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Authorization

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Revisions

This document has been revised according to the following schedule:

Revision	Date Approved	Nature of Revision	Prepared by
00	2013/09/30	First Issue	SJ VREŸ
01	See title page	2ND Issue, general revision, incorporation of Construction Regulations 2014 and incorporation of Safety Standards	SJ VREŸ

Contents:

1 INTRODUCTION

In terms of Construction Regulation 5(1)(b) of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), NLM, as the Client and/or its Agent on its behalf, shall be responsible to prepare Health & Safety Specifications for any intended construction project and provide any Principal Contractor who is making a bid or appointed to perform construction work for NLM and/or its Agent on its behalf with the same.

This document has been reviewed and updated to address the requirements of the new Construction Regulations, 2014, published under GN R84 in GG37305 of 7 February 2014 and the inclusion of applicable safety standards [See Annexure 4]. This document will serve as guidance for potential Principal Contractors and Contractors and ***SHALL*** *form part of any tender or quote procedure as the tenderer shall demonstrate his competence to comply with the applicable legislation and also his ability to do so.*

Compliance with the Occupational H&S Act and the Construction Regulations 2014 is mandatory and this Health and Safety Specification with the necessary additions and amendments shall be submitted to the Principal Contractor prior to commencing work and after the written appointment of the Principal Contractor has been made in writing by the Client.

The Principal Contractor and contractors shall be responsible for the Health & Safety Policy for the site in terms of Section 7 of the Act and in line with Construction Regulation 7 as well as the Health and Safety Plan for the project.

This 'Health and Safety Specifications' document is governed by the "Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), hereinafter referred to as 'The Act'. It should be noted that no single Act or its set of Regulations be read in isolation. Furthermore, although the definition of Health and Safety Specifications stipulates 'a documented specification of all health and safety requirements pertaining to associated works on a construction site, so as to ensure the health and safety of persons', it is required that the entire scope of the Labour Legislation, including the Basic Conditions of Employment Act be considered as part of the legal compliance system. With reference to this specification document this requirement is limited to all health, safety and environmental issues pertaining to the site of the project as referred to here-in. Despite the foregoing it is reiterated that environmental management shall receive due attention.

Prior to drafting the Health and Safety Plan, and in consideration of the information contained here-in, the contractor shall set up a Risk Assessment Program to identify and determine the scope and details of any risk associated with any hazard at the construction site, in order to identify the steps needed to be taken to remove, reduce or control such hazard. This Risk Assessment and the steps identified will be the basis or point of departure for the Health and Safety Plan. The Health and Safety Plan shall include documented 'Methods of Statement' (see definitions under Regulation 1 of Construction Regulations) detailing the key activities to be performed in order to reduce as far as reasonably practicable, the hazards identified in the Risk Assessment.

An agreement as framed in terms of Section 37(2) of the Act, shall be signed by the Principal Contractor (and where applicable Contractors) after appointment and before commencing work. Note that where there is more than one Principal Contractor the same conditions apply to each Principal Contractor. Each Principal Contractor has to repeat this procedure in a "downwards cascade" system whereby he supplies to the Contractors a H&S Specification and they in turn provide him with a fully documented H&S Plan. These subsidiary plans form part of the main Construction Plan which shall be kept on site and handed to the applicable Necsa Facility Manager with all drawings and specifications on completion of the contract.

On completion of the construction work, the Principal Contractor is required to hand over a consolidated HSF to the applicable Necsa Facility Manager which shall, in addition to the documentation referred to above, include a record of all drawings, designs, materials used and other similar information concerning the completed work.

It should be noted that every effort has been made to ensure that this specification document is accurate and adequate in all respects. Should it however, contain any errors or omissions they may not be considered as grounds for claims under the contract for additional reimbursement or extension of time, or relieve the Principal Contractor and contractors from his responsibilities and accountability in respect of the project to which this specification document pertains. Any such inaccuracies, inconsistencies and/or inadequacies shall immediately be brought to the attention of NLM and/or the Agent.

2 PURPOSE

The purpose of this Health and Safety Specification is:

- *To provide the relevant Principal Contractor (and sub-contractor) with any information other than the standard conditions pertaining to construction sites which might affect the health and safety of persons at work and of persons in connection with the use of plant and machinery. It further aims to protect NLM employees and persons other than NLM employees against any potential hazards to their health and safety arising out of or in connection with the activities of persons at work during the construction work for NLM.*

- *To brief the Principal Contractor/ Sub Contractor on the significant health and safety requirements and aspects of the project. This shall include the provision of the following information and requirements namely:*
  a) safety considerations affecting the site of the project and its environment;
  b) health and safety aspects of the associated structures and equipment;
  c) required submissions on health and safety matters required from the Principal Contractor/ Sub Contractor;
  d) and the Principal Contractor's /Sub – Contractors health and safety plan.

- *To serve to ensure that the Principal Contractor / Sub Contractors is fully aware of what is expected from them with regards to the Occupational Health and Safety Act, 85 of 1993 and the Regulations made there-under including the applicable safety standards, and in particular in terms of Section 8 of the Act.*

- *To inform the Principal Contractor/ Sub Contractor that the Occupational Health and Safety Act, 85 of 1993 in its entirety shall apply to the contract to which this specification document applies. The Construction Regulations promulgated on 7 February 2014 and incorporated into the above Act by Government Notice R 84, published in Government Gazette 37305 shall specifically apply to all persons involved in the construction work pertaining to this project.*

This document includes all health and safety standards incorporated in the regulations and shall for the purpose of this Act, be deemed to be a regulation.

Note: This document will serve as an overall guidance for construction work on the NLM facilities. For each project, the client need to prepare a project specific HSS.

Sections of the Construction Regulations that don't apply to the construction work to be done from the specification need to be removed.

The site specific Health and Safety Specification shall be signed for acceptance by the Principal Contractor to before they can start working.

3 SCOPE

This H&S Specification is applicable to all Contractors/ Sub Contractors who intend to perform any Construction related work in the NLM Facilities.

These specifications are contained in the index and intend to specify the normal and specific requirements of NLM pertaining to the health and safety matters (including the environment) applicable to the project in question.

These Specifications should be read in conjunction with the OHS Act 85, 1993 and its Regulations with specific reference to the Construction Regulations. This will also include any Safety Standards which were or will be promulgated under the Act or incorporated into the Act and be in force or come into force during the effective duration of the project. The stipulations in this specification, as well as those contained in all other documentation pertaining to the project, including contract documentation and technical specifications shall not be interpreted, in any way whatsoever, to countermand or nullify any stipulation of the Act, Regulations and Safety Standards which are promulgated under, or incorporated into the Act.

Construction shall be preceded by:

- *The implementation of the project Approval Process [4] to identify all construction relevant requirements;*
- *The identification of all SHEQ related requirements by completing the SHEQ-INS-0801 Form [9];*
- *The Necsa Tender Process [10],* ***and please take note that a Safety Professional needs to identify HSE Requirements which needs to be included in the tender documentation for the project.***
- ***Security clearance of Principal Contractors and Contractors in accordance with [5];***
- ***The Necsa requirements for construction [8] and***
- *The SHEQ verification process to ensure that Principal Contractors and Contractors comply with legal requirements.*

For Projects that fall outside the Scope of this procedure, a generic Project Approval Process will be implemented to identify specific relevant requirements, where a generic H&S Specification will be completed.

These Regulations are applicable to all persons involved in construction work.

Regulations 3 and 5 are not applicable where the construction work carried out is in relation to a single storey dwelling for a client who intends to reside in such dwelling upon completion thereof.

This procedure is also applicable to Necsa and NLM Facility Managers, performing construction related tasks like facility modifications and such Facility Managers will be regarded as a Principal Contractor or Contractor and shall comply with the requirements of this procedure.

4 REFERENCES

The following documents are referenced in this document:

1. OHS-Act:	Occupational H&S Act, (Act No. 85 of 1993) and *applicable* regulations
2. SHEQ-INS-5450:	Requirements for Contractors
3. SHEQ-INS-0238:	Control of procurement
4. SHEQ-INS-0800:	Necsa Approval of Projects
5. SHEQ-INS-8950:	Requirements For Security Screening
6. *SHEQ-INS-0890:*	*Modification proposals to Safety Classified SSC*
7. *SHEQ-INS-0233:*	*Design modification proposals*
8. SHEQ-INS-0825:	*Necsa Requirements for Construction*
9. SHEQ-FRM-0801:	*Applicability of SHEQ System Documents to Individual Facilities*
10. FIM-PAP-PRO-1003:	*Procedure for the Tender Process*

5 DEFINITIONS AND ABBREVIATIONS

In these Regulations any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the context otherwise indicates—

5.1 DEFINITIONS

***"agent"** means a competent person who acts as a representative for a client;*

***"angle of repose"** means the steepest angle of a surface at which a mass of loose or fragmented material will remain stationary in a pile on the surface, rather than sliding or crumbling away;*

***"bulk mixing plant"** means machinery, appliances or other similar devices that are assembled in such a manner so as to be able to mix materials in bulk for the purposes of using the mixed product for construction work;*

***"client"** means any person for whom construction work is being performed;*

***"competent person"** means a person who*
*(a) has in respect of the work or task to be performed the required **knowledge, training***

and experience *and, where applicable,* ***qualifications****, specific to that work or task: Provided that where appropriate* ***qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act No.67 of 2000)****, those qualifications and that training shall be regarded as the required qualifications and training; and*

(b) is familiar with the Act and with the applicable regulations made under the Act;

"construction manager" *means a competent person responsible for the management of the physical construction processes and the coordination, administration and management of resources on a construction site;*

"construction site" *means a work place where construction work is being performed;*

"construction supervisor" *means a competent person responsible for supervising construction activities on a construction site;*

"construction vehicle" *means a vehicle used as a means of conveyance for transporting persons or material, or persons and material, on and off the construction site for the purposes of performing construction work;*

"construction work" *means any work in connection with—*

(a) the construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure; or

(b) the construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work;

"construction work permit" *means a document issued in terms of regulation 3;*

"Contractor" *means an employer who performs construction work;*

"demolition work" *means a method to dismantle, wreck, break, pull down or knock down of a structure or part thereof by way of manual labour, machinery, or the use of explosives;*

"design" *in relation to any structure, includes drawings, calculations, design details and specifications;*

"designer" *means—*

(a) a competent person who—

(i) prepares a design;

(ii) checks and approves a design;

(iii) arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is the employer; or

(iv) designs temporary work, including its components;

(b) an architect or engineer contributing to, or having overall responsibility for a design;

(c) a building services engineer designing details for fixed plant;

(d) a surveyor specifying articles or drawing up specifications;

(e) Contractors carrying out design work as part of a design and building project; or

(f) an interior designer, shop-fitter or landscape architect;

"excavation work" *means the making of any man-made cavity, trench, pit or depression formed by cutting, digging or scooping;*

"explosive actuated fastening device" *means a tool that is activated by an explosive charge and that is used for driving bolts, nails and similar objects for the purpose of providing fixing;*

"fall arrest equipment" *means equipment used to arrest a person in a fall, including personal equipment, a body harness, lanyards, deceleration devices, lifelines or similar equipment;*

"fall prevention equipment" *means equipment used to prevent persons from falling from a fall risk position, including personal equipment, a body harness, lanyards, lifelines or physical equipment such as guardrails, screens, barricades, anchorages or similar equipment;*

"fall protection plan" *means a documented plan, which includes and provides for—*

(a) all risks relating to working from a fall risk position, considering the nature of work undertaken;
(b) the procedures and methods to be applied in order to eliminate the risk of falling; and
(c) a rescue plan and procedures;

"fall risk" *means any potential exposure to falling either from, off or into;*

"HSF " *means a file, or other record containing the information in writing required by these Regulations;*

"H&S plan" *means a site, activity or project specific documented plan in accordance with the client's H&S specification;*

"H&S specification" *means a site, activity or project specific document prepared by the Client pertaining to all H&S requirements related to construction work;*

"material hoist" *means a hoist used to lower or raise material and equipment, excluding passengers;*

"medical certificate of fitness" *means a certificate contemplated in regulation 7(8);*

"Method Statement" –*means a document detailing the key activities to be performed in order to reduce as reasonably as practicable the hazards identified in any risk assessment;*

"mobile plant" *means any machinery, appliance or other similar device that is able to move independently, and is used for the purpose of performing construction work on a construction site;*

"National Building Regulations" *means the National Building Regulations made under the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977), and promulgated by Government Notice No. R. 2378 of 30 July 1990, as amended by Government Notices No's R. 432 of 8 March 1991, R. 919 of 30 July 1999 and R. 547 of 30 May 2008;*

"person day" *means one normal working shift of carrying out construction work by a person*

on a construction site;

"Principal Contractor" *means an employer appointed by the Client to perform construction work;*

"Professional Engineer or Professional Certificated Engineer" *means a person holding registration as either a Professional Engineer or Professional Certificated Engineer in terms of the Engineering Profession Act, 2000 (Act No. 46 of 2000);*

"Professional Technologist" *means a person holding registration as a Professional Engineering Technologist in terms of the Engineering Profession Act, 2000;*

"provincial director" *means the provincial director as defined in regulation 1 of the General Administrative Regulations, 2003;*

"Purpose of the Act" –*To provide for the health and safety of persons at work and the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.*

"Risk Assessment" –means a program to determine any risk associated with any hazard at a construction site, in order to identify the steps needed to be taken to remove, reduce or control such hazard.

"scaffold" *means a temporary elevated platform and supporting structure used for providing access to and supporting workmen or materials or both;*

"shoring" *means a system used to support the sides of an excavation and which is intended to prevent the cave-in or the collapse of the sides of an excavation;*

"structure" *means—*

(a) any building, steel or reinforced concrete structure (not being a building), railway line or siding, bridge, waterworks, reservoir, pipe or pipeline, cable, sewer, sewage works, fixed vessels, road, drainage works, earthworks, dam, wall, mast, tower, tower crane, bulk mixing plant, pylon, surface and underground tanks, earth retaining structure or any structure designed to preserve or alter any natural feature, and any other similar structure;

(b) any falsework, scaffold or other structure designed or used to provide support or means of access during construction work; or

(c) any fixed plant in respect of construction work which includes installation, commissioning, decommissioning or dismantling and where any construction work involves a risk of a person falling;

"suspended platform" *means a working platform suspended from supports by means of one or more separate ropes from each support;*

"temporary works" *means any falsework, formwork, support work, scaffold, shoring or other temporary structure designed to provide support or means of access during construction work;*

"the Act" *means the Occupational H&S Act, 1993 (Act No. 85 of 1993);*

"tunneling" *means the construction of any tunnel beneath the natural surface of the earth for a purpose other than the searching for or winning of a mineral.*

The Act means, unless the context indicates otherwise, the Occupational H&S Act, 1993 (ACT NO. 85 of 1993) and Regulations promulgated there under.

5.2 ABBREVIATIONS

AIA:	Approved Inspection Authority
CR:	Construction Regulations
DoL:	Department of Labour
DI:	Disabling Injury
EMP:	*Event Management Process*
FM:	Facility Manager
HCS:	Hazardous Chemical Substances
HIRA:	Hazard Identification Risk Assessment
HSF:	Health & Safety File
HSP:	Health & Safety Plan
HSS:	*Health & Safety Specification*
H&S:	Health & Safety
NLM:	*Nuclear Liabilities Management*
NNR:	*National Nuclear Regulator*
OEW:	Occupational Exposed Worker
OHS-Act:	Occupational H&S Act, 85 of 1993
PPE:	Personal Protective Equipment
QMS:	Quality Management System
RoD:	Record of Decision
RPE:	Respiratory Protective Equipment
SACPCMP:	South African Council for the Project and Construction Management Professions
SAR:	Safety Assessment Report
SQEP:	Suitably Qualified Experienced Persons
S&LD:	Safety and Licensing Department
SWMS:	*Safe Work Method Statement*
SSC:	Structure Systems and Components
ToR:	Terms of Reference
WASP:	*Worker Allocated surveillance Programme*
SHEQMS:	Safety, Health, Environment and Quality Management

System

6 REQUIREMENTS

6.1 PRE-CONSTRUCTION REQUIREMENTS

*The FM shall appoint in writing the NLM Management Representative (NLM Responsible Person) i.t.o. CR5 (5)(6) as an **Agent** e.g. Project Manager, who shall be overall responsible for ensuring that the construction is performed in accordance with the requirements of the approved design, construction processes the Construction Regulations and Necsa's SHEQ System.*

The requirements for approval of non-nuclear facilities Construction shall be preceded by the implementation of the Project Approval Process [4] to identify all construction relevant requirements.

Construction of a nuclear facility or modification thereof shall not commence without applicable NNR approval to construct. Necsa shall only request approval for construction if the request is supported by (based on):

(a) An NNR approved design (as appropriate) of the installation or modification.
(b) NNR's approval to procure/manufacture SSC (as applicable).
(c) Approval of a Construction Plan.
(d) *Change Management Processes*.

The result shall, for nuclear installations depending on the project categorization, be submitted to the NNR for information. A graded approach for construction planning shall be implemented as indicated by [4].

6.2 EXISTING FACILITIES

(a) Construction work in existing facilities shall be under the control of The FM (or his appointed designee) and in full compliance with all requirements of the relevant processes of the Necsa SHEQ System and the construction regulations 2014.
(b) Contractor staff shall comply with the SHEQ System requirements as if they were NLM's own employees i.r.o. OEW's.
(c) NLM FM will still be responsible for the Radiation Protection Programme of Contractors where construction work has to be performed in radiological areas.
(d) For facility modifications, the FM (or his appointed designee) shall be responsible for the requirements as indicated for the Principal Contractor/ Contractor w.r.t. the compliance with the Construction Regulations.

6.3 NEW FACILITIES

The FM (or his formally appointed designee e.g. project manager or Agent) shall be responsible for the following for construction of new facilities:

(a) Implement the Principal Contractor/Contractor selection process prescribed in [3];
(b) Ensure compliance with Necsa's financial and contractual requirements including compliance with the requirements of [2];
(c) Implement the physical security protection requirements for the construction site;
(d) Formal written hand-over of the demarcated construction site to the Principal Contractor;
(e) Ensure that the construction is performed in compliance with the requirements of this document;

(f) Prepare a construction Baseline Risk Assessment and prescribe HSE measures;
(g) Assist the Principal Contractor/ Contractor with OREPs and WASPs for the different categories of contract workers.
(h) Prepare an environmental protection plan in accordance with RoD conditions for the construction.
(i) Ensure that contractors are established on site in allocated areas and provided, as appropriate, with site services, information and SHEQ relevant instructions/procedures.
(j) Accept hand-over of the constructed facility on completion of construction and construction verification.

6.4 ACCESS TO THE CONSTRUCTION SITE

The Principal Contractor, Contractors, Sub-contractors and their staff performing construction work on the NLM site shall comply with the following before they are allowed access to the construction site:

(a) Attendance of Necsa's Orientation Programme.
(b) Security Vetting to the level prescribed by the Security Services Department.
(c) Compliance with the prescribed medical fitness requirements – i.e. pre-construction medical examination.

The manager shall ensure that an appropriate clause is included in tender enquiry documents indicating the level to which a successful contractor or service provider and staff will have to be security cleared if required.

The above requirements shall also be applicable to new staff (e.g. replacements) joining the contractors team during construction.

6.5 DOCUMENTATION

The Principal Contractor shall prepare and submit the following documents for NLM's approval:

(a) Construction H&S Plan based on the project specific H&S Specification;
(b) A Construction Plan;
(c) QM Plan;
(d) Change Management Process;
(e) Fall Protection Plan including a rescue plan;
(f) Construction Issue Base Risk Assessment;
(g) Work planning process including SWMS's, job cards and work permits, lock-out system, confined space control, RPE control, etc. Work planning should preferably be computer aided and indicate the activities, sequence of activities, its duration and resources required, procedures (including activities to ensure safe performance), special equipment, inspection, witness and hold points;
(h) Training and orientation process;
(i) Event management processes;
(j) The construction verification process and an Emergency Plan.

It should be noted that the QMS of the Construction Contractor (as construction supplier) is audited in compliance with the requirements of [3]. All QMS processes, irrespective of it being mentioned above are important to construction.

6.6 INTERFACING AND OVERSIGHT

The Project Manager or the NLM Responsible Manager (Agent) shall in liaison with the Principal Contractor/Contractor establish a construction oversight committee to ensure proper interface management. The committee shall establish a Terms of Reference incorporating at least the following:

(a) Committee responsibilities and status, including progress reporting and monitoring, SHEQ statistics, event and non-conformance reporting, communication, etc., ensuring that members are up to speed with construction deliverables.

(b) Members of the committee and their roles. Members shall include:

- *Principal Contractor;*
- *Necsa Responsible Manager (Agent) and/or Project Leader;*
- *NLM representative for SHEQ;*
- *Maintenance, Utilities, Licensing, Finances, Design (as appropriate);*
- *All contractors;*
- *Any other individual or organisation deemed necessary involved with the construction.*

(c) Administrative matters, e.g. frequency of meetings, venue, agenda and minutes.

- *For construction of nuclear installations the NNR shall receive notification of such meetings and shall have a standing invitation to such meetings.*

6.7 MANAGEMENT OF SUPERVISION OF CONSTRUCTION WORK

(a) Each principal contractor shall in writing appoint one competent, full-time 8(1) appointee as the construction manager with the duty of managing all the construction work on the NLM site, including the duty of ensuring occupational H&S compliance, and in the absence of the construction manager an alternate shall be appointed by the principal contractor.

(b) Upon having considered the size of the project, in writing appoint one or more assistant construction managers 8(2) for different sections thereof.

(c) Each contractor shall, after consultation with the NLM FM and having considered the size of the project, the degree of danger likely to be encountered or the accumulation of hazards or risks on the site, appoint a full-time or part-time construction H&S officer 8(5) in writing to assist in the control of all H&S related aspects on the site.

No contractor may appoint a construction H&S officer to assist in the control of H&S related aspects on the site unless that construction H&S officer is registered with a statutory body approved by the Chief Inspector (SACPCMP) and has necessary competencies and resources to assist the contractor.

(d) Each construction manager or contractor shall in writing appoint construction supervisors 8(7) responsible for construction activities and ensuring occupational H&S compliance on the construction site.

Upon having considered the size of the project, in writing appoint one or more competent employees for different sections thereof to assist the construction supervisor 8(8) contemplated in sub regulation 8(7).

7 OCCUPATIONAL HEALTH & SAFETY MANAGEMENT

7.1 INTERPRETATION

The Occupational Health and Safety Act and all its Regulations, with the exception of the Construction Regulations, distinguish between the roles, responsibilities and functions of employers and employees respectively. It views consultants and contractors as employees of the "owner" of a construction or operational project, the "owner" being regarded as the employer. Only if formally agreed to by way of the written agreement in this regard between the "owner(s)" and consultant and /or between the "owner(s)" and the contractor(s), will these assumptions be relinquished in favour of the position agreed upon between the relevant parties.

*In terms of the Construction Regulations the **"owner",** in terms of its instructions, operates (has to operate) in the role of client as per relevant definition.*

*The **contractors** working for the "client" are seen to be in two categories, i.e. the Principal Contractor and Sub Contractors. The Principal Contractor has to take full responsibility for the health and safety on the site of the relevant project / contract. This includes monitoring health and safety conditions and overseeing administrative measures required by the Construction Regulations from all contractors on the project site.*

***Sub-Contractors** are required to operate under the control (in terms of all health and safety measures which are covered in the Construction Regulations) of the Principal Contractor. Where, for the work the **Principal Contractor** will have to execute himself, practical health and safety measures are applicable, he will also be subject to the relevant requirements with which Sub Contractors have to comply. The Principal Contractor will, however, not have to actually fulfill such requirements in respect of any of the work / functions of any (ordinary / sub) Contractors on the site for which he has been appointed as Principal Contractor. However, he has to monitor / oversee such processes, ensuring that the requirements are complied with and that the required appointments / evaluations / inspections / assessments and tests are done and that the records are duly generated and kept as prescribed in the Construction Regulations. This has to feature clearly in the Principal Contractor's Health and Safety Plan*

7.2 APPOINTMENTS, ROLES AND RESPONSIBILITIES

Roles and Organisation of Health and Safety Responsibilities

All responsibilities fall under the legal requirement of legal appointment letters – each responsible person shall have an appointment letter.

7.2.1 SAFETY MANAGEMENT APPOINTMENTS AND ROLES

ROLE	***RESPONSIBILITIES***
Client/ Client Agent	***The Client and/or its Agent** shall ensure that the Principal Contractor, appointed in terms of Construction Regulation 5(1) (l), implements and maintains the agreed and approved Health and Safety Plan. Failure on the part of the Client or Agent to comply with this requirement will not relieve the Principal Contractor from any duties under the Act and Regulations.*
CEO – Principle Contractor	***The Chief Executive Officer** of the Principal Contractor in terms of Section 16 (1) of the Act to ensure that the Employer (as defined in the Act) complies with the Act. The pro forma Legal Compliance Audit may be used for this purpose by the*

	Principal Contractor or his/her appointed contractor.
Person responsible for Health and Safety Section 16(2)	*All OHS Act (85 /1993), **Section 16 (2)** appointee/s as detailed in their respective appointment forms shall regularly, in writing, report to management on health and safety matters or deviations identified during routine or ad hoc inspections/ audits. All reports shall be made available to the principal Contractor to become part of their site records (Health & Safety File).*
Construction Manager Or Assistant	***The Construction Manager and Assistant Construction Supervisor**/s appointed in terms of Construction Regulation 8 shall regularly, in writing, report to their managers on health and safety matters or deviations identified during inspections. All reports shall be made available to the principal Contractor to become part of site records (Health & Safety File). This manager shall be registered with SACPCMP.*
Construction Health and Safety Officer Section 8(6)	***A Principal Contractor/Contractor** shall, after consultation with the client and having considered the size of the project, the degree of danger likely to be encountered or the accumulation of hazards or risks on the site, appoint a full-time or part-time construction health and safety officer in writing to assist in the control of all health and safety related aspects on the site. This construction health and safety officer shall be registered with SACPCMP.*
SHE Representatives	***All Health and Safety Representatives (SHE-Reps)** shall act and report as per Section 18 of the Act. She Representatives shall inspect and monitor activities on a daily basis and report finding to the Client and Health and Safety manager immediately. These safety representatives have the right to stop any unsafe work or work due to unsafe conditions and report findings and reason immediately to NLM Management.*
Other Legal Appointees Accident/ Incident Investigator GAR 8(2) First Aid Officer GSR 3 Fire Fighters ER 9 & CR 27 (h) Risk Assessor CR (7)	***Further (Specific) Supervision Responsibilities for OH&S** Several appointments or designations of responsible and /or competent people in specific areas of construction work are required by the Act and Regulations.*

7.2.2 COMPETANT PERSON APPOINTMENTS

The following competent appointments, where applicable, in terms of the Construction Regulations are required to ensure compliance to the Act, Regulations and Safety Standards.

COMPETANT PERSON APPOINTMENTS AS REQUIRED IN THE CONSTRUCTION REGULATIONS			
Item	***Construction Regulation***	***Appointment***	***Responsible Person***
1.	*5(1)(h)*	*Principal contractor for each phase or project*	*Client*
2.	*7(c)(v)*	*Contractor*	*Principal Contractor*
3.	*7(2)(c)*	*Contractor*	*Contractor*
4.	*8(1)*	*Construction Manager*	*Principal Contractor*
5.	*8(2)*	*Construction Manager sub-ordinates*	*Principal Contractor*
6.	*8(6)*	*Construction Safety Officer*	*Principal Contractor & Contractor*
7.	*9(1)*	*Person to carry out risk assessment*	*Principal Contractor & Contractor*
8.	*9(4)*	*Trainer/Instructor*	*Principal Contractor & Contractor*

9.	*10(1)(a)*	*Fall protection planner*	*Principal Contractor & Contractor*
10	*13(1)(a)*	*Excavation supervisor*	*Principal Contractor & Contractor*
11	*13(2)(b)(ii)(bb)*	*Professional engineer or technologist*	*Principal Contractor & Contractor*
12	*13(2)(k)*	*Explosives expert*	*Principal Contractor & Contractor*
13	*14(1)*	*Supervisor demolition work*	*Principal Contractor & Contractor*
14	*14(2) + (3)*	*Demolition expert*	*Principal Contractor & Contractor*
15	*14(11)*	*Explosives expert*	*Principal Contractor & Contractor*
16	*16(1)*	*Scaffold supervisor*	*Principal Contractor & Contractor*
17	*17(1)*	*Suspended platform supervisor*	*Principal Contractor & Contractor*
18	*17(2)(c)*	*Compliance plan developer*	*Principal Contractor & Contractor*
19	*17(8)(c)*	*Suspended platform expert*	*Principal Contractor & Contractor*
20	*17(13)*	*Outrigger expert*	*Principal Contractor & Contractor*
21	*19(8)(a)*	*Material hoist inspector*	*Principal Contractor & Contractor*
22	*18(1)(a)*	*Rope access supervisor*	*Principal Contractor & Contractor*
23	*20(1)*	*Bulk mixing plant supervisor*	*Principal Contractor & Contractor*
24	*20(2)*	*Bulk mixing plant operator*	*Principal Contractor & Contractor*
25	*21(2)(b)*	*Explosive actuated fastening device expert*	*Principal Contractor & Contractor*
26	*21(2) (g) (i)*	*Explosive actuated fastening device controller*	*Principal Contractor & Contractor*
27	*22(e)*	*Tower crane operator*	*Principal Contractor & Contractor*
28	*23(1)(d)(i)*	*Construction vehicle and mobile plant operator*	*Principal Contractor & Contractor*
29	*23(1)(k)*	*Construction vehicle and mobile plant inspector*	*Principal Contractor & Contractor*
30	*24(d)*	*Temporary electrical installations inspector*	*Principal Contractor & Contractor*
31	*24 (e)*	*Temporary electrical installations controller*	*Principal Contractor & Contractor*
32	*28 (a)*	*Stacking and storage supervisor*	*Principal Contractor & Contractor*
33	*29 (h)*	*Fire equipment inspector*	*Principal Contractor & Contractor*

<u>Note:</u> No work may be performed without the knowledge and approval of an appointed competent person.

7.3 RESPONSIBILITIES

7.3.1 FM (Client)

Construction in existing facilities shall be under the control of the FM and in full compliance with all requirements of the relevant processes of Necsa's SHEQ System.

The FM (or his appointed designee) shall be responsible for the compliance with the requirements of the construction regulations as indicated for the Principal Contractor/Contractor for facility modifications or maintenance.

The FM shall be regarded as the Client and shall be responsible for the following:

REQUIREMENT	REFERENCE
Comply with the Necsa Approval of Projects Process [4];	SHEQ-INS-0800
Appoint in writing the NLM Management Representative (NLM Responsible Manager or Agent i.t.o. [2], overall responsible for ensuring that the construction is performed in accordance with the requirements of the approved design, construction process and Necsa SHEQ System;	SHEQ-INS-0825 SHEQ-INS-5450 CR 5(5)(6)
Ensure compliance with the requirements of the Contractors [2];	SHEQ-INS-0825
Implement the physical security protection requirements for the construction site;	SHEQ-INS-0825
Prepare a baseline risk assessment for an intended construction work project;	CR 5(1)(a)
Prepare a suitable, sufficiently documented site specific H&S Specification (HSS) for the intended construction work based on the baseline risk assessment;	*CR* 5(1)*(b)*
Provide the designer with the HSS, ensure the designer take the HSS into consideration during design stage, and ensure the designer complies with CR (6);	*CR* 5(1)*(c-e)*
Include the HSS in the tender documentation;	*CR* 5(1)*(f)*
Ensure that the NLM SHEQ Representative is involved in prescribing HSE Requirements for the project in the tender process	*NLM Requirement*
Ensure that Principal Contractors submitting tenders have made adequate provision for the cost of H&S measures;	*CR* 5(1) *g)*
Ensure that Principal Contractors to be appointed has the necessary competencies and resources to carry out the construction work safely;	*CR* 5(1)*(h)*
Ensure co-operation between all Contractors appointed;	*CR* 5(1)*(i)*
Ensure the Principal Contractor is in good standing with the Compensation Commissioner;	*CR* 5)1)*(i)* SHEQ-INS-0825
Appoint every Principal Contractor in writing and in accordance with the selection process of Necsa [3], submit copy to S&LD;	CR 5(1)*(k)*, SHEQ-INS-0825
Discuss and approve the Principal Contractor HSP and ensure the HSP is available, implemented and maintained;	CR 5(1)*(l-n)*
Establish and implement sufficient communication processes between the Client And the Principal Contractor/ Contractor to ensure information is available and disseminated to NLM and all construction workers as appropriate. The communication processes shall include: i) Establishing of a project committee where worker representatives can communicate SHEQ problems and receive SHEQ relevant feedback. ii) Construction progress report in sufficient detail for the target audience – including workers. iii) Communication of changed procedures and work methods. iv) Event notification and communication of corrective actions to ensure learning opportunities. v) Communication channels between Contractors, Necsa and others including external communication with media and press.	S&LD Requirement
Ensure that periodic H&S audits are conducted at intervals mutually	CR 5(1)*(o-p)*

REQUIREMENT	REFERENCE
agreed upon between the Principal Contractor and any Contractor, but at least once every 30 days, copy of audit report to be provided within 7 days.	
Stop any work that is not in accordance with the HSS, HSP or which posed a threat to the H&S of persons;	CR 5)(1)*(q)* SHEQ-INS-0825
Manage Design changes;	CR 5*(2)(r)*
Ensure that a HSF is kept and maintained by the Principal Contractor;	CR 5*(2)(s)*
In case of a fatality or permanent DI, ensure that the Contractor provide the DoL with a report;	*CR 5(3)*
Where more than one Principal Contractor is appointed ensure co-operation between all Principal Contractors and Contractors;	*CR 5(4)*
Where a construction work permit is required appoint a competent person in writing as an agent to act as his or her representative;	*CR 5(5)*
Where notification of construction work is required appoint a competent person as an agent;	*CR 5(6)*
Prepare an environmental protection plan in accordance with the RoD conditions for the construction.	SHEQ-INS-0825

7.3.2 Agent

An Agent shall be registered with the SACPCMP (the statutory body approved by the DoL Chief Inspector) as a qualified person to perform the required functions.

REQUIREMENT	REFERENCE
Manage the H&S on a construction project for the client.	*CR 5(7)(a)*

7.3.3 Designer CR (6)

The designer of a structure shall—

REQUIREMENT	REFERENCE
Ensure that the applicable safety standards incorporated into these Regulations under section 44 of the Act are complied with in the design;	*CR 6(1)(a)* ***See Annexure 4***
Take into consideration the health and safety specification submitted by the client;	*CR 6(1)(b)*
Before the contract is put out to tender, make available in a report to the client which includes: • all relevant health and safety information about the design of the relevant structure that may affect the pricing of the construction work; • the geotechnical-science aspects, where appropriate; and • the loading that the structure is designed to withstand;	*CR 6(1)(c)*(i)-(iii)
Inform the client in writing of any known or anticipated dangers or hazards relating to the construction work, and make available all relevant information required for the safe execution of the work upon being designed or when the design is subsequently altered;	*CR 6(1)(d)*
Refrain from including anything in the design of the structure necessitating the use of dangerous procedures or materials hazardous to the health and	*CR 6(1)(e)*

REQUIREMENT	REFERENCE
safety of persons, which can be avoided by modifying the design or by substituting materials	
Take into account the hazards relating to any subsequent maintenance of the relevant structure and shall make provision in the design for that work to be performed to minimize the risk;	*CR 6(1)(f)*
When mandated by the client to do so, carry out the necessary inspections at appropriate stages to verify that the construction of the relevant structure is carried out in accordance with his design: Provided that if the designer is not so mandated, the client's appointed agent in this regard is responsible to carry out such inspections;	*CR 6(1)(g)*
When mandated as contemplated in paragraph *(g),* stop any contractor from executing any construction work which is not in accordance with the relevant design's health and safety aspects: Provided that if the designer is not so mandated, the client's appointed agent in that regard shall stop that contractor from executing that construction work;	*CR 6(1)(h)*
When mandated as contemplated in paragraph *(g),* in his or her final inspection of the completed structure in accordance with the National Building Regulations, include the health and safety aspects of the structure as far as reasonably practicable, declare the structure safe for use, and issue a completion certificate to the client and a copy thereof to the contractor; and	*CR 6(1)(i)*
During the design stage, take cognisance of ergonomic design principles in order to minimize ergonomic related hazards in all phases of the life cycle of a structure.	*CR 6(1)(j)*
The designer of temporary works shall ensure that— all temporary works are adequately designed so that it will be capable of supporting all anticipated vertical and lateral loads that may be applied;	*CR 6(2)(a)*
The designs of temporary works are done with close reference to the structural design drawings issued by the contractor, and in the event of any uncertainty consult the contractor;	*CR 6(2)(b)*
All drawings and calculations pertaining to the design of temporary works are kept at the office of the temporary works designer and are made available on request by an inspector; and	*CR 6(2)(c)*
The loads caused by the temporary works and any imposed loads are clearly indicated in the design.	*CR 6(2)(d)*

7.3.4 Principal Contractor

The Principal Contractor shall accept the appointment under the terms and Conditions of Contract. The Principal Contractor shall sign and agree to those terms and conditions

The Principal Contractor shall, before carrying out construction work, prepare and submit the following:

REQUIREMENT	REFERENCE
Notify the Provincial Director of the Department of Labour about the construction work to be commencement. A copy of the notification to be forwarded to NLM for NLM's records. Proof of the notification shall be included in the HSF;	*CR 4(1)*
Prepare a HSP based on NLM's HSS;	*CR 7(1)(a)*
Prepare and keep on site a HSF containing all evidence of compliance;	*CR 7(1)(b)*
On appointing any other Contractor, ensure compliance with the provisions of the Act with the same responsibilities as if he is the Principal Contractor by: • *Provide Contractors who are tendering to perform construction work for the Principal Contractor, with the relevant sections of the HSS pertaining to the construction work which has to be performed;* • *Ensure Contractors made provisions for H&S;* • *Appointment, in writing, SQEP's to perform construction tasks;* • *Ensure Contractors are in good standing with the Compensation Commissioner;* • *Appoint each other Contractor in writing;* • *Ensure that each Contractor's HSP is implemented and maintained;* • *Ensure that the periodic site audits and document verifications are conducted;* • *Stop any Contractor from executing construction work which is not in accordance with the NLM's HSS and the Principal Contractor's HSP;* • *Manage changes and* • *Discuss and approve Contractor's HSP*	*CR 7(1)(c))* *CR 7(1)(c)(i)-(x)*
Ensure that a copy of his HSP as well as the Contractor's HSP is available on request to an employee, an inspector, Contractors, NLM or the client's agent;	*CR 7(1)(d)*
Prepare a HSF containing all evidence of compliance;	*CR 7(1)(e)*
Compile a comprehensive and updated list of all the Contractors on site accountable to the Principal Contractor, the agreements between the parties and the type of work being done;	*CR 7(1)(f)*
Ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3 of the Act (See Annexure 3).	*CR 7(1)(g)*
The Principal Contractor shall submit to NLM for approval a document addressing the Change Management Process, which will be applied during construction. *This process shall comply with the following requirements:* • *All changes shall be documented including requests (change proposals) with justification, proposal evaluation, rejection or approval of proposal with justification.*	*SHEQ-INS-0825*

REQUIREMENT	REFERENCE
• *Change Management control including prescribed forms, individuals (i.e. not positions) authorised to evaluate, review, verify and approve change proposals.* • *Modifications to design shall be evaluated and accepted preferably by the original designer (and if not available by a technically qualified alternative with sufficient knowledge of the design) and the SAR preparation team. Modification proposals to Safety Classified SSC [7]) (Level 1 and 2) shall be submitted to the NNR for approval.* • *Change proposals shall be reviewed and approved by SQEPs, i.e. by individuals who have information and knowledge of the requirements, function of the SSC and the intent of the original design, process and practice.* • *Design modification proposals shall be controlled in compliance with the requirements of [6].* • *The process shall allow for temporary and permanent changes and communication of process outcomes with all relevant staff (including construction workers as appropriate).* • *The Change Management Process shall address the management of all potential changes including design, work procedures, quality management systems, instructions, etc.* • *The Change Management Process shall prescribe close-out only upon modification of the affected source documents (e.g. drawing).*	

Note: The FM (or his appointed designee) shall be responsible for the requirements of compliance with the construction regulations indicated for the Principal Contractor/Contractor for facility modifications and maintenance.

7.3.5 Contractor

Contractor staff shall comply with SHEQ System requirements as if they were Necsa's own employees i.r.o. employee processes such as radiation protection, medical surveillance, training and registration as occupationally exposed workers (e.g. radiation workers), etc. ***The Nuclear FM remains responsible for the Radiation Protection Programme of areas handed over to contractors.***

Each contractor shall:

REQUIREMENT	REFERENCE
Notify the Provincial Director of the Department of Labour about the construction work to be commencement. A copy of the notification to be forwarded to NLM for record purposes. Proof of the notification shall be included in the HSF;	*CR 4(1)*
Provide and demonstrate to the principal contractor a suitable and sufficiently documented HSP, based on the relevant sections of the NLM HSS;	*CR 7(2)(i)*
Open and keep on site a health and safety file;	*CR 7(2)(ii)*
Only appoint another contractor with the necessary competencies and resources	*CR 7(2)(iii)*

REQUIREMENT	REFERENCE
to perform the construction work safely;	
At all times co-operate with the principal contractor;	*CR 7(2)(iv)*
Promptly provide the principal contractor with any information which might affect the H&S of any person at work;	*CR 7(2)(v)*
Where Contractors appoints another contractor to perform construction work, the duties determined in CR 7(1)(b-g) that apply to the principal contractor apply to the contractor as if he or she were the principal contractor.	*CR 7(3)*
Take reasonable steps to ensure co-operation between all Contractors appointed by the Principal Contractor to enable each of those Contractors to comply with these Regulations;	*CR 7(4)*
*H&S induction training pertaining to the hazards prevalent on the site at the time of entry shall be **compulsory**;*	*CR 7(5)*
Ensure that all visitors to a construction site undergo H&S induction pertaining to the hazards prevalent on the site and shall ensure that such visitors have the necessary personal protective equipment;	*CR 7(6)*
Keep records of the H&S induction training;	*CR 7(7)*
Ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3 of the Act (See Annexure 3);	*CR 7(8)*
Prepare a Fall Protection Plan as applicable, to be accepted by NLM;	*SHEQ-INS-0825*
Provide NLM with a Training and Orientation process;	*SHEQ-INS-0825*
Provide NLM with Work Planning Processes e.g. procedures, permits, PPE, RPE, ETC.;	*SHEQ-INS-0825*
Provide NLM with their EMP;	*SHEQ-INS-0825*
Provide NLM with their Construction Verification Process;	*SHEQ-INS-0825*
Provide NLM with their Change Manage Process;	*SHEQ-INS-0825*
Submit a Construction Plan in accordance with the H&S Specification;	*SHEQ-INS-0825*

8 H&S SPECIFICATION REQUIREMENTS

Contractor shall mean: Principal Contractor or Contractor or both

REQUIREMENT	REFERENCE
LEGISLATION (See Administrative & Legal Requirements Par 9 and 11)	
A copy of applicable legislation will be on site: *OHS Act 85 of 1993 and Regulations* ***with amended standards (See Annexure 4)***; ***Take note of the latest revisions in the Act:*** *Construction Regulations, 2014;* *Driven Machine Regulations 2015;* *Pressurized Equipment, 2015*; *Explosive Regulations, 2015.*	
HSE POLICY, OBJECTIVES, GOALS AND TARGETS	**(Act 7 (1) (a))**
The Contractor shall prepare a written policy concerning the protection of the H&S of his employees at work, including the arrangements for carrying out and reviewing that policy. *OH&S goals and objectives and arrangements for monitoring and reviewing OH&S performance shall be established.* *The Principal Contractor is required to maintain an acceptable disabling incident frequency rate (DIFR) and report monthly on their performance to the Client or its Agent.* A copy of the policy shall prominently be displayed, signed by the chief executive officer, in the workplace where his employees normally report for service.	
CONSTRUCTION WORK PERMIT	**CR 3 (1)**
NLM shall at least 30 days before that work is to be carried out apply to the provincial director in writing for a construction work permit to perform construction work if the intended construction work will— *(a)* exceed 180 days; *(b)* will involve more than 1800 person days of construction work; or **(c)** the works contract is of a value equal to or exceeding thirteen million rand or Construction Industry Development Board (CIDB) grading level 6. See Annexure 1 for example.	
NOTIFICATION OF CONSTRUCTION WORK	**CR 4 (1)**
The Contractor shall at least 7 days before construction work is to be carried out notify the provincial director in writing in a form similar to Annexure 2 of the Act if the intended construction work will: *(a)* include excavation work; *(b)* include working at a height where there is risk of falling; *(c)* include the demolition of a structure; or *(d)* include the use of explosives to perform construction work. The Contractor who intends to carry out construction work that involves construction of a single storey dwelling for a client who is going to reside in such dwelling upon completion, shall at least 7 days before that work is to be carried out notify the provincial director in writing in a form similar to Annexure 2 of the Act (See Annexure 2 of this document).	
RESPONSIBILITIES (SEE PAR. 7)	
MANDATARY AGREEMENT WITH CLIENT SHE SPECIFICATIONS	**Section 37(2) Act**
The Contractor shall: Enter into an Agreement with Mandatory in terms of Section 37(2) of the Act, with NLM and all other Contractors appointed by the Principal Contractor; Appoint its Contractor's in accordance with Construction Regulation 7(1)(c);	

REQUIREMENT	REFERENCE
Appoint **competent** Contractors (SQEP) only to perform construction work 7(1)(c)(iii); Monitor the performance of the Contractor by means of regular audits; Ensure all other Contractors are issued with NLM's Health & Safety Specification; Assist and ensure Contractors engaged comply with all of these requirements, the Act *and the incorporated standards (See Annexure 4)**;*** Be stopped from working in the event of unsafe conditions and activities being observed; Once appointed, the Contractor shall submit and implement its own project and site specific HSP for approval by the Principal Contractor; No Contractor will be allowed on site outside of official office hours. These office hours are as follows: Mondays to Fridays 08:45 – 16:30; On completion of the construction work, the Principal Contractor shall submit a consolidated HSF to NLM.	
COMPENSATION OF OCCUPATIONAL INJURIES AND DISEASES ACT, ACT NO. 130 OF 1993 (COIDA)	***CR 7(1)(c)(iv)***
The Contractor shall ensure a letter of good standing is provided to NLM prior to any work commencing on site.	
TAX CLEARANCE CERTIFICATE	**SHEQ-INS-0238**
The contractor/supplier shall provide Necsa with a tax clearance certificate.	
HSE REPRESENTATIVES	***ACT (19)***
Designation of SHE Representatives *Where the Principal Contractor employs more than 20 persons (including the employees of the Sub-Contractors)* each Contractor will be responsible to elect, train and appoint in writing one HSE Representative for every 50 employees **or any part thereof.**.. *(OHS Act85, 1993 - Section 17 and GAR 6; 7.)* ***Duties and Functions of the H&S Representatives*** *(This is based on the Construction norms and is not an exhaustive list)* *The Principal Contractor shall ensure that the designated SHE Representatives conduct a formal weekly inspection of their respective areas of responsibility using a checklist.* *All findings shall be reported to the Principal Contractor.* *The reports shall be* discussed on NLM's H&S Committee meetings or Project Oversight Committee meetings *for action.* *Record shall be kept in the form of minutes.* *SHE Representatives shall take part in incident investigations.* *SHE Representatives shall be members of at least one SHE Committee and attend all the SHE Committee meetings.*	
H&S COMMITTEE	***ACT (19)***
Establishment of H&S Committee(s) *The Principal Contractor shall establish H&S Committees consisting of designated H&S Representatives together with a number of Employers Representatives appointed as per Section 19(3) that are not allowed to exceed the number of H&S Representatives on the committee. The persons nominated by the employer on a H&S Committee shall be designated in writing for such period as may be determined by him. The H&S Committee shall co-opt advisory (temporary) members (who are not allowed to vote on issues discussed) and determine the procedures of the meetings including the chairmanship.* *Legally, the H&S Committee shall meet minimum every 3 months but it is advised that they meet at least once a month and consider, at least, the following Agenda for the first meeting. Thereafter the H&S Committee shall determine its own procedures as per the previous paragraph.*	

REQUIREMENT	REFERENCE
Agenda: *1) Opening and determining of chairmanship (only when necessary)* *2) Facilities and Hygiene* *3) Housekeeping* *4) Incidents and incident investigation* *5) Inspection checklists and Registers:* • *H&S Rep. Inspections* • *Matters of First Aid* • *Scaffolding* • *Ladders* • *Excavations* • *Portable Electric Equipment* • *Fire Equipment* • *Explosive Power Tools* • *Power Hand tools* • *Incident Investigation reports* • *Pressure Equipment and vessels under pressure* • *Personal Protective Equipment* *6) Safety Statistics* *7) Health and Safety Awareness / Training / Posters and Symbolic signs* *8) First Aiders and First Aid equipment* *9) Demarcation of work- /hazardous-/safe areas/walkways* *10) Safety Suggestions* *11) Environmental Management* *12) General* *13) Date of Next Meeting* *14) Closing* All H&S Representatives shall form part of the NLM's H&S Committee for the duration of the project. Contractors shall be required to participate in NLM's H&S committee meeting if one is held during the duration of the project. All members required to be in attendance shall be notified of such a meeting by means of a formal agenda which will be made available by NLM. NLM shall ensure an attendance register and minutes are kept for auditing purposes. A copy of all minutes will be given to the Principal Contractor.	
BASELINE RISK ASSESSMENT	**CR 5 (1) (a)**
NLM shall prepare a baseline risk assessment for the intended construction work to be performed. *The Principal Contractor shall perform risk assessments, compile Standard Working Procedures (SWP) and safe Work Method Statements (SWMS) for each activity executed in the contract or project.* *The identification of hazards is over and above the hazards identification program and those hazards identified during the drafting of the Health and Safety Plan.*	
ISSUE BASE RISK ASSESSMENTS RISK ASSESSMENT	**CR 9**
Contractors shall: Provide NLM with an issue based risk assessment, based on NLM's baseline risk assessment, performed by a competent person, appointed in writing, which will form part of the HSP to be applied on the site, and shall include— • the identification of the risks and hazards to which persons may be exposed to; • an analysis and evaluation of the risks and hazards identified based on a documented method;	

REQUIREMENT	REFERENCE

- a documented plan and applicable safe work procedures to mitigate, reduce or control the risks and hazards that have been identified;
- a monitoring plan; and
- a review plan.

Ensure that as far as is reasonably practicable, ergonomic related hazards are analyzed, evaluated and addressed in a risk assessment.

Contractors shall ensure that all employees under his or her control are informed, instructed and trained by a competent person regarding any hazard and the related work procedures and or control measures before any work commences, and thereafter at the times determined in the risk assessment monitoring and review plan of the relevant site.

Contractors shall consult with the H&S committee or, if no H&S committee exists, with a representative trade union or representative group of employees, on the monitoring and review of the risk assessments of the relevant site.

Contractors shall ensure that copies of the risk assessments of the relevant site are available on site for inspection by an inspector, the client, the client's agent, any contractor, any employee, a representative trade union, a H&S representative or any member of the H&S committee.
Contractors shall review the relevant risk assessment where changes are effected to the design and or construction that result in a change to the risk profile; or when an incident has occurred.

CONTINUOUS RISK ASSESSMENTS

Continuous risk assessments shall be performed at an operational level, where the system, process and activities are monitored on a continuous basis by the operational floor management and first line supervisors, as an integral part of day to day management.
Planned Task Observations shall also be conducted on an ongoing basis.
Contractors shall perform continuous risk assessments by completing daily inspection checklists, pre-use checklists, critical part and paths checklists and observations.

Continuous risk assessment includes:

- *Inspections*
- *Critical task observations*
- *OHS audits*
- *Work permits*
- *Toolbox talks*
- *Medical surveillance*
- *Occupational hygiene measurements*
- *Planned maintenance systems, etc.*

PROJECT/SITE SPECIFIC REQUIREMENTS
SWMS'S, SOP'S, RA'S

*SWMS are mandatory for **high risk construction work**, which includes:*

- *Working at heights*
- *demolition*
- *removal or disturbance of asbestos*
- *diving*
- *trenches or shafts deeper than 1.5 metres*

REQUIREMENT	REFERENCE

- *temporary supports for structural alterations*
- *powered mobile plant*
- *explosives*
- *confined spaces*
- *tunnels*
- *tilt-up or precast concrete, or*
- *work that is in, on or near:*
- *electrical installations or services*
- *roads or railways in use by traffic*
- *water/liquids that pose a drowning risk*
- *telecommunications towers*
- *pressurised gas distribution mains or piping*
- *artificial temperature extremes*
- *contaminated atmospheres*
- *flammable atmospheres*
- *chemical, fuel or refrigerant lines.*

*In addition to the **high risk construction work,** the following is a list of specific activities and considerations that should be considered for NLM Projects and site and for which Safe Work Method Statements (SWMS's), Standard Operating Procedures (SOP's,)Risk Assessment (RA's) , management and control measures have to be developed by the Principal Contractor:*

- *Clearing & Grubbing of the Area/Site.*
- *Site Establishment including:*
  - ✓ *Office/s*
  - ✓ *Secure/Safe Storage and storage areas for materials, plant & equipment*
  - ✓ *Ablution facilities*
  - ✓ *Sheltered dining area*
  - ✓ *Vehicle access to the site*
- *Dealing with existing Structures.*
- *Location of existing Services.*
- *Installation and Maintenance of Temporary Construction Electrical Supply, Lighting and Equipment.*
- *Adjacent properties and surrounding building exposures.*
- *Boundaries and Access control/Public Liability Exposures.*
- *Exposure to Noise.*
- *Exposure to Vibration.*
- *Exposure to Radiant Temperatures.*
- *Exposure to Ionizing Radiation.*
- *Exposure to Non-ionizing Radiation.*
- *Exposure to Hazardous Chemical Substances.*
- *Exposure to Biological Agents.*
- *Protection against dehydration and heat exhaustion.*
- *Protection from the elements.*
- *Use of Portable Electrical Equipment including:*
  - ✓ *Angle grinder*
  - ✓ *Electrical Drilling machine*
  - ✓ *Skill saw*

REQUIREMENT	REFERENCE

- *Excavations including:*
  - ✓ *Ground/soil conditions*
  - ✓ *Trenching*
  - ✓ *Shoring*
  - ✓ *Drainage*
  - ✓ *Daily inspections*
- *Welding including:*
  - ✓ *Arc Welding*
  - ✓ *Gas welding*
  - ✓ *Flame Cutting*
  - ✓ *Use of LP Gas torches and appliances*
- *Loading and Offloading of Trucks.*
- *Aggregate/Sand and other Materials Delivery.*
- *Manual and Mechanical Handling.*
- *Lifting and Lowering Operations.*
- *Driving & Operation of Construction Vehicles and Mobile Plant including:*
  - ✓ *Trenching machine*
  - ✓ *Excavator*
  - ✓ *Roller*
  - ✓ *Plate Compactor*
  - ✓ *Front End Loader*
  - ✓ *Mobile Cranes and the ancillary lifting tackle*
  - ✓ *Parking of Vehicles & Mobile Plant*
  - ✓ *Towing of Vehicles & Mobile Plant*
- *Use and Storage of Flammable Liquids and other Hazardous Substances – the client and/or its Agent on its behalf to be informed of this prior to commencing of the project.*
- *Layering and Bedding of trench floor.*
- *Installation of Pipes in trenches.*
- *Backfilling of Trenches.*
- *Protection against Flooding.*
- *Use of Explosives - the client and/or its Agent on its behalf to be informed of this prior to commencing of the project.*
- *Protection from Overhead Power Lines.*
- *As discovered by the Principal Contractor's hazard identification exercise*
- *As discovered from any inspections and audits conducted by the Client and/or its Agent on its behalf or by the Principal Contractor or any other Contractor on site*
- *As discovered from any accident/incident investigation.*

These SWMS's form the basis for identification and quantification of risks. ***SWMS's shall be site specific.***

H&S SPESIFICATION	**CR 5 (1) (b)**

NLM shall prepare a suitable, sufficiently documented and coherent ***site specific*** HSS for the intended construction work which will be provided as part of the tender procedure and will be submitted to all potential contractors.

H&S PLAN	**CR 5 (1) (m), CR 7 (1), 2 (a)**

The Contractors shall provide to the Client, a HSP in accordance with this HSS.
The following documentation and information shall be included in the HSP:

- *The Requirements as set out in this document;*

REQUIREMENT	REFERENCE

- *The H&S Policy;*
- *A H&S Organogram, outlining the H&S Team, as well as all the appointments;*
- *The competency of each member of the H&S Team, including knowledge, training, experience and qualifications specific to the work or task to be performed;*
- *The estimated number of employees to be working on site;*
- *The expected number of Contractors to be appointed by the Principal Contractor.*

The HSP shall be submitted for approval to NLM before work commences on site.

HEALTH AND SAFETY FILE — **CR 7(1)(b)**

The Principal Contractor shall, in terms of Construction Regulation 7(2)(b), keep a Health & Safety File on site at all times that shall include all documentation required in terms of the Act and Regulations and shall also include a list of all Contractors on site that are accountable to the Principal Contractor and the agreements between the parties and details of work being done.

IMPORTANT:

The Health and Safety File will remain the property of the Client and/or its Agent on its behalf throughout the period of the project and shall be consolidated and handed over to the Client and/or its Agent on its behalf at the time of completion of the project.

APPOINTMENTS — **CR 7(1)(c)**

The Principal Contractor shall provide NLM with a list of all Contractors to be work on the NLM site with:
Contact details;
Residential Address;
ID's;
CV's.
Appointments will be done in writing, of all personnel to perform construction tasks.
Note: *Only SQEP's shall be employed to perform construction work on the NLM Site. Each contractor shall ensure that only competent people are appointed based on their training, experience, knowledge and qualifications (as per SAQA requirements).*

TRAINING AND INDUCTION — **CR 7(5)(6)(7)**

The contents and syllabi of all training required by the Act and Regulations including any other related or relevant training as required shall be included in the Principal Contractor's Health and Safety Plan and Health and Safety File.

GENERAL INDUCTION

All employees of the Principal and other Contractors shall do the Necsa General Induction Training.

SITE SPECIFIC INDUCTION

The Principal Contractor/ Contractor shall ensure that all contractors, over and above the contractors own Induction Course completes NLM Site Specific Health and Safety Induction which will include:

- The Emergency Plan;
- Location of welfare facilities, first aid boxes, fire extinguishers, emergency assembly points, etc.;
- Current site specifics and hazards and risks;
- "No access" areas
- General site rules;
- Site demarcation criteria, etc.

AWARENESS TRAINING

Each contractor shall conduct daily specific Toolbox Talks aimed at addressing the risks and methods involved in a specific task, before work commences on the specific task. These Toolbox Talks shall include the Safety Officer and Supervisory Staff.
Do weekly awareness safety talks on the general aspects of H&S;

REQUIREMENT	REFERENCE
COMPETENCY TRAINING *Each contractor shall ensure that all competent persons have the training, experience, knowledge and qualifications to supervise, control and carry out construction work. (SQEPed)* The Principal Contractor will issue certificates to all employees on completion of the safety induction course. The Principal Contractor shall also keep records of all training, noting the contents of the talk, who presented the talk and who attended. The Contractor shall provide to NLM a training Matrix which shall be included in the HSP to be submitted prior work commencing on site. Training identified through the HIRA Process and conducted through this process shall be kept on file as proof of competency and training and shall be made available to NLM upon request. (This shall include operator competency certificates and licences). Proof of all training will be included in the HSF.	
AUDITS	**CR 5 (1) (o-p)**
CLIENT AUDITS	**CR 5 (1) (o-p)**
NLM shall conduct a pre-construction work audit to verify compliance with the HSS and periodic H&S audits at intervals mutually agreed upon between the Principal Contractor and any Contractor, at least once every 30 days or in the event that the project is completed within a period shorter than one month, before the end of the project. Ensure that a copy of the H&S audit report is provided to the Principal Contractor within seven days after the audit. The audit results shall be tabled and discussed at the Joint H&S Committee meetings. *NLM or its Agent reserves the right to conduct any ad hoc audits and inspections as it deems necessary.* *A representative of the Principal Contractor and the relevant Health and Safety Representative(s) (SHE-Reps) shall accompany NLM and/or its Agent on all Audits and Inspections and may conduct their own audit/inspection simultaneously. Each party will, however, take responsibility for the results of his/her own audit/inspection results. NLM or its Agent may request a copy of the Principle Contractor SHE Committee meeting minutes, reflecting possible recommendations made by that committee to the Employer for reference purposes.*	
PRINCIPAL CONTRACTORS AUDITS	**CR 7 (1) (c) (vii)**
The Principal Contractor and any Contractor shall also conduct periodic site audits at intervals mutually agreed upon between the Principal Contractor and any Contractor, at least once every 30 days or in the event that the project is completed within a period shorter than one month, before the end of the project.	
DESIGNER REPORT	**CR 6 (1) (b)**
The designer of a structure shall— • ensure that the applicable safety standards are complied with in the design; • take into consideration the HSS submitted by the client; • before the contract is put out to tender, make available in a report to NLM indicating all relevant H&S information about the design of the relevant structure that may affect: (i) the pricing of the construction work; (ii) the geotechnical-science aspects, where appropriate; and (iii) the loading that the structure is designed to withstand. • During the design stage, take cognisance of ergonomic design principles in order to minimize ergonomic related hazards in all phases of the life cycle of a structure.	
DESIGNER INSPECTIONS	**CR 6 (1) (g)**
Carry out the necessary inspections at appropriate stages to verify that the construction of the relevant	

REQUIREMENT	REFERENCE

structure is carried out in accordance with his design: Provided that if the designer is not so mandated, the client's appointed agent in this regard is responsible to carry out such inspections.
In the final inspection of the completed structure in accordance with the National Building Regulations, include the H&S aspects of the structure as far as reasonably practicable, declare the structure safe for use, and issue a completion certificate to NLM and a copy thereof to the Contractor.

QUALITY	**SHEQ-INS-0825 [8]**

The QMS of the Construction Contractor (as construction supplier) shall be audited in compliance with the requirements of [3], all QMS processes, irrespective of it being mentioned above are important to construction.

CONTRACTOR DOCUMENTATION	**H&S File**
CONSTRUCTION PLAN	**SHEQ-INS-0825 [8]**

SCOPE OF WORK

These specifications are applicable to the specific scope of work pertaining to the NLM project as detailed in the tender documents.
The Client or its Agent will provide a scope of work in the form of a Gant Chart to the Principal Contractor.
As a result of the inherent generic nature of the Health and Safety Specifications document, specific relevant information on the project shall be provided and it may be necessary to draft the required information under this paragraph on a separate attached document.
If at any time after commencement of the project changes are brought about to the design or construction, sufficient health and safety information and appropriate resources are to be made available to the Principal Contractor to execute the work safely.
NLM ***–shall for the duration of the project make available SHE Representatives on a daily basis to inspect the workplace.***
According to Construction Regulation 7(1)(c)(ii) all potential contractors submitting tenders shall make provision for the cost of health and safety measures during the construction process. When submitting a tender the Principal Contractor shall therefore, make provision for the cost of health and safety measures in terms of their documented Health and Safety Plan and NLM's Health and Safety Specifications. The cost shall be clearly specified and quantified within the tender document under a section for health and safety

The Contractor shall prepare and submit to NLM for approval a Construction Plan including at least the following:

CONSTRUCTION PLAN/ PROJECT PLAN

- Description of the project;
- Title, site set up, enabling works, clearance and early ground works need to be addressed;
- Sequence of work (Steps to be followed);
- Activities and duration of activities and sequence of activities;
- Construction Programme and Schedule with an indication of construction verification Inspections, Witness and Hold-points;
- Responsibilities and Resources;
- Construction organization structure, including HSE Functionaries and interfaces with NLM personnel;
- Names and description of responsibilities;
- Equipment to be used, identify and inventories all equipment;
- Indicate dates and frequency of inspections;
- Testing Programme for constructed SSC **if applicable;**
- Maintenance and care process of stored items and constructed parts before commissioning to ensure their condition and functionality until commissioning;
- Procedures: Identification of documents generating during construction which will be hand over to NLM on completion of the project including Method Statements identified;

REQUIREMENT	REFERENCE

- Communication Process;
- Change Management Process;
- Emergency Plan;
- The Quality and Safety Management Process;
- Arrangements for controlling significant site risks (HIRA's);
- Fire Protection and Control;
- Designs/Drawings/Sketches, Including all drawings, loads and calculations of temporary works, to be submitted to Necsa Engineering Department for reviews and approval ;
- Construction Specifications;
- Commissioning Requirements;
- Configuration Management;
- Bills of Material;
- Public and environmental issues in connection with the workplace.

The following are in particular requirements depending on scope of works and will form a basis for compliance audits.

1. Administrative and Legal Requirements
2. Education, Training & Promotion
3. Public Safety and Emergency Preparedness
4. Personal Protective Equipment
5. Housekeeping
6. Scaffolding, Formwork & Support work
7. Ladders
8. Electrical Safeguarding
9. Emergency Procedures /Fire Prevention and Protection
10. Excavations and Demolition
11. Tools
12. Cranes and other driven machinery
13. Personnel and Material Hoists
14. Transport and Materials Handling
15. Site Plant and Machinery
16. Stacking and Storage Site/ Yards/ Site Workshops Specifics
17. Health and Hygiene
18. Facilities.

COMMUNICATION

The Contractor shall establish and implement sufficient communication processes acceptable to NLM to ensure information is available and disseminated to NLM and all construction workers as appropriate.

Communication between the Employer, the Principal Contractor, Sub Contractors, Project manager, Architect and other concerned parties shall take place in the SHE Committee or Project meeting.
In addition to the above, communication may be directed to the Client or Client Agent, in writing, as and when the need arises.
The workforce may consult on Health and Safety matters with their Supervisor or She Representative.

The Principal Contractor shall be responsible for the dissemination of all relevant Health and Safety information to Sub Contractors and other Contractors e.g. design changes agreed with the Client and its Agent; instructions issued by the Client agent, exchange of information between Contractors, the reporting of hazardous/dangerous conditions/situations etc.

The Communication Process shall include:

REQUIREMENT	REFERENCE

- Establishing of an Oversight Committee/ SHE Committee or Project Meeting where worker representatives can communicate SHEQ problems and receive SHEQ relevant feedback.
- Construction progress report;
- Communication of changed procedures and work methods;
- Event notification and communication of corrective measures;
- Communication channels between NLM and Contractors.

STRUCTURES, SYSTEMS AND COMPONENTS

The Project Leader shall ensure compliance w.r.t. the marking, packing, storage, handling and preservation of items required for construction and shall include:

- *Marking of all construction items in correlation of the design;*
- *Process of issuing of items from the store;*
- *Maintenance and store of stored items including pre-issuing inspection as appropriate;*
- *Protection of and access to high value items and safety classified SSC;*
- *Storage of flammables and explosives*;
- Fire protection in storage areas.

CHANGE MANAGEMENT

The Contractor shall submit to NLM for approval a document addressing the Change Management Process which shall indicate:

- Details of Change
- Implementation of the Change
- Review of the Change

The Change Management Process shall comply with the following requirements:

- All changes shall be documented including requests with justification, proposal evaluation, rejection or approval of proposal with justification;
- Change Management control including prescribed forms, individuals to evaluate, review, verify and approve change proposals;
- Modifications to design shall be evaluated and accepted preferably by the original designer and the SAR Preparation Team;
- Change proposals shall be reviewed and approved by SQEP's;
- The process shall allow for temporary and permanent changes and communication of process outcomes with all relevant staff;
- The Change Management Process shall address the management of all potential changes including changing of scope, design, work procedures, quality management systems, instructions, etc.

The Change Management Process shall prescribe close-out only upon modification of the affected source documents.

CONSTRUCTION VERIFICATION

Construction Verification means the inspection, approval and documentation of any new construction project to confirm compliance with requirements.

The Contractor and in liaison with the NLM Project Leader or NLM Responsible Manager shall prescribe the construction verification process which shall be accepted by the Necsa Licensing Department and S&LD before construction commences.

The verification Process shall address and comply with the following:

REQUIREMENT	REFERENCE
• Confirmation that the construction is performed in accordance with proved designed; • Confirmation that the construction is performed according to legal requirements; • Confirmation of competency of construction workers; • Management and supervision of construction activities; • Non-conformance , event and Change Management processes; • Work planning and job-cards with identification of witness- and hold-points for testing and verification activities before task can continue; • Testing and verification including certification; • Intensified construction control of safety classified SSC's (Level 1 and 2 safety class SSC's) Formal check-sheet to verify and record that construction activity is complete and that the SSC's have been constructed and installed to specific requirements, in their correct locations.	
LIST OF CONTRACTORS	**CR 6, 7 (1) (c), (d) (f), (g) CR 7 (2) (c)**
The Principal Contractor shall make available a comprehensive and updated list of all the Contractors on site accountable for with copies of ID's to the NLM Manager.	
QUALIFICATIONS/COMPETENCIES	**CR 7 (1) (c) (iii)**
The Principal Contractor shall ensure that *only SQEP's are employed to perform construction work on the NLM Site. Each contractor shall ensure that personnel are appointed based on their training, experience, knowledge and qualifications (as per SAQA requirements).* The Principal Contractor shall ensure that each contractor is appointed in writing for the task to be performed.	
MAN JOB SPECIFICATION	
The Principal Contractor/Contractor shall perform man-jobs to be submitted to the occupational health practitioner	
MEDICAL CERTIFICATE OF FITTNESS	**CR 7(1)(f)**
The Principal Contractor/Contractor shall ensure that all employees have a valid medical certificate of fitness specific to the construction work to be performed and issued by an occupational health practitioner in the form of Annexure 3 of the Act. ***(NOT OLDER THAN 3 MONTHS)***	
OCCUPATIONAL HYGIENE	**Act**
Workplace Hazards Contractors shall ensure that proper health and hygiene measurer are put in place to prevent exposure to hazards. Prevent or control inhalation, ingestion, absorption and exposure to noise hazards. **Welfare Facilities** Contractors shall arrange with NLM sufficient welfare facilities like, toilets and toilet paper, changing facilities, hand washing facilities, shower soap, etc. Contractors shall ensure that waste bins are provided and emptied regularly. Safe, clean storage areas will be provided for contractors to store personal belongings and PPE. Adequate, sheltered eating areas will be provided. **Alcohol and Drugs** NECSA is an alcohol and drug free site. No alcohol and drugs are allowed on the Site. Any person on prescription drugs shall report it to his/her supervisor and to the NLM Safety Officer.	

REQUIREMENT	REFERENCE
SECURITY CLEARANCE (NLM NECSA)	**SHEQ-INS-8950**

Contractors may be subjected to security vetting and non-disclosure agreement to the level prescribed by the Necsa Chief Security Officer.
All contractors shall report to the Necsa Security Officer at the main entrance gate.
All equipment and tools shall be declared.

FALL PROTECTION	CR 10

Fall risk means any potential exposure to falling either from or into.
Working at heights includes any work that takes place in an elevated position.
The Contractor shall prior to commencement of work, submit to NLM a risk-specific fall protection plan accordance with the Construction Regulations, 2014.
The Fall Protection Plan shall consider all Works where any potential exist to falling **either from or into**, which includes, but are not limited to:

- Heights and Openings;
- Structures that might collapse;
- Ladders and Scaffolding ;
- Walkways above/ Work Access Above and Platforms;
- Roofs/ceilings;
- Slipping and Tripping Hazards;
- Man cages / Hoist cradle to transport people and Rope Access (Boatswains Chair);
- Crane Operations and Lifting Equipment
- Excavations, Confined spaces Manholes/ Shafts (Ventilation Tunnels);
- Weather Conditions and Lighting Conditions;
- Doing demolition work;
- Etc.

Contractors shall—

- designate a competent person to be responsible for the preparation of a fall protection plan;
- ensure that the fall protection plan contemplated in paragraph is implemented, amended where and when necessary and maintained as required; and
- take steps to ensure continued adherence to the fall protection plan.
- ensure a rescue kit is available on site.
- The fall protection plan shall include—
  - a risk assessment of all work carried out from a fall risk position and the procedures and methods used to address all the risks identified per location;
  - the processes for the evaluation of the employees' medical fitness necessary to work at a fall risk position and the records thereof;
  - a programme for the training of employees working from a fall risk position and the records thereof;
  - the procedure addressing the inspection, testing and maintenance of all fall protection equipment; and
  - a rescue plan detailing the necessary procedure, personnel and suitable equipment required to affect a rescue of a person in the event of a fall incident to ensure that the rescue procedure is implemented immediately following the incident.

Contractors shall ensure that a construction manager appointed under regulation 8(1) is in possession of the most recently updated version of the fall protection plan.

STRUCTURES	CR 11

Contractors shall

REQUIREMENT	REFERENCE

- *prevent the uncontrolled collapse of any new or existing structure or any part thereof, which may become unstable or is in a temporary state of weakness or instability due to the carrying out of construction work;*
- *ensure no structure or part of a structure is loaded in a manner which would render it unsafe; and*
- *provide drawings pertaining to the design of the relevant structure are kept on site and are available on request to an inspector, other Contractors, Necsa, the client's agent or employee.*

NLM shall ensure that—

- *inspections are carried out periodically by competent persons in order to render the structure safe for continued use;*
- *that the inspections carried out initially and at least once every six months for the first two years and thereafter yearly or for shorted projects initially and at least once a month ;*
- *the structure is maintained in such a manner that it remains safe for continued use;*
- *the records of inspections and maintenance are kept.*

TEMPORARY WORKS	**CR 12**

Contractors shall appoint a temporary works designer in writing to design, inspect and approve the erected temporary works on site before use.
The designer of temporary works shall ensure that—

- all temporary works are designed so that it will be capable of supporting all anticipated vertical and lateral loads that may be applied;
- the designs of temporary works are done with close reference to the structural design drawings issued by the Contractor, and in the event of any uncertainty consult the Contractor;
- all drawings and calculations pertaining to the design of temporary works are kept at the office of the temporary works designer
- the loads caused by the temporary works and any imposed loads are clearly indicated in the design.

Contractors shall ensure that all temporary works operations are carried out under the supervision of a competent person who has been appointed in writing for that purpose.

Contractors shall ensure that—

- all temporary works structures are adequately erected, supported, braced and maintained by a competent person so that they are capable of supporting all anticipated vertical and lateral loads that may be applied to them, and that no loads are imposed onto the structure that the structure is not designed to withstand;
- all temporary works structures are done with close reference to the structural design drawings, and where any uncertainty exists the structural designer should be consulted;
- detailed activity specific drawings pertaining to the design of temporary works structures are kept on the site and are available on request to an inspector, other Contractors, the client, the client's agent or any employee;
- all persons required to erect, move or dismantle temporary works structures are provided with adequate training and instruction to perform those operations safely;
- all equipment used in temporary works structure are carefully examined and checked for suitability by a competent person, before being used;
- all temporary works structures are inspected by a competent person immediately before, during and after the placement of concrete, after inclement weather or any other imposed load and at least on a daily basis until the temporary works structure has been removed and the results have been

REQUIREMENT	REFERENCE

recorded in a register and made available on site;

- no person may cast concrete, until authorization in writing has been given by the competent person;
- if, after erection, any temporary works structure is found to be damaged or weakened to such a degree that its integrity is affected, it is safely removed or reinforced immediately;
- adequate precautionary measures are taken in order to—
  - secure any deck panels against displacement; and
  - prevent any person from slipping on temporary works due to the application of release agents;
- as far as is reasonably practicable, the health of any person is not affected through the use of solvents or oils or any other similar substances;
- upon casting concrete, the temporary works structure is left in place until the concrete has acquired sufficient strength to safely support its own weight and any imposed load, and is not removed until authorization in writing has been given by the competent person;
- the foundation conditions are suitable to withstand the loads caused by the temporary works structure and any imposed load in accordance with the temporary works design.
- provision is made for safe access by means of secured ladders or staircases for all work to be carried out above the foundation bearing level;
- a temporary works drawing or any other relevant document includes construction sequences and methods statements;
- the temporary works designer has been issued with the latest revision of any relevant structural design drawing;
- a temporary works design and drawing is used only for its intended purpose and for a specific portion of a construction site; and
- the temporary works drawings are approved by the temporary works designer before the erection of any temporary works.

No Contractor may use a temporary works design and drawing for any work other than its intended purpose.

EXCAVATION WORK	CR 13

Contractors shall ensure that all excavation work is carried out under the supervision of a competent person who has been appointed in writing for that purpose; and has evaluate the stability of the ground before excavation work begins.

Contractors who perform excavation work—

- shall take sufficient steps in order to prevent, as far as is reasonably practicable, any person from being buried or trapped by a fall or dislodgement of material in an excavation;
- may not require or permit any person to work in an excavation which has not been adequately shored or braced: Provided that shoring and bracing may not be necessary where—
  - the sides of the excavation are sloped to at least the maximum angle of repose measured relative to the horizontal plane; or
  - such an excavation is in stable material: Provided that—
    (i) permission has been given in writing by the appointed competent person upon evaluation by him or her of the site conditions;
    (ii) and where any uncertainty pertaining to the stability of the soil still exists, the decision from a professional engineer or a professional technologist is decisive and such a decision shall be noted in writing and signed by both the competent person and the professional engineer or technologist, as the case may be;
- shall take steps to ensure that the shoring or bracing is designed and constructed in a manner that renders it strong enough to support the sides of the excavation in question;
- shall ensure that no load, material, plant or equipment is placed or moved near the edge of any

REQUIREMENT	REFERENCE
excavation where it may cause its collapse and consequently endangers the safety of any person, unless precautions such as the provision of sufficient and suitable shoring or bracing are taken to prevent the sides from collapsing; • shall ensure that where the stability of an adjoining building, structure or road is likely to be affected by the making of an excavation, steps are taken to ensure the stability of such building, structure or road and the safety of persons; • shall cause convenient and safe means of access to be provided to every excavation in which persons are required to work, and such access may not be further than six meters from the point where any worker within the excavation is working; • shall ascertain, as far as is reasonably practicable, the location and nature of electricity, water, gas or other similar services which may in any way be affected by the work to be performed, and shall before the commencement of excavation work that may affect any such service, take the steps that are necessary to render the circumstances safe for all persons involved; • shall ensure that every excavation, including all bracing and shoring, is inspected— - daily, prior to the commencement of each shift; - after every blasting operation; - after an unexpected fall of ground; - after damage to supports; and - after rain, by the competent person, in order to ensure the safety of the excavation and of persons, and those results shall be recorded in a register kept on site • shall cause every excavation which is accessible to the public or which is adjacent to public roads or thoroughfares, or whereby the safety of persons may be endangered, to be— - adequately protected by a barrier or fence of at least one meter in height and as close to the excavation as is practicable; and - provided with warning illuminants or any other clearly visible boundary indicators at night or when visibility is poor, or have resort to any other suitable and sufficient precautionary measure • shall ensure that all precautionary measures stipulated for confined spaces as determined in the General Safety Regulations, 2003, are complied with by any person entering any excavation; • shall, where the excavation work involves the use of explosives, appoint a competent person in the use of explosives for excavation, and shall ensure that a method statement is developed by that person in accordance with the applicable explosives legislation; and • shall cause warning signs to be positioned next to an excavation within which or where persons are working or carrying out inspections or tests.	
DEMOLITION WORK	**CR 14**
Demolition work entails *to dismantle, wreck, break, pull down or knock down of a structure or part thereof by way of manual labour, machinery, or the use of explosives.*	
Contractors shall appoint a competent person in writing to supervise and control all demolition work on site. Contractors shall ensure that before any demolition work is carried out, and in order to ascertain the method of demolition to be used, a detailed structural engineering survey of the structure to be demolished is carried out by a competent person and that a method statement on the procedure to be followed in demolishing the structure is developed by that person. During a demolition, the competent person shall check the structural integrity of the structure at intervals determined in the method statement in order to avoid any premature collapses.	

REQUIREMENT	REFERENCE

Contractors who performs demolition work shall—

- with regard to a structure being demolished, take steps to ensure that—
  - no floor, roof or other part of the structure is overloaded with debris or material in a manner which would render it unsafe;
  - all reasonably practicable precautions are taken to avoid the clanger of the structure collapsing when any part of the framing of a framed or partly framed building is removed, or when reinforced concrete is cut; and
  - precautions are taken in the form of adequate shoring or other means that may be necessary to prevent the accidental collapse of any part of the structure or adjoining structure;
- ensure that no person works under overhanging material or a structure which has not been adequately supported, shored or braced;
- ensure that any support, shoring or bracing is designed and constructed so that it is strong enough to support the overhanging material;
- where the stability of an adjoining building, structure or road is likely to be affected by demolition work on a structure, take steps to ensure the stability of such structure or road and the safety of persons;
- ascertain as far as is reasonably practicable the location and nature of electricity, water, gas or other similar services which may in any way be affected by the work to be performed, and shall before the commencement of demolition work that may affect any such service, take the steps that are necessary to render circumstances safe for all persons involved;
- cause every stairwell used and every floor where work is being performed in a building being demolished, to be adequately illuminated by either natural or artificial means;
- cause convenient and safe means of access to be provided to every part of the demolition site in which persons are required to work; and
- erect a catch platform or net above an entrance or passageway or above a place where persons work or pass under, or fence off the danger area if work is being performed above such entrance, passageway, or place so as to ensure that all persons are kept safe where there is a danger or possibility of persons being struck by falling objects.

Contractors shall ensure that no material is dropped to any point, which falls outside the exterior walls of the structure, unless the area is effectively protected.

No person may dispose of waste and debris from a high place by a chute unless the chute—

- is adequately constructed and rigidly fastened;
- if inclined at an angle of more than 45 degrees to the horizontal, is enclosed on its four sides;
- if of the open type, is inclined at an angle of less than 45 degrees to the horizontal;
- where necessary, is fitted with a gate at the bottom end to control the flow of material; and
- discharges into a container or an enclosed area surrounded by barriers

Contractor shall ensure that every chute used to dispose of rubble is designed in such a manner that rubble does not free-fall and that the chute is strong enough to withstand the force of the debris travelling along the chute.

Contractor shall ensure that no equipment is used on floors or working surfaces, unless such floors or surfaces are of sufficient strength to support the imposed loads.

REQUIREMENT	REFERENCE

Where a risk assessment indicates the presence of asbestos, Contractors shall ensure that all asbestos related work is conducted in accordance with the Asbestos Regulations;

Where a risk assessment indicates the presence of lead, Contractors shall ensure that all lead related work is conducted in accordance with the Lead Regulations

Where the demolition work involves the use of explosives, a method statement shall be developed in accordance with the applicable explosives legislation, by an appointed person who is competent in the use of explosives for demolition work and all persons involved in the demolition works shall adhere to demolition procedures issued by the appointed person.

Contractors shall ensure that all waste and debris are as soon as reasonably practicable removed and disposed of from the site in accordance with the applicable legislation

TUNNELING	**CR 15**

No person may enter a tunnel, which has a height dimension of less than 800 millimeters.

SCAFFOLDING	**CR 16 Section 44 of the OHS Act & SHEQ-INS-2140**

Contractors shall appoint a competent person in writing who shall ensure that all scaffolding work operations are carried out under his or her supervision and that all scaffold erectors, team leaders and inspectors are competent to carry out their work.
Contractors using access scaffolding shall ensure that such scaffolding, when in use, ***complies with the safety standards incorporated*** for this purpose into these Regulations under section 44 of the Act:

- ***SABS 085: The South African Bureau of Standards Code of Practice for the Design, Erection, Use and Inspection of Access Scaffolding.***
- All scaffolds shall be inventoried, uniquely numbered, and inspected by a person trained and appointed for that purpose.
- Inspect directly after erection and thereafter weekly.
- Suitable and sufficient guardrails or barriers and toe-boards shall be fitted.
- Scaffolding parts, where applicable, shall be hoisted up or lowered using ropes, or an appropriate alternative, to ensure safe construction and dismantling.

SUSPENDED PLATFORMS:	**CR 17 (2) (3)**

Contractors shall appoint a competent person in writing who shall ensure that all suspended platforms work operations are carried out under his or her supervision and that all suspended platform erectors, operators and inspectors are competent to carry out their work.

No Contractor may use or permit the use of a suspended platform, unless—

- *the design, stability and construction thereof* ***comply with the safety standards incorporated*** *for this purpose into these Regulations under section 44 of the Act, which include:*
  - ***SANS 10085-1:2004: The Design, Erection, Use and Inspection of Access Scaffolding***
  - ***SANS 1903:2007: Safety Requirements on Suspended Access Equipment - Design calculations, stability criteria, construction tests***
  - ***SANS 50363:2003: Personal Protective Equipment against fall from a height - Fall arrest systems****;*
- *he or she is in possession of a certificate of system design issued by a professional engineer, certificated engineer or a professional technologist for the use of the suspended platform system; and*
- *he or she is, before the commencement of the work, in possession of an operational compliance plan developed by a competent person based on the certificate of system design and applicable to the environment in which the system is being used, which operational compliance*

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plan shall include proof of the—

- *appointment of the competent person*
- *competency of erectors, operators and inspectors;*
- *operational design calculations, which shall comply with the requirements of the system design certificate;*
- *performance test results;*
- *sketches indicating the completed system with the operational loading capacity of the platform;*
- *procedures for and records of inspections having been carried out; and*
- *procedures for and records of maintenance work having been carried out.*

Contractors making use of a suspended platform system shall submit a copy of the certificate of system design, including a copy of the operational design calculations, sketches and test results, to the provincial director before commencement of the use of the system and shall further indicate the intended type of work that the system will be used for.

Contractors shall submit a copy of the certificate of system design for every new project.

Contractors shall ensure that the outriggers of each suspended platform—

- *are constructed of material of adequate strength and have a safety factor of at least four in relation to the load it is to carry; and*
- *have suspension points provided with stop devices or other effective devices at the outer ends to prevent the displacement of ropes.*

Contractors shall ensure that—

- *the parts of the building or structure on which the outriggers of a suspended platform are supported, are checked by means of calculations to ensure that the required safety factor is adhered to without risk of damage to the building or structure;*
- *the suspension wire rope and the safety wire rope are separately connected to the outrigger;*
- *each person on a suspended platform is provided with and wears a body harness as a fall prevention device, which shall at all times be attached to the suspended platform;*
- *the hand or power driven machinery to be used for the lifting or lowering of the working platform of a suspended platform is constructed and maintained in such a manner that an uncontrolled movement of the working platform cannot occur;*
- *the machinery is so situated that it is easily accessible for inspection;*
- *the rope connections to the outriggers are vertically above the connections to the working platform; and*
- *when the working platform is suspended by two ropes only, the connections of the ropes to the working platform are of a height above the level of the working platform to ensure the stability of the working platform.*

Contractors shall ensure that a suspended platform—

- *is suspended as near as possible to the structure to which work is being done to prevent as far as is reasonably practicable horizontal movement away from the face of the structure;*
- *is fitted with anchorage points to which workers shall attach the lanyard of the safety harness worn and used by the worker, and such anchorage connections shall have sufficient strength to withstand any potential load applied to it; and*
- *is fitted with a conspicuous notice easily understandable by all workers working with the suspended platform, showing—*
  - *the maximum mass load;*

REQUIREMENT	REFERENCE

- *the maximum number of persons; and*
- *the maximum total mass load, including load and persons, which the suspended platform can carry.*

Contractors shall cause—

- *the whole installation and all working parts of a suspended platform to be thoroughly examined by a competent person in accordance with the manufacturer's specification;*
- *the whole installation to be subjected to a performance test as determined by the standard to which the suspended platform was manufactured;*
- *the performance test to be done by a competent person appointed in writing, with the knowledge and experience of erection and maintenance of suspended platforms or similar machinery, and who shall determine the serviceability of the structures, ropes, machinery and safety devices before they are used, every time suspended platforms are erected; and*
- *the performance test of the whole installation of the suspended platform to be subjected to a load equal to that prescribed by the manufacturer or, in the absence of such load, to a load of 110 per cent of the rated mass load, at intervals not exceeding 12 months and in such a manner that every part of the installation is stressed accordingly.*

Contractors shall, cause every hoisting rope, hook or other load-attaching device which forms part of the suspended platform to be thoroughly examined in accordance with the manufacturer's specification by the competent person before they are used every time they are assembled, and, in cases of continuous use, at intervals not exceeding three months.

Contractors shall ensure that the suspended platform supervisor, or the suspended platform inspector, carries out a daily inspection of all the equipment prior to use, including establishing whether—

- *all connection bolts are secure;*
- *all safety devices are functioning;*
- *all safety devices are not tampered with or vandalized;*
- *the total maximum mass load of the platform is not exceeded;*
- *the occupants in the suspended platform are using body harnesses which have been properly attached;*
- *there are no visible signs of damage to the equipment; and*
- *all reported operating problems have been attended to.*

Contractors shall ensure that all inspection and performance test records are kept on the construction site at all times and made available to an inspector, the client, the client's agent or any employee upon request.

Contractors shall ensure that all employees required to work or to be supported on a suspended platform are—

- *medically fit to work safely in a fall risk position or such similar environment by being in possession of a medical certificate of fitness;*
- *competent in conducting work related to suspended platforms safely;*
- *trained or received training, which includes at least—*
- *how to access and egress the suspended platform safely;*
- *how to correctly operate the controls and safety devices of the equipment;*
- *information on the dangers related to the misuse of safety devices; and*
- *information on the procedures to be followed in the case of—*
- *an emergency;*
- *the malfunctioning of equipment; and*
- *the discovery of a suspected defect in the equipment; and*

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- *instructions on the proper use of body harnesses.*

Contractors shall ensure that where the outriggers of a suspended platform are to be moved, only persons trained and under the supervision of the competent person effect such move, within the limitation stipulated in the operational compliance plan, and that the supervisor shall carry out an inspection and record the result thereof prior to re-use of the suspended platform.

Contractors shall ensure that the suspended platform is properly isolated after use at the end of each working day in such a manner that no part of the suspended platform presents a danger to any person thereafter.

ROPE ACCESS WORK (BOATSWAINS CHAIR)	**CR 18 & SHEQ-INS-2140**

Contractors shall-

- appoint a competent person in writing as a rope access supervisor with the duty of supervising all rope access work on the site, including the duty of ensuring occupational H&S compliance in relation to rope access work:
  Provided that the appointment of any such person does not relieve the construction manager of any personal accountability for failing in his management duties in terms of this regulation;
- ensure that all rope access work on the construction site is carried out under the supervision of a competent person; and
- ensure that all rope access operators are competent and licensed to carry out their work.

No Contractor may use or allow the use of rope access work unless—

- the design, selection and use of the equipment and anchors comply with the safety standards incorporated for this purpose into these Regulations under section 44 of the Act; and
- he or she is in possession of a site specific fall protection plan developed by a competent person applicable to the specific work and environment prior to the commencement of the work, including records of maintenance and inspections of all the equipment used for the work operations.

Contractors shall ensure that adequate measures are in place to allow rescue procedures to commence immediately in the event of a fall incident taking place.

See Government Gazette no 27292 dated 2005/02/18: Incorporation of National Code of Practice for the Evaluation of Training Providers for Lifting Machine Operators

- ***Government Gazette no 27305 dated 2005/02/18 for the Registration of Entities performing load testing on all lifting machines and Lifting Machinery Inspectors with Department of Labour and ECSA***

MATERIAL HOIST INSPECTIONS	**CR 19 & SHEQ-INS-2140, & SHEQ-INS-2180**

Contractors shall ensure that every material hoist and its tower have been constructed in accordance with the generally accepted technical standards and are strong enough and free from defects.

See Government Gazette no 27292 dated 2005/02/18: Incorporation of National Code of Practice for the Evaluation of Training Providers for Lifting Machine Operators

- ***Government Gazette no 27305 dated 2005/02/18 for the Registration of Entities performing load testing on all lifting machines and Lifting Machinery Inspectors with Department of Labour and ECSA***

Contractors shall ensure that the tower of every material hoist is—

- erected on firm foundations and secured to the structure or braced by steel wire guy ropes, and

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extends to a distance above the highest landing to allow a clear and unobstructed space of at least 900 millimeter's for over travel;

- enclosed on all sides at the bottom, and at all floors where persons are at risk of being struck by moving parts of the hoist, except on the side or sides giving access to the material hoist, with walls or other effective means to a height of at least 2100 millimeters from the ground or floor level; and
- provided with a door or gate at least 2100 millimeters in height at each landing, and that door or gate shall be kept closed except when the platform is at rest at such a landing.

Contractors shall cause—

- the platform of every material hoist to be designed in a manner that it safely contains the loads being conveyed and that the combined mass of the platform and the load does not exceed the designed lifting capacity of the hoist;
- the hoisting rope of every material hoist which has a remote winch to be effectively protected from damage by any external cause to the portion of the hoisting rope between the winch and the tower of the hoist; and
- every material hoist to be provided with an efficient brake capable of holding the platform with its maximum load in any position when power is not being supplied to the hoisting machinery.

No Contractor may require or permit trucks, barrows or material to be conveyed on the platform of a material hoist and no person may so convey trucks, barrows or material unless those articles are secured or contained in a manner that displacement thereof cannot take place during movement.

Contractors shall cause a notice, indicating the maximum mass load which may be carried at any one time and the prohibition of persons from riding on the platform of the material hoist, to be affixed around the base of the tower and at each landing.

Contractors of a material hoist may not require or permit any person to operate a hoist, unless the person is competent in the operation of that hoist.

No Contractor may require or permit any person to ride on a material hoist.
Contractors shall ensure that every material hoist—

- is inspected on daily basis by a competent person appointed in writing by the Contractor and such competent person shall have the experience pertaining to the erection and maintenance of material hoists or similar machinery;
- inspection, includes the determination of the serviceability of the entire material hoist, including guides, ropes and their connections, drums, sheaves or pulleys and all safety devices;
- inspection results are entered and signed in a record book by a competent person, which book shall be kept on the premises for that purpose; is properly maintained and the maintenance records in this regard are kept on site

BULK MIXING PLANT	CR 20

Contractors shall ensure that the operation of a bulk mixing plant is supervised by a competent person who has been appointed in writing and is—

- aware of all the dangers involved in the operation thereof; and
- conversant with the precautionary measures to be taken in the interest of H&S.

No person supervising or operating a bulk mixing plant may authorize any other person to operate the plant, unless that person is competent to operate a bulk mixing plant.

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Contractors shall ensure that the placement and erection of a bulk mixing plant complies with the requirements set out by the manufacturer and that such plant is erected as designed.

Contractors shall ensure that all devices to start and stop a bulk mixing plant are provided and that those devices are-

- placed in an easily accessible position; and
- constructed in a manner to prevent accidental starting.

Contractors shall ensure that the machinery and plant selected is suitable for the mixing task and that all dangerous moving parts of a mixer are placed beyond the reach of persons by means of doors, covers or other similar means.

No person may remove or modify any guard or safety equipment relating to a bulk mixing plant, unless authorized to do so by the appointed person.

Contractors shall ensure that all precautionary measures stipulated for confined spaces as determined in the General Safety Regulations, 2003, are complied with when entering any silo.

Contractors shall ensure that a record is kept of all repairs or maintenance to a bulk mixing plant and that the record is available on site to an inspector, the client, the client's agent or any employee.

EXPLOSIVE ACTUAL FASTENING DEVICE	CR 21

No Contractor may use or permit any person to use an explosive actuated fastening device, unless—

- the user is provided with and uses suitable protective equipment;
- the user is trained in the operation, maintenance and use of such a device;
- the explosive actuated fastening device is provided with a protective guard around the muzzle end, which effectively confines any flying fragments or particles; and
- the firing mechanism is so designed that the explosive actuated fastening device, will not function unless—
  - it is held against the surface with a force of at least twice its weight; and
  - the angle of inclination of the barrel to the work surface is not more than 15 degrees from a right angle.

Contractors shall ensure that—

- only cartridges suited for the relevant explosive actuated fastening device, and the work to be performed, are used;
- an explosive actuated fastening device is cleaned and examined daily before use and as often as may be necessary for its safe operation by a competent person who has been appointed for that purpose;
- the safety devices of an explosive actuated fastening device are in good working order prior to use;
- when not in use, an explosive actuated fastening device and its cartridges are locked up in a safe place, which is inaccessible to unauthorized persons;
- an explosive actuated fastening device is not stored in a loaded condition;
- a warning notice is displayed in a conspicuous manner in the immediate vicinity wherever an explosive actuated fastening device is used; and
- the issuing and collection of cartridges and nails or studs of an explosive actuated fastening device are—
  - controlled and done in writing by a person having been appointed in writing for that purpose; and
  - recorded in a register by a competent person and that the recipient has accordingly signed

REQUIREMENT	REFERENCE

for the receipt thereof as well as the returning of any spent and unspent cartridges.

CRANES:	**CR 22 ALSO DRIVEN MACINE REGULATIONS 1988 & SHEQ-INS-2140, & SHEQ-INS-2180**

- ***See Government Gazette no 27292 dated 2005/02/18: Incorporation of National Code of Practice for the Evaluation of Training Providers for Lifting Machine Operators* into DMR(18)**
- ***Government Gazette no 27305 dated 2005/02/18 for the Registration of Entities performing load testing on all lifting machines and Lifting Machinery Inspectors with Department of Labour and ECSA***
- ***NOSA system, element 2.18***

Contractors shall, in addition to compliance with the Driven Machinery Regulations, 2015 ensure that where tower cranes are used—

- shall be designed and erected under the supervision of a competent person;
- a relevant risk assessment and method statement are developed and applied;
- the effects of wind forces on the crane are taken into consideration and that a wind speed device is fitted that provides the operator with an audible warning when the wind speed exceeds the design engineer's specification;
- the bases for the tower cranes and tracks for rail-mounted tower cranes are firm, level and secured;
- tower crane operators are competent to carry out the work safely; and
- the tower crane operators have a medical certificate of fitness to work in such an environment, issued by an occupational health practitioner in the form of Annexure 3.

CONSTRUCTION VEHICLE AND MOBILE PLANT	**CR 23**

Contractors shall ensure that all construction vehicles and mobile plant—

- are of an acceptable design and construction;
- are maintained in a good working order;
- are used in accordance with their design and the intention for which they were designed, having due regard to safety and health;
- are operated by a person who—
  - has received appropriate training, is certified competent and in possession of proof of competency and is authorised in writing to operate those construction vehicles and mobile plant;
  - has a medical certificate of fitness to operate those construction vehicles and mobile plant, issued by an occupational health practitioner in the form of Annexure 3.;
  - have safe and suitable means of access and egress;
  - are properly organized and controlled in any work situation by providing adequate signaling or other control arrangements to guard against the dangers relating to the movement of vehicles and plant, in order to ensure their continued safe operation;
  - are prevented from falling into excavations, water or any other area lower than the working surface by installing adequate edge protection, which may include guardrails and crash barriers;
  - are fitted with structures designed to protect the operator from falling material or from being crushed should the vehicle or mobile plant overturn;
  - are equipped with an acoustic warning device which can be activated by the operator;
  - are equipped with an automatic acoustic reversing alarm;
  - are inspected by the authorised operator or driver on a daily basis using a relevant checklist prior to use and that the findings of such inspection are recorded in a register kept in the

REQUIREMENT	REFERENCE
construction vehicle or mobile plant. Contractors shall ensure that— • no person rides or is required or permitted to ride on a construction vehicle or mobile plant otherwise than in a safe place provided thereon for that purpose; • every construction site is organized in such a way that, as far as is reasonably practicable, pedestrians and vehicles can move safely and without risks to health; • the traffic routes are suitable for the persons, construction vehicles or mobile plant using them, are sufficient in number, in suitable positions and of sufficient size; • every traffic route is, where necessary, indicated by suitable signs; • all construction vehicles and mobile plant left unattended at night, adjacent to a public road in normal use or adjacent to construction areas where work is in progress, have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, in order to identify the location of the vehicles or plant; • all construction vehicles or mobile plant when not in use, have buckets, booms or similar appendages, fully lowered or blocked, controls in a neutral position, motors stopped, wheels chocked, brakes set and ignition secured; • whenever visibility conditions warrant additional lighting, all mobile plant are equipped with at least two headlights and two taillights when in operation; • tools, material and equipment are secured and separated by means of a physical barrier in order to prevent movement when transported in the same compartment with employees; • vehicles used to transport employees have seats firmly secured and adequate for the number of employees to be carried; and • all construction vehicles or mobile plant traveling, working or operating on public roads comply with the requirements of the National Road Traffic Act, 1996.	
ELECTRICAL INSTALLATIONS AND MACHINERY	**CR 24, Electrical Machine Regulations, 1988, Electrical Regulations 2009**
Safety Standards incorporated into Electrical Machinery Regulations by Government Regulation No R1594 ***SANS10086-1:2003: The Installation, Inspection and Maintenance of Equipment used in Explosive Atmospheres*** ***SANS 10108:2005: The Classification of Hazardous Locations and the Selection of Electrical Apparatus for Use in Such Locations*** ***SANS 10142-1: 2008: The Wiring of Premises*** Contractors shall, in addition to compliance with the Electrical Installation Regulations, 2009, and the Electrical Machinery Regulations, 1988, promulgated by Government Notice No. R. 1593 of 12 August 1988, ensure that— • before construction commences and during the progress thereof, adequate steps are taken to ascertain the presence of and guard against danger to workers from any electrical cable or apparatus which is under, over or on the site; • all parts of electrical installations and machinery are of adequate strength to withstand the working conditions on construction sites; • the control of all temporary electrical installations on the construction site is designated to a competent person who has been appointed in writing for that purpose; • all temporary electrical installations used by the Contractor are inspected at least once a week by a competent person and the inspection findings are recorded in a register kept on the construction site; and	

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• all electrical machinery is inspected by the authorized operator or user on a daily basis using a relevant checklist prior to use and the inspection findings are recorded in a register kept on the construction site. ***LOCKOUT SYSTEMS - ELECTRICAL!*** *A system of control shall be established in order that no unauthorized person can energize a circuit, open a valve, or activate a machine on which people are working or doing maintenance, even if equipment, plant or machinery is out of commission for any period, thus eliminating injuries and damage to people and equipment as far as is reasonably practicable.* *Physical/mechanical lock-out systems shall be part of the safety system and included in training. Lockouts shall be tagged and the system tested before commencing with any work or repairs*	
USE AND TEMPORARY STORAGE OF FLAMMEBLE LIQUIDS	**CR 25, and General Safety Regulations, 2003**
Hazardous Substances Act (Act 15 of 1973) - ***Group II Hazardous Substances: Appendices*** - ***SANS 10089-1:2008 - Storage and distribution of petroleum products in above-ground bulk installations*** - ***SANS 10108:2005 - Code of practice for the classification of hazardous locations and the selection of electrical apparatus for use in such locations*** - ***SANS 1186:2008 - Symbolic Safety Signs*** - ***SANS 1253:2003 - Fire-door assemblies*** - ***SANS 10400-T:2011 - National Building Regulations*** A contactor shall, in addition to compliance with the provisions for the use and storage of flammable liquids in the General Safety Regulations, 2003, ensure that— • where flammable liquids are being used, applied or stored at the workplace concerned, it is done in a manner that does not cause a fire or explosion hazard, and that the workplace is effectively ventilated; • no person smokes in any place in which flammable liquid is used or stored, and the Contractor shall affix a suitable and conspicuous notice at all entrances to any such areas prohibiting such smoking; • an adequate amount of efficient fire-fighting equipment is installed in suitable locations around the flammable liquids store with the recognized symbolic signs; • only the quantity of flammable liquid needed for work on one day is taken out of the store for use; • all containers holding flammable liquids are kept tightly closed when not in actual use and, after their contents have been used up, are removed from the construction site and safely disposed of; • where flammable liquids are decanted, the metal containers are bonded and earthed; and • no flammable material, including cotton waste, paper, cleaning rags or similar material is stored together with flammable liquids.	
WATER ENVIRONMENTS	**CR (26)**
Contractors shall ensure that where construction work is done over or in close proximity to water, provision is made for— • preventing persons from falling into water; and • the rescuing of persons in danger of drowning. Contractors shall ensure that where a person is exposed to the risk of drowning by falling into the water, the person is provided with and wears a lifejacket.	
HOUSEKEEPING AND GENERAL SAFEGUARDING ON CONSTRUCTION SITES	**CR (27)**

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Also see

- ***SANS 10140: Identification Colour Marking***
- ***SANS 10142: The Wiring of Premises***

Good housekeeping shall be maintained at all times as per Construction Regulation No. 27. Poor housekeeping contributes to three major problems, namely, costly or increased accidents, fire or fire hazards and reduction in production. Good housekeeping will enhance production time.
Particular emphasis is to be placed on the following crucial elements of a construction site:

- *Phase priorities and production/plant layout*
- *Enclosures*
- *Pits, openings and shoring*
- *Storage facilities*
- *Effective, sufficient and maintained lighting or illumination*
- *Principal sources of injuries e.g. stairways, runways, ramps, loose building material*
- *Oil, grease, water, waste, rubble, glass, storm water*
- *Colour coding*
- *Demarcations*
- *Pollution*
- *Waste disposal*
- *Ablution and hygiene facilities*
- *First aid*

This list must not be taken to be exclusive or exhaustive!
In promotion of environmental control all waste, rubble, scrap etc., will be disposed of at a registered dump site and records will be maintained. Where it is found to be impractical to use a registered dump site or it is not available, the Principal Contractor will ensure that the matter is brought to record with the client or his representative, after which suitable, acceptable alternatives will be sought and applied.
Dross and refuse from metals, and waste matters or by-products whose nature is such that they are poisonous or capable of fermentation, putrefaction or constituting a nuisance shall be treated or disposed of by methods approved of by an inspector.

NOTE: No employer (Principal Contractor) shall require or permit any person to work at night or after hours unless there is adequate, suitable artificial lighting including support services in respect of Health and Safety.

Contractors shall, ensure that suitable housekeeping is continuously implemented on each construction site, including—

- the proper storage of materials and equipment;
- the removal of scrap, waste and debris at appropriate intervals;
- ensuring that materials required for use, are not placed on the site so as to obstruct means of access to and egress from workplaces and passageways;
- ensuring that materials which are no longer required for use, do not accumulate on and are removed from the site at appropriate intervals;
- ensuring that waste and debris are not disposed of from a high place with a chute, unless the chute complies with the requirements set out in regulation 14(6);
- ensuring that construction sites in built-up areas adjacent to a public way are suitably and sufficiently fenced off and provided with controlled access points to prevent the entry of unauthorized persons; and

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- ensuring that a catch platform or net is erected above an entrance or passageway or above a place where persons work or pass under, or fencing off the danger area if work is being performed above such entrance, passageway, or place so as to ensure that all persons are kept safe in the case of danger or possibility of persons being struck by falling objects.

STACKING AND STORAGE ON CONSTRUCTION SITES — **CR (28)**

Contractors shall, in addition to compliance with the provisions for the stacking of articles in the General Safety Regulations, 2003, ensure that—

- a competent person is appointed in writing with the duty of supervising all stacking and storage on a construction site;
- adequate storage areas are provided;
- there are demarcated storage areas; and
- storage areas are kept neat and under control.

FIRE PRECAUTIONS ON CONSTRUCTION SITES — **CR (29)**

Contractors shall, in addition to compliance with:

- the Environmental Regulations for Workplaces, 1987,
- SANS 10400-T:2011 - The Application of the National Building Regulations Part T: Fire Protection and
- SANS 10105-1:2010 - The Use and Control of Fire-fighting Equipment Part 1: Portable and Wheeled (Mobile) Fire Extinguishers

ensure that—

- all appropriate measures are taken to avoid the risk of fire;
- sufficient and suitable storage is provided for flammable liquids, solids and gases;
- smoking is prohibited and notices in this regard are prominently displayed in all places containing readily combustible or flammable materials;
- in confined spaces and other places in which flammable gases, vapours or dust can cause danger
- **only suitably protected electrical installations and equipment,** including
  - portable lights, are used;
  - there are no flames or similar means of ignition;
  - there are conspicuous notices prohibiting smoking;
  - oily rags, waste and other substances liable to ignite are without delay removed to a safe place; and (v) adequate ventilation is provided;
- combustible materials do not accumulate on the construction site;
- welding, flame cutting and other hot work are done only after appropriate precautions have been taken to reduce the risk of fire;
- suitable and sufficient fire-extinguishing equipment is placed at strategic locations or as may be recommended by the Fire Chief or local authority concerned, and that such equipment is maintained in a good working order;
- the fire equipment is inspected by a competent person, who has been appointed in writing for that purpose, in the manner indicated by the manufacturer thereof;
- a sufficient number of workers are trained in the use of fire- extinguishing equipment;
- where appropriate, suitable visual signs are provided to clearly indicate the escape routes in the case of a fire;
- the means of escape is kept clear at all times;
- there is an effective evacuation plan providing for all—
  - persons to be evacuated speedily without panic;

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- persons to be accounted for; and - plant and processes to be shut down; and a siren is installed and sounded in the event of a fire.	
CONSTRUCTION EMPLOYEES' FACILITIES	**CR (30)**
Contractors shall provide the following clean, hygienic and maintained facilities: • Shower facilities after consultation with the employees or employees representatives, or at least one shower facility for every 15 persons; • at least one sanitary facility for each sex and for every 30 workers; • changing facilities for each sex; and • Sheltered eating areas. Contractors shall provide reasonable and suitable living accommodation for the workers at construction sites who are far removed from their homes and where adequate transportation between the site and their homes, or other suitable living accommodation, is not available.	
CONSTRUCTION H&S TECHNICAL COMMITTEE	**CR (31)**
NA	
APPROVED INSPECTION AUTHORITY	**CR (31)**
NA	
PROTECTION OF THE CONSTRUCTION AND THE CONSTRUCTION SITE/ SHEQ-INS-8950	
The Necsa Security and Information Security Officers shall assess the risks associated with the construction and determine or verify the: • Security Categorization of the completed installation; and • Information Security Classification and prescribe physical security, and information security measures for the construction site. The Chief Security Officer and Information Security Officer shall implement a control process to ensure compliance before and during construction. The above mentioned (including schedule for compliance verification audits) shall be documented and approved by the Project Leader or NLM Responsible Manager. The Chief Security officer shall prescribe and implement a communication process with the Security Services i.r.o. employees whose contracts are terminated or expired to ensure compliance with NLM's and Construction Site access control requirements.	
ACCESS PERMITS & PHYSICAL SECURITY	**SHEQ-INS-8950**
The Contractor shall ensure that access to site works is restricted to construction personnel only. Access to the NLM facility or site shall be by NLM authorization on a prescribed form. A site visit register shall be kept on site for workers and visitors and steps are to be taken to ensure that all visitors sign the visitors register before entering the site. A sign should be provided directing all visitors to report to the site officer.	
SITE OH&S RULES	
The Principal Contractor shall develop a set of site-specific Health and Safety Rules that will be applied to regulate the Health and Safety Plan and associated aspects of the construction project. *When required for a site by law, visitors and non-employees upon entering the site shall be issued with the proper Personal Protective Equipment (PPE) as and when necessary.*	

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Security Arrangements

- *The Principal Contractor shall establish site access rules and implement and maintain these throughout the construction period. Access control shall include the rule that non-employees shall at all times be provided with fulltime supervision while on site.*
- *Additional Access Rules may be imposed by the Project Manager or Client Agent in the interest of the safety of NLM employees, visitors and customers.*
- *The Principal Contractor shall develop a set of Security rules and procedures for their allocated site and maintain these throughout the construction period. These security rules shall be submitted to NLM for approval. Additional security measures or rules may be specified for risk minimisation purposes.*
- *If not already tasked to the H&S Officer appointed in terms of Construction Regulation 8(6), the Principal Contractor shall appoint a competent Emergency Controller who shall develop contingency plans for any emergency that may arise on site as indicated by the risk assessments. These shall include a monthly practice/testing programme for the plans and practiced/tested with all persons on site at the time, participating.*

PPE & PPE ISSUE REGISTER	Section 2 of the OHS Act

The contractor shall ensure that he complies with:

- The General Safety Regulations, Section 2 of the OHS Act, which stipulate the issuing and maintenance of PPE;
- SABS standards, ANSI Z87.1: 2010: Practice for Occupational and Educational Eye and Face Protection
- SANS 1404 Part III –2007: Safety Glasses and
- SANS- 50363: 2003: Personal Protective Equipment Against Fall from a Height – Fall Arrest Systems

The procedures for issuing of PPE shall be indicated in the H&S Plan, as well as enforcement of the wearing thereof.

The Principal Contractor shall ensure that all persons working or visiting the NLM Facility or site are equipped with appropriate H&S equipment (PPE) to reduce the risks of injury or illness as a result of their visit, duties or exposure to the construction site and conditions. Compliance with these requirements will be achieved as follows:

- The Contractor shall provide PPE.
- The Contractor shall through the HIRA process identify the specific PPE needs per activity and then issue the PPE accordingly. (Reference to the OHSAct General Safety Regulation 2 Employer to provide Personal Protective Equipment)
- Should PPE be lost or stolen, then the employee will be issued with a new set of PPE by the Principal Contractor / Contractor.
- The Contractor shall ensure adequate training in the use of PPE is provided to all employees, and proof of training shall be kept at the office for auditing purposes.
- PPE shall be provided to visitors as well.
- All employees, once completing the safety induction course, will be issued with identified PPE to wear at all times while working on site;
- All other PPE and PPC necessary in terms of the Risk Assessments and Methods Statements for particular tasks shall be made available to those employees or visitors directly involved in or affected by the task, for the duration of the task. In the event that the equipment may be safely used by others without posing a hygiene risk, the equipment shall be returned by the employee or visitor on completion of the task;
- The Safety Officer will make weekly inspections of the condition of PPE issued and in use on the site. In the event that the equipment is no longer suitable for providing protection, it shall be withdrawn from the employee and a replacement issued;
- Any person found not to be wearing appropriate PPE **shall** be removed from site and disciplined in

REQUIREMENT	REFERENCE

accordance with their employer's disciplinary procedures;

- A register of all PPE issued during the construction work will be maintained; and a budget for the provision of PPE will be drawn up and presented to Necsa as part of the overall quote/tender cost calculated for H&S.
- PPE for protection against radiological hazards will be provided by NLM.

TOOLS AND EQUIPMENT REGISTERS

PLANT & EQUIPMENT VERIFICATION — **Regulation 21**

General

All plant and construction vehicles:

- Shall be of an acceptable design and construction;
- Shall be maintained in a good working order;
- Shall be used in accordance with their design and the intention for which they were designed, having due regard to safety and health;
- Shall be operated by workers who -
  - Have received appropriate training, have been certified competent and been authorised to operate such machinery;
  - Are physically and psychologically fit to operate such construction vehicles and mobile plant by being in possession of a medical certificate of fitness;
  - Have safe and suitable means of access;
  - Where appropriate, are fitted with structures designed to protect the operator from falling material or from being crushed should the vehicle or mobile plant overturn;
  - Are equipped with an electrically operated acoustic signalling device and a reversing alarm; and
  - Are inspected on a daily basis prior to use, by a competent person who has been appointed in writing and the findings of such inspection are recorded in a register.

DOCUMENTATION

The following documentation is provided and appended hereafter to confirm compliance with the Regulations in terms of plant and equipment

- Register of Plant and Equipment used;
- Register of Approved Operators;
- Copies of Certificates of Training for Operators;
- Copies of Public Driving Permits for use on public roads;
- Records of Daily Inspections for Plant and Equipment;
- Statutory Inspections on equipment;
- Proof of Medical fitness of operators.

HIRED PLANT AND MACHINERY

The Contractor shall ensure the following criteria are adhered to when considering hired plant and machinery:

- Hired plant shall be checked for safety compliance prior to being accepted for use on site, should a deviation be identified, NLM reserves the right to order the removal of such equipment from site.
- Should hired equipment be accompanied by an operator, The Contractor shall ensure that the operator's competency be verified and the operator undergoes an induction training session.
- The Contractor shall ensure the operators of hired plant attend weekly toolbox talks in conjunction with The Contractor site personnel.
- The Contractor shall ensure that all operators are equipped with the required PPE before commencing work on site.

TRANSPORT OF EMPLOYEES

REQUIREMENT	REFERENCE
• Should it be necessary for the Contractor to transport their personnel to site, only safe vehicular transport shall be provided. • This shall include proper seating, side restraints and cover. • No personnel shall be permitted to travel on any plant or equipment on the site works. • Road safety principles shall be adhered to on and off site. • The HSP shall detail the arrangements and methods of transportation of workers.	
ROAD TRAFFIC REGULATIONS	
• All motor vehicles operated by contractors/sub-contractors shall, shall comply with the Road Traffic Ordinance, Ord. 21 of 1966 and regulations framed thereunder. All vehicles shall be inspected daily and shall not be used unless they meet the required roadworthy condition. • Drivers shall strictly obey all road traffic signs on Necsa property and give clear and recognised signals of their intentions whilst operating a vehicle. • Drivers and passengers shall wear seatbelts at all times while driving on Necsa property and if found guilty of such offence will be subject to Necsa system of enforcing of SHE Rules. • The Contractor ensures that no passengers are transported on the back of LDV's (bakkies) or trucks within the boundaries of the Necsa property. Failure to adhere will result in access onto the Employer's property being denied. • Vehicles shall not be overloaded. Drivers shall be held responsible for the observance of this regulation. • Drivers shall be responsible for the travel-worthiness of all loads conveyed by them. Precautions shall be taken to lash all loads properly. • Persons and material shall not be transported simultaneously as such material may move in transit and injure passengers.	
WASTE MANAGEMENT	
All waste shall be effectively managed and controlled in accordance with the NLM Waste Management System as identified for the project. Skips, bins and demarcated areas shall be available within the hoarded site area. Waste shall as far as possible be separated, i.e. plastics, paper, glass, rubble, etc. and shall be placed in separate containers or in separate temporary storage areas. No chemicals shall be disposed of into waste containers. No waste shall be accumulated on site.	
INCIDENT MANAGEMENT	
EMERGENCY & EVACUATION PROCEDURE The Contractor will adhere to the requirements as specified in the evacuation plan already in place on Necsa premises.	
EMERGENCY CONTACT DETAILS A list of all emergency functionaries, telephone numbers and addresses will be displayed at the construction site.	
SAFETY SIGNAGE • The Contractor shall assess the H&S Signage requirements in conjunction with the HIRA conducted and place the signage at strategic positions on the site works accordingly. • The Contractor shall also maintain the signage to ensure its effectiveness at all times and under all conditions. • Signage, which cannot be repaired, shall be replaced.	
FIRST AID • All First-Aiders will be appointed in writing, after successfully completed at least the Level 1 First-Aid	

REQUIREMENT	REFERENCE

Training Course.

- The First-Aiders shall be a permanent member of the site team and shall be uniquely identified.
- Where five (or part thereof) employees are employed or working, the Contractor shall provide a first aid box, with as an absolute minimum, the contents as contemplated in the General Safety regulations, including a neck brace.
- All Contractors working at heights shall also have at least one spine board with straps and neck brace available at all working areas.

FIRST AID BOX AND CONTENTS

- *The Contractor shall ensure that the first aid box is adequately stocked in accordance with the General Safety Regulations, Annexure, Regulation 3 of the Act at all times and is accessible to all.*
- The First Aid attendant shall be trained in accordance with the requirements set out in the Act with a recognized and accredited service provider.
- NLM shall inspect the contents of the first aid box and dressing record from time to time
- The Contractor may make use of the NLM Emergency Team for assistance.

SHE REP INVESTIGATIONS & SHE MEETING MINUTES

- The Contractor shall participate in NLM's H&S committee meeting if one is held during the duration of the project.
- All members required to be in attendance shall be notified of such a meeting by means of a formal agenda which will be made available by the Client.
- NLM shall ensure an attendance register and minutes are kept for auditing purposes.
- A copy of all minutes will be given to the Principal Contractor.

ACCIDENT AND INCIDENT REPORTING AND INVESTIGATION:

The Principal Contractor is responsible to oversee the investigation of all incidents. This will include first aid, medical treatment by a doctor and hospital or clinic cases. (General Administrative Regulation 9)
All incidents shall be recorded in the Accident/Incident Register. (General Administrative Regulation 9).
The Principal Contractor is responsible for the investigation of all incidents as described in Section 24 (1) (b) & (c) of the Act and keeping a record of the results of such investigations including the corrective action to prevent similar incidents in future.
The Principal Contractor is responsible for the investigation of all road traffic accidents relating to the construction site and keeping a record of the results of such investigations including the steps taken to prevent similar accidents in future.
Notwithstanding the requirements of Section 24 of the Act, All incidents shall be investigated and reported on in writing, irrespective of whether such incident gave rise to injury or damage.

The Principal Contractor shall report all incidents where an employee is injured on duty to the extent that he/she:

- *Dies;*
- *becomes unconscious;*
- *loses a limb or part of a limb;*
- *is injured or becomes ill to such a degree that he/she is likely either to die or to suffer a permanent physical defect or likely to be unable for a period of at least 14 days either to work or continue with the activity for which he/she was usually employed.*

or where:

- *a major incident occurred;*
- *the health or safety of any person was endangered (this could be a near miss) and*
- *where a dangerous substance was spilled;*
- *the uncontrolled release of any substance under pressure took place;*

REQUIREMENT	REFERENCE

- *machinery or any part of machinery fractured or failed resulting in flying, falling or uncontrolled moving objects;*
- *machinery ran out of control,*

to the Provincial Director of the Department of Labour within seven days and at the same time to NLM or its Agent.

- All events (injuries, illness and environmental incidents) shall be reported immediately to the NLM Safety Officer.
- All at risk behaviours, at risk conditions and near misses shall also be reported.
- The Contractor in co-operation of Necsa shall conduct an investigation into the event
- The Contractor shall appoint a competent person in writing to conduct the investigation.
- The results of all investigations shall be communicated to the employees engaged through incident recall and prescribed meetings.
- Investigations shall be kept for record purposes
- The NLM Safety Officer shall be notified immediately of the occurrence.
- NLM reserves the right to participate in all investigations into incidents.

According to Section 24 of the Act & General Administrative Regulation 8:
The Principal Contractor shall provide NLM and/or its Agent on its behalf with copies of all statutory reports required in terms of the Act and the Regulations.
The Principal Contractor shall provide NLM and/or its Agent on its behalf with a monthly “SHE Risk Management Report”.
The Principal Contractor shall provide a.s.a.p. NLM and/or its Agent on its behalf with copies of all internal and external accident/incident investigation.
As soon as the occurrence of any accident/incident of whatever nature comes to the notice of the Principal Contractor, it shall be reported immediately to any of the following:

- Project Manager / Client Agent
- Health and Safety Manager.

WORK PERMITS:

Applicable work permits shall be identified in the Risk assessment and issued accordingly by the H&S Officer
Hazardous WP includes:

- Line breaking
- Confined space
- Fall Protection
- Hot work
- Cold Work
- Radiological
- Chemical
- Electrical

PUBLIC H&S

In the interests of public safety, the Contractor shall ensure that all persons who may be affected by the work being conducted on site are informed and kept aware of the dangers, which may arise from the work being conducted on site.

This awareness shall be in the form of posters and inductions for visitors to site and warning signs.

POST CONSTRUCTION REQUIREMENTS

Construction shall be deemed concluded when the following is completed:

- Close-out of Change Management Process proposals, non-conformance and events;

REQUIREMENT	REFERENCE
• Completion of as-constructed drawings; • Hand-over of manuals, documents, records, certificates, etc.; • Completion of construction verification process; • Cleaning of the construction site of rubble and waste, excess materials, temporary buildings and facilities; • Acceptance by the NLM's Responsible Manger of the hand-over document of the construction site.	
OFFENCES AND PENALTIES	**CR (32)**
Non-compliance with NLM's Safety Specifications shall result in work stoppages and possible expulsion from site until the problem has been remedied. Costs will be borne by the Principal Contractor / Contractor.	

9 GENERAL

The project under control of the Principal Contractor shall be subject to periodic health and safety audits that will be conducted by the client at intervals agreed upon between the Principal Contractor and the client, provided such intervals will not exceed periods of one month. The Principal Contractor is to ensure that he/she and all persons under his control on the construction site shall adhere to the above specifications, as non-conformance will lead to the client taking action as directed by Construction Regulation 5.1(q). The Principal Contractor should note that he/she shall be held liable for any anomalies including costs and resulting deficiencies due to delays caused by non-conformance and/or non-compliance to the above Health and Safety Specifications and the Health and Safety Plan based on these specifications.

10 *HAZARDOUS ACTIVITIES*

The following activities are identifiable as hazardous in terms of the Construction Regulations.

The contractor shall execute the activities in accordance with the following Construction Regulations and other applicable regulations of the Act:

Regulation No. 10 - Fall protection

Regulation No. 11 - Structures

Regulation No. 13 - Excavation work

Regulation No. 14 - Demolition work

Regulation No. 15 - Tunneling

Regulation No. 16 - Scaffolding

Regulation No. 17 - Suspended platforms

Regulation No. 18 - Rope access work

Regulation No. 19 - Material hoists

Regulation No. 20 - Bulk mixing plant

Regulation No. 21 - Explosive actuated fastening device

Regulation No. 22 - Cranes

Regulation No. 23 - Construction vehicles and mobile plant.

Regulation No. 24 - Electrical installations and machinery on construction sites

Regulation No. 25 - Use and temporary storage of flammable liquids on construction sites

Regulation No. 26 - Water environments

Regulation No. 27 - Housekeeping on construction sites

Regulation No. 29 - Fire precautions on construction sites.

All of the above requirements will be read in conjunction with the relevant regulations and health and safety standards as required by the Act. All documents and records required by the Construction Regulations will be kept in the Health and Safety File and will be made available at any time when required by the client or his representative, or on request to an interested party.

11 LEGAL FRAMEWORK AND OBLIGATIONS

The more important Acts and relevant subordinate/secondary legislation as well as other (inter alia Local Government) legislation that also apply to the State as well as to State owned buildings and premises: -

- *The latest issue of SABS 0142: "Code of Practice for the Wiring of Premises"*
- *The Local Government Ordinance 1939 (Ordinance 17 of 1939) as amended and the municipal by-laws and any special requirements of the local supply authority*
- *The Fire Brigade Services Act 1987, Act 99 of 1987 as amended*
- *The National Building Regulations and Building Standards Act 1977 (Act 103 of 1977) as amended and relevant proclaimed Regulations (SABS 0400)*
- *The Post Office Act 1958 (Act 44 of 1958) as amended*
- *The Electricity Act 1984, Act 41 of 1984*
- *The Regulations of Local Gas Board(s), including Publications of the SABS Standards and Codes of Practice, with specific reference to GNR 17468 dated 4th October 1997*
- *Legislation pertaining to water usage and the environment*
- *Legislation governing the use of equipment, which may emit radiation (e.g. X-Rays etc.)*
- *Common Law*

11.1 LEGAL LIABILITIES

Common Law and Legislation
Based on two main criteria –

- *Would the reasonable person have foreseen the hazard?*

That is a reasonable person in that specific position, taking experience, qualifications, authority, position in the organization etc. into consideration

- *Would the reasonable person have taken precautionary measures (action) to prevent or limit the hazard?*

*Negligence can be proven on failure on **any** or **both** of the above criteria*
(There may not necessarily be a relationship between criminal and civil liability!)

12 RECORDS

12.1 GENERAL

The following records shall be kept by NLM.

DESCRIPTION	RETENTION PERIOD	BY WHOM
Medical evaluations	For the lifetime of the Facility	Document Custodian
List of appointments	For the lifetime of the Facility	Document Custodian
Inspection checklist	For the lifetime of the Facility	Document Custodian
Training Records	For the lifetime of the Facility	Document Custodian
All other requirements as specified in the HSS and included in the HSF	For the lifetime of the Facility	Document Custodian

12.2 SPECIFIC LIST OF RECORD KEEPING RESPONSIBILITIES

ITEM	CR	RECORD TO BE KEPT	RESP PERSON
1.	3(2)	Application for construction work permit to Provincial Director – Annexure 1, where applicable Available on site	Client
2.	4(2)	Notification to the Provincial Director – Annexure 2, where applicable Available on site	Client
3.	5(1)(m)	Copy of Principal Contractor's Health & Safety Plan Available on request	Client
4.	7(d)	Copy of Principal Contractor's Health & Safety Plan As well as each Contractor's Health & Safety Plan Available on request	Principal Contractor
5.	7(b)	Health and Safety File opened and kept on site (including all documentation required i.t.o. OHSA & Regulations Available on request	Every Contractor
6.	7(e)	Consolidated Health and Safety File handed to Client on completion of Construction work. To include all documentation required i.t.o. OHSA & Regulations and records of all drawings, designs, materials used and similar information on the structure	Principal Contractor
7.	7(f)	Comprehensive and Updated List of all Contractors on site, the agreements between the parties and the work being done Included in Health and Safety file and available on request	Principal Contractor
8.	8(6)	Keep record on the Health and Safety File of the input by Construction Safety Officer [CR 6 (7)] at design stage or on the Health and Safety Plan	Contractor
9.	9(1)	Risk Assessment - Available on site for inspection	Contractor
10.	7 (5)	Proof of Health and Safety Induction Training	Every Employee on site
11.	10(3)	Construction Manager [CR 8(1)] has latest updated version of Fall Protection Plan [CR 10(1)]	Contractor
12.	11(2)(b)	Record of inspections of the structure [First 2 years – once every 6 months, thereafter yearly] - Available on request	Owner of Structure
13.	11(2)(c)	Maintenance records - safety of structure - Available on request	Owner of Structure
14.	13(2)(h)	Record of excavation inspection - On site available on request	Contractor
15.	17(11)	Suspended Platform inspection and performance test records Kept on site available, on request	Contractor
16.	19(8)(c)	Material Hoist daily inspection entered and signed in record book kept on the premises	Contractor
17.	19(8)(d)	Maintenance records for Material Hoist - Available on site	Contractor
18.	20(8)	Records of Batch Plant maintenance and repairs On site available for inspection	Contractor
19.	21(2)(g)(ii)	Issuing and collection of cartridges and nails or studs (Explosive Powered Tools) recorded in register – recipient signed for receipt as well as return	Contractor
20.	23(1)(k)	Findings of daily inspections (prior to use) of Construction Vehicles and Mobile Plant	Contractor
21.	24(d)	Record of temporary electrical installation inspections [once a week] and electrical machinery [daily before use] in a register and kept on site	Contractor
22.	29(l)	Fire Evacuation Plan	Contractor

ANNEXURE 1: APPLICATION FOR A PERMIT TO DO CONSTRUCTION WORK

Application For A Permit To Do Construction Work [In terms of Regulation 3(2) of Construction Regulations, 2014]. This application shall be submitted with the following documents: 1. H&S specification. 2. H&S plan. 3. Baseline risk assessment.
1. Name, postal address and telephone numbers of the client.
2. Details of the Agent. a. Title, Surname and Initials. b. Identity number/ Passport Number c. Registration number with SACPCMP d. Office Tel. number and/or Mobile number e. Postal address.
3. Name, postal address and telephone numbers of the appointed Principal Contractor:
4. Name, postal address and telephone numbers of designer of the project:
5. Name, postal address and telephone numbers of the following persons: a. Construction Manager: b. Construction H&S Manager: c. Construction H&S Officer:
6. Exact physical address of the construction and site office:
7. Nature of construction work:
8. Expected commencement date:
9. Expected completion date:
10. Estimated maximum number of persons on the construction site:
11. Planned number of Contractors on site accountable to Principal Contractor:
12. Name(s) of Contractors appointed:

13. Signature of Client/Client's Agent.

14. Signature of the Principal Contractor
Construction Regulation 2014

FOR OFFICE ONLY

Authorization /Unique No.	**LABOUR CENTRE**	**OFFICIAL APPROVAL STAMP**

15. Date of application:
16. Submitted documents prescribed in Construction Regulation 5(4) (Please Tick):

CR5(1)(a)		CR5(1)(b)		CR5(1);(C-S)	

17. Result of the application (Please Tick):

Approved		Declined	

18. Reason for declining the application:

_____
_____
_____

19. Signature of the Supervisor:

_____

20. Signature of revoking Officer/ Inspector

_____

NLM-FRM-628 Ref 00

ANNEXURE 2: NOTIFICATION OF CONSTRUCTION WORK

NOTIFICATION OF CONSTRUCTION WORK
OCCUPATIONAL H&S ACT, 1993 (Regulation 4 of the Construction Regulations, 2014)

1 .(a) Name and postal address of Principal Contractor:

_____
_____

(b) Name and tel. no of Principal Contractor's contact person:

_____

2. Principal Contractor's compensation registration number:

_____

3.(a) Name and postal address of client:

_____

(b) Name and tel. no of client's contact person or agent:

_____

4.(a) Name and postal address of designer(s) for the project:

_____

(b) Name and tel. no of designer(s) contact person:

_____

5 Name and telephone number of Principal Contractor's construction supervisor on site appointed in terms of regulation 8(1).

_____

6 Name/s of Principal Contractor's sub-ordinate supervisors on site appointed in terms of regulation 8(2).

_____

7. Exact physical address of the construction site or site office:

_____

8. Nature of the construction work: _____
9. Expected commencement date: _____
10. Expected completion date: _____
11. Estimated maximum number of persons on the construction site.

Total: _____ Male: _____ Female: _____

12. Planned number of Contractors on the construction site accountable to principal Contractor: _____

13. Name(s) of Contractors already selected.

Principal Contractor: _____ Date: _____
Client's Agent (where applicable): _____ Date: _____
Client: _____ Date: _____

THIS DOCUMENT IS TO BE FORWARDED TO THE OFFICE OF THE DEPARTMENT OF LABOUR **PRIOR TO COMMENCEMENT** OF WORK ON SITE.

NLM-FRM-629 Ref 00

ANNEXURE 3: MEDICAL CERTIFICATE OF FITNESS

OCCUPATIONAL H&S ACT, 85 OF 1993, Construction Regulations, 2014
Medical Certificate of Fitness

Occupation E.g.	**Possible Exposure* E.g.**															**Job Specific Requirements E.g.**									**Protective Equipment E.g.**							
Rad Worker				Physical Stressors												Type of Work									PPE							
Chem. Worker																															
Noise Worker																															
Engineer																															
Artisan																															
	HCS	Ionising Radiation	Non-Ionising Radiation	Noise	Heat	Cold	Glare	Vibration (Segmental)	Vibration (Whole)	Abnormal posture	Physical Demand	Static loading	Repetitive movements	Illumination	Asbestos	Crane Operations	Building/ Construction	Demolition/ Dismantling	Trenching	Maintenance	Construction Plant & Equipment	Welding	Cutting	Painting	Hand Protection	Foot Protection	Eye Protection	Face Protection	Hearing Protection	Fall Protection	Body Protection	Leg Protection

* The Employer to complete the information in the spaces marked with an * before sending the Employee for a Medical Examination
Declaration by the Medical Examiner:

I certify that I have, by examination and testing, using the above criteria specified by the employer, satisfied myself that the abovementioned employee is fit to perform the duties as described by the employer in the matrix above.
Occupational Medicine Practitioner/Occupational Health Nursing Practitioner: _____

Signature Address: _____

Practice Number: _____ Date: _____

NLM-FRM-630 Ref 00

ANNEXURE 4: STANDARDS INCORPORATED IN THE OHS ACT

REGULATION & GOVERNMENT GAZETTE NR	*STANDARDS INCORPORATED AND ACTS APPLICABLE*
1. General Safety Regulation GN R1031 in GG10252, May 1986 1991/1988	*GN R.283 in GG 13094 of 28 March 1988* *1. Regulation 9(1)(e)* *British Standard specifications BS 6158 entitled "Specification for Safety Devices for Fuel Gases and Oxygen or Compressed Air for Welding, Cutting and Related Processes".* *DIN Standard specifications DIN 8521 entitled "Safety Devices against Flashback Backflow in Welding, Cutting and Allied Processes - Safety Requirements, Testing".* *International Standards Organisation specification ISO 5175 entitled "Equipment Used in Gas Welding, Cutting and Allied Processes - Safety Devices of Fuel Gases and Oxygen or Compressed Air- General Specifications, Requirements and Tests".* *2. Regulation 13B* *The South African Bureau of Standards Code of Practice SABS 085 entitled "The Design, Erection, Use and Inspection of Access Scaffolding".* *3. Regulation 13C* *The South African Bureau of Standards Code of Practice SABS 087 entitled "Handling, Storage and Distribution of Liquefied Petroleum Gas in Domestic, Commercial and Industrial Installations".* *Part I: "Consumer Liquefied Petroleum Gas Cylinder Installations".* *Part II: "Installations in Mobile Units and Small Non-Permanent Buildings".* *Part III: "Bulk Liquefied Petroleum Gas Storage and Allied Facilities at Consumer's Premises".* *Part IV: "Transportation of Liquefied Petroleum Gas in Bulk by Road".* *Part V: "Liquefied Petroleum Gas as Engine Fuel".* *Part VII: "Retail outlet and similar Liquefied Petroleum Gas Filling Sites for Small Containers".* *Part VIII: "The Fuelling of Fork Lift Trucks and Other Liquefied Petroleum Gas Operated Vehicles".*
2. Environmental Regulations for workplaces, GN R2281 in GG 10988, October 1987	*GN R 2282, GG 10988, October 1987* *SABS 083-1983: South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes,* *SABS 572-1973: South African Bureau of Standards Specification for the Acoustical Properties of Ear Protectors,*
3. Driven Machine Regulations, GN 540, GG 38905, June 20152015	*GN R528, GG 38887, June 2015* *Safety standards of South Africa:* *"EN 14502 -1 ", Cranes: equipment for lifting of persons, Part 1: Suspended baskets.* *"ISO9927 -1 ", Crane inspections - Part 1: General.* *"National Code of Practice for Training Providers of Lifting Machine Operators" published under Government Notice No. R. of 2015.* *"SANS 19 ", Inspection, testing and examination of mobile cranes.* *"SANS 71", Inspection, testing and examination of vehicle hoists in use.* *"SANS 500 ", Inspection, testing and examination of hand -operated chain blocks and lever hoists in use.*

	"SANS 522 ", Inspection, testing and examination of tower cranes in use. *"SAN- 3 2972 ", Lifting tackle inspection.* *"SANS 10147 ", Code of Practice: Refrigeration systems, including plants associated with air -conditioning systems.* *"SANS 10148 ", Code of Practice: The installation and operation of cable cranes and aerial ropeways.* *"SANS 10295 ", Parts 1 and 2: Inspection, test and examination of lifting platforms in use.* *"SANS 10375 ", Inspection, testing and examination of overhead cranes (including gantries, electric wire rope hoists & chain hoists).* *"SANS 10388 ", Inspection, testing and examination of lift trucks.* *"SANS 18893 ", Mobile elevated work -platform safety principles, inspection, maintenance and operation.*
4. General Machine Regulations, GN R1521, GG1143, August 1988	
5. Electrical Machine Regulations, GN R250, GG34154, March 2011	*GN R 251, GG 34154, March 2011* *SANS 767-1: Earth leakage protection units Part 1: Fixed earth leakage protection circuit-breakers;* *SANS 10086-1: The installation, inspection and maintenance of equipment used in explosive atmospheres Part 1: Installations including surface installations; STAATSKOERANT, 25 MAART 2011 No.34154 35* *SANS 1507-6: Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3 300 V), Part 6: Service cables;* *SANS 10108: The classification of hazardous locations and the selection of electrical apparatus for use in such locations; SANS 10222-3: Electrical security installation, Part 3: Electric security fences (non-lethal);* *SANS 10280-1: Overhead power lines for conditions prevailing in South Africa Part 1: Safety; and* *SANS 60335-2-76: Household and similar electrical appliances- Safety: Part 2- 76: Particular requirements for electric fence energizers.*
6. Regulations Concerning Certificate of Competence GN 533, GG 12337, March 1990	
7. Lift, Escalator and Passenger Conveyor Regulations, GN R763, GG 39132, AUGUST 2015.	*GN R829, GG 33561, September 2010* *"SANS 1543": the specification for escalators and passenger conveyors, published by the South African Bureau of Standards;* *"SANS 1545-1": the specification for lifts: Safety rules for the construction and installation of lifts: Part 1: Electric lifts, published by the South African Bureau of Standards;* *"SANS 1545-2": the specification for lifts: Safety rules for the construction and installation of lifts: Part 2: Hydraulic lifts, published by the South African Bureau of Standards;* *"SANS 1545-3": the specification for lifts: Safety rules for the construction and installation of lifts: Part 3: Lifts for persons with physical disabilities (stair-lifting platforms), published by the South African Bureau of Standards; "SANS 1545-4": the specification for lifts: Safety rules for the construction and installation of lifts: Part 4: Lifts for persons with physical disabilities (vertical platforms), published by the South African Bureau of Standards;* *"SANS 1545-5": the specification for lifts: Safety rules for the construction and installation of lifts, Part 5: Electric and hydraulic access, goods only lifts, published by the South African Bureau of Standards;* *"SANS 1545-6": the specification for lifts: Safety rules for the construction and installation of lifts: Part 6: Rack and pinion lifts, published by the South African Bureau of Standards;*

	"SANS 1545-9": the specification for lifts: Safety rules for the construction and installation of lifts: Part 9: Lift landing doors fire resistance testing, published by the South African Bureau of Standards; 12 No. 33561 -_._----_•._-- GOVERNMENT GAZETTE, 17 September *"SANS 50280": standard for the design, safe use and maintenance of scissors lifts, published by the South African Bureau of Standards;* *"SANS 10360": the standard for the maintenance and repair of electric and hydraulic powered lifts, escalators and passenger conveyors, published by the South African Bureau of Standards;* *"SANS 21": the specification for escalators, safety rules for the construction and installation of escalator and passenger conveyors;* *"SANS 50081-1": the specification for electric lifts, safety rules for the construction and installation of lifts, published by the South African Bureau of Standards;* *"SANS 50081-2": the specification for hydraulic lifts, safety rules for the construction and installation of hydraulic lifts, published by the South African Bureau of Standards.*
8. Regulations for Integration of the Occupational Health and Safety Act, GN R639, GG 16387, April 1995	
9. Regulations for Hazardous Chemical Substances, GN R1179, GG 16596, August 1995	*GN R1179, GG 16596, August 1995* *Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965).* *Environmental Conservation Act, 1989 (Act No. 73 of 1989), Disposal of hazardous chemical substances* *"OESSM": The Occupational Exposure Sampling Strategy Manual, published by the National Institute for Occupational Safety and Health (NIOSH), Publication No. 77-173 of 1977, United States of America: Department of Health, Education and Welfare;* *"SABS 072" the Code of Practice for the Safe Handling of Pesticides, SABS 072, published by the South African Bureau of Standards (SABS);* *"SABS 0228" the Code of Practice for the Identification and Classification of Dangerous Substances and Goods, SABS 0228, published by the South African Bureau of Standards (SABS);* *"SABS 0229" the Code of Practice for Packaging of Dangerous Goods for Road and Rail Transportation in South Africa, SABS 0229, published by the South African Bureau of Standards (SABS);* *ISO 1 1014 or ANSIZ400.1.1993: Handling of hazardous chemical substances with regard to* *(a) product and company identification;* *(b) composition/information on ingredients;* *(c) hazards identification;* *(d) first-aid measures;* *(e) fire-fighting measures;* *(f) accidental release measures;* *(g) handling and storage;* *(h) exposure control/personal protection;* *(i) physical and chemical properties;*

	(j) stability and reactivity; *(k) toxicological information;* *(l) ecological information;* *(m) disposal considerations;* *(n) transport information;* *(o) regulatory information; and* *(p) other information:*
10. Major Hazardous Installation Regulations, GN R692, GG 22506, July 2001	
11. Regulations for Hazardous Biological Agents, GN R1390, GG 22956, December 2001	*The Regulation of Health Care Waste in South Africa* *DEAT Report Number: 12/9/6 National Waste Management Strategy Implementation* *NEMA: National Environmental Management Act, 1998* *ECA: Environment Conservation Act, 1989* *SANS 10248: 2004 ("the code") Management of Healthcare Waste.*
12. Diving Regulations GN R41, GG 32907, January 2010	*SABS 019-1985: South African Bureau of Standards' Code of practice for portable Metal Containers for Compressed Gasses, ANWASME PVHO-1-1997" "American Society of Mechanical Engineers. Safety Standard for Pressure Vessels for Human Occupancy* *"Lloyd's Register of Shipping. Rules and Regulations for the Construction and Classification of Submersibles and diving systems, Lloyd's Register of Shipping, London, UK 1989",* *"Germanischer Lloyd. Rules for Classification and Construction, Ill - Offshore Technology, Part 1 - Underwater Technology, Germanischer Lloyd, Humburg, Germany, 2000",* *"De Norske Veritas. Rules for certikation of Diving Systems, De Norske Veritas, Hovik, Norway, 1988. and the American Bureau of Shipping. Rules for Building and Classing Underwater Vehicles, Systems and Hyperbaric Facilities, American Bureau of Shipping, New York, U.S.A. 1979" into the Diving Regulations 2001.*
13. Asbestos Regulations, GN R155, GG 23108, February 2002	*Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965), the Environment Conservation Act, 1989 (Act No. 73 of 1989), the National Water Act, 1998 (Act No. 36 of 1998), and the National Environmental Management Act, 1998 (Act No. 107 of 1998).* *"HSG 173" means the Monitoring Strategies for Toxic Substances, HSG 173, published by the Health and Safety Executive of the United Kingdom; "MDHS 39/4" means the Methods for the Determination of Hazardous Substances 39/4 of the Health and Safety Executive of the United Kingdom: Asbestos fibres in air, sampling and evaluation by phase contrast microscopy (PCM) under the Control of Asbestos at Work Regulations, 1995 HSE ISBN 0 7176 0913 8, as revised from time to time;* *"OESSM" means the Occupational Exposure Sampling Strategy Manual, published by the National Institute for Occupational Safety and Health (NIOSH), United States of America: Department of Health, Education and Welfare;* *"SABS 0228" means the Code of Practice for the Identification and Classification of Dangerous Substances and Goods, SABS*

	0228, published by the South African Bureau of Standards (SABS); "SABS 0229" means the Code of Practice for Packaging of Dangerous Goods for Road and Rail Transportation in South Africa, SABS 0229, published by the South African Bureau of Standards (SAGS);
14. Lead Regulations, GN R236, GG 23175, February 2002	*Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965), the Environment Conservation Act, 1989 (Act No. 73 of 1989), the National Water Act, 1998 (Act No. 36 of 1998), and the National Environmental Management Act, 1998 (Act No. 107 of 1998).* *"HSG 173" means the Monitoring Strategies for Toxic Substances, HSG 173, published by the Health and Safety Executive of the United Kingdom; "MDHS 39/4" means the Methods for the Determination of Hazardous Substances 39/4 of the Health and Safety Executive of the United Kingdom: Asbestos fibres in air, sampling and evaluation by phase contrast microscopy (PCM) under the Control of Asbestos at Work Regulations, 1995 HSE ISBN 0 7176 0913 8, as revised from time to time;* *"OESSM" means the Occupational Exposure Sampling Strategy Manual, published by the National Institute for Occupational Safety and Health (NIOSH), United States of America: Department of Health, Education and Welfare;* *"SABS 0228" means the Code of Practice for the Identification and Classification of Dangerous Substances and Goods, SABS 0228, published by the South African Bureau of Standards (SABS); "SABS 0229" means the Code of Practice for Packaging of Dangerous Goods for Road and Rail Transportation in South Africa, SABS 0229, published by the South African Bureau of Standards (SAGS);* *"SABS 0400" means the Code of Practice for the Application of the National Building Regulations, SABS 0400, published by the South African Bureau of Standards (SABS);* *"SABS SM 1164" means the Standard method for the determination of lead (inorganic and tetra-alkyl) in the workplace air by atomic absorption and spectrophotometry, SABS SM 1164, published by the South African Bureau of Standards (SABS).*
15. Explosive Regulations, GNR109, GG 24272, January 2003	*South African Police Services Code of Practice SAP 412;* *Fire Brigade Services Act, 1987 (Act NO. 99 of 1987);* *South African Bureau of Standards Code of Practice SABS 0313, The Protection of Structures against Lightning;* *South African Bureau of Standards Code of Practice SABS 0142, The Wiring of Premises, Part 1, Low Voltage Installations, and SABS 0108, The Classification of Hazardous Locations and the Selection of Apparatus for Use in Such Locations;* *South African Code of Practice SABS 0228, The Identification and Classification of Dangerous Goods for Transport; and* *South African Code of Practice SABS 0228: The Identification and Classification of Dangerous Goods for Transport.*
16. Noise Induced Hearing Loss Regulations, GN R307, GG 24967, March 2003	*South African Qualifications Authority Act, 1995 (Act No. 58 of 1995);* *"General Administrative Regulations" means the General Administrative Regulations published under section 43 of the Act in Government Notice No. R.1449 of 6 September 1996;* *"Instruction No. 171" means the Compensation Commissioner's Circular Instruction No. 171 and Supplement entitled Determination of Permanent Disablement Resulting from Noise Induced Hearing Loss and Trauma* *"SABS 083" means the Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABS 083, published by the South African Bureau of Standards;*
17. General Administrative Regulations, GN R929, GG 25129, June 2003	*Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993);* *Labour Relations Act, 1995 (Act No. 66 of 1995);*

18. *Construction Regulations, GN R84, GG 37305*	*National Qualification Framework Act, 2000 (Act No.67 of 2000)* *National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977), and promulgated by Government Notice No. R. 2378 of 30 July 1990, as amended by Government Notices No's R. 432 of 8 March 1991, R. 919 of 30 July 1999 and R. 547 of 30 May 2008;* *Mine Health and Safety Act, 1996;* *Engineering Profession Act, 2000 (Act No. 46 of 2000);* *General Administrative Regulations, 2003* *General Safety Regulations, 2003* *Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993);* *Electrical Installation Regulations, 2009, and the Electrical Machinery Regulations, 1988, promulgated by Government Notice No. R. 1593 of 12 August 1988,* *Environmental Regulations for Workplaces, 1987* *Facilities Regulations, 2004, promulgated by Government Notice No. R. 924 of 3 August 2004,* *SABS 085: South African Bureau of Standards Cod of Practice, The Design, Erection, Use and Inspection of Access Scaffolding;* *SABS 0400: South African Bureau of Standards Cod of Practice, Application of the National Building Regulations* *SABS 1808: South African Bureau of Standards Cod of Practice, Safety requirements on suspended access equipment- Designing, calculations, stability criteria, construction tests.* *SABS 1903: South African Bureau of Standards Cod of Practice, Safety requirement on suspended access equipment- Design calculations, stability criteria, construction tests*
19. *Facilities Regulations, 2004, GN R924, GG 26636, August 2004*	*SABS 0400: South African Bureau of Standards Cod of Practice, Application of the National Building Regulations* *SABS 241: South African Bureau of Standards, Standard specification for Water for Domestic Supplies.*
20. *Electrical Installation Regulations, 2009, GN R242, GG 31975, March 2004 and Electrical Installation Regulations Explanatory Notes, 2009, GN 258, GG 35180, March 2012*	*SANS 10086-1: The installation, Inspection and maintenance of electrical equipment used in explosive atmospheres Part 1: Installations including surface installations on mines.* *SANS 10089-2: The petroleum industry Part 2. Electrical and other installations in the distribution and marketing sector.* *SANS 10108: The classification of hazardous locations and the selection of apparatus for use in such locations.* *SANS 10142-1: The wiring of premises Part 1: Low voltage installations*
21. *Pressure Equipment Regulations, 2009, GN R* 399*, GG32395, June 2015*	*SANS 347: Standard Specification for the categorization and conformity assessment criteria for all pressure equipment;* *SANS 151: Standard Specification for fixed electrical storage water heaters;* *SANS 1 0227: Standard Specification for Criteria for the operation of inspection authorities performing inspections in terms of the Pressure Equipment Regulations;* *SANS 1 0019: Transportable metal containers for compressed gas - Basic design, manufacture, use and maintenance;* *SANS 10228: Standard Specification for the identification and classification of dangerous goods for transport;*

	SANS 10254: Standard Specification for the installation, maintenance, replacement and repair of fixed electrical water heating systems; *SANS 17020: Standard Specification for general criteria for the operation of various types of bodies performing inspections;* *SANS 14 75 - 1 : The production of reconditioned fire-fighting equipment - Part 1 : Portable and wheeled (mobile} rechargeable fire extinguishers;* *SANS 10087: The handling, storage, distribution and maintenance of liquefied petroleum gas in domestic, commercial and industrial installations: Part 1: Liquefied petroleum gas installations involving gas storage containers of individual water capacity not exceeding 500 t and a combined water capacity not exceeding 3 000 t per installation Part 2: Installation in mobile units and small non-permanent buildings Part 3: Liquefied petroleum gas installations involving storage vessels of individual water capacity exceeding 500 t Part 4: Transportation of LPG in bulk by road Part 6: The application of liquefied petroleum and compressed natural gases as engine fuels for internal combustion engines Reproduced by Sabinet Online in terms of Government Printer's Copyright Authority No. 10505 dated 02 February 1998 4 No.34995 GOVERNMENT GAZETTE, 3 FEBRUARY 2012 Part 7: Storage and filling sites for refillable liquefied petroleum gas (LPG) containers of capacity not exceeding 9 kg Part 8: The fuelling of fork-lift trucks and other LP gas operated vehicles Part 10: Mobile filling stations for refillable liquefied petroleum gas (LPG) containers of capacity not exceeding 9 kg. SANS 10147: Refrigeration systems including plants associated with air-conditioning systems;* *SANS 1539: Appliances operating on liquefied petroleum gas - Portable and mobile appliances - Safety aspects SANS 1237: Single-stage low-pressure regulators for liquefied petroleum gas (LPG);* *SANS 329: Industrial thermal processing equipment - Safety requirements for combustion and fuel-handling systems;* *SANS 1 0105 - 1: The use and control of fire-fighting equipment- Part 1: Portable and wheeled (mobile) fire extinguishers;* *SANS 1910: Portable refillable fire extinguishers;* *SANS 1567: Portable rechargeable fire extinguishers - C02 type extinguishers*
22. Health and Safety of Children at work Regulations, GN R7, GG 32862, January 2010	

Document number	MES-CIV-SOW-0004
Revision number	1.0
Date	2023/03/08
Title	New bunded area in basement between lines A, 49 and 51 —area 8

	NAME	SIGNED	DATE
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Table of Contents

1 INTRODUCTION

This document describes the scope of civil works for the construction of the new bunded area in Area 8 at Necsa.

2 OBJECTIVE

This document will describe the main activities and deliverables that have to be procured for theimplementation of this project.

3 ABBREVIATIONS

3.1 THE FOLLOWING ABBREVIATIONS ARE USED IN THIS DOCUMENT:

Abbr.	Definition
BoQ	Bill of Quantities
BBBEE	Broad Based Black Economic Empowerment
CAD	Computer Aided Design
CIDB	Construction Industry Development Board
COID	Compensation for Occupational Injuries and Diseases
ECSA	Engineering Council of South Africa
ES	Engineering Services
NECSA	The South African Nuclear Energy Corporation
OHS	Occupational Health and Safety
SANS	South African National Standards
SHEQ	Safety Health Environment and Quality
SOW	Scope of Works
UCE	Uranium Containing Effluent
US	Utility Services
VAT	Value Added Tax

4 REFERENCES

Table 1: Applicable Documents

Document title	Document number	Revision
[1] New bunded area in basement between lines A, 49 and 51.	20-C307-00	6.0
[2] Building A-8 Chemical Cleaning	20M-272-00-00	10
[3] Building A-8 Chemical Cleaning	20M-273-00-00	10
[4] Necsa Requirements for Construction	SHEQ-INS-0825	4.0

[5] Access and Egress Control for Radiological Areas	SHEQ-INS-8150	12.0
[6] Written Safe Work Procedure, Instructions, Orientation and Task Training.	SHEQ-INS-5300	4.0
[7] The application of the National Building Regulations Part K: Walls	SANS 10400- K	2015
[8] Concrete floors Part 2: Finishes to concrete floors	SANS 10109-2	2013
[9] Standardized specification for civil engineering construction Section GA: Concrete (Small Works)	SANS 1200-GA	1986

5 SAFETY

The Contractor shall comply with the safety regulations set out by Necsa in document SHEQ-INS-0825, SHEQ-INS-8150 and SHEQ-INS-5300.

6 BACKGROUND

The Nuclear Liabilities Management intends to upgrade the existing bunded area at the decontamination area in A-8. This will require the construction of a new sump, new bunded walls and access ramps and two pump plinths. The civil engineering scope will be limited to the construction of the new bundwalls, concrete plinths for new pumps and the extension of the accessramp inside and outside the facility. All this work is clearly described in drawings (see **Table 1**).

7 THE SCOPE FOR NEW BUNDWALLS AT AREA 8

1. Clean the area of all dust and contaminants.
2. Mark out the positions for dowels and hold-down bolts.
3. Obtain permit to drill the existing surface bed (i.e. concrete floor).
4. Call Necsa radiation protection officers to test the entire work area for radioactive contaminants and wait for Necsa permission to resume work.
5. Cover all drilled holes temporarily.
6. Erect formwork for bund walls and plinths.
7. Break up the area for the new sump.
8. Erect formwork for the sump.
9. Supply and install all relevant reinforcement bars and mesh with adequate spacing, as described in drawing 20-C307-00 Rev. 06.
10. Inspection of the placement of reinforcement must be signed off by the Necsa civil engineer.
11. Call Necsa civil engineer to witness the placement of concrete.
12. Place concrete in all areas inspected and where the permit to place concrete has been obtained from the Necsa's civil engineer.

13. Construction of the screed before ramp
14. Place reinforcement mesh and bars at spacing and laps specified in the bending schedules in drawing 20-C307-00 Rev. 06 for the ramp.
15. Construction of the new access ramps
16. Clean footprints of access ramps.
17. Scabble existing slabs sections and new concrete sections on the new access ramps footprints.
18. Install all dowels into the dowel holes created before
19. Erect formwork and apply oil to it.
20. Call Necsa's civil engineer for inspection before placing concrete
21. Place concrete and float it.
22. Cure concrete for the 3 days after placing it.
23. Coat the area with acid resistant Epoxy
24. Include final inspection showing correct slopes on the screed as well as a water tightness test.

8 PERFORMANCE SPECIFICATION

8.1 COMPLIANCE REQUIREMENTS:

1) SANS 10400 K: The application of the National Building Regulations Part K: Walls
2) SANS 1200 GA: Standardized specification for civil engineering construction Section GA: Concrete (Small Works)
3) SANS 10109-2: Concrete floors Part 2: Finishes to concrete floors
4) All products used should be SABS approved

8.1.1 Bund Walls, Plinth and Sump

The construction of the bund walls, sump and pump plinth should be in accordance with the dimensions as detailed in the drawing 20-C307-00 Rev.06 including the bending schedules to install all relevant reinforcement bars and meshes with adequate spacing. The construction of the concrete pump plinth is determined by the requirements of the pump.

8.1.2 Screeds

The new screed will be a minimum of 30mm thick with a 1:50 fall (2%). It should have a compressive strength of 30MPa at 28 days. Details described in the drawing 20-C307-00 Rev. 06 shows the levels/slope at which the screed should be constructed.

8.1.3 Joint sealants

The bund area should be coated with the acid resistance epoxy as indicated in Table 8 of SANS 10109-2. The epoxy should be able to resist the any corrosion or contamination cause by the liquid effluent.

8.1.4 Inspection Prior to Installation or Erection

Before commencing installation, the Contractor shall verify that the following items have been checked and accepted by the Civil Engineer:

1. Formworks for bund walls, plinth and sump are in place
2. Correct installation of reinforcement mesh and bars
3. Placing concrete in all areas inspected and where the permit to place concrete has been obtained.
4. The corners of the screed are shaped suitably.

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9 SPECIFICATION

9.1 TECHNICAL REQUIREMENTS

9.1.1 Experience

Personnel shall be suitably qualified and experienced to perform tasks typically like construction management, and construction supervision. All labour personnel shall be suitably qualified and experienced to carry out the works. They should provide CVs and qualifications (up to date). Proof of any relevant technical training shall also be submitted. The organizational structure shall be provided to the Necsa representative for approval.

9.1.2 Reference Letters

The Service Provider shall accompany their bid with letters of appointments from relevant companies on similar work performed

9.2 MANDATORY SUBMISSIONS

Contractor Responsibilities and Additional Requirements as listed in Table 2 Items marked in the “Date” column of Table 2 as “Provide together with submission of bid.” are mandatory and automatic disqualification shall follow for the Service Provider if not complied with.

Table 2: Contractor Responsibilities and Additional Requirements

Requirement	Responsibility	Date
[1] **Project Schedule**	A detailed schedule showing all major milestones. To be submitted by Service Provider.	Provide together with submission of bid.
[2] **Payment Schedule**	To be submitted by Service Provider.	Provide together with submission of bid.
[3] **VAT Registration**	To be submitted by Service Provider.	Provide together with submission of bid.
[4] **Tax Clearance**	To be submitted by Service Provider.	Provide together with submission of bid.
[5] **BBBEE Certificate**	To be submitted by Service Provider.	Provide together with

Requirement	Responsibility	Date
		submission of bid.
[6] **Company profile**	To be submitted by Service Provider.	Provide together with submission of bid.
[7] **CIBD**	CIDB of 2 is recommended however a competent Civil Engineering contractor with grade 1 can be considered for the project.	Provide together with submission of bid.
[8] **Audited Financial Statements**	To be submitted by Service Provider.	Together with submission of bid
[9] **Health and Safety file**	To be submitted by Service Provider to show OHS Act compliance.	Prior to commencement of works.
[10] **Work Permit**	The work permit shall be issued to the Service Provider before work commences.	Prior to commencement of works.
[11] **Declaration of secrecy**	Necsa to supply template for Service Provider to complete. The form shall be completed by each and every employee to work on site.	Prior to commencement of works.
[12] **Necsa Induction**	The induction is conducted monthly. All personnel are required to do the induction before commencing any works. Note that Service Provider shall not be issued with Service Provider access cards until induction has been done.	Prior to commencement of works.
[13] **Quality Assurance**	The Service Provider shall submit an approved quality procedure.	To be submitted prior to commencement of works.
[14] **COID letter of good standing**	To be submitted by Contractor.	Provide together with submission of bid.

10 NECSA RESPONSIBILITIES AND ADDITIONAL REQUIREMENTS

In certain designated areas, electrical supply shall be provided for by Necsa. The Contractor shall be responsible for its own supply of electricity in remote areas. Necsa shall therefore not be liable for the supply of electricity in those areas. Necsa will also be responsible for the supply of a set of drawings with the baseline information, see Table 2 above and initial priority list for the execution of the project. Necsa ENS will endeavour to provide available information as required by the Contractor. A contact person shall be appointed to co-ordinate the site work and represent Necsa. Necsa shall perform the training to personnel for radiation and chemical work, non-compliance with this requirement shall result in automatic disqualification for the Service Provider.

11 PROGRESS REPORTING

The Service Provider shall provide monthly, last working day of every month, reports regarding all the works performed. These reports shall include the allocation of resources, task performed, project risk identification/analysis and completed tasks. In addition a weekly meeting shall occur and shall be chaired by an authorized Necsa representative where necessary.

12 PREAMBLE TO THE BILL OF QUANTITIES

12.1 BID PROCESS

This is an open tender payable in South African Rands (ZAR) and the format of the Bill of Quantities (BoQ) is prepared accordingly to realize that requirement and it allows the bidder to insert rates only in Rands.

12.2 COMPLEMENTARY DOCUMENTS

The contractor's attention is drawn to the scope of works above in Section 7 regarding tender drawings.

12.3 METHOD OF MEASUREMENT

The works shall be measured for payment in accordance with the following; SANS 1200A, 1200D and 1200GA. The net measurement of the finished works shall exclude; cutting, wastage, laps, circular work. No allowance shall be made for grout nicks, joggle holes, linkages for fitting ironworks and the like.

Payment shall be made only for the material incorporated in the permanent works and taken over the stocks as stipulated by the Engineer. Any surplus material delivered to the site shall become property of the contractor unless otherwise directed by the Project Manager.

12.4 UNITS AND EXTENSION OF BILL OF QUANTITIES

All sizes and quantities provided in the BoQ are in SI units

12.5 EXTENT OF WORK

Despite any limits that may be implied by the wording of the individual items and/or explanation provided in this preamble, it is to be clearly understood by the contractor that the rates and the sums that are entered in the BoQ shall be for the work finished completely in every respect. The bidder shall be deemed to have taken full account of all requirements and obligations whether expressed or implied, covered by all parts of this Contract and to have priced the items herein accordingly. The rates and sum shall therefore be included for all incidental and contingent expenses and risks of every kind necessary to construct, complete and maintain the whole of works in accordance with the Contract.

13 DOCUMENTS REQUIRED AT CLOSE OUT

The following documents shall be provided by the Contractor when the construction works are complete.

1. Material certification on all components including test results from laboratories on the screed.
2. A certificate from the Contractor that and has been correctly constructed.
3. An as-built reconciled BOQ.
4. As built drawings using CAD should be provided.
5. A record of construction including deviations, non-conformances, reworks, repairs and inspection reports accepted by the Engineer.

B I L L O F Q U A N T I T I E S

NECSA REF. NO. :
PROJECT NO: FILE NO. :
AREA 8 NEW BUNDWALLS RAMPS SUMP AND PLINTHS

ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
A	**SABS 1200 A**	**SCHEDULE A : PRELIMINARY AND GENERAL**				
A1	**8.3**	**FIXED-CHARGE ITEMS**				
A1.1	8.3.1	Contractual Requirements	Sum	1.0		
A1.2	8.3.2	Establish Facilities on the Site :				
A1.5	PS A 8.3.3	Other fixed-charge obligations	Sum	1.0		
A1.6	8.3.4	Removal of site establishment	Sum	1.0		
A2.1	8.7	DAYWORK				
A2.1.1		(a)Labour	Sum	1.00		
A2.1.2		(b)% adjustment for labour	%			
A2.1.3		(c)Materials	Sum	1.00		
A2.1.4		(d)% adjustment for Materials	%			
A2.1.5		(e)Plant(As per Day works Schedule)	Sum	1.00		
		Subtotal carried over to summary page				

ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
B	**SABS 1200 D**	**SCHEDULE C : BREAK-UPS OF EXISTING BUNDWALLS**				
B.1		Inspect test and seal temporarily, drilled holes for anchor bolts, internally.	sum	1		
B.2		Drill all anchor bolts for the extenral section of the access ramp as shown on drawing 20-C307-00 Rev. 3.	sum	1		
B.3		Scabble the existing floor for internal ramp, External Ramp, Plinth and Bund Walls sections.	m^2	66.75		
		Total carried over to summary page				

ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
C	**SABS 1200 GA**	**CONCRETE WORKS SMALL WORKS**				
C.1						
		Supply smooth formwork				
C.1.1		300mm wide formwork casings	m	10.00		
		Erect, prepare and install formwork				
C.1.2		300mm wide formwork casings	m	10.00		
		Remove formwork and repair any defects on cured concrete plinth.				
C.1.3		300mm wide formwork casings	m	10.00		
		Place concrete and reinforcement				
C.1.4		Supply, 30MPa structural concrete for the construction sump and plinths	m^3	0.85		
C.1.5		Supply, 30MPa structural concrete for the construction of bund walls.	m^3	2.50		
C.1.6		Supply, 30MPa structural concrete for the construction of external section of access ramp	m^3	4.00		
C.1.7		Supply, 30MPa structural concrete for the construction of internal section of the access ramp	m^3	1.67		
C.1.8		Conduct relevant tests on the concrete, such as slump test on the concrete thus supplied.	sum	3.00		
		REINFORCEMENT CONCRETE				
C.1.9	8.1.2.	Supply, handle, store temporarily reinforcement Mesh ref. 245	m^2	11.88		
C.1.10		Place and install Reinforcement Mesh Ref. 245 for the strengthening of the existing floor.	m^2	23.00		
C.1.11		Place reinforcement for the sump and plinths including stop blocks etc.	ton	0.19		
C.1.12		Place reinforcement for the bundwalls as follows;	ton	0.12		
C.1.13		Place reinforcement for external access ramp including dowels	ton	0.36		
C.1.14		Place reinforcement for internal access ramp	ton	0.15		
		Total carried over to summary page				

DO NOT SCALE

PROJECTION

IF IN DOUBT ASK

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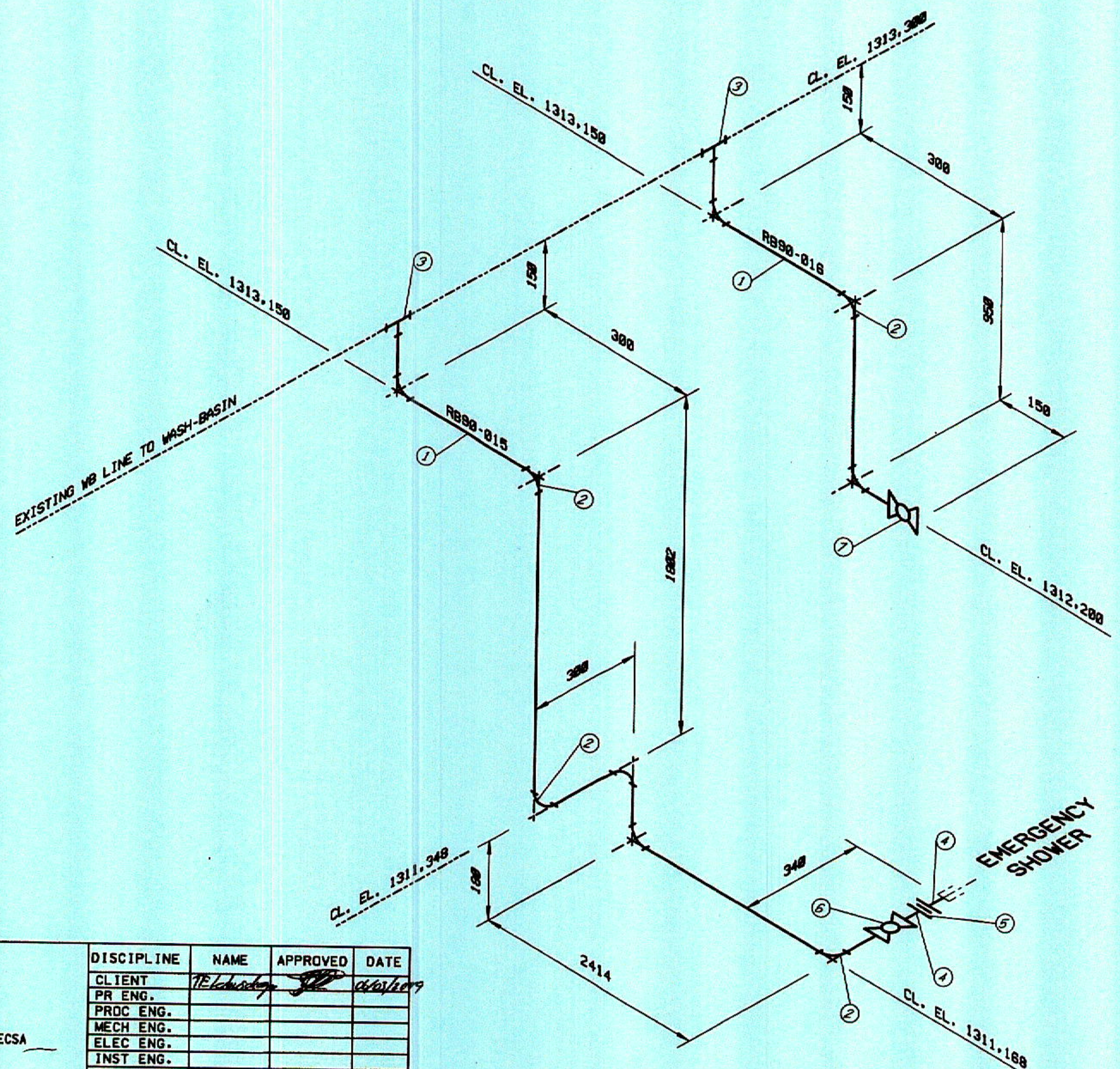

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2	15NB	10	ELL 90° TO BS 143 SCREWED BSP GALV.	
3	15NB	2	TEE EQUAL TO BS 143 SCREWED BSP GALV.	
4	15NB	2	BARREL NIPPLE TO BS 1387 CLASS MED. SCREWED BSP GALV.	
5	15NB	1	UNION TO BS 143 SCREWED BSP GALV.	
6	15NB	1	GATE VALVE BRASS SCREWED BSP	
7	15NB	1	TAP BRASS SCREWED	
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NECSA ISSUED 2023-11-23 ENGINEERING SERVICES The South African Nuclear Energy Corporation

FOR QUOTATION PURPOSES ONLY

FOR QUOTATION PURPOSES ONLY

NECSA ISSUED The South African Nuclear Energy Corporation

DESIGN, FABRICATION AND ERECTION DATA

					OPERATING	DESIGN
PIPE SPECIFICATION	?				OPERATING	DESIGN
LINE CLASS	150#	SERVICE CATERGORY		PRESSURE	? kPag	? kPag
SERVICE	WATER	X-RAY	0 %	TEMPERATURE	? °C	? °C
LAYOUT DRAWING	20M272-00-00	DYE PEN	0 %	SHOP TEST PRESSURE	HYDROSTATIC PNEUMATIC	? kPag
FLOWSHEET	22M03-00-00	DRYNESS		FIELD TEST PRESSURE	HYDROSTATIC PNEUMATIC	? kPag
LINE LIST		CLEANING		HELIUM LEAK TEST		kPag
INSULATION	Thk	DATA BOOK		HELIUM LEAK RATE		$x10^{-6}$ Pa.L/sec

ITEM	QTY	DESCRIPTION	MAT'L/REMARK	DESCRIPTION

NOTES:

1. ALL DIMENSIONS ARE APPROX. AND TO BE DETERMINED ON SITE.
2. PIPES TO BE SITE SUPPORTED.

DISCIPLINE	NAME	APPROVED	DATE
CLIENT	[signature]	[signature]	06/03/2009
PR ENG.			
PROC ENG.			
MECH ENG.			
ELEC ENG.			
INST ENG.			
CIVIL ENG.			
MAINTEN.	[signature]	[signature]	09/03/09
OPERATION	[signature]	[signature]	09/03/09
COMMISSION			
RISK MAN.			
QUALITY			
SAFETY			

REV	ZONE	DESCRIPTION	BY	CHK'D	DATE
0.1		ISSUED FOR CLIENT APPROVAL	RB	BB	20/02/2009
1.0		ISSUED FOR CONSTRUCTION	RB		27/02/2009

UNLESS OTHERWISE STATED:
REMOVE ALL SHARP EDGES
SURFACE TEXTURE: µm
SCREW THREAD: ISO 6H 6g
GEOMETRICAL TOL. BS 308 1972
WELDING SYMBOLS BS 499 PART 2 1980
FIRST ISSUE
APPROVED DATE

MACH TOL. UNLESS OTHERWISE STATED	
OVER - TO	TOL
0 - 6	±0,1
6 - 30	±0,2
30 - 100	±0,3
100 - 300	±0,5
300 - 1000	±0,8
1000 - 3000	±1,2
3000 PLUS	±2,0
ANGLES	±1°

ORIGINAL SCALE -:-
UNITS mm
DRAWN R.B.
TRACED
CHECKED

NECSA

BUILDING A-8 CHEMICAL CLEANING

DESTROY ALL PREVIOUS PRINTS

ISO. ASSEMBLY OF LINE No's: RB90-015 RB90-016

DRG.-No 20M272-02-00

MICROSTATION 1.0 REVISION

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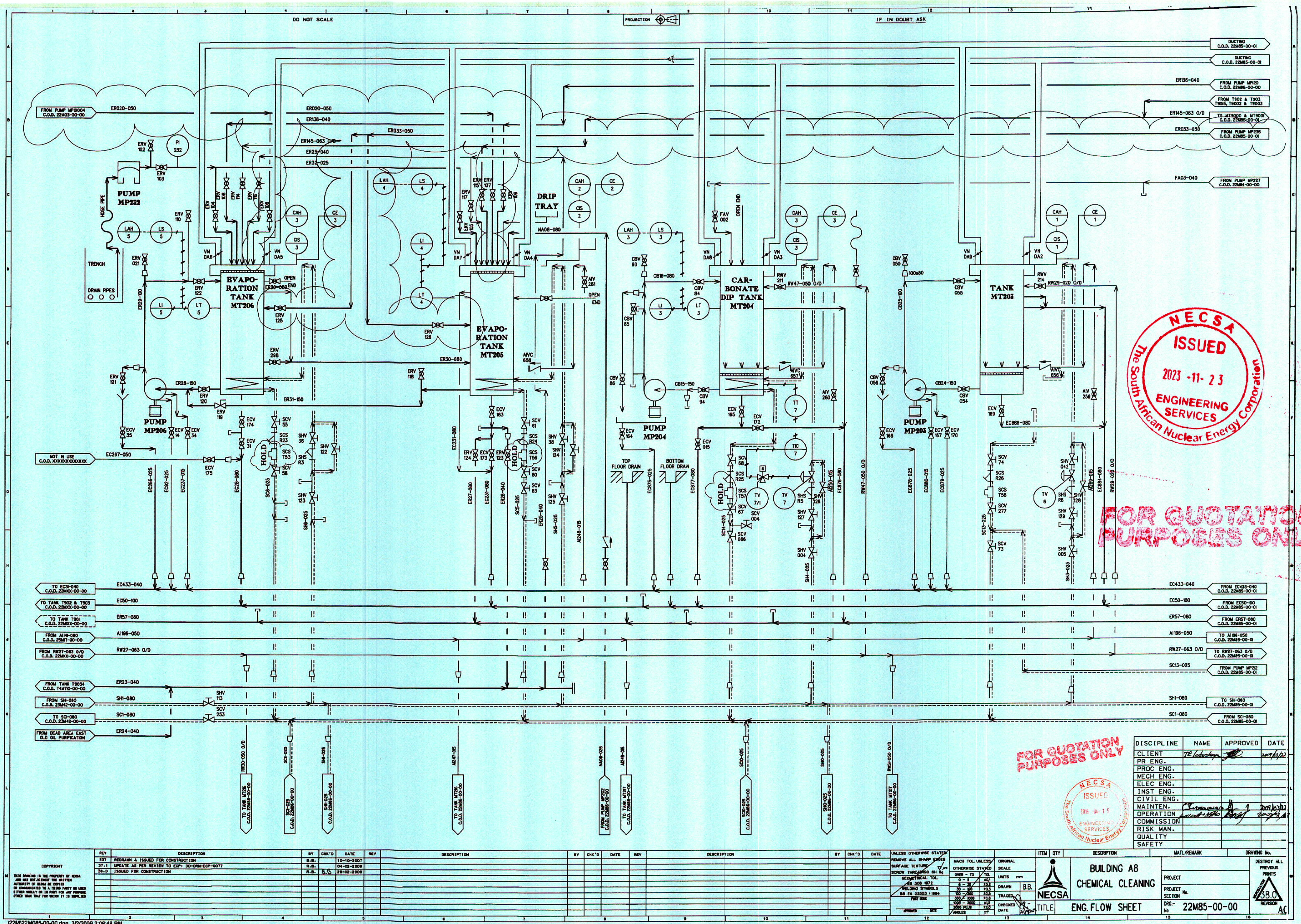
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PROJECTION
IF IN DOUBT ASK
PUMP MP222
HOSE PIPE
TRENCH
DRAIN PIPES
EVAPO-RATION TANK MT206
EVAPO-RATION TANK MT205
DRIP TRAY
CAR-BONATE DIP TANK MT204
TANK MT203
PUMP MP206
PUMP MP204
PUMP MP203
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TOP FLOOR DRAIN
BOTTOM FLOOR DRAIN
OPEN END
FROM PUMP MP0004 C.O.D. 22M03-00-00
NOT IN USE C.O.D. XXXXXXXXXXXXXX
TO EC31-040 C.O.D. 22MXX-00-00
TO TANK T902 & T903 C.O.D. 22MXX-00-00
TO TANK T90_ C.O.D. 22MXX-00-00
FROM AI14-080 C.O.D. 22M17-00-00
FROM RW27-063 O/D C.O.D. 22MXX-00-00
FROM TANK T9034 C.O.D. 74M70-00-00
FROM SH-080 C.O.D. 22M42-00-00
TO SCI-080 C.O.D. 22M42-00-00
FROM DEAD AREA EAST OLD OIL PURIFICATION
DUCTING C.O.D. 22M85-00-01
FROM PUMP MP120 C.O.D. 22M86-00-00
FROM T902 & T903 T9015, T9002 & T9003
TO MT9000 & MT9001 C.O.D. 22M85-00-01
FROM PUMP MP235 C.O.D. 22M85-00-01
FROM PUMP MP227 C.O.D. 22M84-00-00
FROM EC433-040 C.O.D. 22M85-00-01
FROM EC50-100 C.O.D. 22M85-00-01
FROM ER57-080 C.O.D. 22M85-00-01
TO AI196-050 C.O.D. 22M85-00-01
TO RW27-063 O/D C.O.D. 22M85-00-01
FROM PUMP MP212 C.O.D. 22M85-00-01
TO SHI-080 C.O.D. 22M85-00-01
FROM SCI-080 C.O.D. 22M85-00-01
TO TANK MT217 C.O.D. 22M86-00-00
FOR QUOTATION PURPOSES ONLY
NECSA ISSUED 2023-11-23 ENGINEERING SERVICES The South African Nuclear Energy Corporation
NECSA ISSUED 2016-04-15 ENGINEERING SERVICES The South African Nuclear Energy Corporation
DISCIPLINE | NAME | APPROVED | DATE
CLIENT
PR ENG.
PROC ENG.
MECH ENG.
ELEC ENG.
INST ENG.
CIVIL ENG.
MAINTEN.
OPERATION
COMMISSION
RISK MAN.
QUALITY
SAFETY
COPYRIGHT
THIS DRAWING IS THE PROPERTY OF NECSA AND MAY NOT, WITHOUT THE WRITTEN AUTHORITY OF NECSA BE COPIED OR COMMUNICATED TO A THIRD PARTY OR USED EITHER WHOLLY OR IN PART FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SUPPLIED
REV | DESCRIPTION | BY | CHK'D | DATE
R37 | REDRAWN & ISSUED FOR CONSTRUCTION | B.B. | | 10-10-2007
37.1 | UPDATE AS PER REVIEW TO ECP: DO-CRM-ECP-0077 | R.B. | | 04-02-2009
38.0 | ISSUED FOR CONSTRUCTION | R.B. | B.S | 28-02-2009
UNLESS OTHERWISE STATED
REMOVE ALL SHARP EDGES
SURFACE TEXTURE µm
SCREW THREAD ISO 6H 8g
GEOMETRICAL TOL. BS 308 1972
WELDING SYMBOLS BS EN 22553 : 1994
FIRST ISSUE
APPROVED DATE
MACH TOL. UNLESS OTHERWISE STATED
ORIGINAL SCALE
UNITS mm
DRAWN B.B.
TRACED
CHECKED DATE
ITEM | QTY | DESCRIPTION | MATL/REMARK | DRAWING No.
NECSA
BUILDING A8
CHEMICAL CLEANING
TITLE ENG. FLOW SHEET
PROJECT
PROJECT SECTION No.
DRG.-No 22M85-00-00
DESTROY ALL PREVIOUS PRINTS
REVISION 38.0
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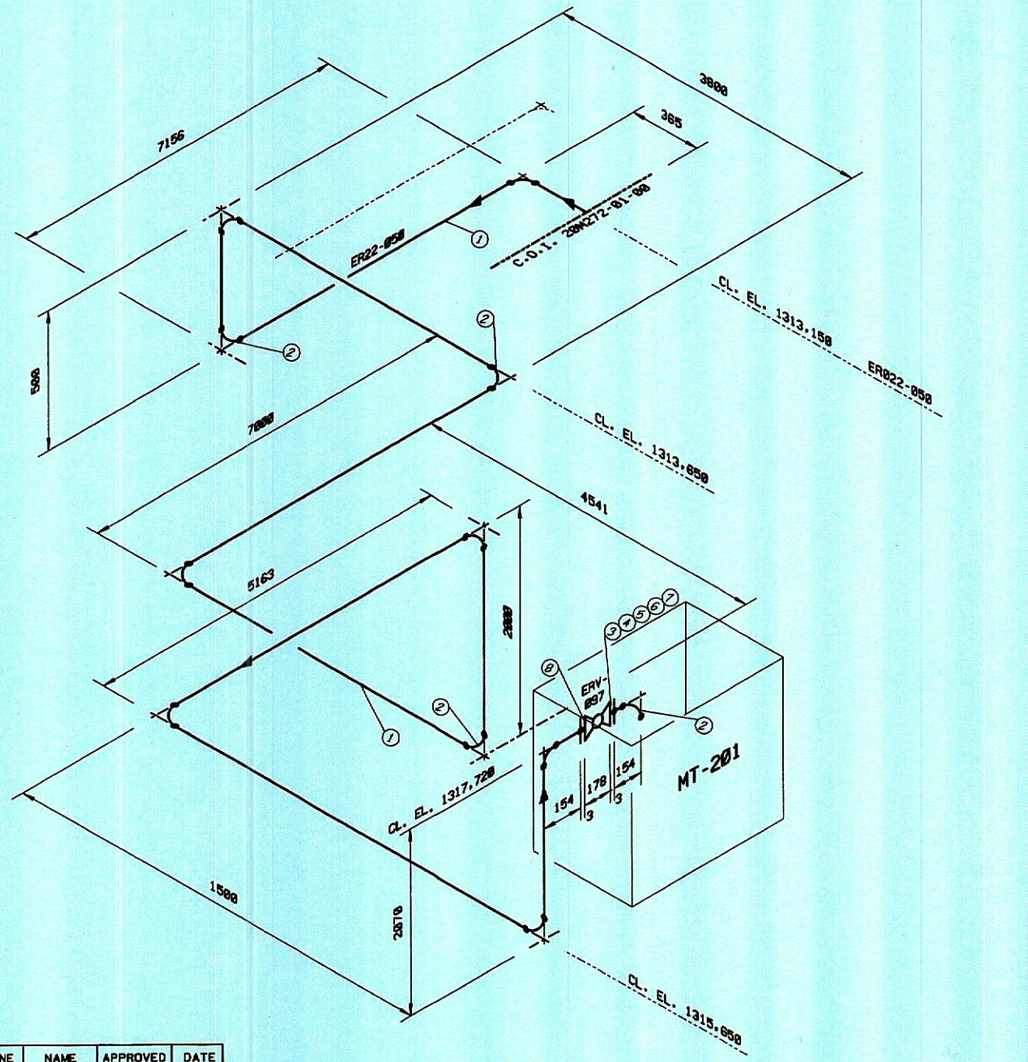
DO NOT SCALE

PROJECTION

IF IN DOUBT ASK



ITEM	SIZE	QTY	DESCRIPTION	MATL/REMARK
1	50NB	34,1m	PIPE SCH.40S SMLS S/STEEL ASTM A312 GR.TP304L	
2	50NB	11	ELL 90° LR WRGT SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
3	50NB	2	SLIP-ON FLG. ANSI B16,5 CL.150 FORGED S/STEEL ASTM A182 GR.F304L	
4	16x45	8	BOLT TO DIN 931 AISI 304 (A2)	
5	M16	8	NUT TO DIN 934 AISI 304 (A2)	
6	M16	8	FLAT WASHER TO DIN 125 A AISI (A-2)	
7	50NB	2	GASKET SPIRAL WOUND TYPE S-P-S-S-150	
8	50NB	2	BALL VALVE CLASS 150 STAINLESS STEEL FULL BORE FLANGED ANSI B16.5	
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NECSA ISSUED 2023-11-23 ENGINEERING SERVICES The South African Nuclear Energy Corporation

FOR QUOTATION PURPOSES ONLY

FOR QUOTATION PURPOSES ONLY

DESIGN, FABRICATION AND ERECTION DATA

					OPERATING	DESIGN
PIPE SPECIFICATION	?					
LINE CLASS	150#	SERVICE CATERGORY		PRESSURE	? kPag	? kPag
SERVICE	RADIOACTIVE EFFLUENT	X-RAY	10 %	TEMPERATURE	? °C	? °C
LAYOUT DRAWING	20M273-00-00	DYE PEN	100 %	SHOP TEST PRESSURE	HYDROSTATIC PNEUMATIC	? kPag
FLOWSHEET	22M85-00-01	DRYNESS		FIELD TEST PRESSURE	HYDROSTATIC PNEUMATIC	? kPag
LINE LIST		CLEANING		HELIUM LEAK TEST		kPag
INSULATION	Thk	DATA BOOK		HELIUM LEAK RATE		$x10^{-6}$ Pa.L/sec

DISCIPLINE	NAME	APPROVED	DATE
CLIENT			
PR ENG.			
PROC ENG.			
MECH ENG.			
ELEC ENG.			
INST ENG.			
CIVIL ENG.			
MAINTEN.			24/10/06
OPERATION			26/1/06
COMMISSION			
RISK MAN.			
QUALITY			
SAFETY			

NOTES:
1. ALL DIMENSIONS ARE APPROX. AND TO BE DETERMINED ON SITE.
2. PIPES TO BE SITE SUPPORTED.

REV	ZONE	DESCRIPTION	BY	CHK'D	DATE
0.1		ISSUED FOR CLIENT APPROVAL	RB	BB	20/02/2009
1.0		ISSUED FOR CONSTRUCTION	RB		27/02/2009

UNLESS OTHERWISE STATED:
REMOVE ALL SHARP EDGES
SURFACE TEXTURE: ---/um
SCREW THREAD: ISO 6H 6g
GEOMETRICAL TOL. BS 308 1972
WELDING SYMBOLS BS 499 PART 2 1980
FIRST ISSUE
APPROVED DATE

MACH TOL. UNLESS OTHERWISE STATED

OVER - TO	TOL
0 - 6	±0,1
6 - 30	±0,2
30 - 100	±0,3
100 - 300	±0,5
300 - 1000	±0,8
1000 - 3000	±1,2
3000 PLUS	±2,0
ANGLES	±1°

ORIGINAL SCALE -:-
UNITS mm
DRAWN R.B.
TRACED
CHECKED

ITEM	QTY	DESCRIPTION	MAT'L/REMARK	DESCRIPTION

NECSA

BUILDING A-8
CHEMICAL CLEANING

NECSA ISSUED 2006-04-15 ENGINEERING SERVICES The South African Nuclear Energy Corporation

DESTROY ALL PREVIOUS PRINTS

MICROSTATION 1.0 REVISION

ISO. ASSEMBLY OF LINE No's: ER022-050

DRG.- No 20M273-01-00

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Document number	MES-MEC-SOW-0003
Revision number	0.1
Date	2016/03/22
Title	The Scope of Work for the Installation of the two Pumps and the Piping System from the Sump to the Measuring Tanks MT201, MT205 andMT206 at A-8 building WDF.

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APPROVED	*Vincent Legoabe* *Head: Mechanical Engineering Services* *Tel: +27 12 305 6952* *Mobile: +27 83 636 3970* *Email:* Vincent.legoabe@necsa.co.za		23/03/2016
CHECKED	*Jaco Lubbinge* *Engineer* *Radwaste Technology* *Tel: Tel:+27 12 305 6536* *email: Jaco.Lubbinge@necsa.co.za*		23/03/2016
ACCEPTED	*William Ntho* *Manager* *Decontamination Services* *Tel: Tel:+27 12 305 6033* *email:* william.ntho@necsa.co.za		23/03/2016

DISTRIBUTION

* (Electronic distribution only)

1	MES Records	6	
2	NLM Record	7	
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4		9	
5		10	

TABLE OF CONTENTS

1 INTRODUCTION

This document describes the scope of works for the verification of the suitability of existing recirculation pump (MP 235) and the determination of the pump capacity required for the sump to be installed in the bunded area at the A-8 building Wet Decontamination Facility (WDF) and for the road tanker.

2 OBJECTIVE

The objective of this document is to outline activities and deliverables that have to be procured for the implementation of this project. The installation of the offloading pump and piping systems from the road tanker to the measuring tanks MT201, MT205 and MT206. The objective is also to install the sump pump and piping systems from the new decontamination sump to the measuring tanks MT201, MT205 and MT206.

3 REFERENCES

[1] Necsa, Drawing no. 20M273-03-00.

[2] "Moterelli Electric Motors," [Online]. Available: www.motorelli.co.za. . [Accessed 7

January 2016].

[3] Necsa, Drawing no. 20M272-01-00.

4 ABBREVIATIONS

In this document the following abbrevations were used:

NECSA	:	Nuclear Energy Corporation of South Africa
WDF	:	Wet Decontamination Facility
MT	:	Measuring Tank
MP	:	Measuring Pump
BA	:	Bunded Area
UCE	:	Uranium Contaminated Effluent
BBBEE	:	Broad-Based Black Economic Empowerment
COID	:	Compensation for Occupational Injuries and Diseases
OHS	:	Occupational Health and Safety

5 BACKGROUND

The current system at the A-8 building WDT consists of the receiving facility where the UCE is received from the road tanker and pumped to the either tank (MT 201, MT 205 or MT 206). From the storage tank the effluent is pumped by existing recirculation pump (MP 235) to the evaprating tanks (MT 205/206). The location of the newly upgraded bunded area where the new sump pump is to be installed is shown in drawing [1].

6 MOUNTING OF NEW SUMP PUMP IN THE BUNDED AREA

The following is a scope of works for the mounting of the new sump pump in the newly upgraded bunded area.

6.1 Preparing the mounting space for the Sump Pump

- Identify the location of the sump in the newly upgraded area from drawing number [1].
- Take into consideration that the pump will be submerged inside the sump.
- Ensure that the mounting space of the new pump is available by considering the space inside the sump and the details of the sump shown in the technical specifications.

6.2 Mounting and installation of the sump pump

- The sump pump will be fully submerged inside the sump.

6.3 Piping System

- Install the piping system from the sump to the measuring tanks MT201, MT205 and MT206.
- Install the valves and elbows from the sump to the measuring tanks MT201, MT205 and MT206.

7 MOUNTING OF THE OFFLOADING PUMP IN THE BUNDED AREA

The following is a scope of works for the mounting of the new offloading pump in the newly upgraded bunded area.

7.1 Preparing the mounting space for the Offloading Pump

- Identify the location of the offloading pump in the newly upgraded area from drawing number [1].
- Design and construct the pump skid suitable for the offloading pump.

7.2 Mounting and installation of the offloading pump

- Install the offloading pump for normal operation.

7.3 Piping System

- Install the piping system from the offloading pump to the measuring tanks MT201, MT205 and MT206.
- Install the valves and elbows from the sump to the measuring tanks MT201, MT205 and MT206.

8 SPECIFICATION

8.1 Technical requirements (Generic NECSA requirements on SOW documents)

8.1.1 Personnel shall be suitably qualified and experienced to perform tasks typically like installation and mounting of the pumps and motors. All labour personnel shall be suitably qualified and experienced to carry out the works. They should provide CVs and qualifications (up to date). Proof of any relevant technical training shall also be submitted. The organizational structure shall be provided to the Necsa representative for approval.

8.1.2 Service Provider shall accompany their bid by letters of proof of appointments from relevant companies on similar work performed.

8.2 Contractor Responsibilities and Additional Requirements as listed in Table 1. Items marked in the "Date" column of Table 1 as "Provide together with submission of bid." are mandatory and automatic disqualification shall follow for the Service Provider if not complied with.

Table 1: Contractor Responsibilities and Additional Requirements

Requirement	Responsibility	Date
[1] **Project Schedule**	A detailed schedule showing all major milestones. To be submitted by Service Provider.	Provide together with submission of bid.
[2] **Payment Schedule**	To be submitted by Service Provider.	Provide together with submission of bid.
[3] **VAT Registration**	To be submitted by Service Provider.	Provide together with submission of bid.
[4] **Tax Clearance**	To be submitted by Service Provider.	Provide together with submission of bid.
[5] **BBBEE Certificate**	To be submitted by Service Provider.	Provide together with submission of bid.
[6] **Company profile**	To be submitted by Service Provider.	Provide together with submission of bid.
[7] **Health and Safety file**	To be submitted by Service Provider to show OHS Act compliance.	Prior to commencement of works.
[8] **Work Permit**	The work permit shall be issued to the Service Provider before work commences	Prior to commencement of works.
[9] **Confidentiality agreement**	Necsa to supply template for Service Provider to complete. The form shall be completed by each and every employee to work on site.	Prior to commencement of works.
[10] **Necsa Induction**	The induction is conducted monthly. All personnel are required to do the induction before commencing any works. Note that Service Provider shall not be issued with Service Provider access cards until induction has been done.	Prior to commencement of works.
[11] **Quality Assurance**	The Service Provider shall submit an approved quality	Prior to commencement of works.

Requirement	Responsibility	Date
	procedure. A professional engineer should ensure quality results of every milestone.	
[12] **INS-0800 License**	This is an internal license agreement between Service Provider, clients & Necsa Licensing department and necessary before all works commence.	Prior to commencement of works.
[13] **COID letter of good standing**	To be submitted by Contractor.	Provide together with submission of bid.

9 NECSA RESPONSIBILITY AND ADDITIONAL REQUIREMENTS

In certain designated areas, electrical supply shall be provided for by Necsa. Necsa will also be responsible for the supply of a set of drawings with the baseline information. Necsa PES will endeavour to provide available information as required by the Contractor.

10 TESTING AND COMMISSIONING REQUIREMENTS

Pressure testing of the pipeline will be done.

Pipeline will be checked and inspected for any leakages.

Site cleared of all debris and restored.

11 DOCUMENTATION UPDATE REQUIREMENTS

Effluent supply pipeline drawings to be updated and revised.

Effluent supply pipeline manuals to be updated and revised.

Operating instructions/manuals to be compiled.

12 SAFETY CLEARANCE CERTIFICATE

NLM Senior operator, Section manager, PES Chief Engineer and the Project Manager will sign the safety clearance certificate after the work is completed.

13 TEST OBJECTIVES

To check whether the pumps and pipeline can deliver 4L/s as designed.

To check whether the new pipeline does not have a negative effect on the existing pipeline.

To check if the flow meter is taking readings as expected.

The test is to make certain all installed valves are performing as expected.

14 COMMISIONING PLAN

14.1 SPECIAL PRECAUTIONS

Warning signs indicating pressure testing to be temporarily placed where required.

14.2 PREREQUISITES FOR TESTING

Pipeline with all its components installed according to the specifications stipulated in the accompanying design drawings. With isolation valves closed. The pipe filled with water from the pump to the temporarily flange of the respective tanks. Pressure gauge readings will be taken.

14.3 TEST INSTRUCTIONS

Barricade the affected area along the pipeline to be tested.

Check for defects and leakages along the pipeline.

Flow meter readings to be checked and calibrated if necessary.

Pressure gauge readings to be checked and gauges calibrated if necessary.

Isolating valves, emergency return valves (ERV) to be opened and closed to check their functionality.

14.4 ACCEPTANCE CRITERIA

When the pipeline from the sump and the offloading bay to the measuring tanks MT 201, MT205 and MT206 is installed and certified by Project Manager to be complete.

When the flow meter mounted on the pipeline is certified by C& I Engineer to be functioning as expected.

When the Pressure Gauge is installed and certified by the C&I Engineer to be complete.

When all work permits are cleared.

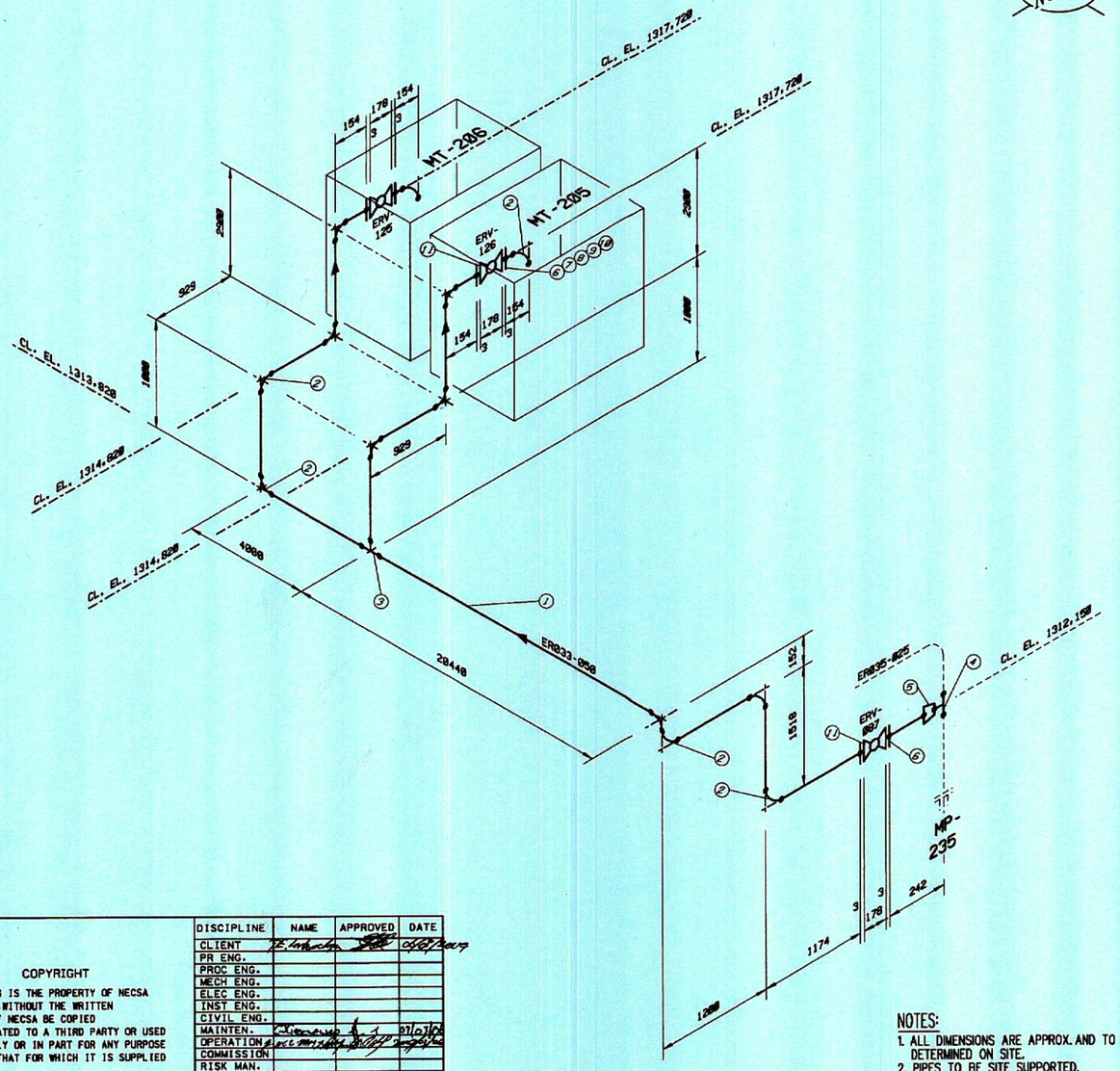
15 PROGRESS REPORTING

The Service Provider shall provide weekly, last working day of every week reports with regards to all the works performed. These reports shall include the allocation of resources, task performed, project risk identification/analysis and completed tasks. In addition weekly meeting shall occur and chaired by authorized Necsa representative where necessary.

DO NOT SCALE

PROJECTION

IF IN DOUBT ASK



NOTES:
1. ALL DIMENSIONS ARE APPROX. AND TO BE DETERMINED ON SITE.
2. PIPES TO BE SITE SUPPORTED.

ITEM	SIZE	QTY	DESCRIPTION	MATL/REMARK
1	50NB	38,2m	PIPE SCH.40S SMLS S/STEEL ASTM A312 GR.TP304L	
2	50NB	13	ELL 90° LR WRGT SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
3	50NB	1	TEE EQUAL WRGT SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
4	25NB	1	TEE EQUAL WRGT SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
5	50-25NB	1	CON.RED.WRGT SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
6	50NB	6	SLIP-ON FLG.ANSIB16,5 CL.150 FORGED S/STEEL ASTM A182 GR.F304L	
7	M16x65	24	BOLT TO DIN 931 AISI 304 (A2)	
8	M16	24	NUT TO DIN 934 AISI 304 (A2)	
9	M16	24	FLAT WASHER TO DIN 125 A AISI(A-2)	
10	50NB	6	GASKET SPIRAL WOUND TYPE S-P-S-S-150	
11	50NB	3	BALL VALVE CLASS 150 STAINLESS STEEL FULL BORE FLANGED ANSIB16.5	
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NECSA ISSUED 2023-11-23 ENGINEERING SERVICES The South African Nuclear Energy Corporation

FOR QUOTATION PURPOSES ONLY

FOR QUOTATION PURPOSES ONLY

DESIGN, FABRICATION AND ERECTION DATA

						OPERATING	DESIGN
PIPE SPECIFICATION							
LINE CLASS	150#	SERVICE CATERGORY		PRESSURE		kPag	kPag
SERVICE	RADIOACTIVE EFFLUENT	X-RAY	10 %	TEMPERATURE		°C	°C
LAYOUT DRAWING	20M273-00-00	DYE PEN	100 %	SHOP TEST PRESSURE	HYDROSTATIC PNEUMATIC		kPag
FLOWSHEET	22M85-00-01	DRYNESS		FIELD TEST PRESSURE	HYDROSTATIC PNEUMATIC		kPag
LINE LIST		CLEANING		HELIUM LEAK TEST			kPag
INSULATION	Thk	DATA BOOK		HELIUM LEAK RATE			$x10^{-6}$ Pa.L/sec

DISCIPLINE	NAME	APPROVED	DATE
CLIENT			
PR ENG.			
PROC ENG.			
MECH ENG.			
ELEC ENG.			
INST ENG.			
CIVIL ENG.			
MAINTEN.			
OPERATION			
COMMISSION			
RISK MAN.			
QUALITY			
SAFETY			

REV	ZONE	DESCRIPTION	BY	CHK'D	DATE
0.1		ISSUED FOR CLIENT APPROVAL	RB	BB	20/02/2009
1.0		ISSUED FOR CONSTRUCTION	RB		27/02/2009

UNLESS OTHERWISE STATED:
REMOVE ALL SHARP EDGES
SURFACE TEXTURE: ---- $\sqrt{}$ µm
SCREW THREAD: ISO 6H 6g
GEOMETRICAL TOL. BS 308 1972
WELDING SYMBOLS BS 499 PART 2 1980
FIRST ISSUE
APPROVED DATE

MACH TOL. UNLESS OTHERWISE STATED	
OVER – TO	TOL
0 – 6	±0,1
6 – 30	±0,2
30 – 100	±0,3
100 – 300	±0,5
300 – 1000	±0,8
1000 – 3000	±1,2
3000 PLUS	±2,0
ANGLES	±1°

ORIGINAL —:—
SCALE
UNITS mm
DRAWN R.B.
TRACED
CHECKED

ITEM	QTY	DESCRIPTION	MAT'L/REMARK	DESCRIPTION

NECSA

BUILDING A-8
CHEMICAL CLEANING

NECSA ISSUED 2006-04-15 ENGINEERING SERVICES The South African Nuclear Energy Corporation

ISO. ASSEMBLY OF LINE No's: ER033-050

DRG. No 20M273-03-00

DESTROY ALL PREVIOUS PRINTS

MICROSTATION 1.0

REVISION

...\Piping\20M273-03-00.dgn 3/3/2009 11:53:17 AM

Title	**BOQ (Civil) - Bund Area Receiving of U Effluent at A8 Upgrade**
Doc. No.	DOC NO. ENS-MES-BOM-0001
Revision	REV. 2.0

APPROVAL & DISTRIBUTION

	NAME	SIGNATURE	DATE
Prepared	L A Monyela Graduate Civil Engineer: Engineering		20/11/2023
Reviewed	O Siko Mechanical Engineer: Engineering		20/11/2023
Approver	S Mngoma Acting Head (MES): Engineering		20/11/2023
Distribution	Department and SharePoint Records		
	Configuration Management		

Bill of Quantities

AREA 8 NEW BUNDWALLS RAMPS SUMP AND PLINTHS

ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
A	**SABS 1200 A**	**SCHEDULE A: PRELIMINARY AND GENERAL**				
A1	**8,3**	**FIXED-CHARGE ITEMS**				
A1.1	8.3.1	Contractual Requirements	Sum	1,0		
A1.2	8.3.2	Establish Facilities on the Site:				
A1.5	PS A 8.3.3	Other fixed-charge obligations	Sum	1,0		
A1.6	8.3.4	Removal of site establishment	Sum	1,0		
A2.1	8,7	DAYWORK				
A2.1.1		(a)Labour	Sum	1,00		
A2.1.2		(b)% adjustment for labour	%			
A2.1.3		(c)Materials	Sum	1,00		
A2.1.4		(d)% adjustment for Materials	%			
A2.1.5		(e)Plant (As per Day works Schedule)	Sum	1,00		
		Subtotal carried over to summary page				

ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
B	**SABS 1200 D**	**SCHEDULE C: BREAK-UPS OF EXISTING BUNDWALLS**				
B.1		Inspect test and seal temporarily, drilled holes for anchor bolts, internally.	sum	1		
B.2		Drill all anchor bolts for the external section of the access ramp as shown on drawing 20-C307-00 Rev. 3.	sum	1		
B.3		Scabble the existing floor for internal ramp, External Ramp, Plinth and Bund Walls sections.	m^2	66.67		
		Total carried over to summary page				

ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
C	**SABS 1200 GA**	**CONCRETE WORKS SMALL WORKS**				
C.1						
		Supply smooth formwork				
C.1.1		300mm wide formwork casings	m	10,00		
		Erect, prepare and install formwork				
C.1.2		300mm wide formwork casings	m	10,00		
		Remove formwork and repair any defects on cured concrete plinth.				
C.1.3		300mm wide formwork casings	m	10,00		
		Place concrete and reinforcement				
C.1.4		Supply, 30MPa structural concrete for the construction sump and plinths	m^3	0,85		

C.1.5		Supply, 30MPa structural concrete for the construction of bund walls.	m^3	2,50		
C.1.6		Supply, 30MPa structural concrete for the construction of external section of access ramp	m^3	4,00		
C.1.7		Supply, 30MPa structural concrete for the construction of internal section of the access ramp	m^3	1,67		
C.1.8		Conduct relevant tests on the concrete, such as slump test on the concrete thus supplied.	sum	3,00		
		REINFORCEMENT CONCRETE				
C.1.9	8.1.2.	Supply, handle, store temporarily reinforcement Mesh ref. 245	m^2	11.88		
C.1.10		Place and install Reinforcement Mesh Ref. 245 for the strengthening of the existing floor.	m^2	23,00		
C.1.11		Place reinforcement for the sump and plinths including stop blocks etc.	ton	0,19		
C.1.12		Place reinforcement for the bund walls as follows;	ton	0,12		
C.1.13		Place reinforcement for external access ramp including dowels	ton	0,36		
C.1.14		Place reinforcement for internal access ramp	ton	0,15		
		Total carried over to summary page				

Document number	MES-MEC-QUO-0251
Revision number	0.1
Date	2016/03/22
Title	BILL OF QUANTITIES FOR THE INSTALLATION OF THE TWO PUMPS AND THE PIPING SYSTEM FROM THE SUMP TO THE MEASURING TANKS MT201, MT205 AND MT206 AT A-8 BUILDING WDF.

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PELINDABA ENTERPRISES

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5		10	

MECHANICAL WORK FOR THE SUPPLY, DELIVERY, INSTALLATION, TESTING, COMMISSIONING AND HAND-OVER AT A-8 BUILDING, WET DECONTAMINATION FACILITY AT NECSA IN PELINDABA, BRITS DISTRICT.

REF. NO. :
FILE NO. :

PROJECT NO:
BILL OF QUANTITIES FOR A-8 BUILDING WET DECONTAMINATION FACILITY (WDF)

ITEM NO	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
1		Pipe Schedule40S Stainless Steel ASTM A312 Grade TP304L	50NB	100m		R
			40NB	0.1m		R
			32NB	0.1m		R
			15NB	3.2m		R
2		90° Elbows LR WRGT SMLS SCH.40S S/Steel ASTM A403 GR.WP 304L Butt Weld Ends	50NB	36.0		R
			15NB	7.0		R
3		Tee Equal WRGT SMLS SCH.40S S/Steel ASTM A403 GR.WP 304L Butt Weld Ends	50NB	4.0		R
4		Con. Reducer SMLS SCH.40S S/Steel ASTM A403 GR.WP 304L Butt Weld Ends	50-15NB	1.0		R
			50-32NB	1.0		R
			50-40NB	1.0		R
5		Slip-on Flange ANSI B16.5 CL150 Forged S/Steel ASTM A182 GR.F304L	50NB	21.0		R
			15NB	4.0		R
6		Slip-on Flange BS4504 PN16 Forged S/Steel ASTM A182 GR.F304L	50NB	1.0		R
			32NB	1.0		R
7		Blank Flange ANSIB16.5 CL150 Forged S/Steel ASTM A182 GR.F304L Drilled 15 NTP Thread on CL	15NB	2.0		R
8		Bolt to DIN 931 AISI 304 (A2)	M16×65	72.0		R
			M16×45	24.0		R
			M12×45	24.0		R
9		Nut to DIN 931 AISI 304 (A2)	M16	96.0		R
			M12	24.0		R
10		Flat Washer to DIN 125 A AISI (A-2)	M16	96.0		R
			M12	24.0		R
11		Gasket Spiral Wound Type S-P-S-S-150	50NB	24.0		R
			15NB	6.0		R
12		Ball Valve Class 150 S/Steel Full Bore Flanged ANSIB16.5	50NB	9.0		R
			15NB	3.0		R
13		Strainer Class 150 Cast S/Steel Flanged ANSIB16.5	50NB	2.0		R
14		Flow Meter Woltman Turbo Mod. WT II Cast Iron, Polyester Coated	50NB	1.0		R
15		Wafer Check Valve S/Steel to Suit 150 FLGS.	50NB	2.0		R
16		Half Socket 3000 S/Steel ASTM A312 GR.TP304L	15NB	1.0		R
		PROPOSED ITEMS (NOT IN THE DRAWINGS)				
17		Union 3000 S/Steel SRC.BSP.	40NB	1.0		R
18		Non Return Valve	50NB	2.0		R
19		Isolating Valve	50NB	3.0		R
20		Submersible Pump	4 l/s, 28 m head	1.0		R
21		Normal pump	4 l/s, 28 m head	1.0		R
22		High Level Indicator		3.0		R
		TOTAL COST FOR NEW ITEMS				R

SUMMARY OF SCHEDULE OF QUANTITIES

SECTION A	:	SITE ESTABLISHMENT	R	.....
SECTION B	:	GENERAL ADMINISTRATION	R	.....
SECTION C	:	SUPPLY OF EQUIPMENT / MATERIAL	R	.....
SECTION D	:	INSTALLATION OF EQUIPMENT / MATERIAL	R	.....
SECTION E	:	TESTING AND COMMISSIONING OF EQUIPMENT / MATERIAL	R	.....
TOTAL OF SCHEDULE OF QUANTITIES CARRIED TO CALCULATION OF TENDER SUM			R	.....

CALCULATION OF TENDER SUM

TOTAL OF SCHEDULE OF QUANTITIES	R	.....
SUBTOTAL	R	.....
VALUE-ADDED TAX (VAT) The tenderer shall add 14% of the subtotal for value-added tax	R	.....
TENDER SUM CARRIED TO FORM OF TENDER	R	.....

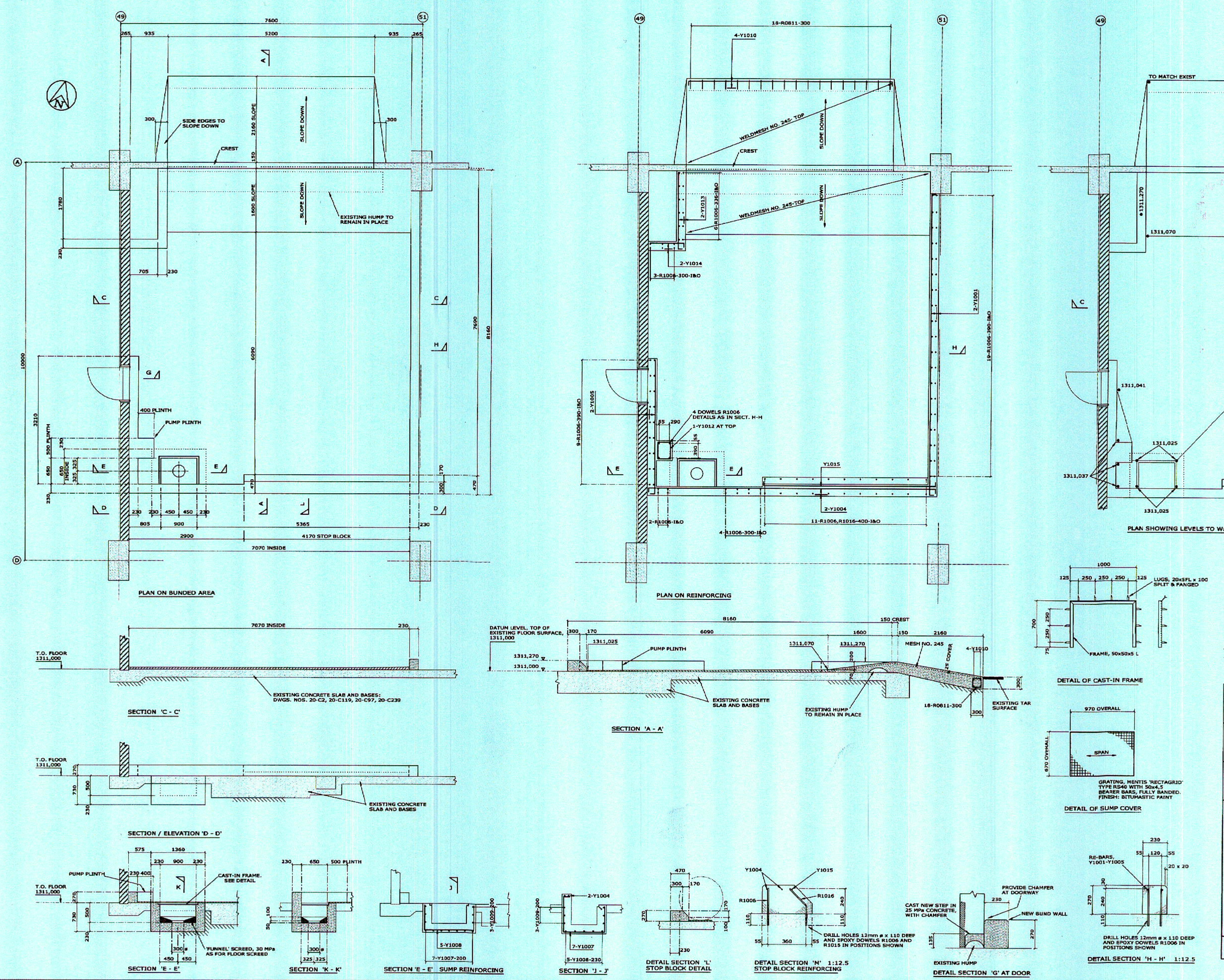
necsa We're in your world South African Nuclear Energy Corporation SOC Limited	DOCUMENT NO.	PROJECT : A8 Effluent Treatment Plant Modification				
	ENS-MES-SPE-0005	LOCATION : NECSA: A8 Wet Decontamination Facili				
	22/11/2023	For Enquiry	0			
	DATE	ISSUE	REV.	PREP	CHKD	APPD

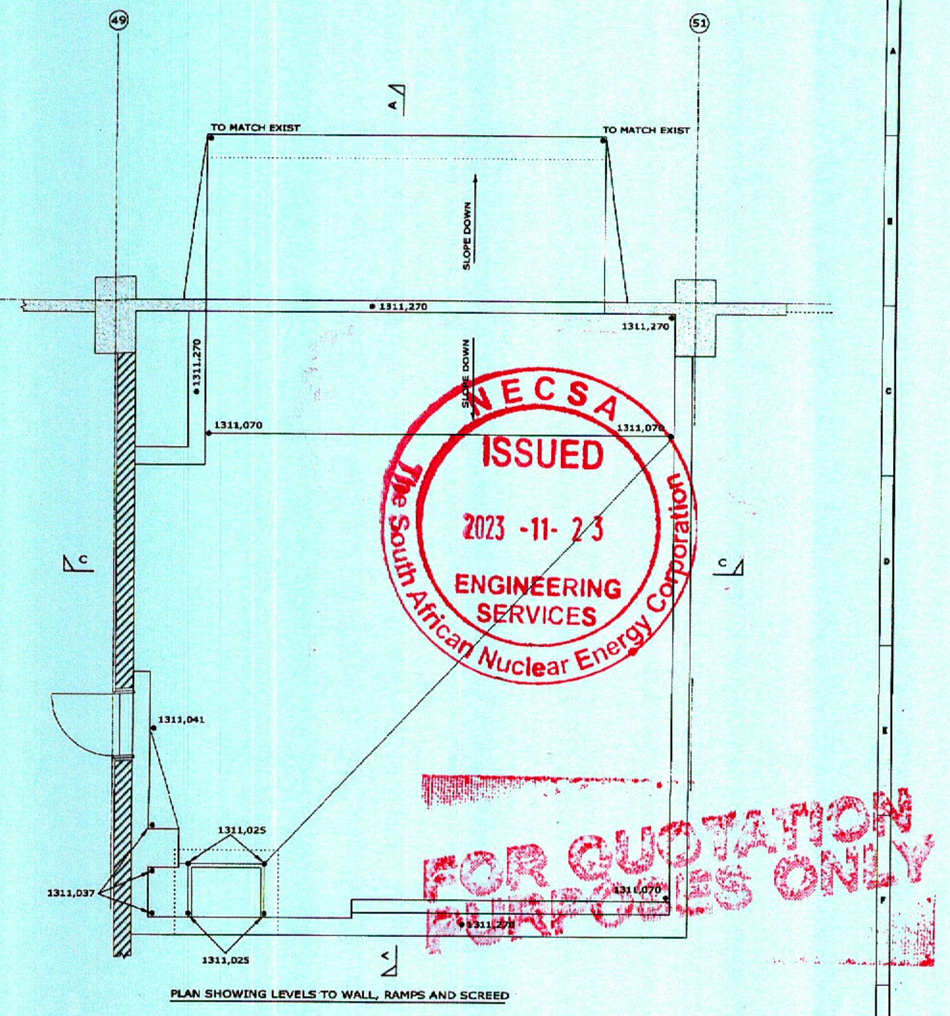
SERVICE / FUNCTION :	**Liquid Effluent Submersible Pump**	**QTY :**	1
SUPPLIER :		**TYPE :**	**SUBMERSIBLE PUMP**
MODEL NO :	*		

PROCESS DATA		**DRIVE : MOTOR**	
Fluid	Liquid Effluent - Water	Starting	3 Phase, Induction Motor
Composition (wt/wt &)	-	Voltage	415+/-10%
Density Max, kg/m3	-	Frequency	50HZ+/-3%
Density at Opr. Temp., kg/m3	994	Motor Rating, kW	1.05
Viscosity at Opr. Temp., cP	1	Motor Speed, RPM	2900
Corrosion / Erosion	NIL	Mounting	Foot Mounted
Operating Temp., Nor/Max, °C	35 / 45	Amb. Temp. °C	-
Solid Content , %	NIL	Protection Class	IP-65
Normal Mass Flow Rate, kg/h		Installation	Out door
Normal Volumetric Flow Rate, m3/hr	14,0	Flame Proof	Yes
Min. Volumetric Flow Rate, m3/hr		Starting	DOL
Max. Volumetric Flow Rate, m3/hr		Motor Frame Size	-
Available NPSH , mtrs		Area Classification	-
Suction Pressure, kg/cm2g		Motor Make	-
Diff. Pressure, kg/cm2g			
Diff. Discharge Head, mtrs			
Vapour Pressure , mmHg			
NPSH Required	*		

ENGINEERING DATA		**MATERIAL OF CONSTRUCTION**	
Design Temperature, °C	*	Casing	CF8
Design Pressure, kg/cm2g	*	Shaft	SS304
Hydrotest Pressure, kg/cm2g	*	Impeller	CF8
Installation	In door	Coupling	*
Suction / Discharge Size, mm	*	Sleeve	CF8
Drive / Pump, RPM	2900	Base Frame	IS 2062
Coupling Type	*	Accessories	*
Pump Mounting	Horzontal	Foundation Bolts	MS
Flange Rating	*	Coupling Guard	IS 2062
Design Efficiency, %	*	All Wetted Parts	SS304
Sealing Type	Single Mechanical Seal	Seal Face Combination	-
Impeller Type	*	Seal Flushing Plan	*
Impeller Dia	*	Mechanical Seal Make	*
Casing Type	*		
Suction / Discharge	*		
Pump Design Standard	*		

REMARKS :





GENERAL NOTES:

1. THE ENTIRE EXISTING FLOOR SURFACE WHICH WILL BE COVERED BY THE BUNDED AREA IS TO BE THOROUGHLY CLEANED, AND ALL PAINT AND LOOSE SCALE IS TO BE REMOVED.
2. A NEAT CEMENT SLURRY IS TO BE BRUSHED ONTO THE FLOOR SURFACE IMMEDIATELY BEFORE EACH SECTION IS CAST, INCLUDING THE SCREED.
3. THE BUND WALL AND PUMP PLINTH , IN 25 MPa CONCRETE, TO HAVE AN OFF-SHUTTER FINISH ON THE SIDES AND A WOOD FLOAT FINISH ON THE TOP SURFACE. PROVIDE CHAMFERS AS SHOWN.
4. FOR THE OUTER RAMP, CUT OUT A PORTION OF THE EXISTING TARMAC SURFACE TO THE DIMENSIONS SHOWN ON THE PLAN AND EXCAVATE TO THE PROFILE SHOWN IN SECTION 'A - A', THOROUGHLY COMPACTING ALL DISTURBED SOIL. CONSTRUCT THE RAMPS IN 25 MPa CONCRETE, WITH A WOOD FLOAT FINISH.
5. THE SCREED IS IN 30 MPa CONCRETE WITH 'CRUSHER RUN' AGGREGATE, PROVIDED WITH A WOOD FLOAT FINISH.
6. MINIMUM CONCRETE COVER TO ALL REINFORCING TO BE 40mm, EXCEPT THE WELDMESH.
7. ON COMPLETION OF THE WORK, THE RAMPS, THE SCREED SURFACE, THE INNER FACES OF THE BUND WALLS AND SUMP, AND THE SIDES AND TOP OF THE PUMP PLINTH SHALL BE PREPARED AND GIVEN AN ACID-RESISTANT EPOXY COATING, BY SPECIALISTS.

Bending shape codes: 20, 34, 38, 62, 52, 60, 75, 83 (B = OUTSIDE)

ITEM	QUANTITY	QUANTITY PER ITEM	TOTAL	DIA. MARK	CUTTING LENGTH	CODE	A	B	C	D	E
			2	Y1001	5250	38	100	5060			
			2	Y1004	7400	38	100	7220			
			2	Y1005	3550	38	100	3360			
			100	R1006	350	20	350				
			7	Y1007	2650	52	650	1030	920		
			5	Y1008	2500	38	640	1260			
			3	Y1009	4650	60	1260	1010			
			4	Y1010	5300	38	100	5120			
			18	R0811	1000	60	220	220			
			1	Y1012	1600	60	420	320			
			2	Y1013	2100	38	100	1930			
			2	Y1014	1050	38	100	855			
			1	Y1015	4500	38	100	4320			
			11	R1016	420	62	230	160			
				MESH 245 25,5 SQ.M (INCLUDES 10% FOR OVERLAP)							

TOTAL WEIGHTS:	
Y-BARS:	69 KG
R-BARS:	33 KG
WELDMESH:	63 KG

REFERENCE DRAWINGS

REV	DESCRIPTION	CHKD	DATE
P1	ISSUED FOR COMMENT AND APPROVAL	DJP.	25-01-2008
R1	ALTERED ACCORDING TO COMMENTS, ISSUED FOR CONSTRUCTION	DJP.	31-01-2008
R2	WALL AT SUMP MOVED SOUTHWARDS & LENGTHENED, STOPBLOCK ADDED, PUMP PLINTH MOVED	DJP.	15-01-2009
R3	STOP-BLOCK WALL EXTENDED TO INTERSECT EAST WALL	DJP.	04-02-2009

FIRST ISSUE

APPROVED 2009/02/04 DATE

ORIGINAL SCALE: 1:33.33 AS SHOWN

DRAWN DJP.

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CHECKED

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A-BUILDING

NEW BUNDED AREA IN BASEMENT BETWEEN LINES A, 49 AND 51

SITE: PEL. EAST

ORDER No. IWO-22097

TITLE: ARRANGEMENT AND DETAILS

DRG No 20-C307-00

REVISION R3

20-C307-00

Classification: OPEN

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NUCLEAR SERVICES

DOCUMENT NO	**TS-PD-002**
REVISION NO:	**2.0**
TITLE:	**Process Description for the Receiving and Interim Storage of Uranium Containing Effluent at A8-Building**

Authorization

	NAME	SIGNED	DATE
PREPARED	E RAUBENHEIMER Project Leader (NLM)		14-05-2013
PREPARED	DO MPHAHLELE Nuclear Safety Analyst (LD)		2013-05-15
REVIEWED	HS SWART Nuclear Safety Analyst (LD)		2013-05-15
ACCEPTED	RGF ROBBERTS Manager: Technical Support: (PDO)		2013/05/15
APPROVED	W NTHO Nuclear Facility Manager: (DC)		2013/05/16

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6	E RAUBENHEIMER	13		20	
7	AA VAN ASWEGEN*	14		21	

- = Distributed via E-mail

Revisions

This document has been revised according to the following schedule:

Revision	Date Approved	Nature of Revision	Prepared by
1.0	2012-01-26	First Issue	E Raubenheimer DO Mphahlele
2.0	See title page	Revised to address NNR comments from NIL06B0019	E Raubenheimer DO Mphahlele

Contents:

1 PURPOSE

The purpose of this document is to describe the receiving and interim storage of the uranium containing effluent in A8- building Wet Decontamination Facility (WDF), received from external facilities on the Necsa site. It also includes the transferring of the interim storage tank content into the evaporation tanks.

Currently the uranium containing effluent from external facilities are deposited and evaporated in Pan 6.These modifications in A8- building are needed since the use of Pan 6 for external effluent could be terminated in future.

2 SCOPE

This document describes the process in the existing WDF in A8- building to receive, offload and temporary store the external uranium containing effluent in the interim storage tank MT 201. The effluent can also be transferred from the road tanker directly into the evaporation tanks MT 205 and MT 206. This process description also includes the transferring of the storage tank MT 201contents into the evaporation tanks MT 205 and MT 206 for evaporation. New pumps, valves and pipes will be installed to facilitate this action.

3 REFERENCES

[1]	NLM-WKI-012	Sampling and Analyzing for Criticality Control
[2]	DS-WAR-002	Decontamination Service Product and Waste Acceptance and Release Criteria
[3]	NL27/DS-PSA-0001(Rev.0/3)	Wet Decontamination Facility in A-building
[4]	SHEQ-INS-5300	Written Safe Work Procedures, Instruction and Task Training
[5]	SHEQ-INS-8150	Access and Egress Control for Radiological Areas
[6]	NLM-PRO-042	Training Procedure for DS Personnel
[7]	NLM-SUR-009	RP Surveillance and Control: A-Building Decontamination Facility
[8]	NIL-06 (Variation 0)	Nuclear Installation License No.06. Granted to Necsa by the National Nuclear Regulator for the A-8 Decontamination Facility
[9]	NLM-AC-002	Area Classification, Access and Egress Control: A-8 Building Decontamination Facility
[10]	NLM-WKI-061	Acceptance, Release and Clearance of Components at Decontamination Facility
[11]	LD-HZA2011-REP-0004	A Prospective Hazard Assessment for the Receiving and Interim Storage of Uranium Containing Effluent at A8-

	Building
[12] NLM-WKI-092	Sampling and analysis of liquids in the wet decontamination facility for criticality control

4 DEFINITIONS AND ABBREVIATIONS

4.1 DEFINITIONS:

No definitions applicable.

4.2 ABBREVIATIONS:

WDF	Wet Decontamination Facility
MCS	Mass Control System
MT	Measuring Tanks
SEADF	Separating Element Assembly Decontamination Facility
NFM	Nuclear Facility Manager
SWDF	Supervisor of the Wet Decontamination Facility
RP	Radiation Protection
RPO	Radiation Protection Officer
PPC	Personal Protection Clothing
PPE	Personal Protection Equipment
UCE	Uranium Containing Effluent

5 RESPONSIBILITY

The NFM, SWDF and RPO are responsible to ensure that the receiving, offloading and interim storage of the external uranium containing effluent in A8- building WDF is done as per prescribed procedure.

The procedure will be compiled once authorization is obtained for the proposed modifications. It is the responsibility of the NFM and SWDF to review this document when applicable.

6 PROJECT AND PROCESS DESCRIPTION

6.1 FACILITY OVERVIEW

A8-building which houses the WDF is located on the Pelindaba East site. The WDF is at the North side of A8-building and adjoins the Dry Decontamination Facility. The receiving facility will be situated at the Northern side of A- building inside the old sand blasting area on the basement level.

The Wet Decontamination Facility in A8- building is a designated NIL-06[8] licensed facility for the decontamination of uranium containing components.

The facility consist of two chemical decontamination lines, evaporation tanks, a SEADF, auxiliary liquid storage tanks and interim drum storage facility. The WDF comprises two levels, namely basement and ground floor.

The current license document NL27/DS-PSA-0001(Rev.0/3)[3] for the WDF in A8- building is authorized and makes provision to receive effluent from external generators on the Necsa site. Small volumes of external U containing effluent from oil purification activities have been accepted in the past at the same area where the intended modifications will take place. The facility is however, not currently configured to receive effluent that is usually transferred to Pan 6. Only a few minor changes are needed to the existing WDF to receive external effluent.

6.2 *ACCESS AND EGRESS CONTROLS*

Access and egress into and out of the facility shall be according to the existing area classification, access and egress control document NLM-AC-002 [9] and SHEQ-INS-8150[5].

6.3 *RADIOLOGICAL SURVEILLANCE PROGRAMS*

Radiological surveillance will be done according to the current facility specific radiological surveillance program NLM-SUR-009. [7]

6.4 *TRAINING OF PERSONNEL*

Personnel performing the required tasks i.e. to transfer effluent from the road tanker into storage tank MT 201 or directly into evaporation tanks MT 205 and MT 206 and the transferring of storage tank MT 201 content into evaporation tanks MT 205 and MT 206 shall be competent, trained and authorised according to the applicable facilities training procedure, work instructions and document NLM-PRO-042 (6) and SHEQ-INS-5300[4].

6.5 *EXTERNAL GENERATORS AND VOLUMES OF EFFLUENT*

The volume of external uranium bearing effluent, currently being taken by road tanker to Pan 6, has been decreasing over the last three years.

The main generators of effluent over this period were as follows:

- Building 2600
- Building 2400 (LEMS)
- Area 70
- Area 27
- E building wash rooms (last consignment in 2006)

Since 2008 the annual uranium bearing effluent has reduced as follows:

- - 2007 273 cubic m per annum
- - 2008 404 cubic m per annum

- - 2009 320 cubic m per annum
- - 2010 115 cubic m per annum
- - 2011 104 cubic m to date (October 2011)

6.6 *RECEIVING FACILITY*

6.6.1 *Function of the receiving facility*

The function of the receiving facility is to safely receive and offload uranium containing effluent shipped by road tanker from external facilities on the Necsa site. The capacity of the road tanker is about 7 m^3. The effluent received with the road tanker will be transferred with the aid of new a pump, piping, valves and instrumentation from the receiving area into existing interim storage tank MT 201 or directly into existing evaporation tank MT 205 and MT 206 with the selection of appropriate valves.

External effluent will only be received directly into evaporation tanks MT 205 or MT 206 if the tanks are available for evaporation. If evaporation tank MT 205 or MT 206 is occupied with other effluent the external effluent will be transferred into storage tank MT 201 where the content will be temporary stored until evaporation tank MT 205 or MT 206 is available to receive external effluent for evaporation.

6.6.2 *Description of the receiving facility*

The receiving area is situated on the northern side on ground level inside A8- building and will consist of a newly built acid and chemical resistance coated bunded area, and a new emergency shower and eye wash unit. The walls in the bunded area will be removed and equipped with a new transferring pump MP 01004, piping, instrumentation and valves to transfer the content from the road tanker into storage tank MT 201 or into evaporation tanks MT 205 and MT 206. The upgraded bunded area with a capacity of 8 m^3 will have a sump where the potentially spilled effluent can collect. The sump will be fitted with a new immersion pump MP 01005, piping and valves from where potentially spilled effluent can be pumped into storage tank MT 201 or into evaporation tanks MT 205 and MT 206.

The entire bunded area, including the walls and sump will be coated with an acid resistant epoxy.

The new bund will be built in a radiological controlled area with current classification white contamination and white radiation.

6.6.3 *Preparations for upgrading of the facility*

Smear tests in the receiving area and along the piping route have confirmed white contamination. Instrument readings (Elektra) will be carried out to check for potential deeper (absorbed) contamination in the intended modification areas. The demolition of the current bund will be done with an experienced decommissioning team. A jackhammer will be used in conjunction with an industrial vacuum cleaner which will vacuum the concrete and dust directly into a 200 litre metal waste drum.

The industrial vacuum cleaner will also be applied when drilling is needed for installation of the pipe lines.

6.7 *PPE REQUIREMENTS*

The following PPE shall be worn at all times during the connection and offloading of the road tanker content into storage tank MT 201 or into evaporation tanks MT 205 and MT 206.These include:

- Safety shoes
- Blue collar overalls
- PVC gloves
- Face shield
- Ear protection

PPE are to be inspected and monitored as required by the applicable RP surveillance program NLM-SUR-009. [7]

6.8 *STORAGE FACILITY*

6.8.1 *Function of the storage facility*

The existing storage tank MT 201 with a volume of 28000 ℓ will be used for the interim storage of uranium containing effluent received from external facilities.

Since the interim storage tank MT 201 is not designed criticality safe, only external uranium containing effluent with a mass fraction that is less than or equal to 0,05 (enrichment level not exceeding 5%) and with a maximum U^{235} mass limit of 250 g will be temporally stored in storage tank MT 201 in the Wet Decontamination Facility. This is consistent with the current limitations for the WDF.

A batch of external effluent received from another facility shall be considered as an entity to be stored and evaporated on its own and shall only be accepted by the SWDF and RPO for storage if the content of the tanker was sampled and analyzed and the analysis show that the mass fraction is less than or equal to 0,05 and the U^{235} mass is less than 250 g as specified in document [2]. The road tanker shall be accompanied by the necessary transport certificate, balance certificate, yellow card and a complete analytical report of its contents and pH level to ensure that the effluent transferred to the storage tank MT 201 or evaporation tanks MT 205 and MT 206 conform to WDF waste acceptance criteria document DS-WAR-001[2].

Storage tank MT 201 is fitted with the necessary instrumentation that continuously measures the volume and gives an audible and visible alarm when the storage tank reaches its maximum and minimum volumes. Storage tank MT 201 is also fitted with a pump MP 235 to circulate the content and to transfer the content into evaporation tanks MT 205 and MT 206.

The content of storage tank MT 201 will be agitated with the abovementioned circulation pump and with the aid of compressed air that is blown through the effluent to prevent the deposit of sediment on the bottom of the tank and to keep the sediment in suspension.

6.9 *EVAPORATION FACILITY*

6.9.1 *Function of the evaporation tanks*

The function of the evaporation tanks MT 205 and MT 206 with a utilized volume of 16000 ℓ each is to evaporate uranium containing effluent. Steam coils are used to evaporate the effluent.

Only uranium containing effluent with a mass fraction of less than or equal to 0,05 shall be received and evaporated in evaporation tanks MT 205 and MT 206. The maximum mass U^{235} allowed per

evaporation in a tank is 250 g. Therefore the volume of effluent transferred into the evaporation tank per evaporation action is limited by the U^{235} mass restriction.

A batch of effluent which is accepted for evaporation in tank MT 205 or MT 206 is considered as an entity and shall be kept as a separate entity. This also implies that no contaminated effluent shall be added to the content of an evaporation tank (MT 205 or MT206) during evaporation and that only effluent from a specific tank (batch) shall be received and evaporated in an evaporation tank at a time. This restriction is necessary to ensure criticality safety and a reliable uranium mass accounting system.

After the effluent has been evaporated all the sludge shall be removed from the evaporation tank before any new effluent shall be pumped into the tank for evaporation. If however, the sludge in the evaporation tank after the evaporation of floor washing water is less than half a drum, a further batch of contaminated effluent may be evaporated in the tank without first removing the sludge on the condition that the SWDF, the RPO and the NFM ensure that the mass of the U^{235} in the sludge after the second batch has been evaporated will not exceed 250g and authorising the evaporation by signing the MCS.

6.10 RECEIVING OF EFFLUENT

Since the interim storage tank MT 201 and evaporation tanks MT 205 and MT 206 are not designed criticality safe, only uranium containing effluent with a mass fraction that is less than or equal to 0,05 and with a maximum mass U^{235} limit of 250 g will be accepted in A8-receiving facility and transferred via the receiving facility into storage tank MT 201 or into evaporation tanks MT 205 and MT 206.

External effluent from another facility shall only be accepted by the SWDF and RPO for offloading via the receiving facility if the content of the tanker was sampled and analyzed and the analysis show that the mass fraction is less than or equal to 0,05 and the U^{235} mass is less than 250 g. The results of the analysis and the calculated U^{235} mass shall be recorded in the MCS.

Any external uranium containing effluent received from another facility will be transported to the Wet Decontamination Facility's storage tank or evaporation system by road tanker. Prior arrangement to receive effluent into A8-building WDF by the road tanker via the receiving facility should be done in advance by the client. Effluent shall only be received according to the availability of storage or evaporation capacity.

The road tanker shall be accompanied by the necessary transport certificate, balance certificate, yellow card and a complete analytical report of its contents and pH level to ensure that the effluent transferred to the storage tank MT 201 or evaporation tanks MT 205 and MT 206 conform to WDF waste acceptance criteria document DS-WAR-001[2].

The analytical report from the Pelindaba Analytical Laboratories of the UCE received in A8 -building WDF via the receiving facility must also include the concentration levels of any other radioactive contaminants present in the effluent and also the enrichment level and concentration of the uranium including the pH level of the effluent. Only U containing effluent is accepted in the WDF.

A batch of effluent which is accepted for storage in the interim storage tank MT 201 and for evaporation in tank MT 205 or MT 206 is considered as an entity and shall be kept as a separate entity. This also implies that no contaminated effluent shall be added to the content of the interim storage tank MT 201 for storage and evaporation tanks MT 205 and MT206 during evaporation. Only effluent from a specific batch shall be received into the empty interim storage tank for storage and to be evaporated at a time in MT 205/MT 206.

6.11 OFFLOADING OF EFFLUENT

The tanker is fitted with a valve and cam coupling that connects onto the flexible pipe and pump MP 01004 that transfer the effluent into storage tank MT 201 or directly into evaporation tanks MT 205 or MT 206. The selection to transfer the effluent from the road tanker into tanks MT 201, MT 205 or MT 206 is done by selecting the appropriate valves.

When all the effluent is offloaded from the road tanker into the dedicated tank the flow transmitter reading will be used to calculate the volume transferred into the dedicated tank. The tanker will be flushed out with a water stream to ensure that no sediment accumulate on the bottom of the tanker. This rinse water will be pumped into the receiving tank as well.

After the offloading of the content all the valves will be closed, the flexible pipe will be disconnected from the road tanker and blank couplings will be connected onto the disconnected flexible pipe and onto the road tanker coupling to prevent any spillage. The total volume (including the rinse water) transferred will be determined by using the reading from the flow transmitter.

The RPO will monitor the road tanker with a contamination monitor for any surface contamination and only when it complies with the release criteria NLM-WKI-061[10] the RPO will issue the necessary release permit.

6.12 TRANSFER OF EFFLUENT FROM STORAGE TANK INTO EVAPORATION TANKS

All external effluent will be sampled and analyzed by the generator before entering the WDF to ensure that the controlled mass is not exceeded according to the document NLM-WKI-092 [12] for the requirement for criticality control in the WDF and to determine the pH level.

No contaminated effluent shall be added to the content of an evaporation tank (MT 205 or MT206) during evaporation and only effluent from a specific tank (batch) shall be received and evaporated in an evaporation tank at a time. This restriction is necessary to ensure criticality safety and a reliable uranium mass accounting.

The transferring of effluent from storage tank MT 201 into evaporation tank MT 205 or MT 206 will be authorized by the SWDF and RPO only. The results of the analysis and the calculated U^{235} mass shall be recorded in the MCS. The content of storage tank MT 201 will be transferred into evaporation tank MT 205 or MT 206 with the aid of pump MP 235, piping and valves. Transferring of the effluent from the storage tank into the dedicated evaporation tank will be done with the selection of the appropriate valves.

The total calculated volume stored in MT 201 (mentioned in Section 6.10) shall be used to ensure that the total volume transferred into an evaporation tank shall not exceed the utilized volume of 16000ℓ for each evaporation tank. As a second measure the total volume stored in MT 201 can be calculated by using the reading of the volume indicator installed in the storage tank. Both evaporation tanks should be available to receive effluent if the total volume in storage tank MT 201 exceeds 16000ℓ.

After the effluent is transferred into the evaporation tank MT 205 or MT 206 the bottom of storage tank MT 201 will be washed with a water stream to clean the bottom from any sediment that could be settled during the storage period. This effluent will also be transferred into MT 205 or MT 206. When al the sediment is washed from the bottom and the effluent is pumped into the evaporation tanks the pump MP 235 will be switched off and all the valves closed.

6.13 SAFETY IMPACT OF THE MODIFICATIONS ON THE CURRENT FACILITY

Up to about 1996 external U bearing effluent were received by tanker from the oil purification plant at the same receiving area which is now intended for upgrade. The bunded area used then was much smaller and there were no eye wash or shower units available for personnel. The historical process involved a single portable pump and temporary pipeline that connected directly with tanks MT 206/206 and no interim storage tank was available.

Apart from the upgrading of the receiving area (new bunded area, eye wash unit and shower) in the old sand blasting area the modifications is limited to five new pipes that connects the receiving area to tanks MT 201 and tanks MT 205/206 and with supporting pumps, control valves and flow meters. Apart from the inlet piping to the three tanks all the modifications are restricted to the basement level which is below the current wet decontamination operational area on the ground level. The modifications are therefore kept mostly apart from the wet decontamination facility and can have no impact on its safety assessment as it is an approved operation.

The dry contamination facility is situated on the southern side of A8 building and is separated by walls and doors from the wet decontamination facility and the basement level where the proposed modifications will take place. The receiving area and most of the piping modifications are on the basement level and are therefore isolated from the wet and dry decontamination operations and can therefore not be affected by its operations and events.

6.14 SUMMARY OF MODIFICATIONS TO THE WET DECONTAMINATION FACILITY

The modifications needed to the existing WDF to receive, store and evaporate U bearing effluent from external generators will be limited to the following features:

- New emergency shower
- New eye wash unit
- Current bund to be upgraded to 8 m^3 in volume and coated with acid resistance epoxy
- New flexible pipe and coupling to connect to road tanker
- New pump, flow meter and pipes connected to tanks MT 201 and MT 205/206
- New valves to direct effluent to either MT 201 or MT 205/206
- New pipes from MT 201 to MT 205 and MT 206
- New pump to feed effluent to evaporation tanks
- Appropriate valves to direct incoming effluent to correct evaporation tank
- Level indicators and high level alarms on both evaporator tanks

7 RECORDS

No.	TITLE	RETENTION PERIOD
External Effluent Form	Total Effluent Received	30 Years

DO NOT SCALE

PROJECTION

IF IN DOUBT ASK

FROM PUMP MP3004 C.O.D. 22M03-00-00 — ER020-050

ER020-050

ER136-040

ER145-063 O/D

ER033-050

ER25-040

ER32-025

DUCTING C.O.D. 22M85-00-01

DUCTING C.O.D. 22M85-00-01

ER136-040 — FROM PUMP MP120 C.O.D. 22M86-00-00

ER145-063 O/D — FROM T902 & T903 T9015, T9002 & T9003

TO MT3020 & MT3021 C.O.D. 22M85-00-01

ER033-050 — FROM PUMP MP235 C.O.D. 22M85-00-01

FA03-040 — FROM PUMP MP227 C.O.D. 22M84-00-00

PUMP MP232

HOSE PIPE

TRENCH

DRAIN PIPES

EVAPO-RATION TANK MT206

EVAPO-RATION TANK MT205

DRIP TRAY

CAR-BONATE DIP TANK MT204

TANK MT203

PUMP MP206

PUMP MP204

PUMP MP203

TOP FLOOR DRAIN

BOTTOM FLOOR DRAIN

HOLD

NOT IN USE C.O.D. XXXXXXXXXXXXX — EC267-050

TO EC28-040 C.O.D. 22MXX-00-00 — EC433-040

TO TANK T902 & T903 C.O.D. 25M0X-00-00 — EC50-100

TO TANK T901 C.O.D. 25M0X-00-00 — ER57-080

FROM AI148-080 C.O.D. 25M7-00-00 — AI196-050

FROM RW27-063 O/D C.O.D. 22MXX-00-00 — RW27-063 O/D

FROM TANK T9034 C.O.D. 74MT0-00-00 — ER23-040

FROM SH-080 C.O.D. 23M42-00-00 — SH1-080

TO SC1-080 C.O.D. 23M42-00-00 — SC1-080

FROM DEAD AREA EAST OLD OIL PURIFICATION — ER24-040

TO EC433-040 C.O.D. 22M85-00-01

FROM EC50-100 C.O.D. 22M85-00-01

FROM ER57-080 C.O.D. 22M85-00-01

TO AI196-050 C.O.D. 22M85-00-01

TO RW27-063 O/D C.O.D. 22M85-00-01

FROM PUMP MP232 C.O.D. 22M85-00-01

TO SH-080 C.O.D. 22M85-00-01

FROM SC1-080 C.O.D. 22M85-00-01

TO TANK MT05 C.O.D. 22M86-00-00 — RW30-050 O/D

TO TANK MT05 C.O.D. 22M86-00-00 — SC5-025

TO TANK MT05 C.O.D. 22M86-00-00 — SH5-025

TO TANK MT05 C.O.D. 22M86-00-00 — AE47-025

FROM PUMP MP202 C.O.D. 22M86-00-00 — HA09-025

TO TANK MT07 C.O.D. 22M86-00-00 — AE49-025

TO TANK MT07 C.O.D. 22M86-00-00 — SC40-025

TO TANK MT07 C.O.D. 22M86-00-00 — SH0-025

TO TANK MT07 C.O.D. 22M86-00-00 — RW9-050 O/D

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NECSA ISSUED 2008 -04- 15 ENGINEERING SERVICES The South African Nuclear Energy Corporation

DISCIPLINE	NAME	APPROVED	DATE
CLIENT	TE Lebakeng		2007/12/12
PR ENG.			
PROC ENG.			
MECH ENG.			
ELEC ENG.			
INST ENG.			
CIVIL ENG.			
MAINTEN.			
OPERATION			
COMMISSION			
RISK MAN.			
QUALITY			
SAFETY			

REV	DESCRIPTION	BY	CHK'D	DATE
R37	REDRAWN & ISSUED FOR CONSTRUCTION	S.B.		10-10-2007
37.1	UPDATE AS PER REVIEW TO ECP: DO-CRM-ECP-0077	R.B.		04-02-2009
38.0	ISSUED FOR CONSTRUCTION	R.B.	B.S	26-02-2009

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UNLESS OTHERWISE STATED: REMOVE ALL SHARP EDGES; SURFACE TEXTURE ▽ µm; SCREW THREADING BS 84; GEOMETRICAL TOL. BS 308 1972; WELDING SYMBOLS BS EN 22553 : 1994 FIRST ANGLE

MACH TOL. UNLESS OTHERWISE STATED	
OVER – TO	TOL
0 – 6	±0,1
6 – 30	±0,2
30 – 80	±0,3
80 – 300	±0,5
300 – 1000	±0,8
1000 – 3000	±1,2
3000 PLUS	±2,0
ANGLES	0°

ORIGINAL SCALE — LIMITS mm — DRAWN B.B. — TRACED — CHECKED — DATE — APPROVED — DATE

ITEM	QTY	DESCRIPTION	MATL/REMARK	DRAWING No.

NECSA

BUILDING A8 CHEMICAL CLEANING

PROJECT

PROJECT SECTION No.

TITLE ENG. FLOW SHEET

DRG.- No 22M85-00-00

DESTROY ALL PREVIOUS PRINTS

REVISION 38.0 AC

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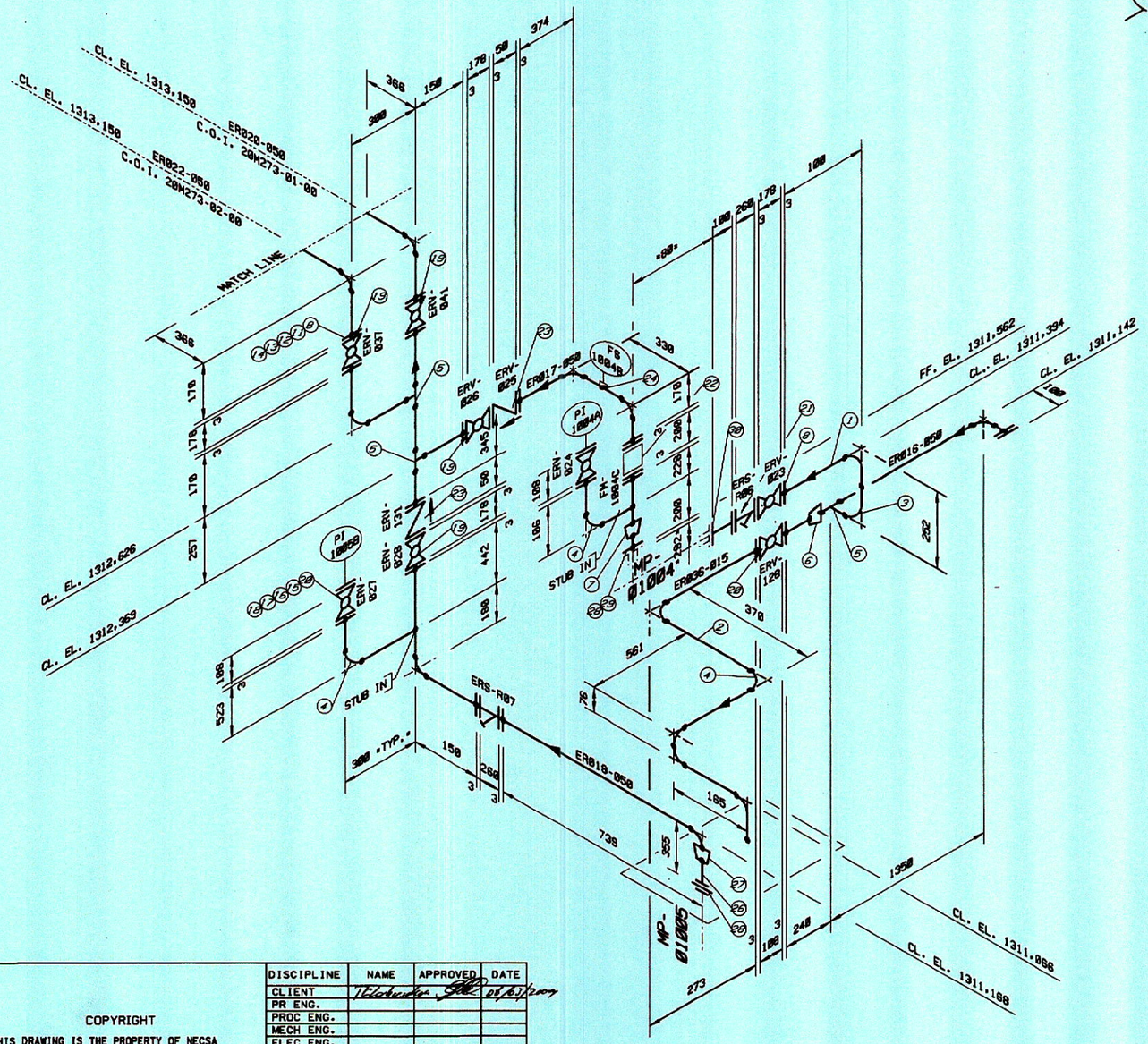
DO NOT SCALE

PROJECTION

IF IN DOUBT ASK

North



NOTES:
1. ALL DIMENSIONS ARE APPROX. AND TO BE DETERMINED ON SITE.
2. PIPES TO BE SITE SUPPORTED.

ITEM	SIZE	QTY	DESCRIPTION	MATL/REMARK
1	50NB	7,1m	PIPE SCH.40S SMLS S/STEEL ASTM A312 GR.TP304L	
2	15NB	3,2m	PIPE SCH.40S SMLS S/STEEL ASTM A312 GR.TP304L	
3	50NB	10	ELL 90° LR WRGT SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
4	15NB	7	ELL 90° LR WRGT SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
5	50NB	3	TEE EQUAL WRGT SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
6	50-15NB	1	CON. RED. SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
7	50-32NB	1	CON. RED. SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
8	50NB	15	SLIP-ON FLG. ANSI B16,5 CL.150 FORGED S/STEEL ASTM A182 GR.F304L	
9	15NB	4	SLIP-ON FLG. ANSI B16,5 CL.150 FORGED S/STEEL ASTM A182 GR.F304L	
10	15NB	2	BLANK FLG. ANSI B16,5 CL.150 FORGED S/STEEL ASTM A182 GR.F304L DRILLED 15 NPT THREAD ON CL.	
11	M16x65	72	BOLT TO DIN 931 AISI 304 (A2)	
12	M16	72	NUT TO DIN 934 AISI 304 (A2)	
13	M16	72	FLAT WASHER TO DIN 125 A AISI(A-2)	
14	50NB	18	GASKET SPIRAL WOUND TYPE S-P-S-S-150	
15	M12x45	24	BOLT TO DIN 931 AISI 304 (A2)	
16	M12	24	NUT TO DIN 934 AISI 304 (A2)	
17	M12	24	FLAT WASHER TO DIN 125 A AISI(A-2)	
18	15NB	6	GASKET SPIRAL WOUND TYPE S-P-S-S-150	
19	50NB	5	BALL VALVE CLASS 150 STAINLESS STEEL FULL BORE FLANGED ANSI B16.5	
20	15NB	3	BALL VALVE CLASS 150 STAINLESS STEEL FULL BORE FLANGED ANSI B16.5	
21	50NB	2	STRAINER CLASS 150 CAST STAINLESS STEEL FLANGED ANSI B16.5	
22	50NB	1	FLOW METER WOLTMAN TURBO MOD. WT II CAST IRON, POLYESTER COATED	
23	50NB	2	WAFER CHECK VALVE STAINLESS STEEL TO SUIT 150# FLGS.	
24	15NB	1	HALF SOCKET 3000# S/STEEL SCR. NPT.	
25	32NB	0,1m	PIPE SCH.40S SMLS S/STEEL ASTM A312 GR.TP304L	
26	40NB	0,1m	PIPE SCH.40S SMLS S/STEEL ASTM A312 GR.TP304L	
27	50-40NB	1	CON. RED. S/STEEL SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
28	40NB	1	UNION 3000# S/STEEL SCR. BSP.	
29	32NB	1	SLIP-ON FLG. BS4504 PN16 FORGED S/STEEL ASTM A182 GR.F304L	
30	50NB	1	SLIP-ON FLG. BS4504 PN16 FORGED S/STEEL ASTM A182 GR.F304L	
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FOR QUOTATION PURPOSES ONLY

DESIGN, FABRICATION AND ERECTION DATA

					OPERATING	DESIGN
PIPE SPECIFICATION	?					
LINE CLASS	150#	SERVICE CATERGORY		PRESSURE	? kPag	? kPag
SERVICE	RADIOACTIVE EFFLUENT	X-RAY	10 %	TEMPERATURE	? °C	? °C
LAYOUT DRAWING	20M272-00-00	DYE PEN	100 %	SHOP TEST PRESSURE	HYDROSTATIC PNEUMATIC	? kPag
FLOWSHEET	22M03-00-00	DRYNESS		FIELD TEST PRESSURE	HYDROSTATIC PNEUMATIC	? kPag
LINE LIST		CLEANING		HELIUM LEAK TEST		kPag
INSULATION	Thk	DATA BOOK		HELIUM LEAK RATE		$x10^{-6}$ Pa.L/sec

DISCIPLINE	NAME	APPROVED	DATE
CLIENT			
PR ENG.			
PROC ENG.			
MECH ENG.			
ELEC ENG.			
INST ENG.			
CIVIL ENG.			
MAINTEN.			
OPERATION			
COMMISSION			
RISK MAN.			
QUALITY			
SAFETY			

REV	ZONE	DESCRIPTION	BY	CHK'D	DATE
0.1		ISSUED FOR CLIENT APPROVAL	RB	BB	20/02/2009
1.0		ISSUED FOR CONSTRUCTION	RB		27/02/2009

UNLESS OTHERWISE STATED:
REMOVE ALL SHARP EDGES
SURFACE TEXTURE: ---√um
SCREW THREAD: ISO 6H 6g
GEOMETRICAL TOL. BS 308 1972
WELDING SYMBOLS BS 499 PART 2 1980
FIRST ISSUE
APPROVED DATE

MACH TOL. UNLESS OTHERWISE STATED

OVER - TO	TOL
0 - 6	±0,1
6 - 30	±0,2
30 - 100	±0,3
100 - 300	±0,5
300 - 1000	±0,8
1000 - 3000	±1,2
3000 PLUS	±2,0
ANGLES	±1°

ORIGINAL -:-
SCALE
UNITS mm
DRAWN R.B.
TRACED
CHECKED

ITEM	QTY	DESCRIPTION	MAT'L/REMARK	DESCRIPTION

NECSA

BUILDING A-8
CHEMICAL CLEANING

NECSA ISSUED 2016-04-15 ENGINEERING SERVICES The South African Nuclear Energy Corporation

DESTROY ALL PREVIOUS PRINTS

MICROSTATION 1.0 REVISION

ISO. ASSEMBLY OF LINE No's: ER016-050 ER017-050 ER018-050 ER036-015

DRG.- No 20M272-01-00

NECSA ISSUED 2023-11-23 ENGINEERING SERVICES The South African Nuclear Energy Corporation

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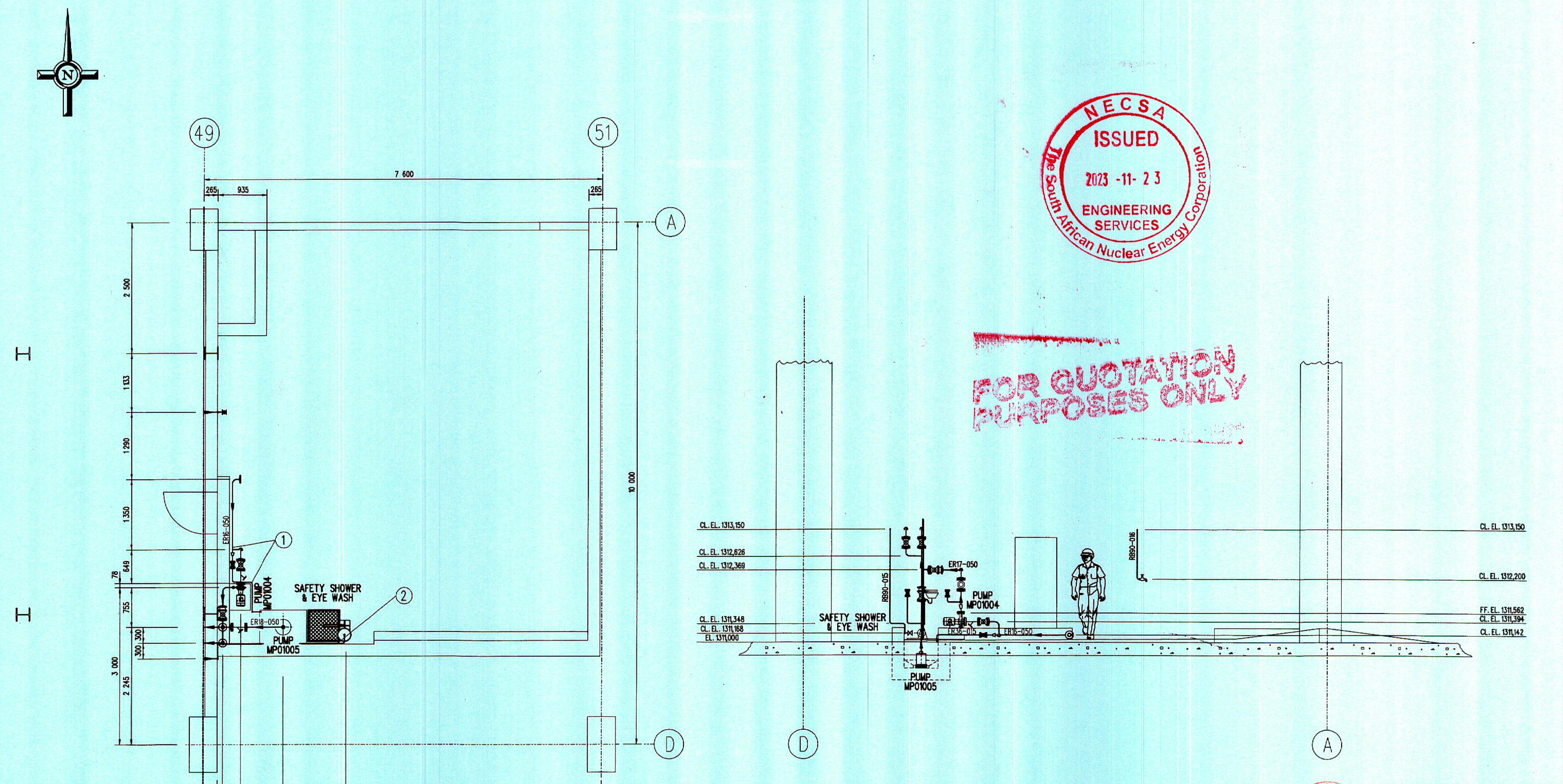
DO NOT SCALE

PROJECTION

IF IN DOUBT ASK



PLAN

SIDE ELEVATION

NECSA
ISSUED
ENGINEERING SERVICES
The South African Nuclear Energy Corporation

FOR QUOTATION PURPOSES ONLY

DISCIPLINE	NAME	APPROVED	DATE
CLIENT	TE Lekalake	[signature]	06/03/2009
PR ENG.			
PROC ENG.			
MECH ENG.			
ELEC ENG.			
INST ENG.			
CIVIL ENG.			
MAINTEN.	[signature]	[signature]	09/02/16
OPERATION	[signature]	[signature]	09/2/16
COMMISSION			
RISK MAN.			
QUALITY			
SAFETY			

ITEM	QTY	DESCRIPTION	MATL/REMARK	DRAWING No
2	1	ISO. ASSEMBLY OF LINE RB90-015		20M272-02-00
1	1	ISO. ASSEMBLY OF LINES ER016-050, ER017-050, ER018-050, ER036-015.		20M272-01-00

REV	ZONE	DESCRIPTION	BY	CHK'D	DATE	REV	ZONE	DESCRIPTION	BY	CHK'D	DATE
0.1		ISSUED FOR CLIENT APPROVAL	RB	BB	15/02/2009						
1.0		ISSUED FOR CONSTRUCTION	RB		27/02/2009						

UNLESS OTHERWISE STATED:
REMOVE ALL SHARP EDGES
SURFACE TEXTURE: µm
SCREW THREAD ISO 6H 6g
GEOMETRICAL TOL. BS 308 1972
WELDING SYMBOLS BS 499 PART 2 1980
FIRST ISSUE
APPROVED DATE

MACH TOL. UNLESS OTHERWISE STATED	
OVER - TO	TOL
0 - 6	±0,1
6 - 30	±0,2
30 - 100	±0,3
100 - 300	±0,5
300 - 1000	±0,8
1000 - 3000	±1,2
3000 PLUS	±2,0
ANGLES	±1°

ORIGINAL SCALE	
UNITS	mm
DRAWN	R.B.
TRACED	
CHECKED	

NECSA

BUILDING A-8
CHEMICAL CLEANING

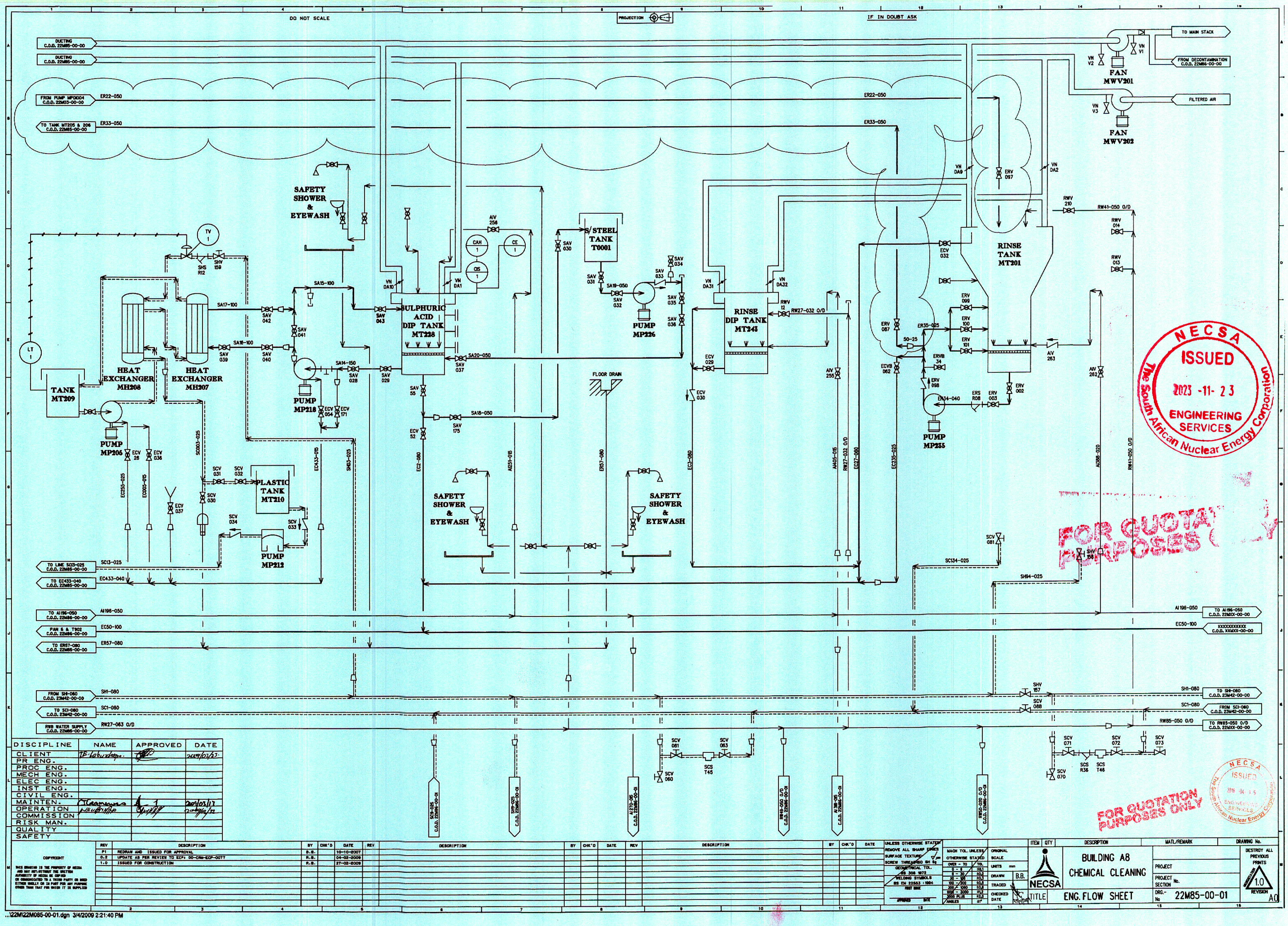
TITLE: PIPING LAYOUT

DRG.-No: 20M-272-00-00

DESTROY ALL PREVIOUS PRINTS

REVISION 1.0

..\Piping\20M272-00-00 Layout.dgn 3/4/2009 2:18:48 PM


DO NOT SCALE
PROJECTION
IF IN DOUBT ASK
DUCTING C.O.D. 22M85-00-00
TO MAIN STACK
FROM DECONTAMINATION C.O.D. 22M86-00-00
FAN MWV201
FILTERED AIR
FAN MWV202
FROM PUMP MP00004 C.O.D. 22M03-00-00
TO TANK MT205 & 206 C.O.D. 22M85-00-00
ER22-050
ER33-050
SAFETY SHOWER & EYEWASH
S/STEEL TANK T0001
SULPHURIC ACID DIP TANK MT228
RINSE DIP TANK MT243
RINSE TANK MT201
HEAT EXCHANGER MH208
HEAT EXCHANGER MH207
TANK MT209
PUMP MP205
PUMP MP218
PUMP MP226
PUMP MP235
PLASTIC TANK MT210
PUMP MP212
FLOOR DRAIN
TO LINE SC3-025 C.O.D. 22M85-00-00
TO EC433-040 C.O.D. 22M85-00-00
TO AI196-050
PAN 5 & T902 C.O.D. 22M85-00-00
TO ER57-080 C.O.D. 22M85-00-00
FROM SH1-080 C.O.D. 23M42-00-00
TO SC1-080 C.O.D. 23M42-00-00
RWB WATER SUPPLY C.O.D. 22M86-00-00
RW27-083 O/D
TO SH1-080 C.O.D. 23M42-00-00
FROM SC1-080 C.O.D. 23M42-00-00
TO RW85-050 O/D C.O.D. 22MXX-00-00
NECSA ISSUED 2023-11-23 ENGINEERING SERVICES The South African Nuclear Energy Corporation
FOR QUOTATION PURPOSES ONLY
DISCIPLINE NAME APPROVED DATE
CLIENT
PR ENG.
PROC ENG.
MECH ENG.
ELEC ENG.
INST ENG.
CIVIL ENG.
MAINTEN.
OPERATION
COMMISSION
RISK MAN.
QUALITY
SAFETY
COPYRIGHT
P1 REDRAW AND ISSUED FOR APPROVAL 10-10-2007
0.2 UPDATE AS PER REVIEW TO ECP: 00-CRM-ECP-0077 04-02-2009
1.0 ISSUED FOR CONSTRUCTION 27-02-2009
NECSA
BUILDING A8 CHEMICAL CLEANING
TITLE ENG. FLOW SHEET
DRG. No. 22M85-00-01
REVISION 1.0
A0
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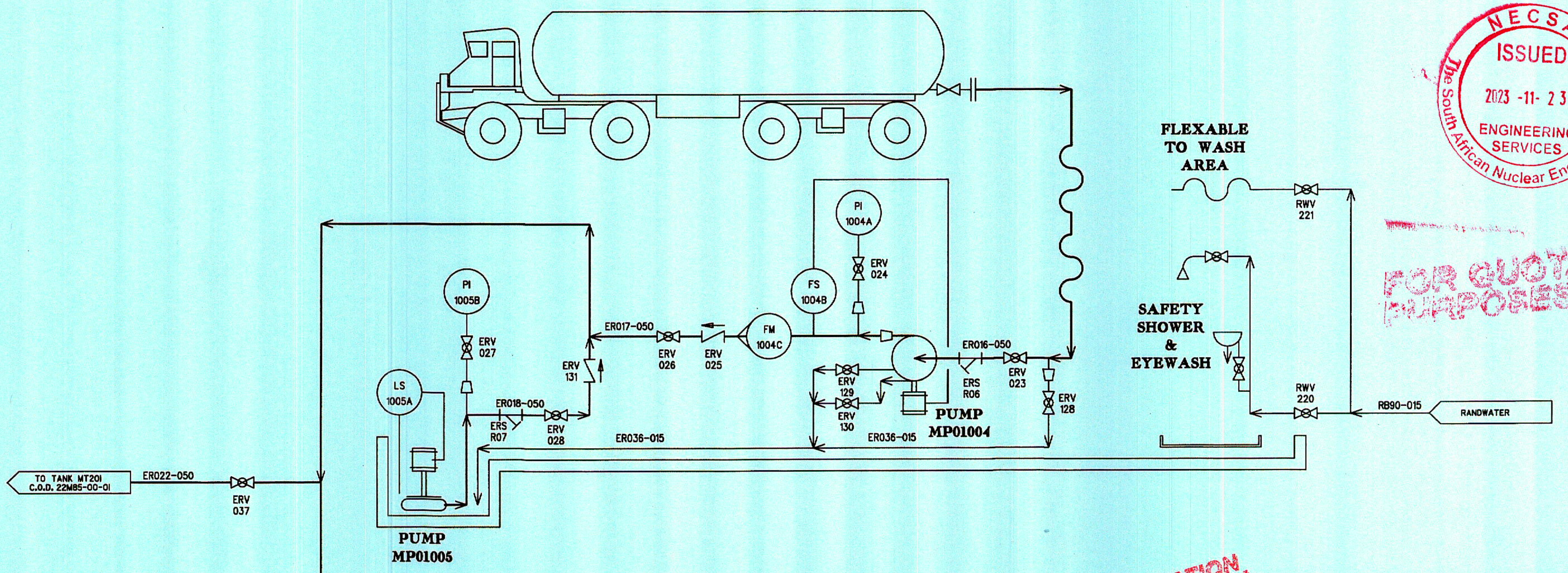
DO NOT SCALE | PROJECTION | IF IN DOUBT ASK



NECSA ISSUED 2023-11-23 ENGINEERING SERVICES The South African Nuclear Energy Corporation

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FOR QUOTATION PURPOSES ONLY

NECSA ISSUED 2016-04-15 ENGINEERING SERVICES The South African Nuclear Energy Corporation

DISCIPLINE	NAME	APPROVED	DATE
CLIENT	[signature]	[signature]	16/03/2009
PR ENG.			
PROC ENG.			
MECH ENG.			
ELEC ENG.			
INST ENG.			
CIVIL ENG.			
MAINTEN.	[signature]	[signature]	09/03/06
OPERATION	[signature]	[signature]	09/03/06
COMMISSION			
RISK MAN.			
QUALITY			
SAFETY			

REV	DESCRIPTION	BY	CHK'D	DATE	REV	DESCRIPTION	BY	CHK'D	DATE
R23	REDRAWN AND ISSUED FOR CONSTRUCTION	B.B.		22/11/2007					
23.1	UPDATE AS PER REVIEW TO ECP: 00-CRM-ECP-0077	R.B.		04/02/2009					
24.0	ISSUED FOR CONSTRUCTION	R.B.		28/02/2009					

UNLESS OTHERWISE STATED:
REMOVE ALL SHARP EDGES
SURFACE TEXTURE: µm
SCREW THREADS ISO 6H 6g
GEOMETRICAL TOL. BS 308 1972
WELDING SYMBOLS BS EN 22553 : 1994
FIRST ISSUE
APPROVED | DATE

MACH TOL. UNLESS OTHERWISE STATED

OVER - TO	TOL
0 - 6	±0,1
6 - 30	±0,2
30 - 100	±0,3
100 - 300	±0,5
300 - 1000	±0,8
1000 - 3000	±1,2
3000 PLUS	±2,0
ANGLES	±1°

ORIGINAL SCALE
UNITS mm
DRAWN B.B.
TRACED
CHECKED DATE

ITEM	QTY	DESCRIPTION	MATL/REMARK	DRAWING No.

NECSA

BUILDING A8
CHEMICAL CLEANING

TITLE: ENG. FLOW SHEET

PROJECT
PROJECT SECTION No.
DRG.- No 22M03-00-00

DESTROY ALL PREVIOUS PRINTS
MICROSTATION 24.0
REVISION A1

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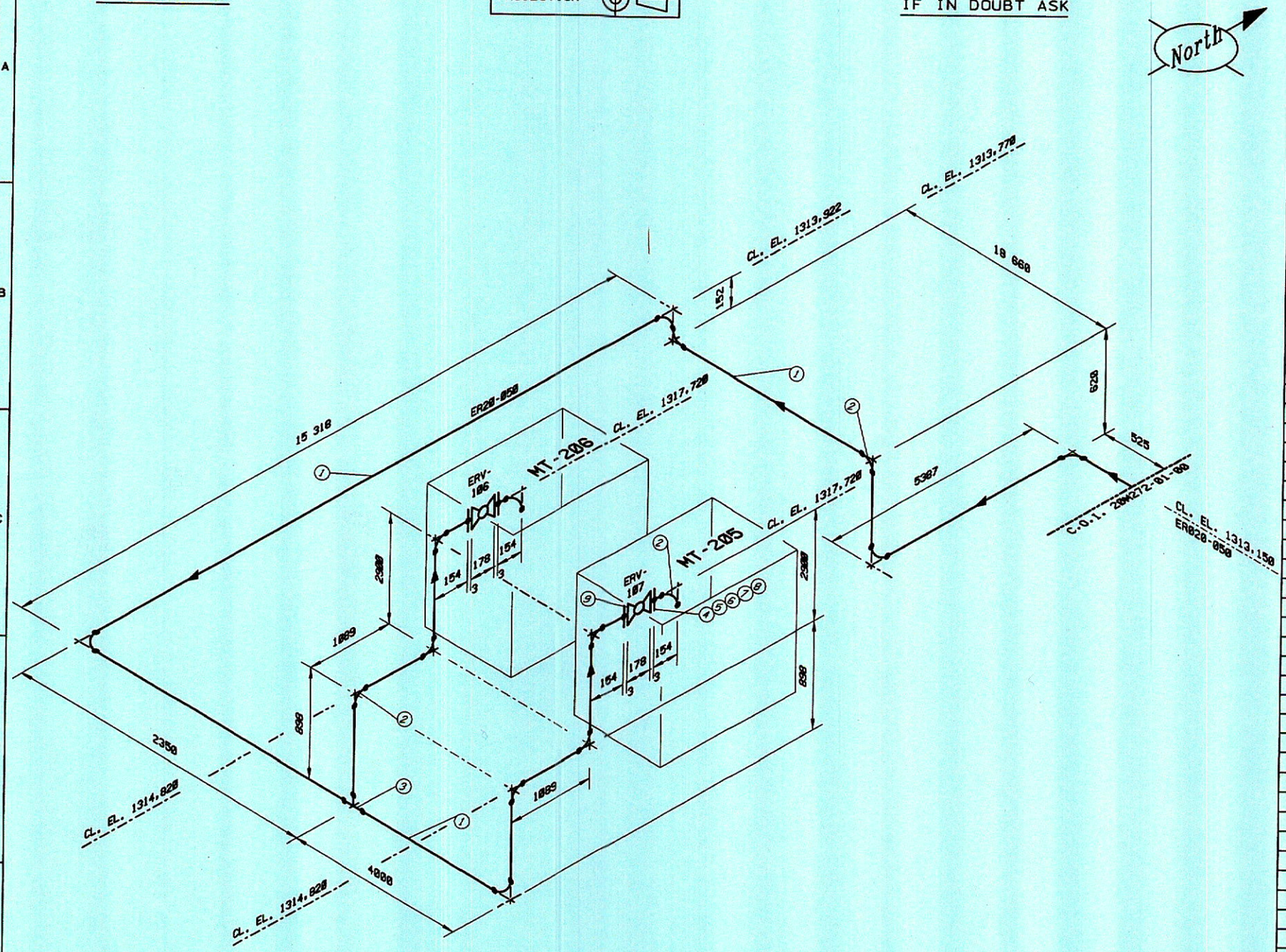
DO NOT SCALE

PROJECTION

IF IN DOUBT ASK



ITEM	SIZE	QTY	DESCRIPTION	MATL/REMARK
1	50NB	55,7m	PIPE SCH.40S SMLS S/STEEL ASTM A312 GR.TP304L	
2	50NB	15	ELL 90° LR WRGT SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
3	50NB	1	TEE EQUAL WRGT SMLS SCH.40S S/STEEL ASTM A403 GR.WP 304L BUTT WELD ENDS	
4	50NB	4	SLIP-ON FLG. ANSI B16,5 CL150 FORGED S/STEEL ASTM A182 GR.F304L	
5	M16x45	16	BOLT TO DIN 931 AISI 304 (A2)	
6	M16	16	NUT TO DIN 934 AISI 304 (A2)	
7	M16	16	FLAT WASHER TO DIN 125 A AISI(A-2)	
8	50NB	4	GASKET SPIRAL WOUND TYPE S-P-S-S-150	
9	50NB	2	BALL VALVE CLASS 150 STAINLESS STEEL FULL BORE FLANGED ANSI B16.5	
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NECSA ISSUED 2023-11-23 ENGINEERING SERVICES The South African Nuclear Energy Corporation

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FOR QUOTATION PURPOSES ONLY

DESIGN, FABRICATION AND ERECTION DATA

					OPERATING	DESIGN
PIPE SPECIFICATION	?					
LINE CLASS	150#	SERVICE CATERGORY		PRESSURE	? kPag	? kPag
SERVICE	RADIOACTIVE EFFLUENT	X-RAY	10 %	TEMPERATURE	? °C	? °C
LAYOUT DRAWING	20M273-00-01	DYE PEN	100 %	SHOP TEST PRESSURE	HYDROSTATIC PNEUMATIC	? kPag
FLOWSHEET	22M85-00-00	DRYNESS		FIELD TEST PRESSURE	HYDROSTATIC PNEUMATIC	? kPag
LINE LIST		CLEANING		HELIUM LEAK TEST		kPag
INSULATION	Thk	DATA BOOK		HELIUM LEAK RATE		$\times 10^{-6}$ Pa.L/sec

ITEM	QTY	DESCRIPTION	MAT'L/REMARK	DESCRIPTION

DISCIPLINE	NAME	APPROVED	DATE
CLIENT			
PR ENG.			
PROC ENG.			
MECH ENG.			
ELEC ENG.			
INST ENG.			
CIVIL ENG.			
MAINTEN.			
OPERATION			
COMMISSION			
RISK MAN.			
QUALITY			
SAFETY			

NOTES:
1. ALL DIMENSIONS ARE APPROX. AND TO BE DETERMINED ON SITE.
2. PIPES TO BE SITE SUPPORTED.

REV	ZONE	DESCRIPTION	BY	CHK'D	DATE
0.1		ISSUED FOR CLIENT APPROVAL	RB	BB	20/02/2009
1.0		ISSUED FOR CONSTRUCTION	RB		27/02/2009

UNLESS OTHERWISE STATED:
REMOVE ALL SHARP EDGES
SURFACE TEXTURE: $\sqrt{}$ µm
SCREW THREAD: ISO 6H 6g
GEOMETRICAL TOL. BS 308 1972
WELDING SYMBOLS BS 499 PART 2 1980
FIRST ISSUE
APPROVED DATE

MACH TOL. UNLESS OTHERWISE STATED	
OVER – TO	TOL
0 – 6	±0,1
6 – 30	±0,2
30 – 100	±0,3
100 – 300	±0,5
300 – 1000	±0,8
1000 – 3000	±1,2
3000 PLUS	±2,0
ANGLES	±1°

ORIGINAL SCALE –:–
UNITS: mm
DRAWN R.B.
TRACED
CHECKED

NECSA

BUILDING A-8 CHEMICAL CLEANING

ISO. ASSEMBLY OF LINE No's: ER020-050

DRG.-No 20M273-02-00

NECSA ISSUED 2016-04-15 ENGINEERING SERVICES The South African Nuclear Energy Corporation

DESTROY ALL PREVIOUS PRINTS

MICROSTATION 1.0 REVISION

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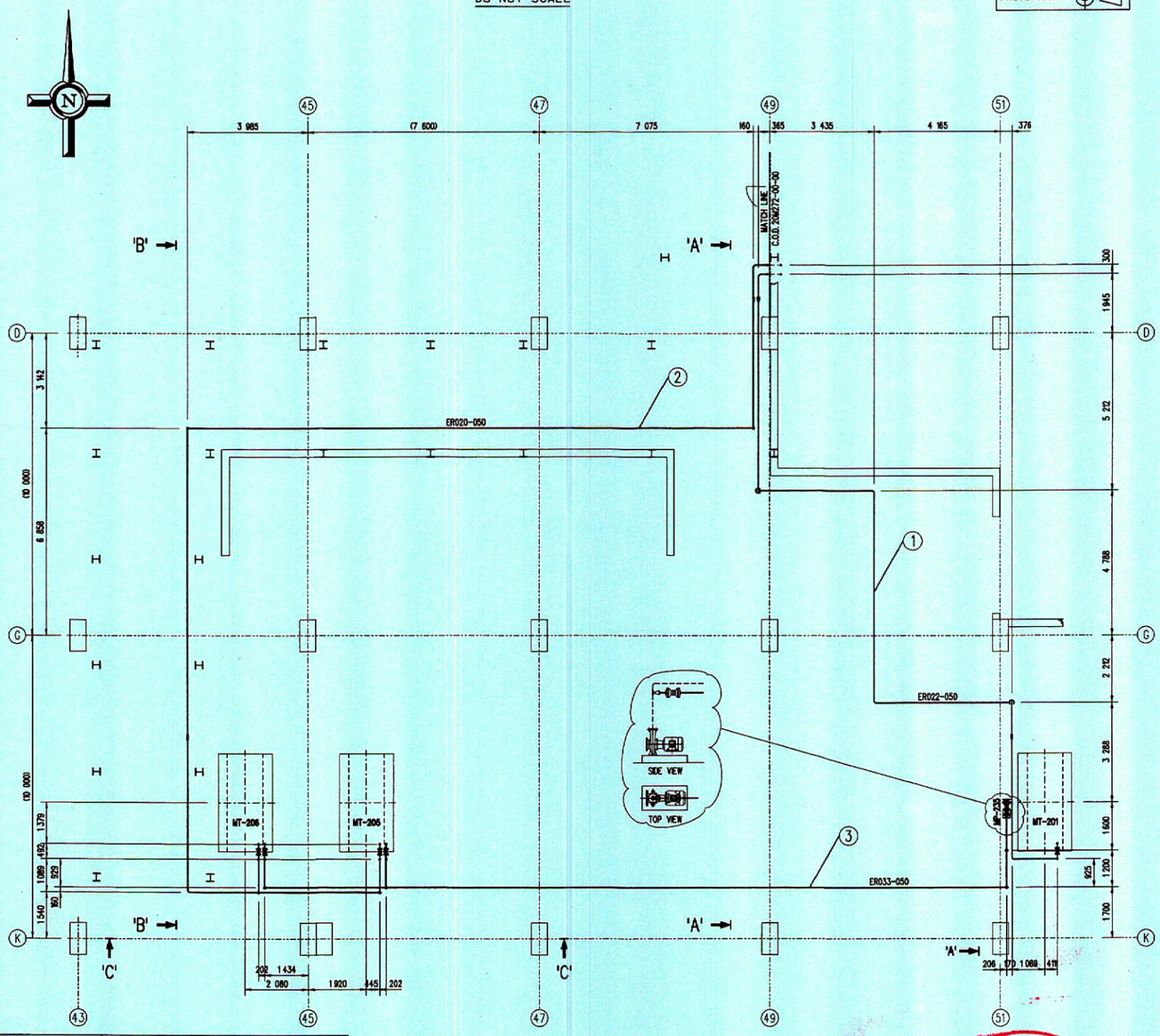
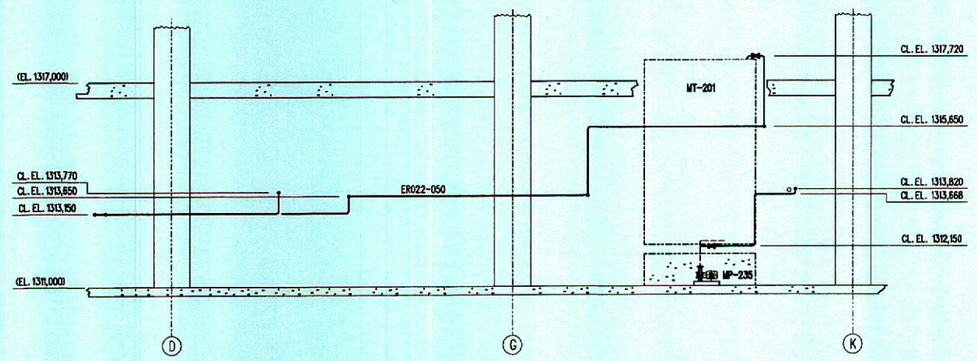
DO NOT SCALE

PROJECTION

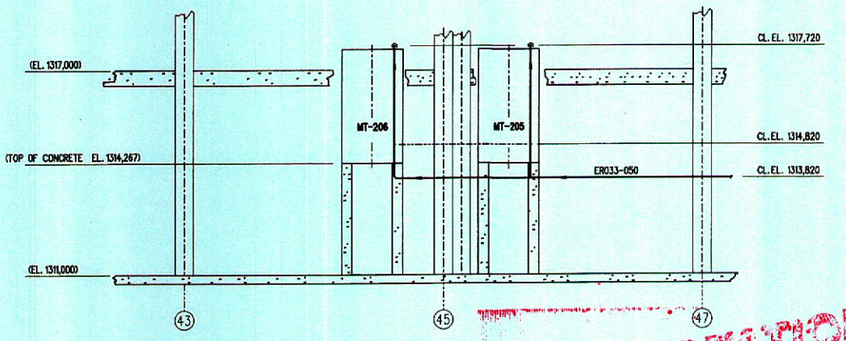
IF IN DOUBT ASK



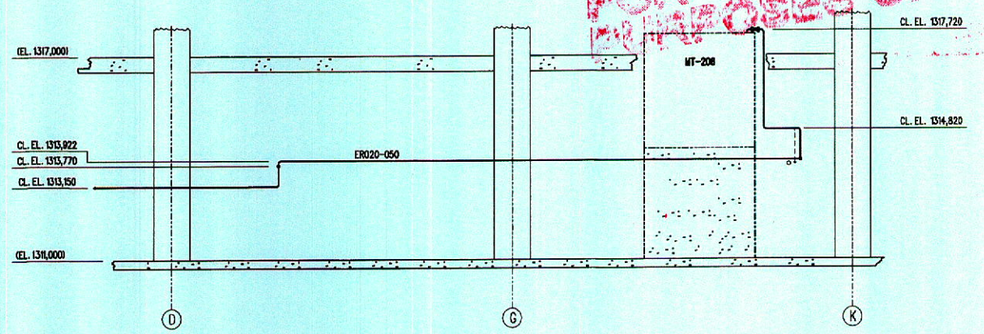
PLAN



SECTION "A-A"



SECTION "C-C"



SECTION "B-B"

FOR QUOTATION PURPOSES ONLY

FOR QUOTATION PURPOSES ONLY

NECSA ISSUED 2023 -11- 23 ENGINEERING SERVICES The South African Nuclear Energy Corporation

DISCIPLINE	NAME	APPROVED	DATE
CLIENT	TE Schreuder		2009/2/23
PR ENG.			
PROC ENG.			
MECH ENG.			
ELEC ENG.			
INST ENG.			
CIVIL ENG.			
MAINTEN.			2009/02/24
OPERATION			2009/02/23
COMMISSION			
RISK MAN.			
QUALITY			
SAFETY			

REV	ZONE	DESCRIPTION	BY	CHK'D	DATE
0.1		ISSUED FOR CLIENT APPROVAL	RB	BB	20/02/2009
1.0		ISSUED FOR CONSTRUCTION	RB		27/02/2009

ITEM	QTY	DESCRIPTION	MATL/REMARK	DRAWING No
3	1	ISO OF LINE No. ER033-050		20M273-03-00
2	1	ISO OF LINE No. ER020-050		20M273-02-00
1	1	ISO OF LINE No. ER022-050		20M273-01-00

UNLESS OTHERWISE STATED:
REMOVE ALL SHARP EDGES
SURFACE TEXTURE: √ µm
SCREW THREADS ISO 6H 6g
GEOMETRICAL TOL. BS 308 1972
WELDING SYMBOLS BS 499 PART 2 1980
FIRST ISSUE
APPROVED DATE

MACH TOL. UNLESS OTHERWISE STATED	
OVER – TO	TOL
0 – 6	±0,1
6 – 30	±0,2
30 – 100	±0,3
100 – 300	±0,5
300 – 1000	±0,8
1000 – 3000	±1,2
3000 PLUS	±2,0
ANGLES	±°

ORIGINAL SCALE
UNITS mm
DRAWN R.B.
TRACED
CHECKED

NECSA

BUILDING A-8
CHEMICAL CLEANING

TITLE PIPING LAYOUT

DRG.- No 20M-273-00-00

DESTROY ALL PREVIOUS PRINTS

1.0 REVISION

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necsa We're in your world South African Nuclear Energy Corporation SOC Limited	DOCUMENT NO.	PROJECT : A8 Effluent Treatment Plant Modification				
	ENS-MES-SPE-0006	LOCATION : NECSA: A8 Wet Decontamination Faci				
	22/11/20	For Enquiry	0			
	DATE	ISSUE	REV.	PREP	CHKD	APPD

SERVICE / FUNCTION :	**Liquid Effluent Circulation Pump**	**QTY :**	1
SUPPLIER :		**TYPE :**	**CENTRIFUGAL**
MODEL NO :	*		

PROCESS DATA		**DRIVE : MOTOR**	
Fluid	Liquid Effluent - Water	Starting	3 Phase, Induction Motor
Composition (wt/wt &)	-	Voltage	415+/-10%
Density Max, kg/m3	-	Frequency	50HZ+/-3%
Density at Opr. Temp., kg/m3	994	Motor Rating, kW	1.5
Viscosity at Opr. Temp., cP	1	Motor Speed, RPM	2900
Corrosion / Erosion	NIL	Mounting	Foot Mounted
Operating Temp., Nor/Max, °C	35 / 45	Amb. Temp. °C	-
Solid Content , %	NIL	Protection Class	IP-65
Normal Mass Flow Rate, kg/h		Installation	Out door
Normal Volumetric Flow Rate, m3/hr	9.324	Flame Proof	Yes
Min. Volumetric Flow Rate, m3/hr		Starting	DOL
Max. Volumetric Flow Rate, m3/hr		Motor Frame Size	-
Available NPSH , mtrs		Area Classification	-
Suction Pressure, kg/cm2g		Motor Make	-
Diff. Pressure, kg/cm2g			
Diff. Discharge Head, mtrs			
Vapour Pressure , mmHg			
NPSH Required	*		

ENGINEERING DATA		**MATERIAL OF CONSTRUCTION**	
Design Temperature, °C	*	Casing	CF8
Design Pressure, kg/cm2g	*	Shaft	SS304
Hydrotest Pressure, kg/cm2g	*	Impeller	CF8
Installation	In door	Coupling	*
Suction / Discharge Size, mm	*	Sleeve	CF8
Drive / Pump, RPM	2900	Base Frame	IS 2062
Coupling Type	*	Accessories	*
Pump Mounting	Horzontal	Foundation Bolts	MS
Flange Rating	*	Coupling Guard	IS 2062
Design Efficiency, %	*	All Wetted Parts	SS304
Sealing Type	Single Mechanical Seal	Seal Face Combination	-
Impeller Type	*	Seal Flushing Plan	*
Impeller Dia	*	Mechanical Seal Make	*
Casing Type	*		
Suction / Discharge	*		
Pump Design Standard	*		

REMARKS :