 Eskom	Work Instruction	Medupi Power Station Project
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Title: **Excavation Permit Application**

Document Identifier: **348-885850**

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Area of Applicability: **Medupi Power Station Project**


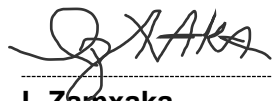


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1. Introduction

The Medupi Excavation Permit Work Instruction (this Work Instruction) is a detailed document which contains, or references, the work processes and procedures required to facilitate integration, co-ordination and consistency of excavation activities across the Project. It will be updated, as required, throughout the life of the Project and is intended to provide day-to-day direction for TM Construction staff in each of the Units

2. Supporting Clauses

2.1 Scope

This work Instruction is applicable to all excavations on Medupi Project and covers all work that involves excavation ground. The permit application includes such operations as spiking, driving of poles, piles and pipes, chasing, drilling, boring and excavations.

The latest approved revision of each document applies, unless otherwise specified

2.1.1 Purpose

The purpose of this work Instruction is to define the process to be followed for the application to TM to allow the contractor to issue an excavation permit. The objective of this work Instruction is to

- Ensure the health and safety of any personnel working in or near such excavations.
- Ensure that no underground services are damaged during excavations.
- Ensure that no interruptions of services occur as a result of excavation damage.

2.1.2 Applicability

This document shall apply to Medupi Power Station.

2.1.3 Effective date

Date of authorisation of the work Instruction.

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2.2 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] ISO 9001 Quality Management Systems
- [2] Occupation Health and Safety Act, Act 85 of 1993
- [3] Occupational health and Safety Management Systems Requirements – OHSAS 18001
- [4] 348-961711 Project Execution Plan
- [5] 348-883902 Project Quality Plan
- [6] 348-670608 Medupi Occupational health, Safety and Management Policy
- [7] 32-421 ESKOM Life Saving Rules
- [8] 32-95 ESKOM Work Instruction for the Effective Management of Safety, Health and Environmental Related Incidents
- [9] 348-709772 Medupi Power Station, s.4 Employer Policy and Work Instructions – Part p; Safety, Health and Environmental Requirements Schedule
- [10] 348-38425 Work Instruction for Hazard Identification and Risk Assessment
- [11] 348-668897 Fall Protection Plan
- [12] 348-885429 Medupi Engineering Change Management
- [13] 240-53114026 Project Engineering Change Management

2.2.2 Informative

- [14] Explosive Act, Act 26 of 1956

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2.3 Definitions

Term	Explanation
Blaster	Means person in possession of a valid surface blasting ticket under whose control blasting shall take place and will generally be sub-contracting to the contractor.
Confined Space	Means an enclosed, restricted or limited space in which, because of its construction, location, contents or any work carried out therein, a hazardous substance may accumulate or an oxygen deficient atmosphere may occur, and includes any chamber, tunnel, pipe, sewer, container, valve, pump, sump or similar construction, equipment machinery or object in which a dangerous concentration of gas, vapour, dust, or fumes may be present.
Construction manager	Responsible to integrate and facilitate the construction process to ensure that the works can progress at the optimum level and to maintain progress against the Integrated Master Schedule (IMS)
Contractor	Means any contractor planning to perform excavation
Drilling	Means the boring through soil and rock to form a cavity for the placement of explosive charges.
Engineering	Means Group Technology Engineering providing the engineering a part of TM
Excavation	Means the making of any man-made cavity, trench, pit, or depression formed by cutting, drilling, digging or scooping
Lead Project Engineer	Engineer fulfilling the lead position of an engineering discipline
Method Statement	Means a formal document compiled by the contractor detailing the Methods and equipment to be used during the execution of the particular activity, in order to minimise the risk as detailed in the risk assessment. Where blasting is required, this will also include the blast design.

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Term	Explanation
RACI Matrix	<p>The RACI matrix is a responsibility assignment matrix that describes the participation by various roles in completing tasks or deliverables for a business process. Where:</p> <p>R = Responsible (the role player required to complete the activity/task)</p> <p>A = Accountable (the role player accountable for the activity/task and who is required to ensure that the activity is completed on time and in a manner which meets all expectation/requirements)</p> <p>C = Consulted (the role player with whom the Responsible person is expected to consult before the activity)</p> <p>I = Informed (the role player whom the Responsible person is required)</p>
TM Supervisor	Means the construction management representative who will supervise the works form TM

2.4 Abbreviations

Abbreviation	Explanation
CAT	Cable Avoidance Tool
FCN	Field Change Notice
GPS	Global Positioning System
H&S	Health and Safety
HSMS	Health and Safety Management System
ITP	Inspection Test Plan
KG	Kilograms
KG/M	Kilograms/metre
M	Metre/s
MM	Millimetre/s
M/S	Metre/s per second
QCP	Quality Control Plan
QMS	Quality Management System
RFI	Request for Information
RAL	Roads Authority Limpopo
SPO	Smart Plant Operation
TM	Team Medupi
XLS	Excel Spreadsheet

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2.5 Roles and Responsibilities

Those who do the work to achieve the task. There is at least one role with a participation type of responsible, although others can be delegated to assist in the work required.

a) Responsible

Those who do the work to achieve the task. There is at least one role with a participation type of responsible, although others can be delegated to assist in the work required.

b) Accountable (also approver or final approving authority)

The one ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those responsible. In other words, an accountable must sign off (approve) work that responsible provides. There **must** be only one accountable specified for each task or deliverable.

c) Consulted (sometimes counsel)

Those whose opinions are sought, typically subject matter experts; and with whom there is two-way.

d) Informed

Those who are kept up-to-date on progress, often only on completion of the task or deliverable; and with whom there is just one-way.

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Table 1: RACI Matrix

Process Phase	Process Step	TM H&S	TM Supervisors	TM surveyors	Engineering	Construction Manager	Contractor
Prior to applying for excavation permit	The authorized issued for construction drawing is confirmed/sourced.				C		R
	The proposed excavation is set out and marked.						R,A
	Other services are set out and marked as detailed in the drawings.						R,A
	Route is scanned for any services using a CAT scan						R,A
	Request for survey and verification		C	R,A			R,A
	Issue excavation survey report			R,A			
	Submits proposed Method statement for the excavation for approval					C	R,A
	Submits the proposed risk assessment for the excavation for approval					C	R,A

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	Approval of application is obtained from principal contractor						R,A
Application for excavation permit	Excavation permit application package is submitted to the Construction Manager.					C	R,A
	Excavation permit application package is reviewed by the TM supervisor		A			R	
	Excavation permit application package review status.		R				
	Response to Contractor					R	

Process Phase	Process Step	TM H&S	TM Supervisors	TM surveyors	Engineering	Construct ion Manager	Contractor
Execution of excavation	Consult Excavation Work Instruction						R,A
	Contractor's permit holder visible						R,A
	Copy of permit displayed						R,A
	Areas where excavations are prohibited demarcated						R,A

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	Medupi project emergency number is displayed						R,A
Surveillance and compliance monitoring	Compliance to excavation permits						R,A
	Compliance monitoring	R,A	R			A	
Method Statement for Drilling and Blasting	Compliance to requirements as specified in section 3.2.5	I	R	C	C	I	A

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2.6 Supporting / Related Documents

The following records are utilised to record necessary process data required to verify process conformity:

- Excavation Permit Application – this will be registered and tracked on SPO and kept by the TM documentation centre.
- Excavation Check List

3. Process Definition

3.1 Process Map / Flowchart

The process defined hereunder does not require documenting in the form of a process map/flow Chart

3.2 Process Description

3.2.1 Prior to applying for excavation permit

3.2.1.1 The contractor only excavates to an authorised drawing as issued by the respective Construction Manager.

- a) If the contractor has been issued an authorised "for construction "drawing, the contractor uses this drawing
 - b) If the contractor does not have an authorised drawing detailing the excavation, the contractor raises an RFI to the Construction Manager, detailing the proposed excavation route and services to be installed (if applicable). The Package/Project manager will submit this RFI to his Lead Project Engineer for resolution.
- If not design base exist, the design authority will mark up the respective drawing detailing the required services being proposed to be installed and issue the mark up as an FCN.
 - IF the required design base already exists, Lead Project Engineer will notify the Construction Manager in this regard with an Engineering Response highlighting the authorised “ for construction” drawings to be used for the excavation and installation of the services (if applicable).

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- 3.2.1.2 The contractor sets out and marks the proposed excavation according to details and coordinates from the authorised 'for construction' drawings
- 3.2.1.3 The contractor also sets out and marks the other services as detailed in the drawings, differentiating between the proposed excavation route and the services suspected in the area
- 3.2.1.4 The contractor scans the route for any services using a CAT scan (A valid calibration certificate to be produced by the contractor/scanning personnel). If any services are picked up in the area that has not been indicated on the drawing, this is also clearly marked out on the ground
- 3.2.1.5 The contractor requests, via the TM supervisor for the proposed excavation to be surveyed and verified by the TM surveyors, if available.
- 3.2.1.6 The TM surveyors issues an excavation survey report clearly detailed in the X, Y, Z coordinates of;
- a) The proposed excavation and service to be installed
 - b) The existing services installed in the area
 - c) The existing services installed in the area not detailed on the drawing in the possession of the contractor
 - d) The existing services installed in the area not detailed on any drawing.
 - e) This information is given to the respective engineer for investigation and updating of the design base.
 - f) Any discrepancies between the design base and the as- built information
 - g) Any other hazards identifiable such as overhead lines or the proximity of other structures.
 - h) Where other services/ structures are in the vicinity, this is clearly marked with 'caution - Hand excavation only' on the report.
- 3.2.1.7 The contractor submits the proposed Method statement (in conjunction with the blast design where applicable - refer to Section 3.2.5) for the excavation for approval to the Construction Manager prior to submitting the application for excavation permit, if the proposed Method statement is not yet approved
- 3.2.1.8 The contractor submits the proposed risk assessment for the excavation for approval to the Construction Manager prior to submitting the application for excavation permit, if the proposed risk assessment is not yet approved

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3.2.1.9 The contractor consults and obtains the approval of this application from the principle contractor, if the contractor is not the principal contractor

3.2.2 Application for excavation permit

3.2.2.1 The excavation permit application package is submitted to the Construction Manager, consisting of the following minimum document:

- a) Excavation permit application form – completed and signed by the contractor's supervisor who:
 - Will be overseeing all the excavation and service installation for the duration of the permit;
 - Is a competent person who needs to supervise the specific excavation work to ensure the safety of persons involved in excavation; and
 - Ensures compliance to the construction regulation/s.
- b) The excavation check list is completed by the competent person (contractor) to verify that all the requirements for approval of the excavation permit application are met.
- c) Authorised for 'construction' drawings, detailing the excavations and the services (where applicable)
- d) The TM surveyor's excavations report, if available.
- e) Applicable Method statements are authorised by TM
- f) Applicable risk assessment as authorised by TM

3.2.2.2 The Construction Manager submits the application for excavation permit to the relevant TM supervisor for approval of;

- a) Completeness of the application for excavation permit package
- b) Correct completion of the excavation permit application form and check list
- c) Applicability of the excavation and the authorised drawings for excavation
- d) Review of the TM surveyor's excavation survey report, if available.
- e) Review of the authorised method statement for applicability to the excavation
- f) Review of the authorised risk assessment for applicability

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3.2.2.3 The TM supervisor approves or rejects the application for excavation permit

- a) If it is rejected, he indicates the reason for rejection on the application form and returns it to the Construction Manager.

3.2.2.4 On receipt of the application for excavation permit back from the TM supervisor the Construction manager;

- a) If the package was approved –
- Returns to the contractor to allow the issue of the contractors' excavation permit and to perform the works
 - Forward a copy of the application for excavation permit package to the TM safety department for compliance monitoring of the contractor to their permit requirements.
- b) IF the package was rejected, the Construction manager returns the application for excavation permit to the contractor for the correction and resubmittal of the complete package.

Note: *Excavation Permit is valid for maximum of 7 days only and it can be extended for another 7 days if the works go beyond 7days. An updated Risk Assessment should be produced should the conditions change.*

3.2.3 Execution of excavations

3.2.3.1 Before any excavation commences, the contractor's excavation application permit will be consulted.

3.2.3.2 The contractor's permit holder shall be wearing a high visibility vest at all times at the work area, while the work is in progress.

3.2.3.3 A copy of the permit shall be displayed at all times at the excavation area and available to all workers involved with excavation directly.

3.2.3.4 All areas where machine excavations are prohibited shall be marked with the appropriate visible signage.

3.2.3.5 Ensure that the Medupi Project emergency number is displayed at the excavation. This is to be contacted during any incident.

3.2.4 Surveillance and compliance monitoring

Correct application of this work Instruction allows compliance monitoring:

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3.2.4.1 The contractor is responsible for ensuring compliance to their excavation permits

3.2.4.2 The TM safety department and TM construction will perform compliance monitoring

3.2.5 Information to be Included as part of a method Statement for Drilling and Blasting

3.2.5.1 Blast Design

- a) The Contractor includes as part of the method statement the detailed blast design, which conforms to the following minimum information:
- b) The provisional drill pattern based on the as built rock levels, locations of closest structures in a 360-degree radius of the blasting block and hole depths should be transmitted in electronic format (pdf, Arrangement Drawing file format and Excel).
- c) The survey information should include a large-scale layout showing individual holes positions as well as a smaller scale layout showing the blasting block in relation to any services and/or sensitive structures such as concrete and offices in proximity to the planned blast.
- d) Area to be blasted
- e) Planned blasting date and time
- f) Hole diameter (mm)
- g) Spacing and burden (m)
- h) Maximum and minimum bench heights (m)
- i) Sub drill (m)
- j) Estimated volume of rock to be blasted (m³)
- k) Stemming length (m) and type of stemming material
- l) Explosives types / Brand names
- m) Pumping in hole density encase of emulsion type explosives (kg/m³)
- n) Cartridge diameter and length (mm) in case of cartridge explosives
- o) Charge mass per hole (kg)
- p) Total mass of explosives in blast (kg)
- q) Initiation system
- r) Downhole, interhole and interrow delays (ms)
- s) Proposed timing layout showing initiation point, drill pattern and cumulative timing from initiation point to end. Windblast layouts are preferred but hand drawn sketches are also acceptable provided they are drafted in sufficient detail.
- t) Vibration predictions: the following formula should be used to perform vibration predictions:

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$$V+1460 \times (D/E^{0.5})^{-1.6}$$

Where:

V= Predicted peak particle velocity, mm/s

D= Distance between seismograph and blasting site, m

E = Mass of explosive per delay period, kg

u) Vibration limits: The Following vibration limits will apply to blasting in proximity of both 'green' and cured concrete and sensitive structure:

- Green' concrete:

0 - 1 Day after pouring = 10mm/s

1 – 2 Days after pouring = 20mm/s

2 – 3 Days after pouring = 30mm/s

3 – 4 Days after pouring = 40mm/s

> 4 Days after pouring = 50mm/s

- Cured concrete (age > 4 days):50mm/s filtered for frequencies below 50Hz, either Vector Sum or greatest to any vector, whichever is the greatest.

v) The design should detail the mitigating action/s taken to contain vibration and fly rock including the excavation of separation trenches and use of soil cover and mats.

w) Location of camera to capture movement from blast, and nature of photography.

3.2.5.2 SET-OUT, DRILLING AND CHARGING

a) The Contractor sets-out the blast design in terms of all the holes to be drilled

b) The Contractor drills the blast holes

c) The Contractor surveys as-built positions of drilled blast holes as well as the depths, making this available in XLS format on request.

d) Calculate final timing layout based on as-built locations of blast holes.

e) The Contractor requests a meeting via the Construction manager two days in advance of the planned blast to discuss the finalized timing and confirm ordering of explosives with the relevant TM personnel

f) The contractor, upon confirmation of the final timing design, proceeds with the ordering of explosives.

g) The Contractor requests an inspection to confirm the timing tie-up and stemming lengths on day of blasting. (Spot checks on uncharged lengths will test whether overcharging has been allowed, which will be regarded in a serious safety light.)

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- h) Upon confirmation of the above, stem blast holes, cover blast as necessary and prepare for blasting.

3.2.5.3 BLASTING DURING CALM WEATHER CONDITIONS

a) Notification

- The date and time of intended blasts will be posted on blast notification boards positioned at all entrances to site at least 24 hours in advance of a planned blast. In general blasting will be carried out Mondays to Fridays at 17h30.
- A safety representative from the Blaster shall notify TM and ALL contractors via sms of blasting times before 08h00 on a day preceding a planned blast.
- Logistical and coordination arrangements to be agreed between Blaster, TM and other affected contractors at meeting to be convened by the Principal Contractor a day in advance of planned blast.
- The Blaster shall notify the relevant authorities in advance of his intention to blast in close proximity of infrastructure under their control. This includes notifying the local traffic department and RAL if blasting is to take place in proximity of provincial roads, Exxaro in the event of blasting in proximity to the railway line to the south and east of the main site and Eskom Transmission in the event of blasting in proximity to transmission lines.
- All the Contractor's personnel working on site will be thoroughly and regularly briefed on the evacuation work Instruction during blasts.
- Based on the size of the blast and distance between the blast and ongoing critical works the appointed Blaster shall determine whether workmen should evacuate or whether they may remain at their workplace during the blasts.
- The Blaster shall notify contractor/s a minimum of three (3) hours in advance of a scheduled blast if an evacuation is required to allow the contractor's sufficient time to introduce the necessary precautions such as retarders to retard concrete curing in the event of slip forming works.

b) Site Clearance

- Except for the slip forming crews the site will be cleared by 17h00 of all plant and persons within a radius specified by the Blaster. This will typically be about 500m but may be increased or decreased depending on the size of the blast and factors such as blast holes depth and orientation of free facets.
- Two Seismographs will be positioned at locations agreed with TM and sensors fixed by the Blaster to concrete or rock using appropriate adhesives. Where any seismograph sensor is embedded in soil, sand bags of sufficient size and number will be placed across the sensor to weigh it down. Sensor locations will be recorded via differential GPS. Seismographs will typically be positioned at the closest cured and 'green' concrete and/or sensitive structures to planned blasts

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- A pre-blast safety meeting is arranged at 16h30 on the day of the blast by the Blaster through the Principal Contractor and attended by the Contractor and other affected contractors. This meeting will be held at an agreed observation position to direct guards and brief all parties on the impending blast.
- From this point onwards the blast is under control of the Blaster.
- On conclusion of the pre-blast meeting, the Principal Contractor posts guards at all entrances to the blasting area to prevent any person/s and plant entering the blasting area.
- In the event that the Blaster regards the conditions at critical works as safe during blasting workmen will be allowed to continue working during the blast. The Blaster will notify the contractor/s engaged in critical works a minimum of three (3) hours in advance of a blast if a full evacuation of the workmen is required.
- If conditions are deemed safe for workmen engaged in critical works to remain at their workplace the Blaster shall proceed with the blast once all other persons and plant have evacuated the blast area and all entrances to the blast area has been secured.
- If a full evacuation of workmen engaged in critical works is required the appointed Blaster shall notify safety representative/s of the relevant contractors, via radio, to evacuate all workmen to a safe distance. In the event that the workmen engaged in critical works need to be stationed as close as possible to their workplace to allow a timeous re-entry after the blast, bunkers may be used
- Suitably reinforced containers may be used as bunkers if required.
- To allow sufficient ventilation all containers will be positioned with their entrances away from the blast and left open when occupied
- All bunkers will be supplied with an adequate number of dust masks to be used by all occupants during blasts.
- Once all workmen engaged in critical works have been evacuated to a safe distance or pre-prepared bunkers the safety representative/s stationed with the workmen will notify the appointed Blaster via radio to proceed with the blast.

c) Blasting

- The blasting operations will be conducted under the control of a certified and appointed Blaster.
- Blasting will take place during the hours of daylight which will typically be at 17h30 on week days.
- The appointed blaster shall activate the blasting siren 3 (three) minutes prior to detonation he blasts.
- The appointed Blaster shall connect the detonator to the lead-in after connection it to the shot exploder.
- The appointed Blaster shall give a 5 (five) second count-down prior to detonation the blast.

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d) Re-entry after a Blast.

- All persons will remain in position until dust and fumes generated by the blast have settled.
- Once the dust and fumes have settled the appointed Blaster shall inspect the blast for any misfires/cut-offs or signs thereof.
- If any misfires/cut-offs are identified or suspected he shall demarcate the area for further investigation.
- IF no misfires/cut-offs are found or suspected the appointed Blaster shall declare the blast area safe for all persons and plan and notify all guards to open entrances.

3.2.5.4 BLASTING WORK INSTRUCTION DURING INCLEMENT WEATHER

e) Notification

- On the approach of inclement weather, the Blaster's appointed safety representative will phone representatives of TM and ALL contractors to place all affected parties on standby for a potential emergency evacuation. He shall endeavour to notify all parties at least 30 minutes prior to an intended emergency evacuation.

f) Site Clearance

- In the event that weather condition worsens an emergency siren will be sounded to evacuate all persons from the blasting area to a safe distance specified by the Blaster.
- Based on the size of the blast and the distance between the blast and critical works the Blaster shall determine whether workmen engaged in critical works should evacuate or whether they may remain at the sliding works during the emergency blast.
- If a full evacuation is required workmen engaged in critical works will be evacuated to a safe distance.
- No pre-blast meeting will be held and all guards will move into pre-determined positions to block all traffic within a radius specified by the Blaster from the blast area. Under no circumstances whatsoever, may anyone ignore guards place around the blasting area
- The appointed Blaster and safety representatives of TM and relevant contractors will gather at a pre-determined observation position on the sounding of the evacuation siren.

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g) Blasting

- When the appointed Blaster is satisfied that all guards are in position and that the site is secure he shall proceed with detonation the blast.
- The blasting operation will be conducted under the control of a certified and appointed Blaster
- The appointed Blaster shall connect the detonator to the lead-in after connecting it to the shot exploder.
- The appointed Blaster will give a 5 second count-down prior to detonating the blast.

h) Re-entry after the Blast

- All persons will remain in position until all dust and fumes generated by the blast have settled.
- Once the dust and fumes have settled the Blaster shall investigate the blast area for any misfires/cut-offs or signs thereof.
- If no misfires/cut offs are identified/suspected he shall declare the blast area safe upon which all guards will open entrances to persons and plan.

3.2.5.5 TREATMENT OF MISFIRED BLAST HOLES /CUT-OFFS AND SURPLUS EXPLOSIVES

- a) In event of identifying or suspecting misfires/cut-offs, the blaster shall demarcate the area for further investigation.
- b) No persons or plant will be allowed within a radius specified by the Blaster of the affected area.
- c) Barricading and guards will be placed within a radius specified by the Blaster around the affected area.
- d) The Blaster shall notify all guards to allow entrance to plant outside of the specified radius.
- e) The appointed Blaster shall deal with misfired holes/cut-offs in accordance with the latest regulations. On locating the misfire/cut-offs the Blaster shall immediately withdraw all persons from the blast site except those who will assist him.
- f) He shall report the locality of the misfire/cut-off to representatives of the relevant contractor/s and TM.
- g) He shall then:
 - Withdraw the stemming carefully with a wooden spoon or copper scraper, preferably with the use of water, to expose the charge, and then place a fresh primer cartridge on top of the charge which he shall fire subject to the normal safety precautions being taken; or
 - Drill a hole under his personal supervision, parallel to, at least 150mm deeper than, and not nearer than 1m to the misfire/cut-off, which he shall charge and fire and then recover the explosives liberated from the misfire/cut-off

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- In the event of visible detonation cord protruding from the hole, the misfire/cut off will be handled by clearing the area in the normal manner, attaching a detonator to the detonation cord, and when safe, blasting.
 - In the event of there being no detonation cord, but slurry only, the howl will be cleared of stemming and the misfire/cut-off re-primed using a Pentolite Booster and detonation cord and detonated.
 - In the event of shock tube protruding from an apparently misfired hole, the Blaster shall determine whether the shock tube has fired and if not, shall take the above precautions. If it has fire, indication that there is no live detonator in the hole, and then digging may proceed with caution, watching as always for any undetonated explosive.
 - Misfires/cut-offs may be destroyed together with a blast provided that the blast is carried out in the vicinity of the misfire, and that the blast is carried out within a reasonable period of the misfire/cut off being found.
 - No misfire/cut-off may be destroyed during the hours of darkness
 - After the misfire/cut-off has been treated and made safe, the Blaster shall report the area to be safety to TM and relevant contractors.
- h) All surplus explosives and spend accessories left over after the successful detonation of misfires/cut-offs will be destroyed through burning at a location indicated by TM.
- i) All surplus explosives magazine or destroyed through burning at a location indicated by TM.

3.2.5.6 SLEEPING OF BLAST

- a) As general rule NO misfires/cut-offs will sleep over during inclement weather.
- b) All efforts will be made to locate misfires/cut-offs and detonate them on the same day as the original blast. However, as the law does not allow blasting during the hours of darkness except under total illumination some blasts may need to sleep over
- c) In such an event permission to sleep a blast will be obtained from the relevant inspector of Explosives.
- d) The Blaster shall notify representatives of TM and all affected contractors of his intention to sleep a blast and the planned date and time of detonation misfires/cut-offs.
- e) The area with misfires/cut-offs will be barricaded and clearly demarcated with danger tape and blasting area sing boards.
- f) Guard/s will be placed at a radius demarcated by the Blaster from the affected area to prevent persons, animals and plant from entering the charged-up area.
- g) Any electric detonators connected to the surface blast initiation system will be removed.
- h) The relevant Inspector of Explosives and representatives of TM and affected contractors will be advised of site conditions, i.e. all is well prior to blasting of misfires/cut-off.

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4. Process for Monitoring

4.1 Key Performance Areas and Indicators

The following Key Performance Areas / Indicators (KPA's / KPI's) shall be measured, analysed and reported. The Process Owner shall be accountable, and assign the responsibility at the frequency as indicated below, documented as part of the QMS measurement, analysis and improvement initiative.

Table 2: KPA's/KPI's

Key Performance Area	Key Performance Indicator	Target	Measure Frequency	Responsible	Record
Successful Excavations	Number of Excavations Registered	All	Monthly	Process Owner	Excavations Register
	Number of Excavations Incidents due to non-compliance to the process	ZERO	Monthly	Process Owner	Incident Reports

4.2 Document Review and Self-Assessment

4.2.1 Document Self-Assessment

The "Process Owner" identified on the front page of this document along with departmental personnel and the project QMS Engineer shall undertake a "self-check" review of the process defined in this document at six monthly intervals, commencing from the effective date of this document, to check:

- The process / procedure operational integrity
- Process efficiency
- The level of stakeholder knowledge and implementation.

Participants and results of the "self-check" review shall be documented by the Process Owner in the "Self-Assessment Checklist" (**Template No. 348-655890**) included as an Appendix to this procedure which shall be submitted via SharePoint to Medupi Documentation Department Help Desk by the Process Owner once completed.

Process Owner shall proceed with any revision requirements in line with Medupi Procedures, 348-653867 "Development and Change of Medupi QMS Documents" and 348-883808 "Document and Record Management".

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4.2.2 Revision Period

All QMS documents shall undergo a 3-yearly compulsory revision.

4.3 Training Requirements

Personnel implementing this Work Instruction require no specific training other than the operational requirements of this work Instruction by the respective Process Owner and Line Managers.

The Contractor is responsible for ensuring compliance to their approved QCP/ITP. A copy of typical ITP is contained in Annexure D.

5. Acceptance

This document has been seen and accepted by:

Name	Designation
Thabisile Biyela	Senior Construction Manager
Thulani Ndubane	Construction Manager
Lwandiso Zamxaka	Senior Advisor Risk and Assurance
Velly Phosa	Senior Construction Supervisor

6. Revisions

Date	Rev.	Compiler	Remarks
October 2022	7	KV Phosa	<ul style="list-style-type: none"> Use of new approved template. Appendix/s to be separate document and to have separate Document Identifier and shall be referenced Edition of excavation permit extension table When scanning for services, calibration certificate to be produced by contractor
March 2018	6	T Raudzingana	To address permit expiry date and to migrate a document into a new template.
September 2016	5	T Raudzingana	Specify reasons for compiling of document.

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7. Development Team

The following people were involved in the development of this document:

- T Ndubane
- L Zamxaka
- V Phosa

8. Appendix

The following documents are included as Attachments to this work instruction:

- Appendix A – Document Self-Assessment Checklist (348 - 10012201)
- Appendix B – Excavation Permit Support Application Form (348-10013042)
- Appendix C – Excavation Work Application Checklist (348-10013047)
- Appendix D – Inspection and Test Plan (ITP) for Drill and Blast activities (348-10013049)

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Appendix A - Process Self-Assessment Checklist

Discipline: Construction Management		Applicable Document No: 348-10012201				Self-Assessment Date: DD/MM/YYYY	
Item No	Ref Section	Self-Assessment Question	Compliant			Comment	
			Yes	Part	No		
1	3.2	Is the process still applicable to the site and project life cycle stage?					
2	Appendix B	Does the checklist still comply to current hazards on site and the projects life cycle stage					
3	Appendix C	Does the checklist still comply to current hazards on site and the projects life cycle stage					
4	Attachment D	Does the checklist still comply to current hazards on site and the projects life cycle stage					
Comments:							
Self-Assessment by:		Name:	Position:		Revision Required? (Yes/No)	Planned Revision Date:	
Attendees:							

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	MEDUPI POWER STATION PROJECT	Template Identifier	348-677196	Rev	2
		Document Identifier	348-10013042	Rev	0
		Effective Date	October 2022		
		Next Review Date	October 2025		
TITLE: Appendix B: Excavation Permit Support Application Form					
APPLIED BY PRINT NAME:	APPLIED BY SIGNATURE:	APPLICATION DATE:			
CELL NO:	EMAIL:	TIME:			
PRINCIPAL CONTRACTOR IN CONTROL OF THIS AREA :					
EXCAVATION START DATE:	EXCAVATION END DATE:	CONTRACT NO.			
DRAWING REF:		EXCATION APPLICATION NO:			
METHOD STATEMENT REF:		RISK ASSESSMENT REF:			
<u>JOB DESCRIPTION AND LOCATION (BE SPECIFIC)</u>					
CONTRACTORS COMPETENT PERSON - MARK ALL ACTIVITIES COMPLETED AND REPORTS ATTACHED					
		Completed	Attached		
6.1. Excavation/Services Drawing approved and Issued for Construction?					
6.2. Site set out and proposed excavation routing marked on ground?					
6.3. Site Set out and mark other services on the ground?					
6.4. Scanned the area with CAT scan? (Valid calibration certificate to be produced)					
6.5. Excavation Survey requested from TM supervisor and TM excavation Survey Report received?					
6.6. Risk Assessment Approval Obtained					
6.7. Method Statement Approval Obtained					
6.8. Principle Contractor for the area consulted and approval obtained?					
6.9. Electrical representative sign off on electrical installations and earth mat?					

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File Name: 348-677196 Excavation Permit Support Application Checklist Rev 2 – Final

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	MEDUPI POWER STATION PROJECT	Template Identifier	348-677197	Rev	1
		Document Identifier	348-10013047	Rev	0
		Effective Date	October 2022		
		Review Date	October 2025		
TITLE: Appendix C: Excavation Work Application Checklist					

PLANT AREA	Indicate Yes/No
A. GENERAL CHECKLIST:	
Are the relevant drawings checked and approved, including reference drawings and attached?	
Any underground services expected/present and at what depth?	
Excavation Depth Width Length	
Is excavating depth greater than 1000mm?	
Method of shoring required? Slope Stability Report required by Registered Professional Engineer/Scientist	
Does the excavation need barricades or cover plates?	
Monitor For Possible Oxygen Deficiency or Gaseous Conditions? – Confined spaces	
Type of hazard to be aware of? (Checked For Previously Disturbed Ground. Other Known Obstructions Noted (i.e., Footing Concrete Encasements) Overhead Obstructions Reviewed)	
Confined Space (Atmospheric Testing Required) /Hazardous area?	
Adequacy & availability of all equipment, including personal protective gear, shoring material, signs, barricades, and machinery. (Entrance And Exit Facilities – Stairway/Ladders/Ramp)	
Designed Shoring (Data must be filed on site)	
Any overhead hazards, power lines or gables, distribution boxes etc.?	
Barricading solid and visible	
B. ELECTRICAL CHECKLIST:	
Any surface or external identifiers on site? (Cable markers/drawings)	
What and where are they in relation to the job area (and the job reference drawing)?	
Type and location of any known cables in vicinity.	
Any restriction placed on excavation method?	
Hazardous area?	
Earth mat drawings available for area?	
Earth mat identified as per drawings?	
C. MECHANICAL/ CIVIL CHECKLIST:	
Are the relevant excavation Drawings attached?	
Is proximity to utilities, buildings, footing or pilings and sources of vibration determined and attached?	
Type and location of:	
<ul style="list-style-type: none"> Structural or equipment foundations near job area. 	
<ul style="list-style-type: none"> Any known underground, under floor or wall services. 	

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File Name: 348-677197 Excavation Work Application Checklist Template Rev 1 – Draft


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		Document Identifier	348-10013047	Rev	0
		Effective Date	October 2022		
		Review Date	October 2025		
TITLE: Appendix C: Excavation Work Application Checklist					
Are possible changing ground conditions, particularly after rain fall recorded?					
Soil type: Stable Rock, Clay, Sandy, Silt?					
Contaminated soil/groundwater?					
Method of soil/groundwater disposal?					
Proposed digging or break-in method.					
Type of digging implements:					
<ul style="list-style-type: none"> • Hand shovels • Hand picks • Crowbars • Pneumatic jack • Saw cut 			<ul style="list-style-type: none"> • Mechanical leg backhoe, ditch witch • Spoil Placed Distance Equal to Depth Away from Trench • Timber Shoring for Trenches • Aluminium Hydraulic Shoring for Trenching 		

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File Name: 348-677197 Excavation Work Application Checklist Template Rev 1 – Draft


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 Eskom	MEDUPI POWER STATION PROJECT	Template Identifier	348-621886	Rev	1
		Document Identifier	348-10013049	Rev	00
		Effective Date	October 2022		
		Next Review Date	October 2025		
TITLE: Appendix D: Inspection and test plan for drill and blasting activities					

Process Description:		ITP No:		Rev No:		
Item No.	Activity	Conformance Criteria, Specifications and Standard references	Record Type:	Intervention Levels & Responsibilities		
				1	2	3
		(Reference relevant internal document numbers)		1	2	3
1	Approval of ITP		This Document	H	H	H
2	Approval of method statement		Method Statement	H	H	H
3	Submit Drilling/Blasting layout and design for review		Pre-print format and Excel	H	H/V	H
4	Setting out of holes		Model Maker Excel	H	H	H
5	Drill holes		Data book	H	W	W
6	Verify holes are correct depth		Eskom application for inspection	H	S	S
7	As-Built Surveys and Drilled holes		Eskom survey request Model maker and Excel	H	H	H

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File Name: 348-621886 Inspection and Test Plan (ITP) for Drill and Blast activities Rev 1 – Final

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		Document Identifier	348-10013049	Rev	0
		Effective Date	October 2022		
		Next Review Date	October 2025		
TITLE: Appendix D: Inspection and test plan for drill and blasting activities					

8	Final Approval of blast design surveillance plan		Pre-print format	H	H	H	
9	Charging		Pre-print format	H	W	W	
10	Verify steering length and delay tie-up		Eskom application for inspection	V	H	H	
11	Pre Blast Check List		Pre-print format	H	H	H	
12	Blast		Video	H	W	W	
13	Post Blast check List		Pre-print format	H	H	R	
14	Blast return						
15	Data book review		Data Pack	H	H/ R	R	

Key to Intervention Levels

H-Hold - Process not allowed to proceed unless inspected and signed off by designated authority	S-Surveillance - Checks on a process compliance	V-Verify - Check that records, operations and results comply with requirements.	W-Witness - Operations allowed to proceed and witnessed by designated authority	DR-Document Review - Prior to starting, a document review must be held by approved authorities, President Engineer or contractor, etc.
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		Document Identifier	348-10013049	Rev	00
		Effective Date	October 2022		
		Next Review Date	October 2025		
TITLE: Appendix D: Inspection and test plan for drill and blasting activities					

** Intervention Responsibilities	Name	Position	Signature	Date
Approved by:				
1. CONTRACTOR.				
2. TM				
3.				
4.				
Prepared by:				

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