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Demand Side Management
&
Audit Review

April 2012

Keno Hill Project Overview

KEY Reasons for Involvement

2011 Demand Side Management Energy Audit

- Mutually beneficial partnership between YEC & Alexco

- Identified areas which allow Alexco to:
  - ✓ Reduce peak usage
  - ✓ Reduce total energy usage
  - ✓ Identify possible efficiencies
  - ✓ Further reduce energy footprint

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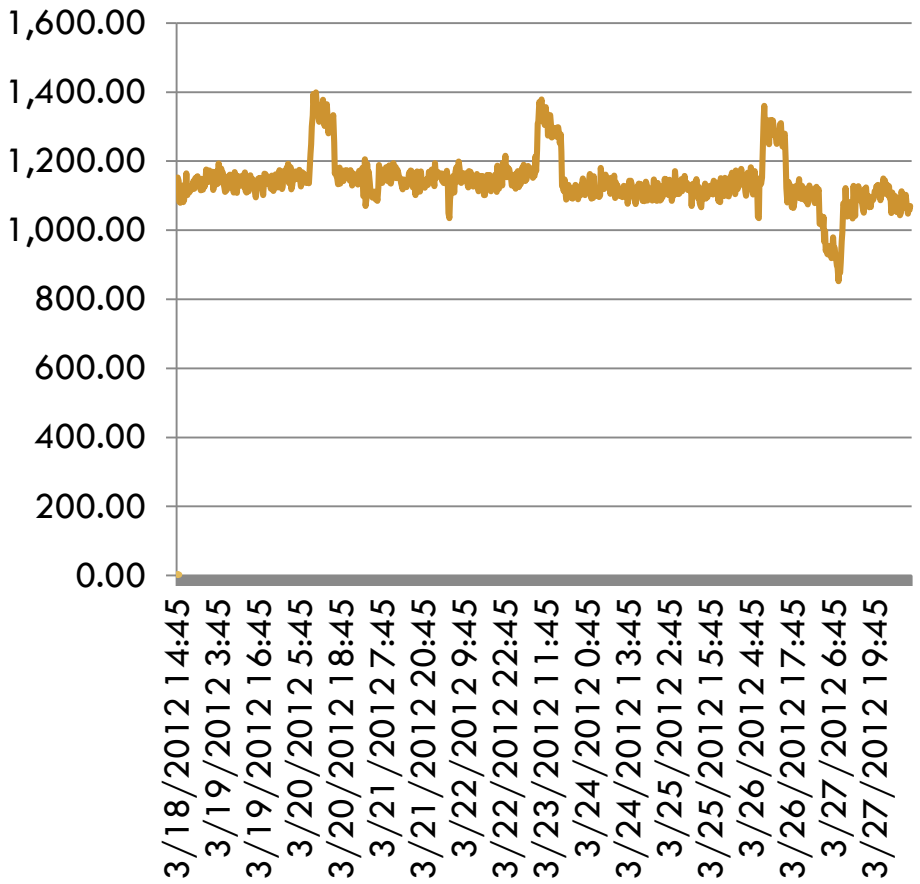
Demand Side Energy Consultants

Study Scope

1.	2.	3.	4.
Observation of Keno Hill Project operational procedures	**Comparison of other projects to Keno Hill Project**	**Analysis of utilization rates & operational parameters**	**Final report & recommendations to Alexco & YEC**
1 week at site Off-site consulting work	Database comparison for efficiency gains	Large equipment such as: air compressors, crushers, blower, ball mill …	Operational recommendations & capital projects

Typical Energy Profile

- Base Load = Daily Steady State Operations
- All infrastructure must be sized to peak load
- Peaks are associated with ore crushing operations



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Recommendations of Demand Side Audit

1. Instillation of an ammeter in Mill operators cab
2. Convert plant lighting to T5 HO fluorescents & LED's for outdoors
3. Re-commission mill air system
4. Initiate compressed air leak reduction program
5. Commission the air blower inlet modulation
6. Re-apply variable frequency drives to Mine ventilation
7. Optimize plant process thru program logic controller
8. Install electrical sub-metering for Mine
9. kWh per tonne as performance measure
10. Install capacitors on the 600V Mill

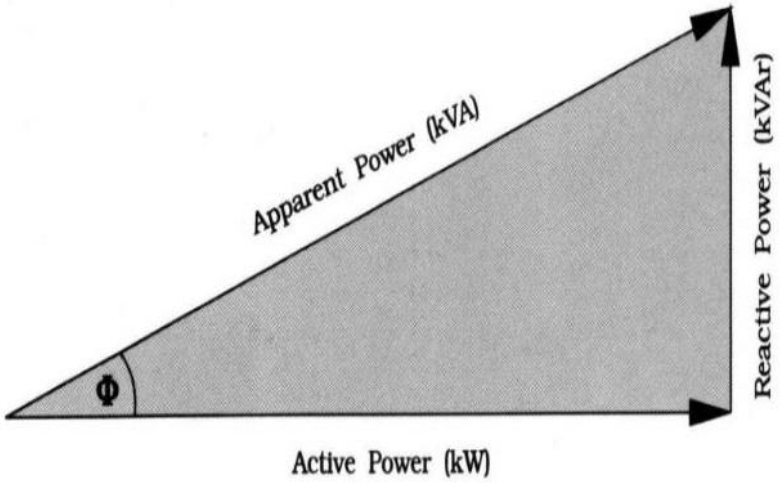
Status of Recommendations

- ✓ Investigation of alternate lighting options (LED's) - in progress
- ✓ Mill compressed air system has been re-commissioned
- ✓ Ongoing air leak reduction program at Mill & Mine
- ✓ Additional variable frequency drives have been installed
- ✓ Program logic control on filter presses implemented
- ✓ Evaluation of site power distribution & metering options - in progress
- ✓ Cost benefit analysis & design of power factor correction unit for the Mill – in progress

Power Factor (PF)

- Power Factor is a measure of how effectively the power is being used and is a ratio of “active power” used to the “apparent power” required which is a combination of both active power & reactive power

- 0.85 for normal operations
- 0.75 for peak loading conditions
  - For every unit of power required to run upwards of 15-20% more power needs to be provided
- 0.95 – 0.98 PF with correction



- **PF = Active Power / Apparent Power**

Future Considerations

- Increased use of variable frequency drives on motors
- Power factor correction studies
- Energy measuring devices
- Alternative lighting sources
- Proper equipment sizing & selection
- Ongoing evaluation of operational practices

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