



**MAKE
SURE
YOUR
MINE
IS ALWAYS ON.**

aggreko

World leader in power solutions

aggreko



AMRE Safety Presentation 2011

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Aggreko – who are we?

- World leader in temporary power generation and temperature control services
- UK FTSE-100 company, headquartered in Scotland
- Operate in over 144 locations in over 34 countries worldwide



What do we do?

Aggreko provides complete turnkey temporary power and temperature control solutions, including:

- Design
- Mobilisation and installation
- Power generation and distribution
- Mine shaft air or liquid cooling
- Commissioning, operation and maintenance
- Decommissioning and demobilisation

Applications in Mining:

- Power for mine construction
- Power where grid supply is unavailable or unreliable
- Early power before grid supply or main power plant is installed
- Supplementary power during upgrade/ expansion of mine
- Power for man camps, process plants, mining equipment
- Emergency breakdown coverage
- Temperature Control Solutions



Why mining houses choose Aggreko

- **In house expertise**
 - Aggreko will provide in-house expertise across all areas to support you and your core business to meet your time frames and budget requirements
- **Risk Elimination**
 - By utilising Aggreko equipment and Engineering staff the client will limit their risks in relation to Power and TC supply required on demand.
- **Experience**
 - Aggreko will provide the client with a suitably qualified rental company with proven network experience, staff and modern equipment so they can focus on their core business
- **Technical Knowledge**
 - Aggreko has a comprehensive understanding of the compliance issues relating to the supply of Generators on Electricity networks and standards that must be met

Why mining houses choose Aggreko

- **Availability**
 - Aggreko will provide a 24/7 commitment to client for the duration of any contract
- **Full Operational Support**
 - Aggreko will endeavour to minimise downtime to ensure that all fleet and systems are of the highest standard to enable works to be delivered on time and on budget
- **Flexibility**
 - Aggreko will provide the necessary flexibility of all temporary resources without having to invest in large amounts of Capital Expenditure yourselves
- **Quality**
 - Assurance that all fleet is maintained to the highest standards at all times during the contract

Confidence in knowing Aggreko is “**The One Stop Shop**”

Safety for Life at Aggreko

- **Safe Operating Procedures are drafted for the project**
 - Procedures are drafted by Engineering for each project with Risk assessment carried out
 - Will be signed off by QHSE Manager
- **Risk Assessments**
 - Aggreko staff to complete risk assessments before starting any on site works
 - Aggreko will attend any inductions necessary for specific sites
- **Operating Procedures and Compliance**
 - Up to date operating manuals to be supplied with all Generators so they comply
 - Current electrical schematics to be supplied for the Power Station

Harmony Gold Co : Phakisa Mine

- Supplement Refrigeration Plants for Phakisa Mine situated in Odendaalsrus, Free State



Case Study – Harmony Gold Co : Phakisa Mine

- **The Need**

- To supply a climate underground to meet Harmony's QHSE operating practices, throughout the summer period while annual maintenance was undertaken.

- **The Solution**

- Short term hire of a surface cooling package to allow QHSE requirements to be continually met during maintenance.

- **Obstacles to the Solution**

- Where do we obtain a refrigeration plant of the required capacity?
- Extremely tight window of 60 days to located, design, install, commission and operate solution.
- Placement in small area close to the shaft intake for efficiency.
- Robust and reliable system
- Economically viable.



Case Study – Harmony Gold Co : Phakisa Mine

- **The Opportunity**
 - Locate options for short term solutions in house and externally.
 - Aggreko presented at AMRE in 2010 a case study on mine cooling in Australia, and a further discussion was held.
- **The Pre-Installation Process**
 - 20/9/2010 Business case was developed on internal and external options and approved for pre-feasibility.
 - 29/9/2010 The pre-feasibility options were considered the Aggreko short term option was selected.
 - 4/10/2010 Letter of intent issued to Aggreko.
 - 16/10/2010 A plant design / operating criteria in accordance with Harmony's QHSE was developed with Aggreko, that defined the cost, reliability and efficiency of the installation.
 - 16/10/2010 Final operation criteria and installation schedule agreement.
 - 19/10/2010 order placed with Aggreko for 3.7mVA dense air injection cooling package.



Case Study – Harmony Gold Co : Phakisa Mine

- Harmony scope of work
 - The dense air entry point was constructed.
 - The lay down area for chillers, BAC's and cooling towers prepared.
 - 11kV power supply and step down transformer prepared.
 - 3 /12/2010 Equipment from Australia arrives, re-furbished and modified for site specific application.
 - Conduct heavy lifts to place the major components in position



Case Study – Harmony Gold Co : Phakisa Mine

- The Execution

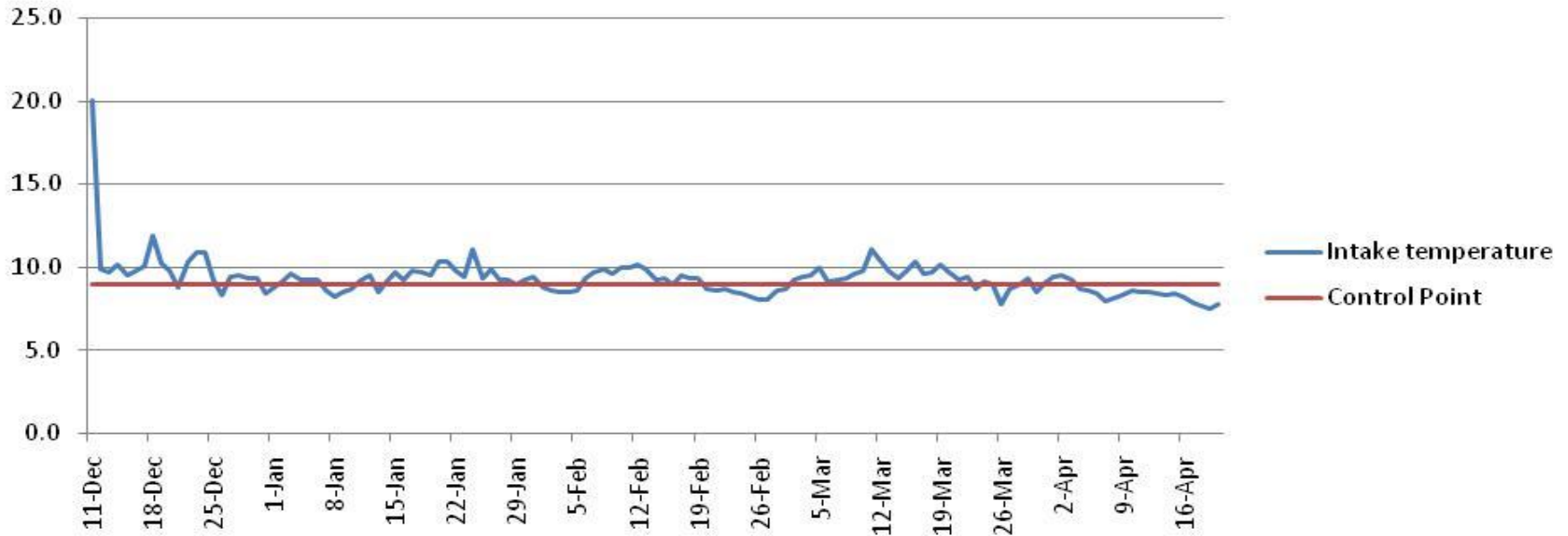
- 4/12/2010 install composite hoses and manifolds.
- Place BAC's into positions.
- 5/12/2010 Install Pumps
- 7 and 8/12/2010 install electrical supply and transformer.
- 9/12/2010 Locate steel hood and attach elbows, install 1000mm ducting. Pre-commission chillers
- 10/12/2010 – Final commission Dense air injection plant fully operational and operational training for local staff.
- Fully commissioned 3700kW_r Refrigeration Plant within 8 Days of arrival on site



Case Study – Harmony Gold Co : Phakisa Mine

- The Result

- Mix 69 m³/hr at constant 9⁰C with ambient air intake 180m³/hr.
- Maintain temperature below legal limit levels by reducing station and haulage temperatures with approx 2⁰C.



Case Study – Harmony Gold Co : Phakisa Mine

- Closure

- On the 21st April 2011 the plants was stopped due to sufficient cooler ambient temperatures.

- On the 7th May the plants was de – assemble and lift and transport to Aggreko by the 10th May 2011.

- Thank you to Marius De Leeuw for the assistance in developing the case study



AngloGold Ashanti : Mponeng Mine

- 5000kWr Aggreko Surface Cooling Plant



Case Study – AngloGold Ashanti : Mponeng Mine

- **The Need**
 - AngloGold Ashanti required an additional 5000kW cooling capacity to slip stream into the existing refrigeration system.
 - To source a solution which could be installed with minimal turnaround time of approximately 3 months.
- **The Solution**
 - Slip Streaming Water from the return of the BAC to the pre-cooled dam by lowering the inlet temperature to the plant by 3 Degrees Celsius.
 - This increasing the efficiency of the Hitachi Plants HM25B in producing more refrigeration for better underground working conditions
- **The Opportunity**
 - Fast track a solution within 2 months from start of discussions therefore reduced lead times as opposed to conventional project lead times of >2 Years.
 - Introduction of a new solution which is safely operated by trained and experienced Aggreko personnel.
 - No requirement of training unknowledgeable employees to operate the plant.



Case Study – AngloGold Ashanti : Mponeng Mine

- **The Pre-Installation Process**
 - Business case was developed on both opportunities and approved for pre-feasibility by 4th November 2010
 - The pre-feasibility for the Hire a Refrigeration Plant was completed on 26th November 2010
 - Letter of intent issued to Aggreko on 26th November 2010
 - Feasibility was developed with the co-operations of the Aggreko team, that defined the cost, reliability, the installation and the final operation criteria and period to make the plant operation.
 - Order placed on 2nd December 2010.
- **The Execution**
 - Small Footprint required for site layout
 - Fully commissioned within 5 days of arriving on site.
 - Power supply was stepped down from 11kV to 415V through an Aggreko 6.3mVA Transformer.



Case Study – AngloGold Ashanti : Mponeng Mine

- The Result
 - The Surface installation was very successful that possible future are present within AGA.
 - Through the addition of the temporary refrigeration plant AGA were able to lower the temperature of the pre cooled water sent to ice plants, and therefore increasing the volume of ice sent underground.
 - Therefore improved working conditions underground.
 - Thank you to Andrew Robbins for the assistance in developing the case study



Mobile Mine Equipment Relocations



Mobile Mine Equipment Relocations

- Minimising of exposure to QHSE
- Reduces handling time with cable connections
- Reduction of tramming times
- Allows for relocations without costly temporary infrastructure installations.
- Full onsite compliance to operating and safety procedures.
- Minimises costly mining downtime.
- Turnkey solution at voltage requested.



Aggreko in Summary

- Fast response and rapid mobilization of equipment
- Flexible and cost effective solutions
- Highly reliable equipment which is proven for performance
- Safe and secure power and temperature control systems
- Turnkey approach
- 24/7 support on site
- Global experience and support



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