

## Evaporation Fans

### Xstrata Coal Queensland – Newlands Northern Underground

#### The Problem or Initiative

##### a) Identified problem

- The core problem was the risk of water inrush to the underground working (especially in light of recent weather events).
- This creates an obvious risk for workers, as the risk of incident and injury increases with increase water make underground.
- The initiative was to design and implement a system to discharge water from site.
- There is also stringent Environmental Authority guidelines in place for Newlands Northern Underground lease in terms of water discharge.
- The underground has exhausted available options to discharge water offsite, which has a water quality not suitable for creek discharge.

##### b) How the improvement opportunity was identified

- Research into, and implementation of water discharge alternatives is a key priority and project for Newlands Northern Underground.
- With increasingly stringent requirements for water discharge off mining leases, a dedicated project team was created to investigate and review alternatives for water discharge. The inability to discharge water from site due to water quality and EA requirements resulted in an alternative method of discharge to be investigated.

##### c) What health and safety consequences were to be addressed

- Protecting workers from the risk of water inrush.
- Reducing the risk of injury and safety incidents as a result of increased water make underground.

#### The Solution

##### a) Strategies and initiatives developed to identify and address the problem

- After investigating and reviewing all options and alternatives, the installation of evaporation fans was agree to be the application of choice.
- The Newlands Northern Underground Engineering department did design calculations for pump and flow requirements.
- The team worked with the manufacturers (Sandquip) and ancillary equipment supplier (Dowdens Pumping) on the specific site and project requirements.
- 21 evaporation fans have been installed at the underground operations.



##### b) Internal and external resources used

- The Newlands Northern Underground Engineering department did design calculations for pump and flow requirements.
- Sandquip were utilized as the manufacturer of the fans.
- Dowdens Pumping were utilized as the supplier of ancillary equipment.
- Onsite labour was utilized to install the fans and ancillary equipment.

##### c) Methods used to trial and test

- This is a proven method for water removal.
- The installation was based on other installations.
- Six of the twenty fans were used as a trial and the remainder of the fans were brought into line in three stages (6 first, then 12, then 20).



#### **d) Implementation process**

- Onsite labour was utilized to install the fans and ancillary equipment.
- Implementation of the initiative was communicated to employees and contractors through the management of change process.

#### **e) Demonstrate how hierarchy of control has been applied**

- The evaporation fans are a substitute for pumping water offsite, which has a number of environmental implications.
- The evaporation fans were used in favour of Reverse Osmosis (RO) plants due to cost and safety requirements.



### **Benefits / Effects / Outcomes**

#### **a) Safety and occupational health benefits**

- The trial of this method has enabled the successful discharge of water and minimized the risk of water inrush during the 2011 – 2012 wet season.
- The risk of inrush is reduced by minimizing water levels in pits prior to wet season.
- Reduction in safety incidents underground associated with increase water make underground.
- Reduces equipment downtime associated with increase water make underground.

#### **b) Supporting data**

- These fans are capable of discharging 9ML of water per day.
- With evaporation rates of 40 – 60%, the total discharge from evaporation would be 3.6ML – 5.4ML per day.

#### **c) Extent of deployment**

- The fans are currently being used on site.
- They are also being trialed at the Newlands Surface operations for dust suppression.

### **Transferability**

#### **a) Potential for innovation to be used, modified, transferred across the industry**

- These fans can be utilised at any other surface operation where removal of water is required.
- There are other applications, such as dust suppression that the fans can be utilized for.
- This initiative is available for use in all applications where water discharge is required and stringent environmental regulations prevent the discharge of water through normal creek discharge.
- Areas of low humidity benefit the most from the evaporation method.

### **Innovation**

#### **a) Originality of the innovation**

- Being used for a similar purpose at other operations.

### **Approximate Cost**

#### **a) Statement of approximate cost, if known**

- \$2.8 million (\$15.0 million for an RO Plant.)

