



MHSC

Mine Health and Safety Council

Background and Learnings from Winder Incident

Siphesihle Sithole
New Denmark Colliery

Every mine worker returning from work unharmed every day. Striving for zero harm in our lifetime.

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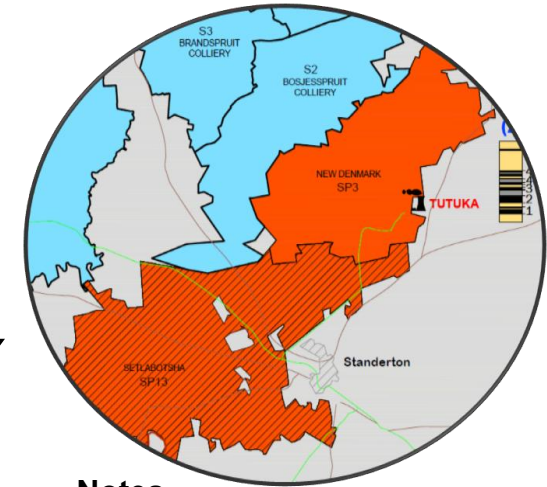
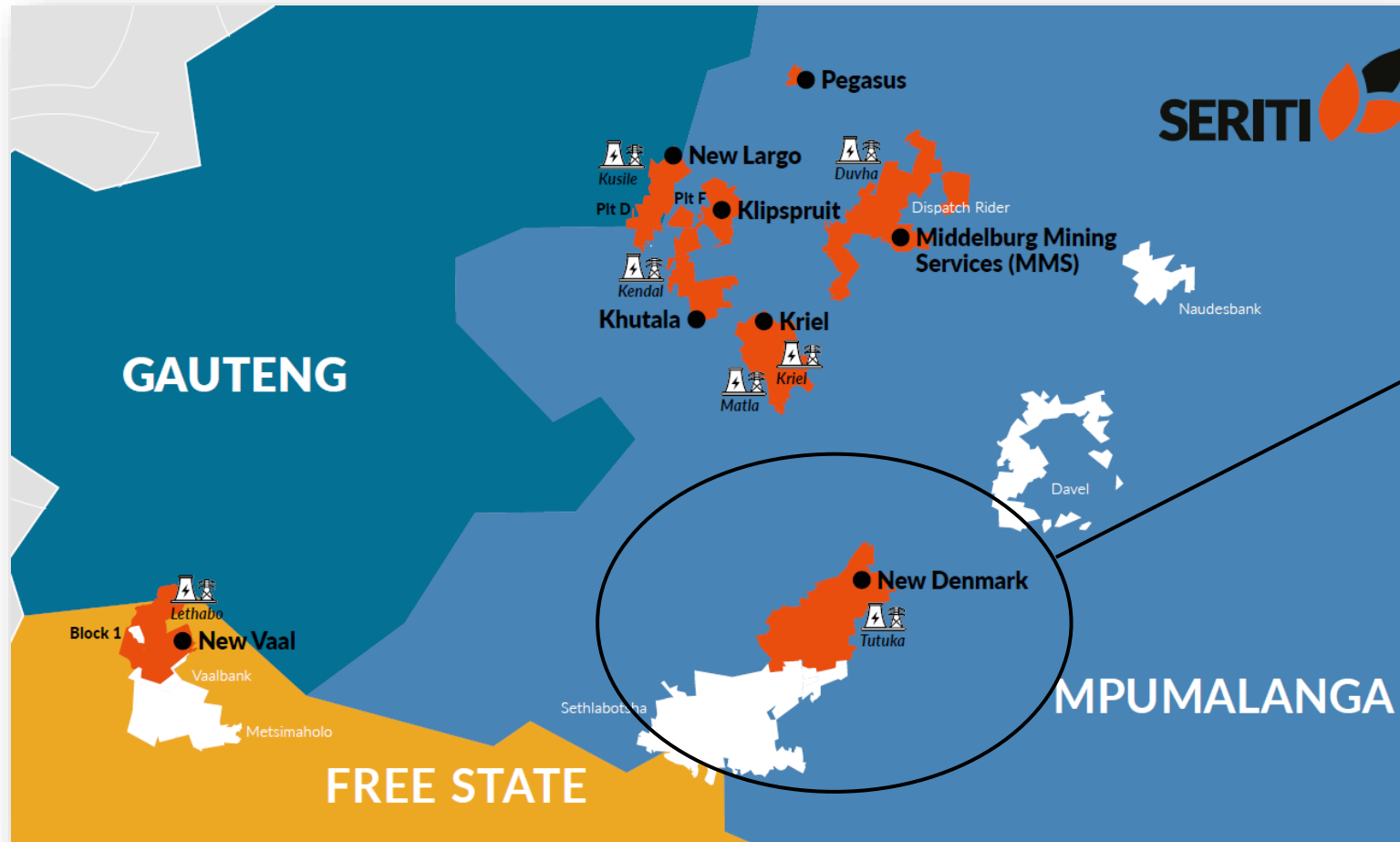
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Questions



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New Denmark Colliery | Locality



Notes

- Located **30km** North of Standerton
- Supplies thermal coal to **Eskom's Tutuka Power Station**
- 1 of 4 **Seriti UG Mines**
- **Sethlabotsha**, is the life extension project for NDC, with a resource estimated 1.2 billion tons (MTIS)

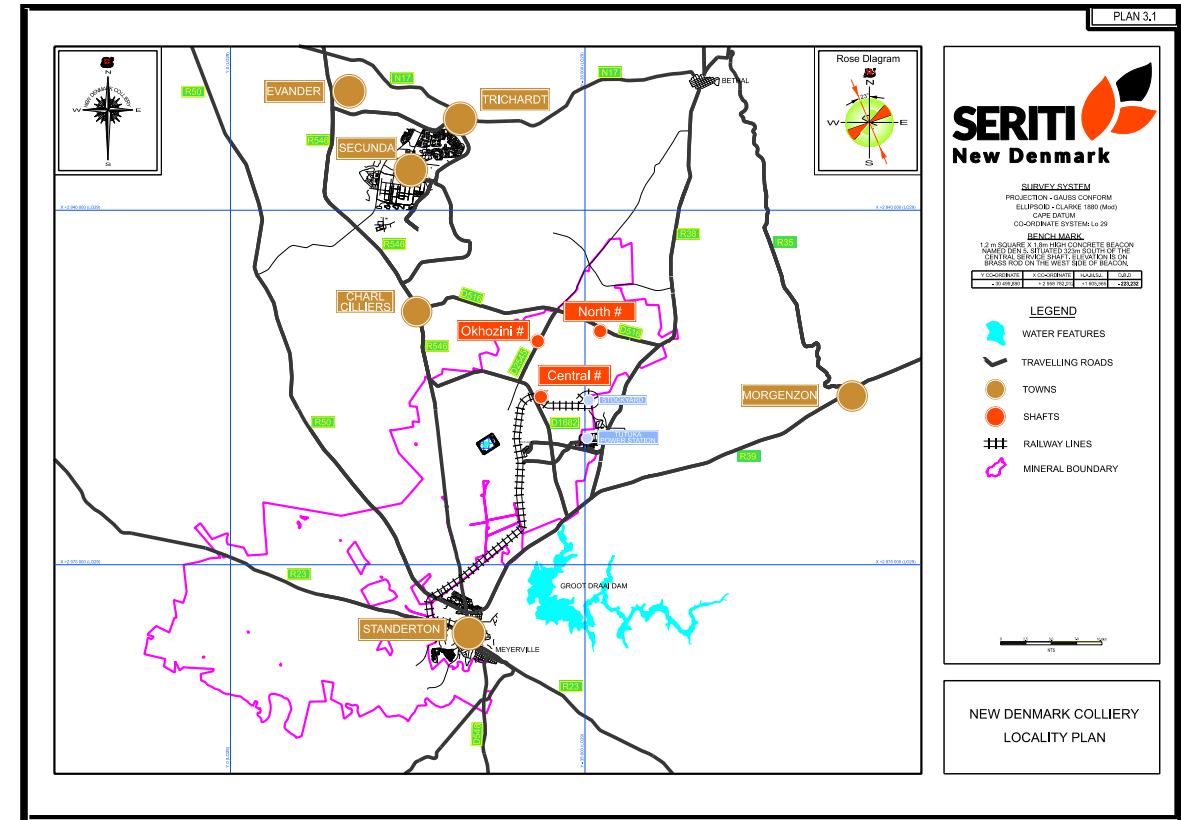
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New Denmark Colliery | Overview

Overview

Thermal coal market	Domestic (Eskom's Tutuka Power Station)
Marketable coal reserves	102.8 Mt Run Of Mine as delivered (as at 31 March 2025)
Coal resource (inclusive)	193.4 Mt MTIS
Mine life	26 years on current NDC footprint
Mine Type	Underground (average 200m deep)
Mining Method	Board & Pillar with concurrent stooping
Seams	No. 4 seam – full seam Averages 1.85m. Min – 1.65m Max – 2.7m Highveld coal field
Processing facility	Crush and screen - ROM product to Tutuka Power Station.
FY27 Saleable production	4.60 Mt

Map of operations



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New Denmark Colliery | Safety Performance

FY27 Safety Performance



HCT – 64%



LTI Free Days - 53



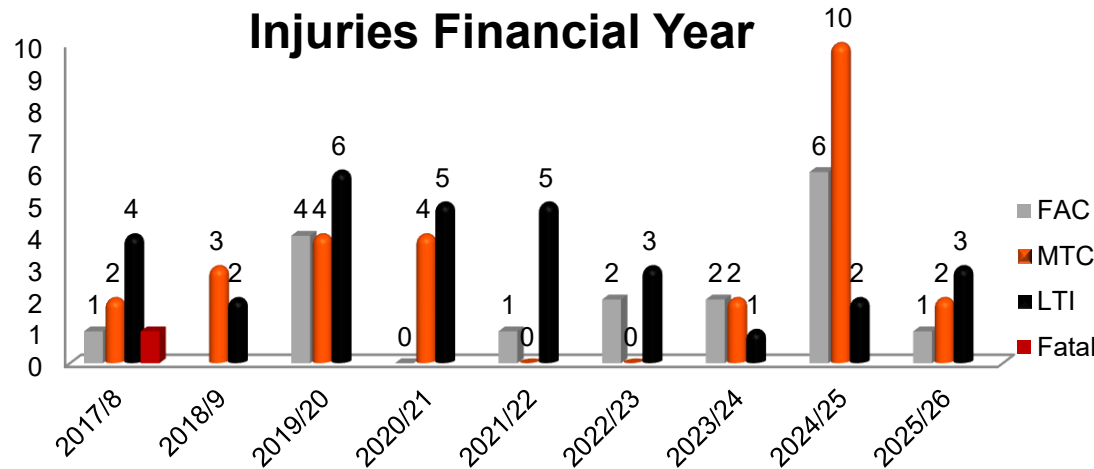
Scratch Free Days - 36



FFPS -9790

NDC Safety Performance

Injuries Financial Year



8
Fatality
Free
Years

9 000
FFPS

SIYAVIKA

My name is **Siyavika**.
I'm here to help you work safely.
Always make sure you VIKA



- Visually inspect hazards
- Identify the risk
- Know when to ask for help
- Achieve the task safely

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Learning from Incident | Impala 11 Shaft

Date	28 November 2023
Time	±16:30
Shift	Morning Shift
W/Place	11 Shaft Barrel
Activity	Pulling of the shift
Agency	Cage fell
Description	On the Monday of 27 Nov 2023 at approximately ±16:30pm the onsetter was busy conducting shift clearance with an all-level traveling up to surface. The Winder was operating in automatic mode i.e. No Winding Engine Driver set the winder into motion. A clear signal was received from underground to move to the next level above and the brakes subsequently lifted. After the brakes lifted the winders started to travel in the wrong direction attaining full speed, the emergency stop button was activated from the winding engine driver's cabin however there wasn't sufficient headroom to safely arrest the winder resulting in the counter-weight being arrested by the headgear arrestors and the man winder cage bottom deck colliding with the penthouse. All relevant authorities were informed, and the incident investigation is underway. At the time of the accident, 174 employees were underground of which 86 were in the cage. Of the 86 employees 75 are injured and 11 deceased. 88 employees were evacuated unharmed

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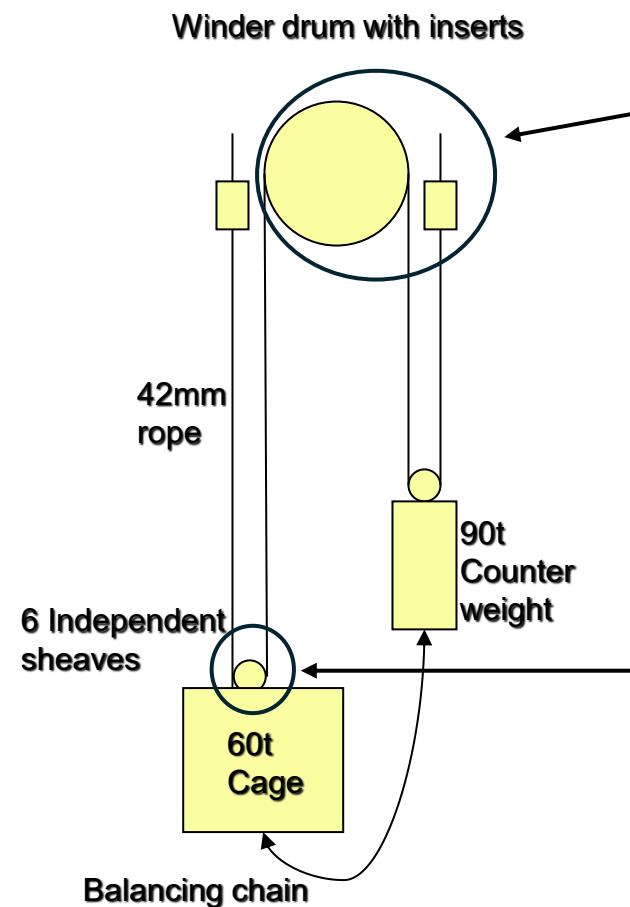
New Denmark Colliery | Koepe winder

Winder used at NDC:

- This is a friction type winder
- The drive can either be tower mounted or ground-Mounted.
- Ropes used are non-spin
- Tail rope balances the rope mass and compensating cylinders removes slack on the rope,

Advantages

- Heavy loads can be hoisted, over short to medium distances due to continuous balanced load
- Low power consumption (balanced load)
- Mechanical configuration simple



Reliance glands with tensioning jacks



6 sheave wheel on top of the Cage

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New Denmark Colliery | Winder Cage Upgrade

Shaft Conveyance Service Life

- Shaft conveyances convey men and material from surface to shaft bottom, over 200 m.
- Shaft conveyances have never been replaced since commissioning.
- Due to the complexity of the installations, conveyances have never been removed for comprehensive inspection, refurbishment, or repairs.

Central Shaft

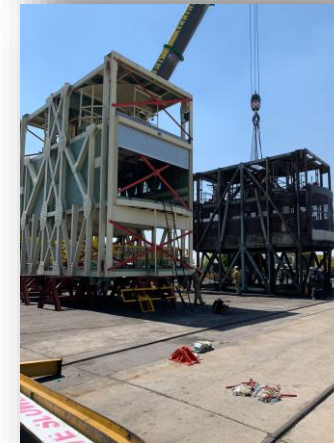
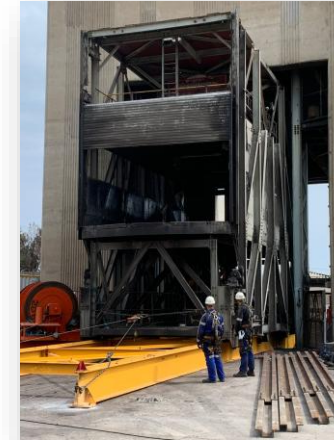
- 60 t Personnel & Materials Cage (Main Cage) in service for 38 years.
- Main Cage Counterweight in service for 38 years.
- Auxiliary Cage and Counterweight also in service for 38 years.

North Shaft

- 60 t Personnel & Materials Cage (Main Cage) in service for 33 years.
- Main Cage Counterweight in service for 33 years.
- Auxiliary Cage and Counterweight have been decommissioned.

Benefits of New Conveyances

- Improved safety and regulatory compliance.
- Enhanced personnel safety and operational reliability.



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New Denmark Colliery | Electrical Panels Upgrade

Central Electrical Panel Upgrade Justification

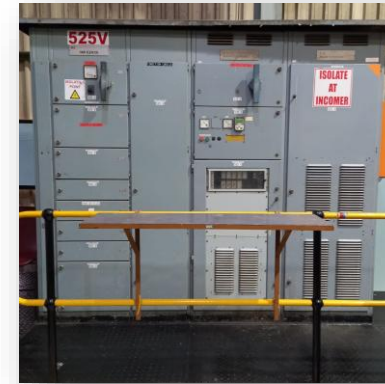
The existing central electrical control panels are based on relay logic and electronic control cards installed in 1982, with no PLC-based control system. The North Winder, installed in 1986, utilizes the same obsolete relay-logic technology.

Central Electrical Panel Upgrade – Key Points

- Existing control panels were installed in 1982 and use relay logic and electronic cards, with no PLC system.
- The North Winder (1986) uses the same obsolete technology.
- Spare parts are no longer available, and existing spares have become obsolete.
- Aging equipment increases the risk of failures and extended downtime.

Proposed Upgrade Benefits

- Replace old panels with modern PLC-based control systems.
- Implement **SIL-rated safety systems** for enhanced operational safety and reliability.
- Spare parts and technical support available for at least 20 years.
- HMI diagnostics provide clear fault messages and assist with troubleshooting.
- ABB remote support enables faster fault resolution and reduced downtime.
- Improved reliability, maintainability, safety, and plant availability.



Old Electrical
Control Panels



New PLC Based
Electrical Control
Panels

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New Denmark Colliery | SIL- Rated Safety Systems

Safety Integrity Level (SIL) System

- Quantitative measure of how reliable a safety function needs to be within a system.
- Essentially defining the acceptable level of risk reduction by indicating the probability of failure on demand for a specific safety function.
- The higher the SIL level, the lower the acceptable failure rate and the greater the safety required.

Frequency	5	SIL3	SIL4	X	X	X
	4	SIL2	SIL3	SIL4	X	X
	3	SIL1	SIL2	SIL3	SIL4	X
	2	-	SIL1	SIL2	SIL3	SIL4
	1	-	-	SIL1	SIL2	SIL3
		1	2	3	4	5
Severity of Consequence						

Seriti Specification

- Seriti specification SC_DEN_SPC_535002 - Mine Winder Electrical Drive and Control System Specification, requires:
 - ☐ A contractor tasked with winder electrical and control systems design to develop and implement a safety philosophy to Safety Integrity Level 2/3.

ABB Offering

- SAFETY PLUS HOIST MONITOR (SPHM) system which consists of AC500-S PLC.
- SPHM handles the main speed and position-related safety functions.
- Upon detection of a hazardous event, it de-energizes one or more safety relays connected to the mine hoist safety circuit(s).

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Questions ?

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