5.3                   | 8.1.1                         | The Sector, Organization, Department or Contractor Head shall appoint the COSHH Coordinator who shall identify any potential hazardous substances that have a COSHH implication and may affect employees and or the environment.  |              |                 |
| 8.1.2                 | 8.2.3                         | All hazardous substances will be marked and identified in accordance with the global harmonized system as it relates to classification and labeling   |              |                 |
|                       | 8.3.1,<br>8.4.1               | A central copy of all COSHH assessments and MSDS/SDS shall be held by the Safety Practitioner / Coordinator, together with a register that indicates the revision status of each assessment   |              |                 |
| 6.1.2                 | 8.8.1                         | The COSHH Coordinator shall conduct routine inspections of hazardous materials in storage / use and replace expired or damaged materials  |              |                 |
| 8.2                   | 8.9                           | Established emergency procedures, safe disposal of the substance and sufficient   |              |                 |

| Audit Criteria              |          | Requirements  | Verification | Area of Concern |
|-----------------------------|----------|---|--------------|-----------------|
| ISO<br>45001:2018<br>Clause | NMS Ref. |   |              | Yes/ No         |
|                             |          | suitable personal protective equipment to enable the source of the release to be safely identified and repairs made |              |                 |
|                             |          |   |              |                 |
|                             |          |   |              |                 |
|                             |          |   |              |                 |

### **9.3 Appendix C: Guidance Information**

Reference can be made to the OSHA standards 29 CFR 1910, Subpart H, which lists requirements for situations which have the potential to expose employees to hazardous materials:

Under OSHA requirements Contractor are required to know that they have hazardous materials in the workplace and train employees how to read the placard or label.

The US Department of Transportation (DOT)

DOT Hazardous materials regulations are subdivided by function into four basic areas:

- Procedures and/or Policies (49 CFR Parts 101, 106, and 107)
- Material Designations (49 CFR Part 172)
- Packaging Requirements (49 CFR Parts 173, 178, 179, and 180)
- Operational Rules (49 CFR Parts 171, 173, 174, 175, 176, and 177)

The OSHA HAZWOPER standard, 29 CFR 1910.120, which covers emergency response personnel who respond to the incident. If the operator of the vehicle becomes actively involved in an emergency response, then he/she is considered an emergency responder and is covered by 29 CFR 1910.120(q).

OSHA's 29 CFR 1910.1450 sets requirements for Occupational exposure to hazardous chemicals in laboratories. These deal with Toxic and Hazardous substances and are applicable to other areas besides laboratories.

OSHA's 29 CFR 1910 Subpart H has requirements regarding Hazardous waste operations and emergency response.

In the UK the Control of Substances Hazardous to Health Regulations 2002 is a United Kingdom Statutory Instrument which states general requirements imposed on Contractor to protect employees and other persons from the hazards of substances used at work by risk assessment, control of exposure, health surveillance and incident planning. There are also duties on employees to take care of their own exposure to hazardous substances and prohibitions on the import of certain substances into the European Economic Area. The regulations reenacted, with amendments, the Control of Substances Hazardous to Work Regulations 1999 and implement several European Union directives.

You can prevent or reduce workers exposure to hazardous substances by:

- finding out what the health hazards are;
- deciding how to prevent harm to health (risk assessment);
- providing control measures to reduce harm to health;
- making sure they are used ;
- keeping all control measures in good working order;
- providing information, instruction and training for employees and others;
- providing monitoring and health surveillance in appropriate cases;
- planning for emergencies.

Most businesses use substances, or products that are mixtures of substances. Some processes create substances. These could cause harm to employees, contractors and other people.

Sometimes substances are easily recognised as harmful. Common substances such as paint, bleach or dust from natural materials may also be harmful.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
PERSONAL PROTECTIVE EQUIPMENT**

NEOM-NLF-NMS-006.021 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with the Selection, Control and Use of Personal Protective Equipment (PPE)

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

It covers the Selection, Control and Use of Personal Protective Equipment.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expects each Sector, Organisation, Department or Contractor to ensure that risks are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities.

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements.
- (b) ANSI requirements.
- (c) NFPA Standards and requirements.
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms   | Definitions  |
|---|--|
| NEOM Co   | NEOM Company   |
| Client  | NEOM Sector /Department responsible for management and oversight of the Contractor   |
| Contractor                                      | The organisation contracted to carry out the works   |
| Sector, Organization or Department:             | Responsible department with overall authority for a specific project, location asset and operational function.   |
| Sector, Organization or Department Head:        | Person accountable for the implementation and function of this procedure within the Sector, Organization, Department or Contractor.  |
| Responsible Person                              | The senior NEOM employee who has delegated responsibility for the day-to-day management of the work activities, or the contracted party engaged in such activities                     |
| Safety Practitioner/ Coordinator                | An employee working for the Sector, Organization or Department Head Safety Department.   |
| Personal Protective Equipment (PPE)             | Personal Protective Equipment is protective clothing, helmets, goggles, gloves or other garments or equipment designed to protect the wearer's body from injury, infection, or illness |
| Equivalent                                      | Alternative designs, materials, or methods to protect against a hazard where it can be demonstrated will provide an equal or greater degree of safety                                  |
| Material Safety Data Sheet or Safety Data Sheet | A document that contains information on the potential hazards (health, fire, reactivity and environmental) and how to work safely with the chemical product.                           |
| Employer  | The person or organization that employs people to complete a task this can be the Sector, Organisation, Department or Contractor   |
| Safety Management System (SMS)                  | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard   |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                          |
|---------------|---------------------------------------|
| SMS           | Safety Management System              |
| NMS           | NEOM Minimum Standard                 |
| SOP           | Standard Operating Procedure          |
| ANSI          | American National Standards Institute |
| NFPA          | National Fire Prevention Association  |
| CPP           | Construction Phase Plan               |

| Abbreviations | Descriptions                                   |
|---------------|--|
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| TLV           | Threshold Limit Values                         |
| OHS           | Occupational Health and Safety                 |
| ISO           | International Organization for Standardization |
| MSDS          | Material Safety Data Sheet                     |
| SDS           | Safety Data Sheet                              |
| LEP           | Light Eye Protection                           |
| IBC           | International Building Codes                   |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance                      |
| NEOM-Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors   |
| NEOM-NLF-NMS-006.001        | SMS Organisation, Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | Safety Construction Management Plan                                       |
| NEOM-NLF-NMS-006.003        | Scaffolding   |
| NEOM-NLF-NMS-006.007        | Working at Heights  |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards  |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals  |
| NEOM-NLF-NMS-006.020        | Hazardous Materials   |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                       |
| NEOM NLF- NMS-006.022       | Occupational Noise  |
| NEOM-NLF-NMS-006.038        | Confined Space  |
| NEOM-NLF-NMS-006.047        | Respiratory Protection  |

## **7 Roles and Responsibilities**

### **7.1 Client**

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring.
  - (b) Managing change.
  - (c) Continuous improvement.

### **7.2 Contractor**

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available. (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
- 7.2.7 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Shall ensure that suitable PPE is provided to all personnel who may be exposed to risk associated with work, or the work environment
  - (b) All PPE shall be provided free of charge. Employees may only be charged for PPE if they willfully damage, misuse or misplace PPE.

### **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NLF-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Employees shall ensure they follow all the rules and regulations set by the employers and shall not misuse items of PPE provided for the purpose of safety.
  - (b) Make sure they are wearing the right PPE for the task and check with the safety representative if they are not sure.
- 7.3.5 Employee shall
  - (a) Inspect PPE before and after each use.
  - (b) Take care of PPE at all times.
  - (c) Clean all PPE after use.
  - (d) Repair or replace damaged or broken PPE.
  - (e) Store PPE in clean dry air - free from exposure to sunlight or contaminants.

- (f) Participate in education and training in how to fit, wear, and maintain PPE.
- (g) Ask questions to make sure you know when and what PPE should be worn,

## **7.4 Specific Responsibilities**

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.4.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 Introduction to PPE**

- 8.1.1 The Employer responsibilities in this Section 8 relate to Sector, Organization, Department or Contractor.
- 8.1.2 It is an individual's responsibility to provide PPE for certain sporting and individual leisure activities such as SCUBA Diving, mountain climbing, cycling, hiking etc. and personnel are encouraged to complete a personal risk assessment to ensure they have the correct PPE for the activity. For leisure activities organised by the Employer personal safety equipment shall be provided by the Employer.
- 8.1.3 This procedure shall be implemented by Employers and individuals when a risk assessment determines PPE must be worn however the hierarchy of controls should be utilised prior to issue and use of PPE
- 8.1.4 Personal protective equipment, commonly referred to as "PPE", is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards.
- 8.1.5 Personal protective equipment may include items such as gloves, safety glasses and shoes, earplugs or muffs, hard hats, respirators, or coveralls, vests, and full body suits.
- 8.1.6 All personal protective equipment should be safely designed, constructed, and should be maintained in a clean and reliable fashion. It should fit comfortably, encouraging worker use.
- 8.1.7 When engineering, work practice, and administrative controls are not feasible or do not provide sufficient protection, employers must provide personal protective equipment to their workers and ensure its proper use.
- 8.1.8 Employers are also required to train each worker required to use personal protective equipment to know:
  - (a) When it is necessary
  - (b) What kind is necessary
  - (c) How to properly put it on, adjust, wear, and take it off
  - (d) The limitations of the equipment
  - (e) Proper care, maintenance, useful life, and disposal of the equipment
- 8.1.9 A PPE program should be implemented to address
  - (a) the hazards present; the selection,
  - (b) maintenance, and use of PPE.
  - (c) the training of employees; and
  - (d) monitoring of the program to ensure its ongoing effectiveness.

**NOTE:** This NMS does not apply to general clothing worn whilst at work, such as corporate clothing with the primary purpose of presenting a corporate image.

## **8.2 General Principles**

- 8.2.1 All PPE must comply with the relevant recognized national and/or international standards (OSHA, ANSI, ISO, BS)
- 8.2.2 PPE shall be selected and provided following a risk assessment of the anticipated hazards associated with the work/environment to protect all personnel, including visitors.
- 8.2.3 Formal pictogram signs detailing the required PPE shall be posted at the entrance to site facilities. See Appendix A2 for a sample of gate PPE sign for details.(Refer: NEOM-NLF-NMS-006.013 Safety Signage and Signals)
- 8.2.4 PPE shall be worn when conducting work activities or whenever there is a significant risk of injury. Minimum required PPE for work activities typically includes but is not limited to:
  - (a) Head Protection
  - (b) Foot Protection
  - (c) Eye Protection
  - (d) Hand Protection
  - (e) High visibility clothing
- 8.2.5 When working in the vicinity of any vehicle or construction plant, as well as the minimum described above, a High Visibility Vest (with reflective strips) shall be worn.
- 8.2.6 Additional personal protective and life-saving equipment requirements are determined based on the risks introduced by the specific work task or activity in accordance with the following:
  - (a) Ability of PPE to provide protection against risk without compromising individual safety
  - (b) Suitability for the user
  - (c) Compatibility with work task or activity
  - (d) Duration of work task or activity

## **8.3 Issue and Control of PPE**

- 8.3.1 For work tasks the employer shall ensure that the issuing of PPE is suitably controlled and managed to provide full traceability for equipment (Refer: NEOM-NLF-NMS-006.021, Personal Protective Equipment (PPE))
- 8.3.2 Employees shall be provided with the necessary PPE as identified in the risk assessment for the particular work activity, together with the necessary information, instructions and training relating to the effective use of the equipment.
  - (a) When wearing different types of PPE at the same time (i.e., eye and hearing protection), compatibility between the PPE must be checked.
  - (b) Employees are responsible for the proper care and reasonable use of any PPE supplied to them.
  - (c) Employees shall check their PPE before each use to make sure that it is not defective and that it is fit for purpose.
  - (d) Employees not wearing, or refusing to wear, PPE issued to them shall not be allowed to enter the location.
  - (e) Disciplinary actions may be taken against the employees who are in breach of the company or site PPE requirements

## **8.4 Clothing**

- (a) Every employee will wear clothing (conventional or disposable overalls, boiler suits, aprons, chemical suit) that protects the body and extremities from typical hazards. Additional PPE may be required for specific risks.

8.4.1 The following items are prohibited on work sites:

- (a) Loose fitting clothing and clothing made from flammable material (cellulose fibres, cotton, linen, and viscose) which easily catch fire.
- (b) Traditional national garb (e.g., thawb, bisht, abaya, shayla).
- (c) Short pants are prohibited as outerwear.
- (d) Jewelry such as finger rings or necklaces when there is a danger of entanglement or contacting energized conductors

## **8.5 Eye and Face Protection**

8.5.1 Approved Light Eye Protection (LEP) shall be worn at all times whilst on site or in the vicinity work activities.

8.5.2 Suitable protective goggles, face shields or screens shall be worn by personnel involved in, assisting with, or working adjacent to any activity where there may be a danger of projected debris, sparks or other particles, corrosive fluids or mists, excessive heat, light, or other harmful radiation.

8.5.3 Exceptions to the wearing of LEP include:

- (a) Vehicle and equipment operators inside enclosed cabs
- (b) Administration building (office work)
- (c) Lunch and break periods (provided that no work is in progress in the immediate vicinity)
- (d) Offices and buildings
- (e) When goggles are worn (unless the activity calls for double eye protection)

8.5.4 Safety sunglasses should be worn in strong sun glare to reduce eyestrain and fatigue.

8.5.5 Wearing of Sunglasses and Non-light-sensing glasses with tinted lenses are prohibited inside buildings or other structures with limited illumination.

8.5.6 Employees whose vision requires the use of corrective lenses will wear one of the following:

- (a) Personal eyeglasses whose protective lenses provide optical correction with permanent fixed side shields and conform to the requirements of a recognized national or international standard (e.g., BS, EN 166:2002 ANSI, or equivalent)
- (b) Safety goggles over their glasses, or goggles that incorporate a corrective lens mounted behind the protective lens, or safety over-glasses

| Eye and Face PPE Selection  |  |  |
|---|--|--|
| Hazard Source   | Hazard Assessment  | Protection <sup>1</sup>  |
| Chipping, grinding, machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, sanding, etc. | Impact from flying fragments, dirt, sparks, fine particles, etc. | Safety glasses w/ side protection <sup>3</sup><br>Goggles (eyecup or cover types)<br>Severe exposure (e.g., grinding): face shield |
| Woodworking, buffing, dusty conditions.   | Nuisance dust  | Goggles and face shield (eyecup and cover types)   |
| HEAT  | High temperature   | Screen/reflective face shield <sup>2,3</sup>   |
| Welding, soldering, brazing, furnace operations, etc.   | Sparks   | Goggles, safety glasses w/ side protection, welding hood<br><b>Severe exposure: face shield<sup>2,3</sup></b>                      |
| Pouring hot material, casting metal, hot dipping, etc.  | Molten metal splash  | Face shield (worn over goggles) <sup>2,3</sup>   |
| CHEMICALS   | Splash   | Goggles (eyecup and cover types) and face shield <sup>3</sup>  |
|   | Gas, mist, powder  | Goggles and face shield  |
| LIGHT RADIATION   |  |  |
| Electric arc welding/cutting  | Optical, ultraviolet, and infrared radiation                     | Welding helmet, welding face shield<br>Filter lens shade rating: 10-14 <sup>3,4</sup>  |
| Gas welding/cutting/brazing   | Optical and infrared radiation                                   | Welding goggles, welding face shield <sup>3,4</sup> . Filter lens shade ratings, typical: welding 4-8, cutting 3-6, brazing 3-4    |
| Propane torch heating, soldering and brazing  | Optical and infrared radiation                                   | Safety glasses w/side shields, face shield.<br>Filter lens shade rating: 1.5-3 <sup>4</sup>  |

## 8.6 Head Protection

8.6.1 Safety Helmets protect heads from falling and flying objects and from limited electrical shock and burns. Safety Helmets are required at all times while on a construction facility, with the following exceptions:

- (a) Vehicle and equipment operators inside enclosed cabs
- (b) Inside administration buildings or offices
- (c) During lunch and break periods, provided that no work is in progress in the immediate break area.

8.6.2 Safety Helmets are to be worn in accordance with all manufacturer requirements.

- (a) The painting of Safety Helmets shall be prohibited.
- (b) Safety Helmets must be worn directly on the head facing the front to ensure proper function and head protection.
- (c) The wearing of baseball caps, liners or other headgear under the Safety Helmets shall be prohibited

## **8.7 Safety Helmet Color Coding:**

- 8.7.1 It is recommended that a policy of standard Colours is adopted for safety helmets for ease of identification The recommended Colors in NEOM are:
- (a) White – Supervisors / Engineers / Leads
  - (b) Blue – General staff and Labor
  - (c) Red – Fire Marshall / Fire Warden
  - (d) Green with First Aid sticker both sides – First Aider / First Aid Personnel
  - (e) Yellow – Banks man, Slinger/Signalers
  - (f) White with ER Sticker – Emergency Response Team
  - (g) Green with Safety Sticker both sides – Site Safety Officer / Supervisor
  - (h) White with Safety Sticker both sides - Safety Manager/Practitioner

## **8.8 Foot Protection**

- 8.8.1 Protective footwear which meets ASTM F2412/F2413/F2892 (or ANSI Z41) standard provide both impact and compression protection for general industrial use shall be provided.
- 8.8.2 Where appropriate employers shall ensure protective footwear is available which provides puncture protection, metatarsal protection, or electrical (non-conducting) protection.

## **8.9 Respiratory Protection**

- 8.9.1 Respiratory protective equipment shall be available to all persons who are exposed to any situation in which there is a possibility of the atmosphere containing any harmful substance (e.g., particle, dust, mist, vapour, or gas) (Refer: NEOM-NLF-NMS-006.047 Respiratory Protection)
- 8.9.2 Correct respiratory protection certified by recognised certification bodies shall be selected to provide adequate protection against airborne hazards.
- 8.9.3 Employers are required to evaluate the respiratory hazards in their workplaces to determine the identity of contaminants, chemical states, and physical forms
- 8.9.4 Dust masks can be worn for comfort against non-toxic nuisance dusts during activities like mowing, gardening, sweeping, and dusting. These masks are not respirators and do not offer protection against hazardous dusts, gases, or vapours.
- 8.9.5 Refer: Refer: NEOM-NLF-NMS 006.047 Respiratory Protection which identifies process for the selection and use of approved disposable filtering facepieces associated with harmful substance (e.g., particle, dust, mist, vapour, or gas)
- 8.9.6 If an employer cannot identify or reasonably estimate employee exposures to respiratory hazards, the employer must consider the atmosphere “Immediately Dangerous to Life or Health” (IDLH).
- 8.9.7 IDLH atmospheres require a full-face piece, pressure demand self-contained breathing apparatus (SCBA) or supplied-air respirator (SAR) with self-contained auxiliary air supply. Details are contained in NEOM-NLF-NMS 006.047 Respiratory Protection

## **8.10 Hearing Protection**

- 8.10.1 Hearing protection will be worn in accordance with the requirements established in the Hearing Conservation Program. In summary, the following requirements shall apply (Refer: NEOM-NLF-NMS-006.022 Occupational Noise)
- (a) Suitable hearing protection shall be provided to all workers exposed to instantaneous noise levels of 130 dB(A) or above.

- (b) When the time-weighted average noise levels reach 85 dB(A) for an eight-hour work period, implementation of Hearing Conservation Program requirements is mandatory.
- (c) At least two types of hearing protection devices will be made available to employees. In general, hearing protection worn frequently shall be issued on a personal basis. Additionally, suitable hearing protection shall be retained for general use at the entrance into high-level noise areas.
- (d) Other than disposable hearing protection, equipment shall be properly inspected and cleaned on a regular basis.

## **8.11 Hand and Arm Protection**

8.11.1 Adequate hand and arm protection shall be available for all manual labor. The type of protection worn shall be selected according to the hazard. These include but not limited to:

- (a) Impacts, cuts, abrasions, and infections.
- (b) Extreme temperatures and sun exposure
- (c) Chemical, toxic, corrosive, and other hazardous substances

8.11.2 Selection shall be based upon the hazards and tasks to be performed. Refer: Appendix A-1

## **8.12 Body Protection**

8.12.1 Specific and adequate body protection shall be supplied for all work activities, which present certain hazards to personnel, including but not limited to:

- (a) Working in extremes of temperature, such as firefighting, heating furnace attendance, working in refrigeration plants, etc.
- (b) Welding, burning, cutting, and grinding
- (c) Handling or mixing of acids and other toxic, corrosive, or hazardous chemicals
- (d) Clean up and disposal of hazardous wastes (e.g., asbestos, hydrocarbons etc.)(Refer NEOM-NLF-NMS-006.020 Hazardous Materials)

## **8.13 Personal Fall Arrest Systems**

8.13.1 Fall protection will be used in accordance with the requirements established in the Fall Protection Procedure. In summary, the following requirements shall apply:

- (a) Safety harnesses and lifelines shall be provided, worn, and properly secured in all work situations where any of the following dangers exist
  - I. Falling from a height greater than 2 meters
  - II. Succumbing to toxic atmospheres or oxygen deficiency
  - III. Confined spaces and limited-access areas

8.13.2 Such situations include, but are not limited to:

- (a) Working on scaffolding (Refer: NEOM-NLF-NMS-006.003 Scaffolding)
- (b) Work on any high structure, whether in construction or maintenance, including petroleum processing plants (Refer: NEOM-NLF-NMS-006.007 Working at Heights)
- (c) Drilling rigs, storage tanks, etc.(Refer: NEOM-NLF-NMS-006.038 Confined Space)
- (d) Work over water
- (e) Rescue work, in firefighting, from high structures and from hazardous atmospheres
- (f) Working inside vessels or sewers .(Refer: NEOM-NLF-NMS-006.038 Confined Space)

- 8.13.3 Only full body safety harnesses shall be used. All such safety devices shall be manufactured and inspected in conformance to a recognized national or international standard.
- 8.13.4 All safety harnesses and lifelines shall be inspected for damage prior to its use. Ensure webbing is free from any form of tape/sticky as it leaves a chemical residue and damages the webbing. Items failing to meet inspection criteria shall be removed from service.

## 8.14 Electrical Protection Equipment

- 8.14.1 Selection and identification of requirements for use of PPE associated with electrical work should be carried out by a competent person, broadly defined as **a person having appropriate technical knowledge, skills and experience and ability to recognize the hazards that may arise and whether it is safe to continue work.**
- 8.14.2 PPE requirements for high voltage work activities should be defined on the required Permit to Work
- 8.14.3 Electrical Protective Equipment falls into two categories: Electrical PPE (PPE) and Insulating Protective Equipment (IPE)
- 8.14.4 **Electrical (PPE).** Refers to items typically worn by a worker to provide protection from recognized hazards. Depending on the job task to be performed, PPE for the electric power industry generally includes
  - (a) Rubber insulating gloves and leather protectors to protect the hands and arms
  - (b) Rubber insulating sleeves to protect the arms and shoulders
  - (c) Flame-resistant (FR) clothing to protect the body against arc flash
  - (d) Hoods to protect the head against arc flash
  - (e) Hard hats to protect the head from electrical shorts, and striking or being struck by objects
  - (f) Safety glasses and shields to protect the face against flying objects and arc flash
  - (g) Safety shoes and overshoes to protect the feet and worker from being grounded
- 8.14.5 **Insulating Protective Equipment (IPE).** Rubber and hardcover insulating protective equipment (IPE) is used to provide workers protection Workman in aerial bucket using IPE from contacting energized conductors, but unlike PPE it is not worn on the body. Insulating Protective Equipment (IPE) includes items such as:
  - (a) Insulating (rubber) line hose, blankets, and hoods.
  - (b) Insulating barriers made of fiberglass or phenolic resin.
  - (c) Live-line tools such as hot sticks, switch sticks, and shotgun sticks.
  - (d) Plastic or fiberglass line hoods and covers that can be installed with live-line tools.
- 8.14.6 All electrical protective equipment made of rubber should meet the established safety standards and specifications
- 8.14.7 Employees who are exposed to an electrical hazard, and their supervisors, are required to know the following:
  - (a) When PPE is necessary
  - (b) What PPE is necessary
  - (c) How to properly, don, doff, adjust, and wear PPE
  - (d) The limitations of the PPE
  - (e) The proper inspection, care, maintenance, useful life and disposal of the PPE.

8.14.8 Re-training is required when:

- (a) Changes in the workplace require additional or new types of PPE
- (b) Changes in the types of PPE to be used require new information be provided

## **8.15 Specialized PPE**

8.15.1 Life jackets will be worn by employees when working from a boat, near open water, or in any place where the danger of drowning exists, this includes work in specific areas of cooling tower basins.

8.15.2 Certain leisure activities require the use of PPE and Sector, Organisation, Department and Contractor should ensure all personnel are aware of the PPE requirement for leisure activities.

## **8.16 Inspection & Testing**

8.16.1 All personal protective equipment shall be inspected at regular intervals, tested in accordance with the manufacturer's guidance and conform to international standards

## **8.17 Enforcement**

8.17.1 Supervisors of work activities shall ensure that all personnel in the work area are aware of the PPE requirements and are in full compliance at all times

8.17.2 Improper use or failure to use personal protective equipment and wearing appropriate clothing is considered a violation of safe work practices and work rules. Disciplinary action could be taken according to work rules.

8.17.3 In some cases, disciplinary action may also be directed beyond the employees observed in the actual violation (e.g., Failure to report unsafe acts and those cases where it is determined that supervisors or foremen had knowledge that employees were consistently violating safe work practices and failed to initiate any action to correct the situation)

## **8.18 Monitor & Review**

8.18.1 This NMS and any supporting documentation shall be reviewed periodically (as a minimum every 3 years) and in the event a potential improvement is identified or changes in legislative requirements shall be updated.

## **8.19 Training Requirements**

8.19.1 All personnel working on any site within NEOM must be suitably trained and made aware of the correct use of Personal Protective Equipment. They shall be made aware of the hazards associated with tasks prior to work commencing.(Refer: NEOM Element 5 Training, Awareness, and Competency)

8.19.2 It is the responsibility of the responsible Sector management to monitor and influence the use of Personal Protective Equipment within their Sector

## **8.20 Records & Forms**

8.20.1 All records / documentation relating to these procedures will be maintained at the Sector, Organization, Department and/or Contractor Safety Department and Appointed PPE Custodian and shall always be made available for auditing. (Refer: NEOM Element 3 Control of Documented Information & Legal Compliance)

## **9 Appendices**

### **9.1 Appendix A - : Checklist for PPE Program:**

Design a PPE Program:

- Make sure the “hierarchy of controls” methods such as elimination, substitution, engineering controls, and administrative controls, are considered first. PPE is the last line of defence.
- Secure the active participation of all parties.
- Ensure that a program coordinator has been appointed.
- Re-evaluate program on an ongoing basis.

Promotional Strategy

- Publicize commitment to the program.
- Make sure a clear, concise company policy has been formulated.

Hazard identification and risk assessment

- Review work practices, job procedures, equipment, and plant layout.
- Use job hazard analysis techniques to integrate accepted safety and health principles and practice into specific operations.

Selection

- Choose PPE to match the hazard.
- Get advice on proper selection.
- Have a workplace trial, whenever possible.
- Consider the physical comfort of PPE.
- Evaluate cost considerations of PPE usage.
- Ensure PPE meets standards / certification (e.g., CSA, CGSB, NIOSH, ANSI).

Fitting and wearing

- Include fitting of PPE to the individual.
- Observe or survey users to make sure the PPE is worn and worn properly.

Maintenance

- Make sure that workers know how to perform regular maintenance and inspection of their PPE.
- Make sure that workers can identify potential problems or defects with their PPE during the pre-use inspection or while wearing/using.

Education and Training

- Verify that all users, supervisors, selectors, buyers, and stock keepers are educated and trained.
- Make sure that education and training programs are ongoing.

Audit the Program

- Review the program at least annually.
- Review and compare production and safety performance records.

Worker responsibilities include:

Use of proper PPE

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|                                      |                      |               |
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|--------------------------------------|----------------------|---------------|

- Make sure you are wearing the right PPE for the job. Check with your safety representative if you are not sure.

#### Maintenance and inspection

- Inspect PPE before and after each use.
- Take care of PPE at all times.
- Clean all PPE after use.
- Repair or replace damaged or broken PPE.
- Store PPE in clean dry air - free from exposure to sunlight or contaminants.

#### Education and Training

- Participate in education and training in how to fit, wear, and maintain PPE.
- Ask questions to make sure you know when and what PPE should be worn, and why it should be worn.

## 9.2 Appendix A-1 NEOM PPE

| NEOM Personal Protective Equipment (PPE) - Standards |   |                                       |  |
|--|---|---------------------------------------|--|
| PPE  | Law   | Standard Reference                    | Photo - different types are available refence only                                   |
| Head Protection -Industrial Safety Helmet            | The Occupational Safety and Health Administration (OSHA) guidelines for head protection are referenced in 29 Code of Federal Regulations (CFR) 1910.135 and 1926.100. | EN397 or ANSI/ISEA Z89.1-2014 (R2019) |   |
| Hearing Protection -(ear plug and muff )             | OSHA's 29 CFR 1910.95 & 1926.101 and 1926.52  | EN 352                                |   |
| Safety Footwear -                                    | OSHA 1926.96 &29 CFR 1910.136 &1910.132)  | EN ISO 20345/ ASTM F2413-05           |  |

| NEOM Personal Protective Equipment (PPE) - Standards   |   |  |   |
|--|---|--|---|
| PPE  | Law                                     | Standard Reference   | Photo - different types are available refence only                                    |
| Eye & Face Protection  | OSHA 19.10 133 &1910.252,& 1926.102 (a) | EN 166 or ANSI Z87.1   |  |
| Protective Clothing-General Requirements   | OSHA 1910.132                           | EN ISO 13688   |  |
| Protective Clothing. Clothing to Protect Against Heat & Flame. Minimum Performance Requirements. | OSHA 1910.269 (I)(8)(ii),               | EN ISO 11612<br>EN 469:2005 - Protective clothing for firefighters |  |

| NEOM Personal Protective Equipment (PPE) -Standards |  |  |   |
|---|--|--|---|
| PPE<br>Respiratory Protection                       | Law  | Standard Reference                       | Photo -<br>different types are available reference only                             |
| Respiratory Protection                              | OSHA 1910.134  | EN 140, EN 149                           |  |
| Hood Supplied Air                                   | OSHA 29 CFR 1910.134 (i).  | EN 269, EN 14594                         |  |
| Face Masks –N95                                     | N95 masks, although they are called masks and look like masks, are considered by OSHA to be respirators. - OSHA 1910.134 | OSHA 1910.134 or P2-P3 Rating AS/NZS1716 |  |

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| NEOM Personal Protective Equipment (PPE) -Standards-Also NEOM -NLF- SOP -006.021 |                          |                           |   |
|--|--------------------------|---------------------------|---|
| PPE -Gloves  | Law                      | Standard Reference        | Photo -<br>different types are available reference only                               |
| Protective Gloves. General Requirement & Test Methods                            | OSHA 29 CFR 1910 132-140 | EN 420: 2003 + A1:2009    |   |
| Protective Gloves Against Mechanical Risk  | OSHA 29 CFR 1910 132-140 | EN 388                    |  |
| Protective Gloves for Welders  | OSHA 29 CFR 1910 132-140 | EN 12477                  |  |
| Protective Gloves Against Chemicals  | OSHA 29 CFR 1910 132-140 | EN 374 Parts 1 to 3: 2003 |  |
| Protective gloves against thermal risks (heat and/or fire).                      | OSHA 29 CFR 1910 132-140 | EN 407: 2004              |  |
| Mechanical vibration and shock. Hand-arm vibration.                              | OSHA 29 CFR 1910 132-140 | EN ISO 10819: 2013        |  |
| Protective gloves for firefighters.  | OSHA 29 CFR 1910 132-140 | EN 659: 2003 + A1: 2008   |  |

### 9.3 Appendix A-2 - Sample: Gate PPE Sign



#### 9.4 Appendix A-3 - Sample: Glove Matrix

Important Note: This matrix is only to be used as a suggestive general guide. Consult with your HSE Supervisor for further guidance.

| Work /Glove type                                 | Cut Resistant  | Impact Protection | Abrasion Protection/ Leather | Chemical (Neoprene & Nitrile) | Hot Works | Latex / Nitrile |
|--|--|-------------------|------------------------------|-------------------------------|-----------|-----------------|
| Access to Site All employees/Visitors            |  |                   |                              |                               |           |                 |
| Carpentry/Form Work                              |  | **                |                              |                               |           |                 |
| Chemical, Glues, Epoxyes, Paint, Resins Handling |  |                   |                              | *                             |           |                 |
| Electrical Wiring (Not Energized)                |  |                   |                              |                               |           |                 |
| Heavy Duty Drilling                              |  |                   |                              |                               |           |                 |
| Fuel Handling/Refueling                          |  |                   |                              | *                             |           |                 |
| Handling Sharp/Jagged Objects                    |  | **                |                              |                               |           |                 |
| Jack Hammering                                   |  |                   |                              |                               |           |                 |
| Masonry Work (Wet Cement)                        |  |                   |                              | *                             |           |                 |
| Masonry Work (Excluding Wet Cement)              |  |                   |                              |                               |           |                 |
| Medical / First Aid                              |  |                   |                              |                               |           |                 |
| Mechanical                                       |  | **                |                              |                               |           |                 |
| Oils, Fuels, Grease Handling                     |  |                   |                              | *                             |           |                 |
| Pipefitting                                      |  | **                |                              |                               |           |                 |
| Rebar, Steel Work                                |  | **                |                              |                               |           |                 |
| Rigging  |  | **                |                              |                               |           |                 |
| Saw Cutting Protected Blade                      |  |                   |                              |                               |           |                 |
| Scaffold Erection/Dismantling                    |  |                   |                              |                               |           |                 |
| Using Electrical/Hand Tools                      |  |                   |                              |                               |           |                 |
| Using Knife/Unprotected Blade                    |  |                   |                              |                               |           |                 |
| Welding, Cutting, Burning (Hot Works)            |  |                   |                              |                               |           |                 |
| Gloves advised for use                           |  |                   |                              |                               |           |                 |
| *  | Check Chemical Safety Data Sheet and complete chemical evaluation through SDS/and risk assessment to determine the type of gloves. |                   |                              |                               |           |                 |
| **   | Where risk of impact is present.   |                   |                              |                               |           |                 |

**LIVE ELECTRICAL WORK** – Specific gloves to be prescribed by Electrical Field Engineer and Safety Department, in line with specific regulations and standards.

**ANTI-VIBRATION GLOVES** – Specific gloves to be prescribed where the tool is not fitted with anti-vibration technology

## 9.5 Appendix A-4 - PPE Standards

**Important Note:** This matrix is only to be used as a suggestive general guide. Consult with your HSE Supervisor for further guidance. European and American standards are identified to help with purchasing

| Standard Title  | Standard Reference                    |
|---|---------------------------------------|
| <b>Head Protection</b>  |                                       |
| Industrial Safety Helmet- The Occupational Safety and Health Administration (OSHA) guidelines for head protection are referenced in 29 Code of Federal Regulations (CFR) 1910.135 and 1926.100. | EN397 or ANSI/ISEA Z89.1-2014 (R2019) |
| <b>Hearing Protection</b>   |                                       |
| Hearing Protection (ear plug and muff)- OSHA's 29 CFR 1910.95 & 1926.101 and 1926.52  | EN 352                                |
| <b>Eye &amp; Face Protection</b>  |                                       |
| Personal Eye Protection -OSHA 19.10 133   | EN 166 or ANSI Z87.1                  |
| <b>Respiratory Protection</b>   |                                       |
| Respiratory Protection  | EN 140, EN 149                        |
| Hood Supplied Air   | EN 269, EN 14594                      |
| <b>Personal Gas Detection</b>   |                                       |
| Personal Gas Detection  | EN 60079-29                           |
| <b>Hand Protection</b>  |                                       |
| Protective Gloves. General Requirement & Test Methods   | EN 420 2003 + A1:2009                 |
| Protective Gloves Against Mechanical Risk   | EN 388                                |
| Protective Gloves for Welders   | EN 12477                              |
| Protective Gloves Against Chemicals   | NE 374 Parts 1 to 3: 2003             |
| Protective gloves against thermal risks (heat and/or fire).   | EN 407: 2004                          |
| Protective gloves against Mechanical vibration and shock. Hand-arm vibration.   | EN ISO 10819: 2013                    |
| Protective gloves for firefighters.   | EN 659: 2003 + A1: 2008               |
| <b>Protective Foot ware</b>   |                                       |
| Personal Protective Equipment. Safety Foot ware -OSHA 1926.96 29 CFR 1910.136 &1910.132)  | EN ISO 20345/ ASTM F-2413-18          |
| <b>Protective Clothing</b>  |                                       |
| Protective Clothing General Requirements  | EN ISO 13688                          |
| Protective Clothing. Clothing to Protect Against Heat & Flame. Minimum Performance Requirements.  | EN ISO 11612                          |
| <b>Personal Flotation Devises (PDF's)</b>   |                                       |
| Personal Flotation Devises  | EN ISO 12402                          |
| <b>Fall Protection</b>  |                                       |

## 9.6 Appendix A- 4 – continued

### Fall Protection

| Standard Title   | Standard Reference   |
|--|--|
| Personal Protective Equipment Against Falls from Height. Full Body Harness   | EN 361, EN 358, EN 813, EN 12841 B ANSI Z359.11, CSA Z259.10 |
| Personal Protective Equipment Against Falls from a Height. Guided Type Fall Arresters Including a Flexible Anchor Line | EN 353-2 EN12841 A   |
| Personal Protective Equipment Against Falls from a Height. Energy Absorber   | EN 355   |
| Personal Protective Equipment Against Falls from a Height. Connectors  | EN 362   |
| Personal Fall Protection Equipment. Anchor Devices   | EN 795   |
| Personal Fall Protection Equipment. Rope Access Systems. Rope Adjustment Device.                                       | EN 12841   |

## 9.7 Appendix B: Audit Criteria

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria        |                | Requirements  | Verification | Area of Concern |
|-----------------------|----------------|---|--------------|-----------------|
| ISO 45001:2018 Clause | NMS Ref.       |   |              | Yes/ No         |
| 5.3                   | 7.1.3          | Pre-Tender Health and Safety Plan has been developed and issued   |              |                 |
| 5.3,<br>8.1.4.2       | 7.1.4          | Selection of Contractors undertaken in accordance with NEOM's policies and procedures   |              |                 |
| 7.2                   | 7.2.4,<br>8.19 | Persons appointed to manage /oversee work operations have the skills, knowledge, experience   |              |                 |
| 8.1.2 (e)             | 7.2.6          | Personal protective equipment required for use are fit for purpose  |              |                 |
| 6.1.2.3<br>6.1.2.2    | 7.2.5<br>8.2.2 | Hazards Identification Plan (HIP)<br><br>Assessment of the various risks shall be undertaken, PPE shall be selected and provided following a risk assessment of the anticipated hazards associated with the work/environment to protect all personnel, including visitors |              |                 |
| 8.1.2 (e)             | 8.2.1          | PPE must comply with the relevant recognized national and/or international standards  |              |                 |
| 8.1.2 (e)             | 8.3.1          | Employer shall ensure that the issuing of PPE is suitably controlled and managed to provide full traceability for equipment   |              |                 |
| 8.1.2 (e)             | 8.4            | Employee will wear clothing (conventional or disposable overalls, boiler suits, aprons, chemical suit) that protects the body and extremities from typical hazards  |              |                 |
| 8.1.2 (e)             | 8.5            | Approved Light Eye Protection (LEP) shall be worn at all times whilst on site or in the vicinity work activities  |              |                 |
| 8.1.2 (e)             | 8.6.2          | Safety Helmets are to be worn in accordance with all manufacturer requirements  |              |                 |
| 8.1.2 (e)             | 8.8            | Protective footwear provide both impact and compression protection for general industrial use, or in addition with puncture protection, metatarsal protection, or electrical (non-conducting) protection as required by the nature of work                                |              |                 |
| 8.1.2 (e)             | 8.9            | Respiratory protective equipment shall be available to all persons who are exposed to any situation in which there is a possibility of the atmosphere containing any harmful substance  |              |                 |

| Audit Criteria        |          | Requirements  | Verification | Area of Concern |
|-----------------------|----------|---|--------------|-----------------|
| ISO 45001:2018 Clause | NMS Ref. |   |              | Yes/ No         |
| 8.1.2 (e)             | 8.11     | Adequate hand and arm protection shall be available for all manual Labor  |              |                 |
| 8.1.2 (e)             | 8.16     | All personal protective equipment shall be inspected at regular intervals, tested in accordance with the manufacturer's guidance and conform to international standards |              |                 |
| 7.2                   | 8.17     | Supervisors of work activities shall ensure that all personnel in the work area are aware of the PPE requirements and are in full compliance at all times               |              |                 |
|                       |          |   |              |                 |
|                       |          |   |              |                 |

## 9.8 Appendix C: Guidance Information

The OSHA requirements for PPE as set forth in the Code of Federal Regulations (CFR) at 29 CFR 1910.132 (General requirements).

- 29 CFR 1910.133 (Eye and face protection).
- 29 CFR 1910.135 (Head protection).
- 29 CFR 1910.136 (Foot protection).
- 29 CFR 1910.137 (Electrical protective equipment).
- 29 CFR 1910.138 (Hand protection); and

Regulations that cover the construction industry, at 29 CFR 1926.95 (Criteria 5 for personal protective equipment).

- 29 CFR 1926.96 (Occupational foot protection).
- 29 CFR 1926.100 (Head protection).
- 29 CFR 1926.101 (Hearing protection); and
- 29 CFR 1926.102 (Eye and face protection).

and for the maritime industry at

- 29 CFR 1915.152 (General requirements).
- 29 CFR 1915.153 (Eye and face protection).
- 29 CFR 1915.155 (Head protection).
- 29 CFR 1915.156 (Foot protection); and
- 29 CFR 1915.157 (Hand and body protection).

OSHA produce an excellent guidance document for PPE OSHA 315 Personal Protective Equipment.

In the UK PPE is governed by the Personal Protective Equipment at Work Regulations 1992.

A brief guidance document is available in INDG 174 (rev 2) 2013 - Personal protective equipment (PPE) at work

A brief guide also available is the publication L 25 Personal protective equipment at work (Third edition).



NEOM



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**NEOM OCCUPATIONAL SAFETY AND HEALTH  
NEOM MINIMUM STANDARD  
for  
OCCUPATIONAL NOISE EXPOSURE**

NEOM-NLF-NMS-006.022 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all Occupational health, and safety (OHS) risks associated with Occupational Noise Exposure.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

This NMS establishes the standards and requirements to ensure that the risks associated with Occupational Noise Exposure are managed.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor ensures that risks associated with the workplace are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions  |
|--------------------------------|--|
| NEOM Co                        | NEOM Company   |
| Client                         | NEOM Sector /Department responsible for management and oversight of the Contractor                       |
| Contractor                     | The organisation contracted to carry out the works   |
| Employer                       | The person or organisation that employs personnel to complete the work                                   |
| Safety Management System (SMS) | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions   |
|---------------|--|
| SMS           | Safety Management System   |
| NMS           | NEOM Minimum Standard  |
| SOP           | Standard Operating Procedure   |
| ANSI          | American National Standards Institute  |
| NFPA          | National Fire Prevention Association   |
| CPP           | Construction Phase Plan  |
| OSHA          | Occupational Safety and Health Administration.   |
| PPE           | Personal Protective Equipment  |
| TWA           | Time Weighted Average  |
| MSU           | Moving Sensor Units  |
| dB(A)         | Decibel (A – weighted Decibels) These are an expression of the relative loudness of sound in air as perceived by the human ear |
| IBC           | International Building Codes   |
| OHS           | Occupational Health and Safety   |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance                      |
| NEOM-Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors   |
| NEOM-NLF-NMS-006.001        | SMS Organisation, Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards  |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals  |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                       |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM—Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring;
  - (b) Managing change;
  - (c) Continuous improvement.

### 7.2 Contractor

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.(Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)
- 7.2.7 Contractor shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Shall eliminate noise hazards by purchasing low noise and vibration producing equipment, maintaining equipment to manufacturer's specifications, eliminating noise hazards, erecting barriers, or implementing other control measures to eliminate / reduce noise hazards, were reasonably practicable.
  - (b) Provide protection to employees, contractors, and visitors against the effects of noise exposure Through development and implementation of a "Hearing Conservation Program" meeting the requirements of this NMS when they have noise hazards that exceed 85 dB(A).
  - (c) Ensure employees, contractors and visitors are not exposed to any continuous, intermittent, or impact noise levels at or more than a 100 dB(A), unless the appropriate hearing protection is provided.

### **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices including hearing protection provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Employees shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Employees shall report any activity or equipment defect relating to noise exposures which they believe is reasonably practicable to cause any overexposure to themselves or another person.

### **7.4 Specific Responsibilities**

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|                                      |                      |              |
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- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.4.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## **8 Other Sections related to subject**

### **8.1 General requirements**

- 8.1.1 When employees are subjected to exposure levels exceeding those permitted. Reasonably practicable engineering and/or administrative control measures shall be implemented. If such control measures fail to reduce sound levels within acceptable levels, personal protective equipment (with effective attenuation) shall be provided and used to reduce sound levels within acceptable parameters.
- 8.1.2 Ensure employees, contractors and visitors are not exposed to any continuous, intermittent, or impact noise levels at or more than a 100 dB(A), unless the appropriate hearing protection is provided.

**Note:** If the variations in noise level involve maxima at intervals of 1 second or less, it is to be considered continuous.

- 8.1.3 The tables identified below are to be referenced for assessing exposure levels

- (a) Appendix 1 - Allowable Duration of Exposure Based on Sound Level dB(A)
- (b) Appendix 2 – Calculating dB(A) Using Octave Band Analysis

### **8.2 Training and Competency**

- 8.2.1 Ensure that Safety training complies with the requirements of:

- (a) NEOM-Element 5 – Training, Awareness and Competency.
  - (b) NEOM-NLF-NMS-006.001–SMS Organisation, Practitioner Registration and Appointment of Contractor
- 8.2.2 Provide training to all employees exposed to noise at or more than an 8-hr time weighted average of 85 dB(A). Training shall be conducted within 30 days of starting work and prior to working in a high noise area, and include:
- (a) Requirements of this NMS.
  - (b) Health hazards associated with exposure to noise above 85 dB(A).
  - (c) Signs and symptoms of noise exposure and hearing loss.
  - (d) Types of hearing loss.
  - (e) Information on the employer's hearing conservation program.
  - (f) The purpose of hearing protectors along with the advantages, disadvantages, and attenuation of various types of hearing protectors.
  - (g) Instructions on selection, fitting, use, and care of hearing protectors.
  - (h) Purpose of audiometric testing and explanation of the testing procedures; and
  - (i) Locations within the facility where noise hazards exist, and hearing protection is required.

- 8.2.3 Training provided shall include practical and theoretical training.

- 8.2.4 Training shall be conducted in a language and method appropriate for the workforce.

- 8.2.5 Refresher training shall be provided at appropriate intervals

- 8.2.6 Employers shall maintain a record of the required training that contains the following:

- (a) Name and ID number.
- (b) Subject(s) of training.

- (c) Date(s) of training; and
  - (d) Person providing the training.
- 8.2.7 Provide appropriate information, instruction and /or training to those persons who are not at work but are at risk from noise levels emitted from the workplace.
- 8.2.8 Ensure that any contractors who are working within the workplace and are exposed to noise levels at or above an 8-hr time weighted average of 85 dB(A) have received appropriate training.

### **8.3 Noise Risk Assessment**

- 8.3.1 Client/Contractors/Employers who carry out work which is liable to expose any employees to noise at or above the action level of 85 dB(A) shall ensure a suitable and sufficient assessment of the risk, in line with the requirements of NEOM-Element 2 –Risk and Opportunity Management, from that noise to the safety and health of those employees, and the risk assessment shall identify the measures which need to be taken to meet the requirements of this NMS.
- 8.3.2 Assess exposure to any employees, contractors or other persons that may be affected by the noise emissions of the workplace.
- 8.3.3 When undertaking the noise risk assessment assess the levels of noise to which workers are exposed by:
  - (a) Observation of specific working practices.
  - (b) Reference to relevant information on the probable levels of noise corresponding to any equipment used in the working conditions; and
  - (c) If necessary, measurement of the level of noise to which his employees are likely to be exposed.
- 8.3.4 Assess whether any employees are likely to be exposed to noise at or above the exposure limits as detailed in Appendix 1 of this document. The risk assessment shall consider:
  - (a) The level, type, and duration of exposure, including any exposure to peak sound pressure.
  - (b) The effects of exposure to noise on employees or groups of employees whose health is at particular risk from such exposure.
  - (c) So far as is practicable, any effects on the health and safety of employees resulting from the interaction between noise and the use of ototoxic substances at work, or between noise and vibration.
  - (d) Any indirect effects on the health and safety of employees resulting from the interaction between noise and audible warning signals or other sounds that need to be audible to reduce risk at work.
  - (e) Any information provided by the manufacturers of work equipment.
  - (f) The availability of alternative equipment designed to reduce the emission of noise.
  - (g) Any extension of exposure to noise at the workplace beyond normal working hours, including exposure in rest facilities supervised by the employer.
  - (h) Appropriate information obtained following health surveillance, including, where possible, published information; and
  - (i) The availability of personal hearing protectors with adequate attenuation characteristics.
- 8.3.5 The risk assessment shall be reviewed on a regular basis, at least annually and following any significant changes within the workplace likely to affect the noise exposure levels to employees.

## **8.4 Hearing Conservation Program**

- 8.4.1 A continuous, effective hearing conservation program, as described in this section is required whenever noise exposures identified through a noise risk assessment equals or exceeds 85 decibels measured on the A-weighted scale (slow response).
- 8.4.2 Ensure for the purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with Appendix A - 1 and/or Appendix A - 3, and without regard to any attenuation provided using personal protective equipment.
- 8.4.3 Ensure no employee, contractor or other person is exposed to any continuous, intermittent, or impact noise at or more than 100dB(A) without the use of hearing protection.
- 8.4.4 Hearing conservation programs shall consist of the following Moving Sensor Units (MSU's):
- (a) Exposure monitoring:
- I. Appoint a Competent Person to develop and implement a monitoring program and sampling strategy to assess employee's exposure to noise.
  - II. The sampling strategy shall be designed to identify employees for inclusion in the hearing conservation program and to enable the appropriate selection of hearing protection.
  - III. Where circumstances such as high employee mobility, significant variations in sound level, or a significant component of impulse noise make area monitoring generally inappropriate use a representative personal sampling to comply with the monitoring requirements of this paragraph unless it can be shown that area sampling produces equivalent results.
  - IV. All continuous, intermittent, and impulsive sound levels from 80 dB(A) to 130 dB(A) shall be integrated into the noise measurements.
  - V. Instruments used to measure employee noise exposure shall be calibrated as per manufacturer's recommendations to ensure measurement accuracy.
  - VI. Monitoring shall be repeated whenever a change in production, process, equipment, or control measures increases noise exposures to the extent that:
    1. Additional employees may be exposed at or above the action level; or
    2. The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of Section 3.3(b)(xii) of this NMS.
- (b) Employee notification:
- I. Ensure each employee exposed at or above an 8-hour time weighted average of 85 dB(A) is notified of the results of the monitoring. Notification shall be made in the language and method understood by the employee.
- (c) Audiometric testing program:
- I. Establish and maintain an audiometric testing program as provided in this paragraph by ensuring audiometric testing available to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 dB(A).
  - II. The audiometric testing program shall be provided at no cost to the employees; and
  - III. Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician that is certified/accredited by the MOH and who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and appropriately using, maintaining, and checking calibration and appropriate functioning of the audiometers being used. A technician who performs audiometric tests shall be responsible to an Audiologist, Ear Nose Throat Specialist, or Physician.

(d) Baseline audiogram:

- I. Within 6 months of an employee's first exposure at or above 85 dB(A) of noise, a valid baseline audiogram shall be established against which subsequent audiograms can be compared.
- II. Testing to establish a baseline audiogram shall be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirements that the baseline audiograms be preceded by 14 hours without exposure to workplace noise; and
- III. Employees shall be informed of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

(e) Annual audiogram:

- I. Within 12 months of an employee's baseline audiogram, the employer shall provide an audiogram that can be compared to the baseline audiogram and subsequent audiograms.
- II. Testing to establish an annual audiogram shall be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirements that the baseline audiograms be preceded by 14 hours without exposure to workplace noise; and
- III. Employees shall be notified of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

(f) Evaluation of audiogram:

- I. Each employee's audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid
- II. If the annual audiogram shows that an employee has suffered a standard threshold shift, the employer may obtain a retest within 30 days and consider the results of the retest as the annual audiogram.
- III. An audiologist, otolaryngologist, or physician shall review problem audiograms and they shall determine whether there is a need for further evaluation. The employer shall provide to the person performing this evaluation the following information:
- IV. A copy of the requirements of this NMS.
- V. The baseline audiogram and most recent audiogram of the employee to be evaluated.
- VI. Measurements of background sound pressure levels in the audiometric test room as required in this document; and
- VII. Records of audiometric calibrations as required by the equipment manufacturer.

(g) Follow-up procedures:

- I. If a comparison of the annual audiogram to the baseline indicates a standard threshold shift, the employee shall be informed of this fact in writing, in a language the employee will understand, within 21 days of the determination.
- II. Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, the employer shall ensure that the following steps are taken when a standard threshold shift occurs:
  1. Employees shall be fitted/refitted with hearing protectors, trained in their use and care, and required to use them.

2. Hearing protection in use shall be evaluated to ensure they are offering the appropriate attenuation. If necessary, hearing protectors shall be replaced with hearing protectors offering greater attenuation.
3. Employees shall be referred for a clinical audio-logical evaluation or an otological (ear) examination, as appropriate, if additional testing is necessary or if the employer suspects that the medical pathology of the ear is affected or aggravated by the wearing of hearing protectors; and
4. The employee is informed of the need for an otological examination if the medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.
5. If subsequent audiometric testing of an employee indicates that a standard threshold shift is not persistent, the employer shall inform the employee of the new audiometric interpretation.

(h) Standard threshold shift:

- I. As per this NMS, a standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB(A) or more in 2000, 3000, and 4000 Hz in either ear; or
- II. In determining whether a standard threshold shift has occurred, no allowance shall be made for the contribution of aging.

(i) audiometric test requirements:

- I. Audiometric tests shall be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency shall be taken separately for each ear.
- II. Audiometric tests shall be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained in accordance with, American National Standards Institute S3.6-2010 or International Standards Organization 8253-1:2010.
- III. Pulsed tone and self-recording audiometers, if used, shall meet the requirements specified in this NMS; and
- IV. Audiometric examinations shall be administered in a room meeting the requirements listed in this NMS.

(j) Audiometric calibration:

- I. The functional operation of the audiometer shall be checked before each day's use in accordance with manufacturer's specifications. If no specification exists, the audiometer shall be checked by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Deviations of 10 dB(A) or greater require an acoustic calibration.
- II. Audiometric calibration shall be checked annually in accordance with manufacturer's specifications. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check. Deviations of 15 dB(A) or greater require an exhaustive calibration; and
- III. An exhaustive calibration shall be performed at least every two years in accordance with manufacturer's specifications and American National Standards Institute S3.6-2010 or International Standards Organization 8253-1:2010. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check.

(k) Hearing protectors:

- I. Hearing protectors available to all employees exposed to an 8-hour time-weighted average of 85 dB(A) or greater at no cost to employees. Hearing protectors shall be replaced, as necessary.
- II. All employees exposed to an 8-hour time-weighted average of 85 dB(A) or greater are required to wear hearing protection.
- III. Employees shall be given the opportunity to select their hearing protectors for a variety of appropriate hearing protectors provided by the employer.
- IV. Training shall be provided in the use and care of all hearing protectors provided to employees; and
- V. Ensure that hearing protectors provided to employees fits the employee correctly and provides the required protection.

(l) Hearing protector attenuation:

- I. Ensure evaluation of hearing protector attenuation for the specific noise environments in which the protector shall be used. The employer shall use one of the evaluation methods described in Section 3.8 of this document.
- II. Hearing protectors shall attenuate employee exposure at least to an 8-hr time weighted average of 85 dB(A).
- III. In the event hearing protectors cannot be purchased with an attenuation rating that shall bring the exposure below an 8-hr time-weighted average of 85 dB(A), double protection (both muffs and plugs) shall be worn. Calculate the rating for the double hearing protection using the requirements of Section 3.8(b) of this document. Double hearing protectors shall attenuate employee exposure at least to an 8-hr time-weighted average of 85 dB(A); and
- IV. The appropriateness of hearing protector attenuation shall be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided no longer provide appropriate attenuation. Where necessary more effective hearing protection shall be provided.

## 8.5 Noise Hazard Signage

- 8.5.1 Warning signs shall be posted in each work area where the noise levels are or exceed 85 dB(A) notifying employees and visitors that hearing protection is required if entering or working in the area. If double hearing protection is required, this shall be identified on the warning sign.
- 8.5.2 Signs shall be in the language of employees entering the area. Signs shall comply with NEOM-NLF-NMS-006.013– Safety Signage and Signals.

## 8.6 Audiometric Measuring Instruments

- 8.6.1 If pulse-tone audiometers are used, they shall have a tone on-time of at least 200 milliseconds.
- 8.6.2 Self-recording audiometers shall comply with the following requirements:
  - (a) The chart upon which the audiogram is traced shall have lines at positions corresponding to all multiples of 10 dB(A) hearing level within the intensity range spanned by the audiometer. The lines shall be equally spaced and shall be separated by at least 1/4 inch. Additional increments are optional. The audiogram pen tracings shall not exceed 2 dB(A) in width.
  - (b) It should be possible to set the stylus manually at the 10 dB(A) increment lines for calibration purposes.

- (c) The slewing rate for the audiometer attenuator shall not be more than 6 dB(A)/sec except that an initial slewing rate greater than 6 dB(A)/sec is permitted at the beginning of each new test frequency, but only until the second subject response.
- (d) The audiometer should remain at each required test frequency for 30 seconds (+ or - 3 seconds). The audiogram shall be clearly marked at each change of frequency and the actual frequency change of the audiometer shall not deviate from the frequency boundaries marked on the audiogram by more than + or - 3 seconds; and
- (e) It shall be possible at each test frequency to place a horizontal line segment parallel to the time axis on the audiogram, such that the audiometric tracing crosses the line segment at least six times at that test frequency. At each test frequency the threshold shall be the average of the midpoints of the tracing excursions.

## **8.7 Audiometric Test Rooms**

- 8.7.1 Rooms used for audiometric testing shall not have background sound pressure levels exceeding those in Table 3.1 when measured by equipment conforming at least to the Type 2 requirements of American National Standard Specification for Sound Level Meters, S1.41983 (R2006), and to the Class II requirements of American National Standard Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters, S1.11-2004 (R2009).

*Table 4 – Maximum Allowable Octave-Band Sound Pressure Levels for Audiometric Test Rooms*

|                                   |     |      |      |      |      |
|-----------------------------------|-----|------|------|------|------|
| Octave-band centre frequency (Hz) | 500 | 1000 | 2000 | 4000 | 8000 |
| Sound pressure level (dB)         | 40  | 40   | 47   | 57   | 62   |

## **8.8 Computation of Employee Noise Exposure**

- 8.8.1 The sound pressure level shall be determined by a sound level meter or dosimeter conforming, as a minimum, to the requirement of the American National Standards Institute (ANSI) Specification for Sound Level Meters, S1.4-1983 (R2006), Type S2A, or ANSI S1.251991 (R2007) Specification for Personal Noise Dosimeters. The measurement device shall be set to use the A-weighted network with slow meter response. The duration of exposure shall not exceed that shown in Appendix 1. These values apply to the total duration of exposure per working day regardless of whether this is one continuous exposure or a number of short-termed exposures.
- 8.8.2 A sound calibrator shall be used for direct calibration of sound level meter or dosimeter before and after noise measurements. The sound calibrator shall comply with:
  - (a) EN/IEC 60942 (2003) Class LS and Class 1; and/or
  - (b) ANSI S1.40-1984.
- 8.8.3 Sound level meters and dosimeters shall be calibrated by the manufacturer, or a manufacturer approved third party organization according to manufacturer's specifications.
- 8.8.4 Occupational noise exposure assessments shall be completed in accordance with this NMS.
- 8.8.5 When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect shall be considered rather than the individual effect of each.
- 8.8.6 When sound level meter or dosimeter readings equal or exceed 85 dB(A), Organisation shall calculate the allowable noise using the calculation found in Appendix A-3.

## **8.9 Computation of Hearing Protection Attenuation**

- 8.9.1 Calculating single hearing protection device (plugs or muffs): (An example of how to perform this calculation can be found in Appendix A-4.)

- (a) When calculating the hearing protection attenuation, the employer shall take the noise reduction rating (NRR) stated by the manufacturer of the hearing protection and subtract 7dB(A) from the rating; and
  - (b) The calculated hearing protection attenuation shall then be subtracted from the worksite sound level measured with a sound level meter or dosimeter on the A weighted scale. If the calculated exposure is below 85 dB(A), the hearing protection shall be determined to be appropriate.
- 8.9.2 Calculating double hearing protection (plugs and muffs) - When a single hearing protection device is not enough to protect an employee for a noise hazard, and double protection (plugs and muffs) is required, the hearing protection attenuation shall be calculated in the following manner: (An example of how to perform this calculation can be found in Appendix A-4.)
- (a) Calculate the hearing protection attenuation for the plugs as stated in this NMS
  - (b) Calculate the hearing protection attenuation for the muffs by subtracting 25% of the manufacturer rated NRR. If the calculation gives you a decimal, round down to nearest whole number.
  - (c) Add the calculated attenuation for the plugs and muffs together to get the total attenuation; and
  - (d) The calculated total hearing protection attenuation shall then be subtracted from the worksite sound level measured with a sound level meter or dosimeter on the weighted scale. If the calculated exposure is below 85 dB(A), the double hearing protection shall be determined to be appropriate.

## **8.10 Record Keeping**

- 8.10.1 Exposure monitoring, medical surveillance, examination, and consultation records shall be kept for a minimum of period of employment plus 30 years, as per NEOM-SMS Element 3 Control of Documented Information and Legal Compliance
- 8.10.2 All compliance and training records shall be kept for a minimum of five (5) years, as per NEOM-SMS Element 3 Control of Documented Information and Legal Compliance

## 9 Appendices

### 9.1 Appendix A-1 : Allowable Duration of Exposure Based on Sound Level dB(A)

| مستوى التعرض      | الفترة الزمنية |         |         | مستوى التعرض      | الفترة الزمنية |         |         |
|-------------------|----------------|---------|---------|-------------------|----------------|---------|---------|
| Exposure Level, L | Duration, T    |         |         | Exposure Level, L | Duration, T    |         |         |
| (dBA)             | Hours          | Minutes | Seconds | (dBA)             | Hours          | Minutes | Seconds |
| 80                | 24             | -       | -       | 106               | -              | 3       | 45      |
| 81                | 20             | 10      | -       | 107               | -              | 2       | 59      |
| 82                | 16             | -       | -       | 108               | -              | 2       | 22      |
| 83                | 12             | 42      | -       | 109               | -              | 1       | 53      |
| 84                | 10             | 5       | -       | 110               | -              | 1       | 29      |
| 85                | 8              | -       | -       | 111               | -              | 1       | 11      |
| 86                | 6              | 21      | -       | 112               | -              | -       | 56      |
| 87                | 5              | 2       | -       | 113               | -              | -       | 45      |
| 88                | 4              | -       | -       | 114               | -              | -       | 35      |
| 89                | 3              | 10      | -       | 115               | -              | -       | 28      |
| 90                | 2              | 31      | -       | 116               | -              | -       | 22      |
| 91                | 2              | -       | -       | 117               | -              | -       | 18      |
| 92                | 1              | 35      | -       | 118               | -              | -       | 14      |
| 93                | 1              | 16      | -       | 119               | -              | -       | 11      |
| 94                | 1              | -       | -       | 120               | -              | -       | 9       |
| 95                | -              | 47      | 37      | 121               | -              | -       | 7       |
| 96                | -              | 37      | 48      | 122               | -              | -       | 6       |
| 97                | -              | 30      | -       | 123               | -              | -       | 4       |
| 98                | -              | 23      | 49      | 124               | -              | -       | 3       |
| 99                | -              | 18      | 59      | 125               | -              | -       | 3       |
| 100               | -              | 15      | -       | 126               | -              | -       | 2       |
| 101               | -              | 11      | 54      | 127               | -              | -       | 1       |
| 102               | -              | 9       | 27      | 128               | -              | -       | 1       |
| 103               | -              | 7       | 30      | 129               | -              | -       | 1       |
| 104               | -              | 5       | 57      | 130-140           | -              | -       | <1      |
| 105               | -              | 4       | 43      | -                 | -              | -       | -       |

## 9.2 APPENDIX A-2: Calculating dB(A) Using Octave Band Analysis Data

When noise levels are determined by octave band analysis, the equivalent A-weighted sound level may be determined using the following procedure:

- Step 1:** The A-weighting corrections given in Table A shall be added or subtracted arithmetically to each octave band sound pressure level.
- Step 2:** The A-corrected band levels shall be converted into arbitrary intensity MSUs "I" am using Table B.
- Step 3:** The values of "I" shall be added together arithmetically.
- Step 4:** The total value of "I" shall be converted into A-weighted sound level, dB(A), using Table B. When the total value of "I" falls between two values in the table, take the next higher value of sound level.

| Octave band centre frequency Hz | 63  | 125 | 250 | 200 | 1000 | 2000 | 4000 | 8000 |
|---------------------------------|-----|-----|-----|-----|------|------|------|------|
| A-weighting correction dB       | -26 | -16 | -9  | -3  | 0    | +1   | +1   | -1   |

**Table A**

| dB  | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 60  | .0010 | .0013 | .0016 | .0020 | .0025 | .0032 | .0040 | .0050 | .0063 | .0079 |
| 70  | .010  | .013  | .016  | .020  | .025  | .032  | .040  | .050  | .063  | .079  |
| 80  | .100  | .126  | .158  | .200  | .251  | .316  | .398  | .501  | .631  | .794  |
| 90  | 1.00  | 1.26  | 1.58  | 2.00  | 2.51  | 3.16  | 3.98  | 5.01  | 6.31  | 7.94  |
| 100 | 10.0  | 12.6  | 15.8  | 20.0  | 25.1  | 31.6  | 39.8  | 50.1  | 63.1  | 79.4  |
| 110 | 100   | 126   | 158   | 200   | 251   | 316   | 398   | 501   | 631   | 794   |

**Table B****Example Problem:**

The first two columns in the table below show the octave band sound pressure level measured in each octave band centre frequency. Column three shows the A-weighting corrections taken from Table A as required in Step 1 above, and column four gives the A-corrected octave band. The A-corrected octave band levels are converted into "I" values using Table B as required in Step 2 above. Column 5 shows the "I" value for each frequency, which is then added together as required in Step 3 above. The total value for "I" is then converted into an A-weighted sound level value using Table B, as required in Step 4 above.

| <b>1<br/>Octave band centre frequency HZ</b> | <b>2<br/>Octave band sound pressure level dB</b> | <b>3<br/>A-weighting correction from Table A dB</b> | <b>4<br/>A-corrected octave band level dB</b> | <b>5<br/>"I" value from Table B</b> |
|--|--|---|---|-------------------------------------|
| 125  | 95   | -16   | 79  | 0.079                               |
| 250  | 102  | -9  | 93  | 2.000                               |
| 500  | 105  | -3  | 102   | 15.800                              |
| 1000   | 102  | 0   | 102   | 15.800                              |
| 2000   | 98   | +1  | 99  | 7.940                               |
| 4000   | 89   | +1  | 90  | 1.000                               |
| 8000   | 79   | -1  | 78  | 0.063                               |

- Total value of "I" = 42.682
- From Table B the nearest A-weighted sound level to the nearest decibel, as required by Step 4 above = 107 dB(A)

### **9.3 APPENDIX A-3: Calculation of Allowable Noise Calculation:**

T = reference duration corresponding to the measured sound level L = sound level measured in decibels (A-weighted sound level)

$$T = \frac{8}{2(L-85)/3}$$

Example:

You measure a sound level of 94dB(A), what is the length of exposure allowed before 8-hr time-weighted average of 85 dB(A)?

$$T = \frac{8}{2(94-85)/3} T = 1 \text{ hr}$$

You are allowed one hour of exposure before you shall exceed the 8-hr time-weighted average of 85 dB(A).

**Note: This is the same as found in Appendix 1.**

**Calculation of total noise exposure (dose) shall be done using the following calculation:**

D = noise dose (less than 1 = no overexposure and greater than 1 = overexposure) C = total time of exposure at a specific noise level

T = reference duration corresponding to the measured sound level      \*\* see above calculation or Appendix 1.

$$D = \frac{C_1}{T_1} + \frac{C_2}{T_2} + \dots + \frac{C_n}{T_n}$$

Example:

You measure a sound level of 88dB(A) for 2 hours, 91dBA for 30 min, and 85dB(A) for 3 hours. Have you exceeded the allowed 8-hr time-weighted average of 85 dB(A)?

$T_{88} = 4 \text{ hrs}$ ,  $T_{91} = 2 \text{ hrs}$ ,  $T_{85} = 8 \text{ hrs}$

$C_{88} = 2 \text{ hrs}$ ,  $C_{91} = 0.5 \text{ hrs}$ ,  $C_{85} = 3 \text{ hrs}$

$$D = \frac{2}{4} + \frac{0.5}{2} + \frac{3}{8} = 1.125$$

Since D is greater than one (1.125) you have exceeded the 8-hr time-weighted average of 85 dB(A).

#### **9.4 APPENDIX A-4: Calculating Single Hearing Protection Device (Plugs or Muffs):**

When calculating the hearing protection attenuation take the noise reduction rating (NRR) stated by the manufacture of the hearing protection and subtract 7dB from the rating.

The calculated hearing protection attenuation shall then be subtracted from the worksite sound level measured with a sound level meter or dosimeter on the A-weighted scale. If the calculated exposure is below 85 decibels, the hearing protection shall be determined to be appropriate. Example:

- Noise monitoring determines a level of 94 decibels on the A-weighted scale.
- Hearing protection is rated by the manufacture to have an NRR of 28dB
- Hearing Protection Attenuation =  $28\text{dB} - 7\text{dB} = 21\text{dB}$
- Employee exposure with hearing protection =  $94\text{dB} - 21\text{dB} = 73\text{dB}$
- The hearing protection is appropriate to protect employees.

#### **Calculating double hearing protection (plugs and muffs):**

When a single hearing protection device is not enough to protect an employee for a noise hazard, and double protection (plugs and muffs) is required, the hearing protection attenuation shall be calculated in the following manner:

- I. Calculate the hearing protection attenuation for the plugs as stated above for single hearing protection device.
- II. Calculate the hearing protection attenuation for the muffs by subtracting 25% of the manufacture rated NRR. If the calculation gives you a decimal, round down to nearest whole number.
- III. Add the calculated attenuation for the plugs and muffs together to get the total attenuation
- IV. The calculated total hearing protection attenuation shall then be subtracted from the worksite sound level measured with a sound level meter or dosimeter on the A-weighted scale. If the calculated exposure is below 85 decibels, the double hearing protection shall be determined to be appropriate.

Example:

- Noise monitoring determines a level of 125 decibels on the A-weighted scale.
- Hearing protection for plugs is rated by the manufacture to have an NRR of 34dB
- Hearing protection attenuation for plugs =  $34\text{dB} - 7\text{dB} = 27\text{dB}$
- Hearing protection for muffs is rated by the manufacture to have an NRR of 25dB.
- Hearing protection attenuation for muffs:
  - 25% of 25dB = 6.25dB
  - Attenuation for muffs =  $25\text{dB} (\text{NRR}) - 6.25\text{B} = 18.75\text{dB}$  (round 18.75 dB down to 18dB)
- Attenuation for double hearing protection =  $27\text{dB} + 18\text{dB} = 45\text{dB}$
- Employee exposure with double hearing protection =  $125\text{dB} - 45\text{dB} = 80\text{dB}$
- The double hearing protection is appropriate to protect employee

## 9.5 Appendix B: Audit Criteria OCCUPATIONAL NOISE EXPOSURE

**N E O M - N L F - N M S - 0 0 6 . 0 2 2 -**

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria        |   | Requirements   | Verification | Area of Concern |
|-----------------------|---|--|--------------|-----------------|
| ISO 45001:2018 Clause | NMS Ref.                                    |  |              | Yes/ No         |
| 5.3                   | 7.1.3                                       | Pre-Tender Health and Safety Plan has been developed and issued  |              |                 |
| 5.3,<br>8.1.4.2       | 7.1.4                                       | Selection of Contractors undertaken in accordance with NEOM's policies and procedures  |              |                 |
| 7.2                   | 7.2.3,<br>7.2.4, 8.2                        | Persons appointed to manage /oversee work operations have the skills, knowledge, experience and trained  |              |                 |
| 8.1.2 (e)             | 7.2.6                                       | Personal protective equipment required for use are fit for purpose   |              |                 |
| 6.1.2.3<br>6.1.2.2    | 7.2.5,<br>8.3.2                             | Hazards Identification Plan (HIP)<br><br>Assessment of the various risks shall be undertaken, to assess exposure to any employees, contractors or other persons that may be affected by the noise emissions of the workplace.  |              |                 |
| 8.1.1,<br>8.1.2       | 7.2.7(c,<br>b)<br>8.1.1,<br>8.1.2,<br>8.4.1 | Ensure employees, contractors and visitors are not exposed to any continuous, <b>intermittent</b> noise levels at or more than a 100 dB(A), or noise at or more than an 8-hr time <b>weighted average</b> of 85 dB(A), unless the appropriate hearing protection is provided |              |                 |
|                       |   | A continuous, effective hearing conservation program, is required whenever noise exposures identified through a noise risk assessment equals or exceeds 85 decibels measured on the A-weighted scale (slow response)   |              |                 |
|                       |   | Reasonably practicable engineering and/or administrative control measures shall be implemented   |              |                 |
| 8.1.2                 | 8.5.1                                       | Warning signs shall be posted in each work area where the noise levels are or exceed 85 dB(A) notifying employees and visitors that hearing protection is required if entering or working in the area  |              |                 |
| 6.1.3,<br>9.1.2       | 8.10.1                                      | Exposure monitoring, medical surveillance, examination, and consultation records shall be kept for a minimum of period of employment plus 30 years   |              |                 |



## 9.6 Appendix C: Guidance Information

OSHA Occupational Noise Regulations - 1910.95 - The OSHA noise exposure standards define two action levels at which worker protection must be provided and used. These actions are based on the 8-hour Time Weighted Average (TWA) of the noise levels that the worker is exposed to throughout the working day:

| TWA      | Dose   | Action                       | Details  |
|----------|--------|------------------------------|--|
| 85 dBA + | 50% +  | Hearing Conservation Program | Provide hearing protection for workers to wear if they choose to.<br>Give training on the risks of high noise exposure.<br>Monitor the levels regularly in case they increase.<br>Provide audiometric testing. |
| 90 dBA + | 100% + | Noise Control Program        | Provide hearing protection, which must be worn.<br>Provide training on the risks of high levels and the wearing of protection.<br>Provide audiometric testing.   |

### Time Weighted Average - TWA - Noise Levels

These noise exposure limits are not based on instantaneous sound levels. They are based on the TWA (time weighted average) or Dose %, which indicates the average noise levels that the worker is exposed to throughout a working day.

OSHA – Occupational noise exposure 1910.95External. OSHA sets legal limits on noise exposure in the workplace. These limits are based on a worker's time weighted average over an 8-hour day. With noise, OSHA's permissible exposure limit (PEL) is 90 dBA for all workers for an 8-hour day. However, NEOM's requirements set this limit at 85 dBA.

### When to Monitor the Noise Levels

The noise levels in a workplace should be carefully monitored using the correct grade of equipment if there is any possibility that a worker will be exposed and an 8-hour time weighted average noise level of 85 dB(A) or above. This monitoring should be repeated periodically (e.g., every year or every two years) or whenever there is change to machinery, production levels or processes that may impact on the noise levels.

In the UK the Control of Noise at Work Regulations 2005

The Control of Noise at Work Regulations 2005 (Noise Regulations 2005) require employers to prevent or reduce risks to health and safety from exposure to noise at work. Employees have duties under the Regulations too. The Regulations require you as an employer to:

- Assess the risks to your employees from noise at work;
- Take action to reduce the noise exposure that produces those risks;
- Provide your employees with hearing protection if you cannot reduce the noise exposure enough by using other methods;
- Make sure the legal limits on noise exposure are not exceeded;
- Provide your employees with information, instruction and training;
- Carry out health surveillance where there is a risk to health.

Publication INDG 362 (Rev 2) Noise at Work – a brief guide to controlling the risks is available on the UK HSE web-site and provides much useful guidance in controlling the risks in the work place.



نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
VIBRATION**

NEOM-NLF-NMS-006.023 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02,00     | SMS Update             | Issued for Implementation | 01-02-2022 |

## Document Approval

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of all occupational health, and safety (OHS) risks associated with personnel exposed to vibration.

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

It is applicable to all worksites where person(s) could have an exposure to vibration at any level. Worksites include, but are not limited to construction, maintenance, manufacturing, operation of light equipment, heavy plant and equipment, vehicles, and trucks.

## **3 Expectations**

To ensure the health and safety of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities involving vibration

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements;
- (b) ANSI requirements;
- (c) NFPA Standards and requirements;
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement.*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions   |
|--------------------------------|---|
| NEOM Co                        | NEOM Company  |
| Client                         | NEOM Sector /Department responsible for management and oversight of the Contractor                                      |
| Employer                       | The person or organisation that employs personnel to complete the works   |
| Contractor                     | The organisation contracted to carry out the works  |
| Competent Person               | A person who has acquired through training, qualification or experience the knowledge and skills to carry out the task. |
| Exposure limit value           | The level of daily vibration exposure to HAV for a worker which should not be exceeded.                                 |
| Exposure action value          | The level of daily vibration exposure to HAV for a worker above which steps should be taken to minimise exposure.       |
| Safety Management System (SMS) | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard                |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| HAV           | Hand-Arm Vibration                             |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name   |
|-----------------------------|---|
| NEOM Element 2              | Risk and Opportunity Management   |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance                      |
| NEOM-Element 5              | Training, Awareness and Competency.                                       |
| NEOM-Element 6              | Contractor Management   |
| NEOM-SMS                    | Neom Safety Management System   |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities                                |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table   |
| NEOM-NLF-PRC-006;           | Occupation Health, Safety, and Fire Safety requirements for Contractors   |
| NEOM-NLF-NMS-006.001        | SMS Organisation, Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002        | Safety Construction Management Plan                                       |
| NEOM-NLF-NMS-006.012        | Barricading of Hazards  |
| NEOM-NLF-NMS-006.013        | Safety Signage and Signals  |
| NEOM-NLF-NMS-006.021        | Personal Protective Equipment (PPE)                                       |
| NEOM-NLF-NMS-006.024        | Occupational Health Screening and Medical Surveillance                    |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM—Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organisations capable of meeting the requisite safety standards associated with project are contracted.

7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:

- (a) Safety performance monitoring and measuring;
- (b) Managing change;
- (c) Continuous improvement.

## 7.2 Contractor

7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM–NLF-SM–Safety Management Manual-Roles and Responsibilities

- (a) That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- (b) Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organisational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
- (c) Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks. (Refer: NEOM Element 2 Risk and Opportunity Management)
- (d) That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available. (Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment (PPE))
  - (a) Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)

7.2.2 Contractor shall undertake their specific roles and responsibilities in accordance with the following:

- (a) Where reasonably practicable, eliminate vibration hazards by purchasing low vibration producing equipment, maintaining equipment to manufactures specifications, erecting barriers, or implementing other control measures to eliminate / reduce vibration hazards.
- (b) Ensure when employees are subjected to vibration exceeding limits set in Section 8.5, reasonably practicable control measures are utilized.
- (c) Ensure employees are protected from all foreseeable vibration hazards.
- (d) Ensure defective equipment, or equipment that requires maintenance is reported to the appropriate department for repair or replacement.

## 7.3 Employee

7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.

7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.

7.3.3 Use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)

- 7.3.4 Use appropriate vibration protection, equipment or safety devices provided in accordance with any training or instruction received.

## 7.4 Specific Responsibilities

- 7.4.1 Sector, Organization, Department or Contractor Head is responsible in ensuring that provisions are made the safe systems of work to prevent and minimize risks in each workplace
- 7.4.2 Safety Practitioner/Coordinator is responsible to monitor the implementation of this procedures and document its effectiveness
- 7.4.3 The Responsible Person will support this procedure and ensure that any Contractor Organization working for, or on behalf of, the Sector, Organization, Department or Contractor will comply with the requirements of these procedures
- 7.4.4 Line Managers / Supervisors are responsible for training their workers in risks and controls
- 7.4.5 The LP & FS Public Safety department will support the NEOM risk assessments by carrying out compliance checks and supporting and guiding the various safety teams.

## 8 Other Sections related to subject

### 8.1 Hand-Arm Vibration (HAV)

- 8.1.1 Hand-arm vibration (HAV) is vibration transmitted to a person's hand and arm when using hand-held power tools, hand-guided machinery like powered lawnmowers, or while holding materials being processed by plant. HAV is commonly experienced by people who use jackhammers, chainsaws, grinders, drills, riveters, and impact wrenches.

### 8.2 Planning and Assessment

- 8.2.1 Contractor who carries out work which is liable to expose any of their employees to risk from HAV shall ensure appropriate risk assessment is undertaken, in accordance with NEOM-Element 2 – Risk and Opportunities Management. The risk assessment shall identify the control measures that need to be taken to meet the requirements of this NMS.
- 8.2.2 In conducting the risk assessment, a Competent Person shall assess daily exposures to vibration to determine if employees are to be exposed to vibration at or above the action level or above the exposure limit value. Assessment shall be by means of:
  - (a) Observation of specific working practices.
  - (b) Reference to relevant information (e.g., Equipment specifications, scientific studies, etc.) On the probable magnitude of the vibration corresponding to the equipment used in the particular working conditions; and
  - (c) If necessary; measurement of the magnitude of vibration to which employees are liable to be exposed.
- 8.2.3 The risk assessment shall include consideration of:
  - (a) The magnitude, type, and duration of exposure, including any exposure to intermittent vibration or repeated shocks.
  - (b) The effects of exposure to vibration on employees whose health is at particular risk from such exposure.
  - (c) Any effects of vibration on the workplace and work environment, including the appropriate handling of controls, the reading of indicators, the stability of structures and the security of joints.
  - (d) Any information provided by the manufacturers of work equipment.

- (e) The availability of replacement equipment designed to reduce exposure to vibration.
  - (f) Any extension of exposure at the workplace to whole-body vibration beyond normal working hours, including exposure in rest facilities supervised by the employer.
  - (g) Specific working conditions such as low temperatures; and
  - (h) Appropriate information obtained from health surveillance including, where reasonably practicable, published information.
- 8.2.4 Contractor shall assess proposed modifications to equipment, addition of new processes, or the purchasing of new equipment to assess their effect on the work environment and employees, with special focus placed on vibration hazards. Contractor shall:
- (a) Purchase equipment that has built in vibration control devices. Special attention shall be placed on equipment that can cause whole body vibration (e.g., jack hammers, earth moving equipment, industrial trucks, etc.) to ensure vibration control devices are built into the equipment and appropriate for their intended use.
  - (b) Design new work processes to include vibration dampening devices; and
  - (c) Implement a maintenance program to ensure equipment is maintained to manufacturer's specifications and vibration control equipment is functioning appropriately.
  - (d) Have a buy new policy so equipment is of latest anti vibration standards
  - (e) The risk assessment shall be reviewed regularly, and updated if:
    - (f) There is reason to suspect that the risk assessment is no longer valid; or
    - (g) There has been a significant change in the work to which the assessment relates.

8.2.5 Records shall include::

- (a) The significant findings of the risk assessment as soon as reasonably practicable after the risk assessment is made or changed; and
- (b) The measures which the employer has taken and which they intend to take to meet the requirements of this NMS.

### **8.3 Elimination or Control of Exposure to Vibration at the Workplace**

- 8.3.1 Where it is not reasonably practicable to eliminate the risk at the source, and an exposure action value is likely to be reached or exceeded, the exposure shall be reduced to as low a level as is reasonably practicable by establishing and implementing a program of organizational and technical measures which is appropriate to the activity.
- 8.3.2 The control measures taken by the employer shall be based on the health and safety hierarchy of controls and shall consider:
- (a) Other working methods which eliminate or reduce exposure to vibration.
  - (b) Choice of work equipment of appropriate ergonomic design, which, taking account of the work to be done, produces the least possible vibration.
  - (c) The provision of auxiliary equipment which reduces the risk of injuries caused by vibration.
  - (d) Appropriate maintenance programs for work equipment, the workplace and workplace systems.
  - (e) The design and layout of workplaces, workstations, and rest facilities.
  - (f) Appropriate information and training for employees, such that work equipment may be used correctly and safely in order to minimise employee exposure to vibration.
  - (g) Appropriate work schedules with appropriate rest periods; and

- (h) Providing clothing, as needed, to protect employees from cold and damp environments.
- 8.3.3 When it is not possible to eliminate, vibration hazards, using engineering control measures, or through administrative controls the employee shall be provided PPE designed to reduce the transmission of vibrations to the employee (e.g., anti-vibration gloves, anti-vibration mats, etc.). The vibration attenuation (effectiveness) of personal protective equipment shall be evaluated to determine if other controls are needed to protect employees, as per NEOM-NLF-NMS-006.021 – Personal Protective Equipment.
- 8.3.4 Section 8.5 (below) shall not apply where the exposure of an employee to vibration is usually below the exposure action value but varies markedly from time to time and may occasionally exceed the exposure limit value, provided that:
  - (a) Over exposure does not occur more than two days per week.
  - (b) Any exposure to vibration averaged over one week is less than the exposure limit value, calculated based on schedule 1 part ii and schedule 2 part ii.
  - (c) There is evidence to show that the risk from the actual pattern of exposure is less than the corresponding risk from constant exposure at the exposure limit value.
  - (d) Risk is reduced to as low a level as is reasonably practicable, considering the special circumstances.
  - (e) The employees concerned are subject to increased health surveillance; and
  - (f) The employer has considered any employee or group of employees whose health is likely to be particularly at risk from vibration.

## **8.4 Health Surveillance**

- 8.4.1 If the risk assessment indicates that there is a risk to the health of employees who are exposed to vibration or likely to be exposed to vibration at or above the exposure action level, the exposed employees are to be placed in an appropriate health surveillance program in accordance with the requirements of NEOM-NLF-NMS-006.024–Occupational Health Screening and Medical Surveillance.
- 8.4.2 Health surveillance, which shall be intended to prevent or diagnose any health effect linked with exposure to vibration, shall include:
  - (a) Medical evaluation from a physician that has experience in diagnosing and treating vibration related injuries and diseases and knowledge of the work environment and vibration exposures.
  - (b) Documentation of any links between the exposure and identifiable disease or adverse health effect; and
  - (c) A requirement that when a vibration related injury or illness occurs, the treating physician shall review the job duties of the employee and determine if there is alternative work or light duties that can be performed by the employee during their recovery.

## **8.5 Exposure Limit Values and Action Values**

- 8.5.1 Hand-Arm Vibration
  - (a) The daily exposure limit shall be ascertained on the basis set out in Schedule 1 Part I. (Refer Appendix A)
  - (b) The daily exposure limit value for hand-arm vibration is 5m/s<sup>2</sup> A (8).
  - (c) The daily exposure action value for hand-arm vibration is 2.5m/s<sup>2</sup> A (8).

#### **8.5.2 Whole Body Vibration:**

- (a) The daily exposure limit shall be ascertained on the basis set out in Schedule 2 Part I. (Refer Appendix A)
- (b) The daily exposure limit value for whole body vibration is 1.15m/s<sup>2</sup> A (8).
- (c) The daily exposure action value for whole body vibration is 0.5m/s<sup>2</sup> A (8).

### **8.6 Training and Competency**

#### **8.6.1 Training shall comply with the requirements of:**

- (a) NEOM-Element 5 – Training, Awareness and Competency.
- (b) NEOM-NLF-NMS-006.001 – SMS Organisation, Practitioner Registration and Appointment of Contractor

#### **8.6.2 Where risk assessment indicates that employees are/or likely to be exposed to vibration, at or above the action level, the employer shall:**

- (a) Provide training on vibration exposure limit values and action levels set by this NMS.
- (b) Identify the significant findings of the risk assessment, including any measurements taken, with an explanation of those findings.
- (c) Inform and educate employees on the signs and symptoms of vibration related injuries and the process for reporting and getting treatment for vibration related injuries.
- (d) Ensure employees are aware of their entitlement to appropriate health surveillance as required by this NMS and NEOM NLF NMS-006.024— Occupational Health Screening and Medical Surveillance; and
- (e) Provide training on safe working practices and other control measures to minimize exposure to and injury from exposure to vibration.

#### **8.6.3 The information, instruction, and training shall take account of significant changes in the type of work carried out or the work methods used by the employers.**

#### **8.6.4 Any visitors, contractors, or temporary employees shall, as needed receive training to minimize exposure to vibration.**

#### **8.6.5 Employees who are/or likely to be exposed to vibration at or above the action level shall receive annual refresher training.**

### **8.7 Record Keeping**

- 8.7.1 Exposure monitoring, medical surveillance, examination, and consultation records shall be kept for a minimum of the period of employment plus 30 years, (Refer: NEOM-Element 3 Control of Documented Information and Legal Compliance Review and NEOM-NLF-NMS--006.024— Occupational Health Screening and Medical Surveillance).
- 8.7.2 All compliance and training records shall be kept for a minimum of five (5) years, (Refer:: NEOM Element 3 Control of Documented Information and Legal Compliance)
- 8.7.3 Medical records relating to vibration injuries and illness shall be maintained in the employee's official medical record file.
- 8.7.4 Contractor shall keep all medical records confidential unless the employee has provided a written and signed release stating who can have access to their medical records (e.g., human resources, employee family members, etc.).

## 9 Appendices

### 9.1 Appendix A: Schedule 1: Hand-Arm Vibration

#### Part 1-Daily exposure to vibration

The daily exposure to vibration (A (8)) of a person is ascertained using the formula:

$$A(8) = a_{hv} \sqrt{\frac{T}{T_0}}$$

where:

- ahv is the vibration magnitude, in meters per second squared (m/s<sup>2</sup>);.
- T is the duration of exposure to the vibration magnitude ahv; and
- T<sub>0</sub> is the reference duration of 8 hours (28,800 seconds).

To avoid confusion between vibration magnitude and daily exposure to vibration, it is conventional to express daily exposure to vibration in m/s<sup>2</sup> A (8). The vibration magnitude, ahv, is ascertained using the formula:

$$a_{hv} = \sqrt{a_{hwx}^2 + a_{hwy}^2 + a_{hwz}^2}$$

where:

- a<sub>hwx</sub>, a<sub>hwy</sub> and a<sub>hwz</sub> are the root-mean-square acceleration magnitudes, in m/s<sup>2</sup>, measured in three orthogonal directions, x, y and z, at the vibrating surface in contact with the hand, and frequency weighted using the weighting Wh. The definition for the frequency weighting Wh is given in British Standard BS EN ISO 5349-1:2001.

Where both hands are exposed to vibration, the greater of the two magnitudes ahv is used to ascertain the daily exposure.

If the work is such that the total daily exposure consists of two or more operations with different vibration magnitudes, the daily exposure (A (8)) for the combination of operations is ascertained using the formula:

$$A(8) = \sqrt{\frac{1}{T_0} \sum_{i=1}^n a_{hvi}^2 T_i}$$

where:

- n is the number of individual operations within the working day.
- a<sub>hvi</sub> is the vibration magnitude for operation i; and
- T<sub>i</sub> is the duration of operation i.

#### Part 2-Exposure to vibration averaged over one week

The exposure to vibration averaged over one week (A (8) week) is the total exposure occurring within a period of seven consecutive days, normalized to a reference duration of five 8-hour days (40 hours). It is ascertained using the formula:

where:

- $A(8)j$  is the daily exposure for day  $j$ .

## 9.2 Appendix A; Schedule 2: Whole-Body Vibration

### 9.2.1 Part 1-Daily exposure to vibration

The daily exposure to vibration ( $A(8)$ ) of a person is ascertained using the formula:

$$A(8) = k a_w \sqrt{\frac{T}{T_0}}$$

where:

- $a_w$  is the vibration magnitude (root-mean-square frequency-weighted acceleration magnitude) in one of the three orthogonal directions, x, y and z, at the supporting surface.
- $T$  is the duration of exposure to the vibration magnitude  $a_w$ ; •  $T_0$  is the reference duration of 8 hours (28,800 seconds); and
- $k$  is a multiplying factor.

To avoid confusion between vibration magnitude and daily exposure to vibration, it is conventional to express daily exposure to vibration in  $\text{m/s}^2 \text{A}(8)$ . Daily exposure to vibration ( $A(8)$ ) is evaluated separately for the x, y and z directions of vibration.

For horizontal vibration (x and y directions),  $k = 1.4$  and  $a_w$  is obtained using the  $W_d$  frequency weighting. For vertical vibration (z direction),  $k = 1.0$  and  $a_w$  is obtained using the  $W_k$  frequency weighting.

Definitions for the frequency weightings are given in International Standard ISO 2631-1:1997.

If the work is such that the total daily exposure consists of two or more operations with different vibration magnitudes, the daily exposure ( $A(8)$ ) for the combination of operations is ascertained using the formula:

$$A(8) = \sqrt{\frac{1}{T_0} \sum_{i=1}^n a_{wi}^2 T_i}$$

where:

- $n$  is the number of individual operations within the working day.
- $a_{wi}$  is the vibration magnitude for operation  $i$ ; and
- $T_i$  is the duration of operation  $i$ .

### 9.2.2 Part 2-Exposure to vibration averaged over one week

The exposure to vibration averaged over one week ( $A(8)_{\text{week}}$ ) is the total exposure occurring within a period of seven consecutive days, normalized to a reference duration of five 8-hour days (40 hours). It is ascertained using the formula:

$$A(8)_{\text{week}} = \sqrt{\frac{1}{5} \sum_{j=1}^7 A(8)_j^2}$$

where:

- $A(8)j$  is the daily exposure for day  $j$ .

### 9.3 Appendix B: Audit Criteria Vibration NEOM -NLF -NMS 006 -023

Contractor/ Area: \_\_\_\_\_

Department: \_\_\_\_\_

Completed by: \_\_\_\_\_ Date completed: \_\_\_\_\_

| Audit Criteria              |                   | Requirements   | Verification | Area of Concern |
|-----------------------------|-------------------|--|--------------|-----------------|
| ISO<br>45001:2018<br>Clause | NMS Ref.          |  |              | Yes/ No         |
| 5.3                         | 7.1.3             | Pre-Tender Health and Safety Plan has been developed and issued  |              |                 |
| 5.3,<br>8.1.4.2             | 7.1.4             | Selection of Contractors undertaken in accordance with NEOM's policies and procedures  |              |                 |
| 7.2                         | 7.2.1 (b),<br>8.6 | Persons appointed to manage /oversee work operations have the skills, knowledge, experience  |              |                 |
| 8.1.2 (e)                   | 7.3.3             | Personal protective equipment required for use are fit for purpose   |              |                 |
| 6.1.2.3<br>6.1.2.2          | 7.2.1 (c)         | Hazards Identification Plan (HIP)<br>Assessment of the various risks shall be undertaken,  |              |                 |
| 6.1.2.2,<br>8.1.1,<br>8.1.2 | 7.4.1             | Contractor shall consider safe methods of working  |              |                 |
|                             | 7.2. (a)          | Where reasonably practicable, eliminate vibration hazards by purchasing low vibration producing equipment, maintaining equipment to manufactures specifications, erecting barriers, or implementing other control measures to eliminate / reduce vibration hazards |              |                 |
| 6.1.2.3<br>6.1.2.2          | 8.2.1             | Contractor who carries out work which is liable to expose any of their employees to risk from HAV shall ensure appropriate risk assessment is undertaken   |              |                 |
|                             | 8.2.4             | Contractor shall assess proposed modifications to equipment, addition of new processes, or the purchasing of new equipment to assess their effect on the work environment and employees, with special focus placed on vibration hazards                            |              |                 |
| 8.1.2                       | 8.3.2             | The control measures taken by the employer shall be based on the health and safety hierarchy of controls   |              |                 |
|                             | 8.3.3             | When it is not possible to eliminate, vibration hazards, using engineering control measures, or through administrative controls the employee shall be provided PPE   |              |                 |

| Audit Criteria        |          | Requirements  | Verification | Area of Concern |
|-----------------------|----------|---|--------------|-----------------|
| ISO 45001:2018 Clause | NMS Ref. |   |              | Yes/ No         |
|                       |          | designed to reduce the transmission of vibrations to the employee   |              |                 |
| 9.1.2                 | 8.4.2    | Health surveillance, which shall be intended to prevent or diagnose any health effect linked with exposure to vibration |              |                 |
|                       |          |   |              |                 |
|                       |          |   |              |                 |
|                       |          |   |              |                 |
|                       |          |   |              |                 |

#### 9.4 Appendix C: Guidance Information

Currently, in the US there are no legal standards that limit exposures to vibration. However, there are many ways Contractor and workers can help to reduce workers' exposure to vibration. Whole-body vibration levels can often be reduced by using vibration isolation and by installing suspension systems between the operator and the vibrating source.

Many workers do not think that their exposure to vibration could be a health hazard. Vibration exposure is more than just a nuisance. Constant exposure to vibration has been known to cause serious health problems such as back pain, carpal tunnel syndrome, and vascular disorders. Vibration related injury is especially prevalent in occupations that require outdoor work, such as forestry, farming, transportation, shipping, and construction. There are two classifications for vibration exposure: whole-body vibration and hand and arm vibration. These two types of vibration have different sources, affect different areas of the body, and produce different symptoms.

Whole-body vibration is vibration transmitted to the entire body via the seat or the feet, or both, often through driving or riding in motor vehicles (including fork trucks and off-road vehicles) or through standing on vibrating floors (e.g., near power presses in a stamping plant or near shakeout equipment in a foundry).

Hand and arm vibration, on the other hand, is limited to the hands and arms and usually results from the use of power hand tools (e.g., screwdrivers, nut-runners, grinders, jackhammers, and chippers) and from vehicle controls.

Occupational health effects of vibration result from extended periods of contact between a worker and the vibrating surface. Occupational Vibration Exposure. Many workers do not think that their exposure to vibration could be a health hazard. Vibration exposure is more than just a nuisance. Constant exposure to vibration has been known to cause serious health problems such as back pain, carpal tunnel syndrome, and vascular disorders.

In the UK the HSE executive regulate vibration exposure under the "Control of Vibration at Work Regulations (2005) The formula shown in the NMS come from the UK regulations regarding vibration as The Control of Vibration at Work Regulations 2005 (the Vibration Regulations), came into force on 6 July 2005 with the aim to protect workers from risks to health from vibration. The regulations introduce action and limit values for hand-arm and whole-body vibration.

There are two (2) free advice papers available from the UK HSE Hand-arm vibration at work: A brief guide INDG175 (rev3) Advice for Contractor and Hand-arm vibration INDG296 (rev2) Advice for employees

Also available from the HSE web-site is Publication L 140 (2019) a guidance document regarding Hand-arm vibration - The Control of Vibration at Work Regulations 2005





نیوم NEOM

**NEOM OCCUPATIONAL HEALTH and SAFETY  
NEOM MINIMUM STANDARD  
for  
OCCUPATIONAL HEALTH SCREENING AND  
MEDICAL SURVEILLANCE**

NEOM-NLF-NMS-006.024 Rev 02.00 – February 2022

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## Document History

| Revision code | Description of changes | Purpose of issue          | Date       |
|---------------|------------------------|---------------------------|------------|
| Rev 00.00     | First Issue            | Issued for Implementation | 27/07-2020 |
| Rev 02.00     | Sector Review          | Issued for Implementation | 01-02-2022 |

## Document Approval

|           | Prepared by  | Reviewed by  | Approved by                         |
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## OUR NEOM VALUES



### CATALYST

Make a difference.  
Create a legacy.



### CARE

Leave the environment  
in a better place.



### CURIOS

Challenge the norm.  
Stay restless.



### PASSIONATE

Be accountable.  
Finish what you start.



### RESPECT

Be authentic.  
Be true. Be bold.



### DIVERSITY

Embrace cultural  
differences.  
Seek to understand.

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## **1 Purpose**

This NEOM Co. SMS Minimum Standards (hereafter referred to as NMS) relates to the management of Occupational Health Screening and Medical Surveillance

It provides guidance to support compliance with industry best practice and international regulatory safety requirements to ensure that the associated risks are assessed, and control measures are implemented in accordance with the hierarchy of risk controls.

It has been developed to align with the requirements of the ISO 45001 Health and Safety Management Manual (Refer NEOM-NLF-PRC-006- Section 2 ISO 14001 Cross reference table)

## **2 Scope**

This NMS applies to all personnel within NEOM and any Contractors working for NEOM and or associated projects and activities. It is designed to incorporate requirements set by the NEOM-SMS.

It identifies specific requirements for.

- Occupations Requiring Health Screening to Work
- Medical Surveillance for Health Care Workers
- Hazardous Materials or Exposures Requiring Medical Surveillance
- Employment Medical Examination

## **3 Expectations**

To ensure the occupational health and safety (OHS) of all personnel, protection of assets (services, plant/equipment) and the environment

NEOM expect each Sector, Organization, Department or Contractor to ensure that risks associated with work are controlled in accordance with the hierarchy of risk controls: elimination, substitution, engineering controls, administrative controls, and personal protective equipment.

Consideration shall be given to technological advances that may introduce new means of controlling or eliminating the risks associated with work activities

That the expectation for safety compliance is meeting and exceeding all applicable OSHA Laws, Regulations, and Industry Best Practice.

Applicable requirements and standards include:

- (a) OSHA Standards and Regulatory requirements.
- (b) ANSI requirements.
- (c) NFPA Standards and requirements.
- (d) NEOM Minimum Standards
- (e) Saudi Building Codes
- (f) International Building Codes

*If requirements of this document conflict with requirements set by another regulatory authority, Contractor are required to follow the more stringent requirement*

## 4 List of Definitions

Table 1 : Table of Definitions

| Terms                          | Definitions  |
|--------------------------------|--|
| NEOM Co                        | NEOM Company   |
| Client                         | NEOM Sector /Department responsible for management and oversight of the Contractor                       |
| Contractor                     | The organization contracted to carry out the works   |
| Employer                       | The person or organization that employs personnel to complete the work                                   |
| Safety Management System (SMS) | Occupational Health and Safety Management System established by NEOM in compliance to ISO 45001 Standard |

## 5 List of Abbreviations

Table 2 : Table of Abbreviations

| Abbreviations | Descriptions                                   |
|---------------|--|
| SMS           | Safety Management System                       |
| NMS           | NEOM Minimum Standard                          |
| SOP           | Standard Operating Procedure                   |
| ANSI          | American National Standards Institute          |
| NFPA          | National Fire Prevention Association           |
| CPP           | Construction Phase Plan                        |
| OSHA          | Occupational Safety and Health Administration. |
| PPE           | Personal Protective Equipment                  |
| IBC           | International Building Codes                   |
| OHS           | Occupational Health and Safety                 |

## 6 Related NEOM Documents

Table 3 : Related NEOM Documents

| Document Code               | Document Name  |
|-----------------------------|--|
| NEOM Element 2              | Risk and Opportunity Management                      |
| NEOM-Element 3              | Control of Documented Information & Legal Compliance |
| NEOM-Element 5              | Training, Awareness and Competency.                  |
| NEOM-Element 6              | Contractor Management                                |
| NEOM-SMS                    | Neom Safety Management System                        |
| NEOM-NLF-SM                 | Safety Manual - Roles and Responsibilities           |
| NEOM-NLF-PRC-006- Section 2 | ISO 14001 Cross Reference Table                      |

| Document Code          | Document Name  |
|------------------------|--|
| NEOM-NLF-PRC-006;      | Occupation Health, Safety, and Fire Safety requirements for Contractors  |
| NEOM-NLF-NMS-006.001   | Organization and Practitioner Registration and Appointment of Contractor |
| NEOM-NLF-NMS-006.002   | Safety Construction Management Plan                                      |
| NEOM-NLF-NMS-006.012 – | Barricading of Hazards   |
| NEOM-NLF-NMS-006.021   | Personal Protective Equipment (PPE)                                      |

## 7 Roles and Responsibilities

### 7.1 Client

- 7.1.1 General Health and Safety roles and responsibilities are defined in; and shall be carried out in accordance with the requirements of NEOM-NLF-SM–Safety Management Manual - Roles and Responsibilities.
- 7.1.2 The Client is responsible for ensuring that NEOM Safety Commitment Statement and safety management system are properly applied within their areas of control/responsibility. Effective implementation will ensure compliance with relevant legislative requirements and will help promote the use of industry best safe working practices.
- 7.1.3 That a suitable, Pre-Tender Health and Safety Plan has been developed and issued to Contractors to ensure they have all the information necessary to make informed decisions when developing the Construction Phase Health and Safety Plan (NEOM-NLF-NMS-006.002 Safety Construction Management Plan) (CPP) which will form part of the Contractor review and selection process
- 7.1.4 That the selection of Contractors shall be undertaken in accordance with NEOM's policies and procedures (NEOM-Element 6-Contractor Management). To ensure that only Competent organizations capable of meeting the requisite safety standards associated with project are contracted.
- 7.1.5 Conduct regular Contractor safety assurance reviews to provide the confidence level required that the safety management system is delivering as planned, and consistently achieves the acceptable level of safety. Including:
  - (a) Safety performance monitoring and measuring.
  - (b) Managing change.
  - (c) Continuous improvement.

### 7.2 Contractor

- 7.2.1 Contractor shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM–Safety Management Manual-Roles and Responsibilities
- 7.2.2 Maintaining control of access to dangerous or high-risk areas or equipment using suitable barricades that are in serviceable condition (Refer: NEOM-NLF-NMS-006.012 – Barricading of Hazards)
- 7.2.3 That all work activities are assessed, planned, organized, and that suitably competent Supervision is available to implement the safety requirements and oversee the work (Refer: NEOM- Element 5 – Training, Awareness and Competency)
- 7.2.4 Ensure persons appointed to manage /oversee work operations have the skills, knowledge, experience and, where relevant, the organizational capability to plan and manage work safely and without risk to those who may be affected by the activities (Refer: NEOM Element 5 Training, Awareness, and Competence).
  
- 7.2.5 Ensure employees carrying out the work are trained to recognize the associated hazards and understand the processes and procedures to control or minimize the risks.(Refer: NEOM Element 2 Risk and Opportunity Management)
- 7.2.6 That all equipment including personal protective equipment required for use is fit for purpose, and (as required) has been inspected by a competent person and inspection records are maintained and readily available.(Refer: NEOM-NLF-NMS-006.021 Personal Protective Equipment) (PPE)

### **7.3 Employee**

- 7.3.1 Shall undertake their roles and responsibilities in accordance with the general requirements of NEOM-NLF-SM – Safety Management Manual - Roles and Responsibilities.
- 7.3.2 Report any activity or defect relating to the work which they believe is reasonably foreseeable to endanger their safety or that of another person's.
- 7.3.3 Shall use appropriate equipment or safety devices provided for the work by the Contractor in accordance with any training or instruction received in the use of the work equipment. (Refer NEOM-NFL-NMS-006.021 Personal Protective Equipment)
- 7.3.4 Shall undertake their specific roles and responsibilities in accordance with the following:
  - (a) Employees shall participate in any medical surveillance program of occupational health screening program if their job tasks or a risk assessment indicates the exposure warrants such screening or surveillance and as required by their employer.
  - (b) Employees have a right to decline to take part in occupational health screening or surveillance programs but shall be informed of the consequences by the employer or a qualified physician and evidence of the decision shall be recorded in writing along with the employees, employers and physicians' signatures.
  - (c) Employees shall report to any place required for the screening or surveillance to be conducted as advised by their employer.
  - (d) Employees shall report any adverse effects or symptoms associated with their work or exposure to a hazard at work to the employer or supervisor which shall be recorded in writing and investigated.
  - (e) Employees have a right to request copies of their records or risk assessment results and an explanation of the results in a language they understand using a translator.

### **7.4 Specific Responsibilities**

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