

Simulation Report

Published on: 2017/01/31

Document control

	Name	Email	Date	Signed
Compiled by:	Brandon Friedenstein			
Checked by:				
Approved by:				
Client rep.:				

1. Background

Using test results, refuge bay leaks were added to the Mine B compressed air simulation model. Using SCADA data for validation, the system was modelled with an accuracy of 98%.

A simulation was done to test what effect closing off all the refuge bays has on the system’s energy and air usage.

2. Summarised simulation results

The difference between the baseline and the optimised simulations were compared in order to determine the total savings and system impact that could be achieved.

Table 1: Simulated results

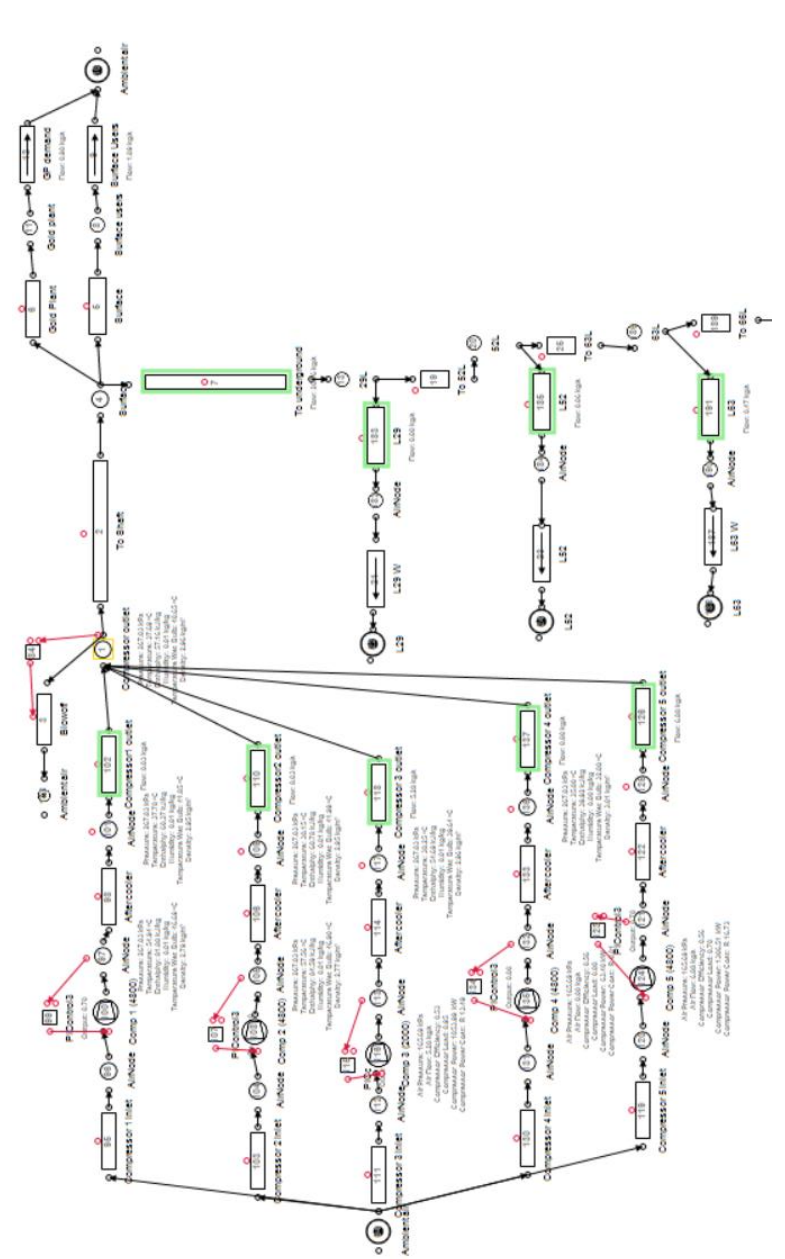
Simulation scenario	Simulated power saving	Compressed air reduction	Drilling shift pressure increase	Cost saving p.a.
Closing refuge bays on all levels	840 kW E.E	6158 m³/hr	15 kPa	R 5.1 million

The compressors are presently unable to reach their set points during drilling shifts. The simulation indicated that by reducing the airflow to all refuge bays, the service delivery can be increased.

3. Next steps

Improvements on the service delivery can be achieved by reducing the airflow to refuge bays. It is recommended that the airflow be controlled by valves in order to limit the amount of air lost through refuge bays. The feasibility of such a valve however is unclear. Research must therefore be done on different types of valves and adequate configurations to determine a solution to the present problem.

Appendix A: Simulation screenshot - compressors



Appendix B: Results discussion

Figure 1 shows the difference between the optimised and baseline power profiles. Savings are lower during the drilling times.

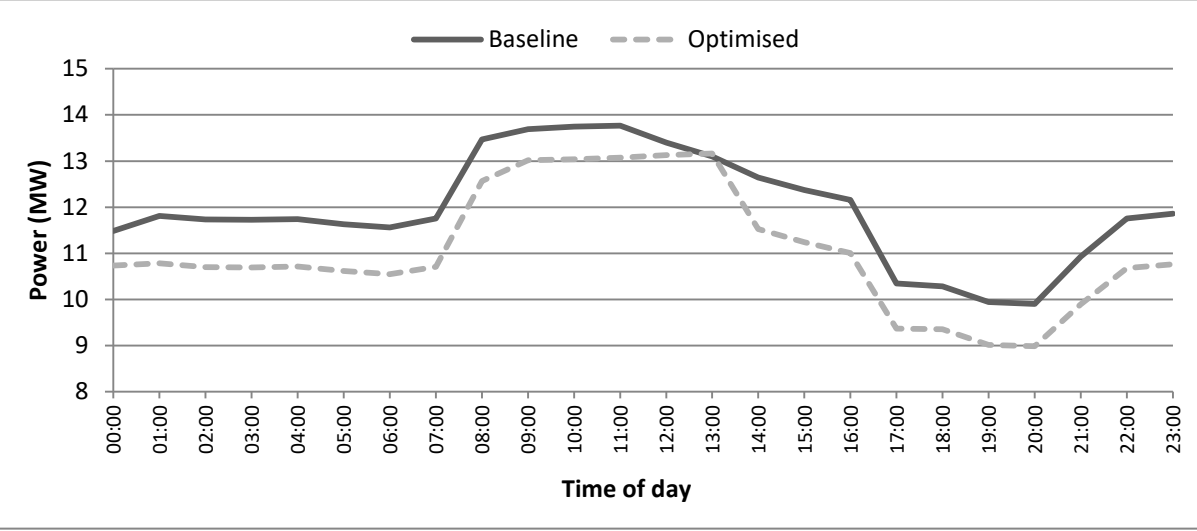


Figure 1: Baseline vs optimised power profile

Figure 2 Shows the difference between the optimised and baseline flow profile.

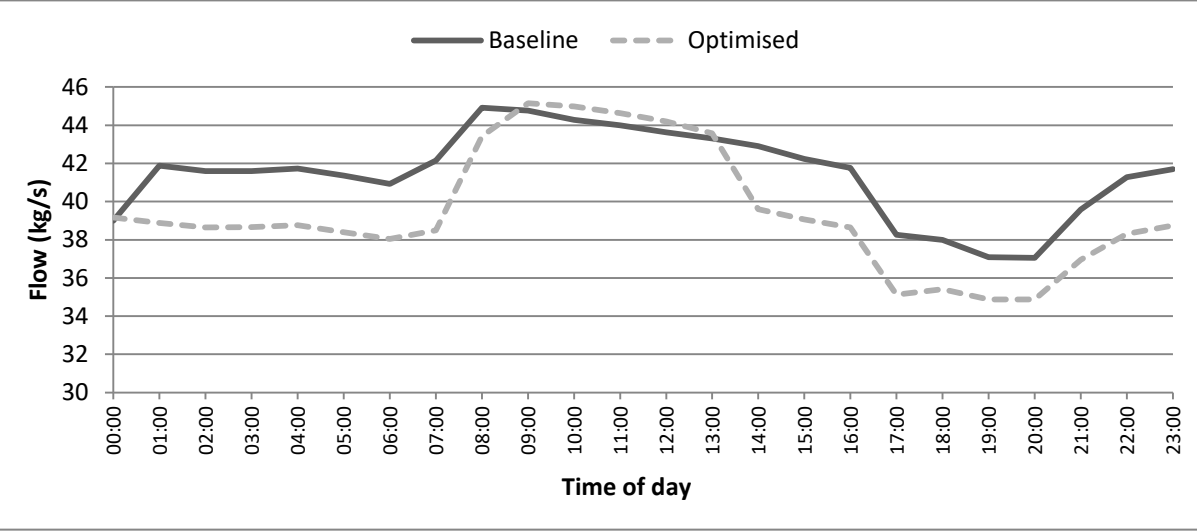


Figure 2: Baseline vs optimised compressor flow

Figure 3 shows the difference between the optimised and baseline pressure profile. Pressure is increased during drilling shift.

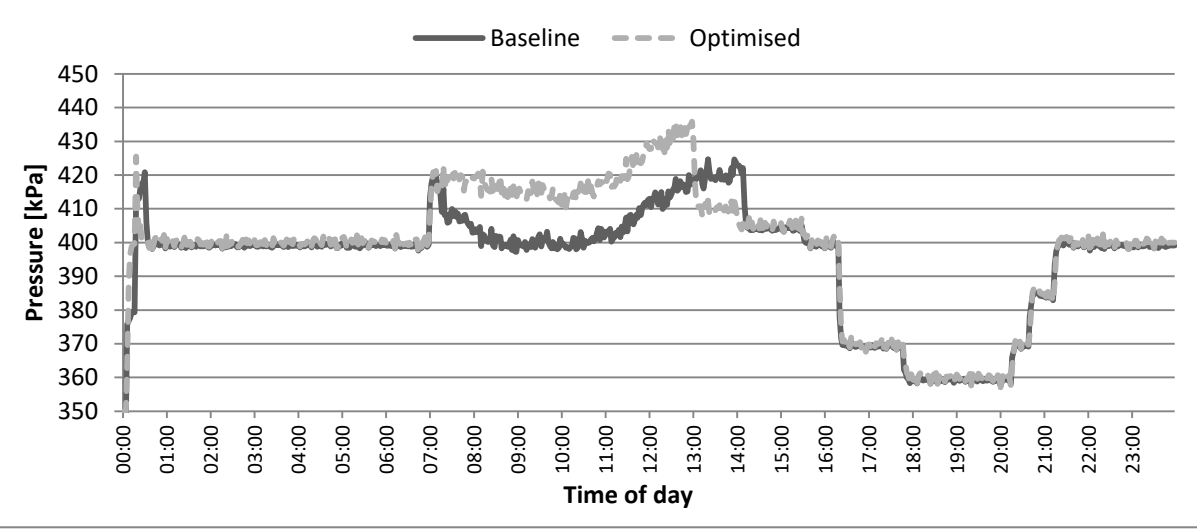


Figure 3: Baseline vs optimised compressor pressures