



TRIGGER ACTION RESPONSE PLAN (TARP) – FALL OF GROUND (FOG)



“Precautionary measures were put in place following a TARP team visit”

FULL DESCRIPTION OF THE RISK ADDRESSED

FALL OF GROUND (FOG) / GROUND STRATA FAILURE

Iron rich ultramafic pegmatoid (IRUP) hanging wall conditions were intersected in the west side of the Marikana B (MKB) section and identified through the application of the mines TARP FOG process. Precautionary measures were put in place following a TARP team visit which included increased support densities and visit frequencies from the advanced Mineral Resources management department (Rock, engineering and geology) prior to the fall. The geologist conducted a routine inspection in the company of the mine manager on 15 March 2016 and identified adverse geotechnical conditions within the face area of the west panels which resulted in a TARP red trigger (horizontal parting with clay filling). No production activities were planned on the day within the affected area which was barricaded at the time of the inspection. The geologist’s findings were immediately escalated to the TARP Red Team as well as to the mine manager.

The mine manager issued a special instruction to stop all work on the western panels and to only work on the eastern side of the section until the TARP Red Team had issued further instructions for the western side. The mine manager conducted early entry examinations with the crew on the morning of 16 March 2016 and noted scaling and falling rocks from the pillar sidewalls at the 13 West panel. He proceeded to barricade all access points to the entire western side of the section and reported the conditions to the mine overseer who was at the waiting area at the time. **While the mining crew was working within the panels of the eastern section, an uncontrolled FOG occurred behind the barricade in panel 13 West at approximately 11:10am. All activities within the section was stopped immediately and the crew withdrew to the waiting area.** The incident was reported to all stakeholders, including nightshift employees. The MKB section crew were stopped from proceeding underground until a geotechnical investigation was conducted.

OVERVIEW

Mining company

Glencore Alloys

Commodity

Chrome

Operation/Mine

Kroondal

Health and safety case study

Trigger Action Response Plan (TARP) – fall of ground (FOG)

Number of employees affected by the health and safety case study

>4

Stakeholders consulted

Mining and engineering departments, technical services, unions, full-time health and safety representatives and contractors

Occupations affected/benefited

All employees

FINDINGS AND LESSONS LEARNED FROM THE ADOPTION OF THE TARP FOG LEADING PRACTICE

- 1 The TARP system is well entrenched and adhered to. Procedures are followed, with hazards/triggers identified and escalated.
- 2 The existing systems are effective as the possibility of a FOG with high potential consequence is proactively identified and action is taken.
- 3 The workforce is empowered and can apply section 23 without fear.

The geologist's findings were immediately escalated to the TARP Red Team as well as to the mine manager.

BENEFITS AND IMPROVEMENTS REPORTED BY AFFECTED STAKEHOLDERS

The stakeholders appreciated management's swift response to stop work at the section and to withdraw the employees from underground indicating its commitment to placing safety first.



View from front at 13 West



View from 13 West



View from South along pillar from 13 West



Top view from 13 West RSE 14 (Damp mud infill on hanging wall)

KROONDAL MINE

SAPS DMS reference number	10002347766	Mine manager and Competent "A" Persons Safe Declaration Book
Implementation date	9 May 2019	
Revision/Amendment Number	3	
Revision/Amendment Date	6 May 2021	

TRIGGER ACTION RESPONSE PLAN - Fall of ground: western chrome mines	TARP- FOG			
Mine manager/team leader 1. Conduct pre-shift and mid-shift- shift examination, bar and make safe 2. Install all support as per mine standard	Geological Structure	Dip angle <15° and 60°	Dip angle between 15° and 25°	Dip angle between 26° and 60°
Shift supervisor/mine overseer: 1. Barricades and call the shift supervisor 2. Carry out joint examination with the shift supervisor, mine manager and team leader 3. Communicate the actions in the safe declaration book/form 4. Comply with recommendations given by the examining team 5. Once the panel has been examined by the examination team, it can be declared safe to work under the conditions given 6. If unsure, the shift supervisor shall declare the panel Red	Idle panel	Less than 14 days	Between 14 - 30 days	More than 30 days
	Stoping width	Less than 3.0m	None	Higher than 3.0m
	Only applicable to working areas where the average stoping width is less than 3m			
	Fault	Throw smaller than 30cm	Throw between 30cm - 80cm	Throw bigger than 80cm and/or fault dip angle 60° and less
	Shear zone	Thickness less than 30cm	Throw between 30cm - 80cm thick	Thickness greater than 80cm
TARP Team: 1. Barricade and report to the mine overseer/site champion 2. Request and participate in the TARP visit 3. Document the actions in the safe declaration book 4. Give support recommendations 5. Only on completion of the recommendations made by the TARP Team and the start note is signed and approved by the relevant disciplines shall normal work commence 6. A panel will remain Red until all TARP recommendations have been completed and signed off by the shift supervisor	Dykes	Less than 30cm thick or no lamprophyre dyke	Between 30cm - 80cm thick lamprophyre dyke less than 10cm thick	Thicker than 80cm/ lamprophyre dyke thicker than 10cm
	Brow	Smaller than 30cm thick	Between 30cm - 80cm thick	Ticker than 80cm
	Reef/ chrome stringer on hanging wall	None	Yes	N/A
	Blasting damage	None	Minor	Severe - resulting in blocky hanging wall
	Reef dip	None	Reef Roll	More than 12° up-dip
Pothole/IRUP Blocky ground/ Friable ground Low angled structures with a dip angle between 26° and 60° resulting in the formation of a wedge (joint dipping 60° or less, domes, horizontal joint in inclined waste ends, joints with similar strike and opposing dip angles)				
Water seepage Pillar failure or clay infilling within the pillar or immediate hanging or footwall contacts				
Uncontrolled fall of ground Multiple faulting				



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