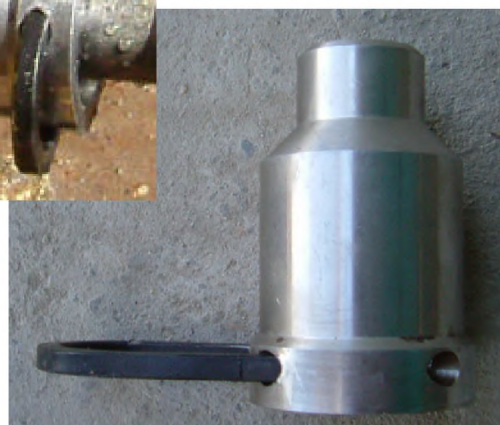
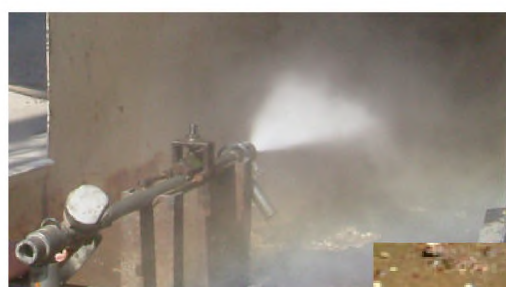




EVALUATION OF THE HPE CLIP-ON WATERING DOWN NOZZLE'S DUST SUPPRESSION CAPABILITY

TAU LEKOA MINE
10 November 2003



JJ Dekker
O-ESH Manager Occupational Hygiene
South African Region Central O-ESH Team

PURPOSE

To evaluate the dust suppression capability of the Hydropower Equipment (HPE) clip-on watering down nozzle.

This report serves as a follow-up report on:

- The "Effect of Hydropower Water Jetting on Airborne Dust Concentrations" report, dated 8 November 2002, and
- The "Evaluation of the HPE Watering Down Gun's dust suppression capability" report, dated 7 February 2003.

METHODOLOGY

Project was conducted in the 1500 S1 Rse 11.

Gravimetric dust samples were collected at:

- The intake to the stope.
- The return of the stope when utilising the clip-on watering down nozzle.
- The return of the stope when utilising the water jet.
- The watering down nozzle operator during operation of the watering down nozzle.
- The water jet operator during operation of the water jet.

The respirable dust concentrations due to utilisation of the watering down nozzle were evaluated first. This was followed by the evaluation of the respirable dust concentrations due to utilisation of the water jet. The combined effect (after utilisation of both types of equipment) on the prevailing airborne dust concentrations was deemed adequate as an indication of the dust suppression capability of the HPE watering down nozzle.

FINDINGS

The detailed results of the survey are depicted in Appendix 1.

The utilisation of the watering down nozzle resulted in:

- A 40,3 % (0,067 to 0,040 mg/m³) decrease in panel operator exposure.
- A 70,1 % (0,067 to 0,020 mg/m³) decrease in stope dust concentrations.

The utilisation of the water jet resulted in:

- A 746 % (0,067 to 0,500 mg/m³) increase in operator exposure.
- A 119 % (0,067 to 0,080 mg/m³) increase in stope dust concentrations.

The clip-on watering down nozzle proofed:

- To be easy to install,
- To be accepted by the operator as an improved tool, (did not want the clip-on watering down nozzle to be removed from his section)
- Capable of watering down a large area in a very short time (took the operator 13 minutes to water down an entire panel, including the back area),
- Improved footwall dust penetration ($\pm$ 15 to 25 mm compared to previous > 1 mm)

CONCLUSION and RECOMMENDATIONS

From the findings it is clear that the HPE clip-on watering down nozzle proofed to be an improved dust suppressant tool. Unfortunately employees are still exposed to unacceptably high dust concentrations, when hydropower water jetting is done.

It is recommended that the following corrective action plan be adopted:

- The current practice of issuing water jet operators with appropriate Respiratory Protection Equipment (RPE) must be continued with.
- All other stope employees to be moved to fresh air (stope intake) or issued with disposable RPE whiles water-jetting operations are being performed.
- Employees be trained (training material must be updated) in the purpose of the watering down activity. During the test it was clear that watering down is mainly done to clean the stope face and hanging wall to identify hazards associated with hanging rock and non-detonated explosives. The use of "watering down" as a dust suppressant method was not known by the employees.
- The HPE Design Engineer (Mr. Peter Fraser) be contacted to assist Tau Lekoa Management in the development of an appropriate and effective "in-stope water blast". An "in-stope water blast" is required to ensure that all dust on the footwall is adequately suppressed before water jetting commences. Any dust particles not properly suppressed will become airborne due to the forces involved during the water jetting activity.

APPENDIX A – Survey Results

Table 1. – Detailed survey results.

Filter Number	Position	Sample Time (min)	Sample Concentration (mg/m ³)
Watering Down Nozzle			
Q 153	Stope Intake	39	0,067
Q 152	Operator	13	0,040
Q 154	Stope Return	11	0,020
Water Jetting			
Q 153	Stope Intake	39	0,067
Q 155	Operator	20	0,500
Q 151	Stope Return	16	0,080

