

Australian Mining

No. 1 FOR MINING TECHNOLOGY & EQUIPMENT



Asia-Pacific's International Mining Exhibition

4-7 September 2007
SYDNEY SHOWGROUNDS

www.aimex.com.au

VOLUME 99/3 APRIL 2007

Print Post Approved P1255003000535

Miners cheat drugs tests

Mine workers are using masking agents obtained on the Internet and dodgy urine samples to try to beat testing at coal mines near Mackay in Queensland, according to a man who failed a drug test. By ***Jim Mulcair**

Products offered over the web, such as Urinate, and carrying a clean urine sample onto mine sites in a condom secreted in underpants are among the tactics being used to get around the testing process.

The 30-year-old, who tested positive for ecstasy, said he thought he "had the system beat".

He outlined some of the methods being used to beat drug testing and warned mine workers that trying to beat the system was not worth it.

"A mate told me you could get someone who was clean to urinate into a specimen jar or condom.

"You took that sample hidden in your jocks and transferred it to the mines' jar when asked to provide a sample," he said.

"There are also websites offering products, including Urinate, which will substitute for the real

thing," the man said he had been told.

The man said he had taken one tablet of ecstasy at 9pm on a Saturday night and tested positive at 7.30 on the following Tuesday morning.

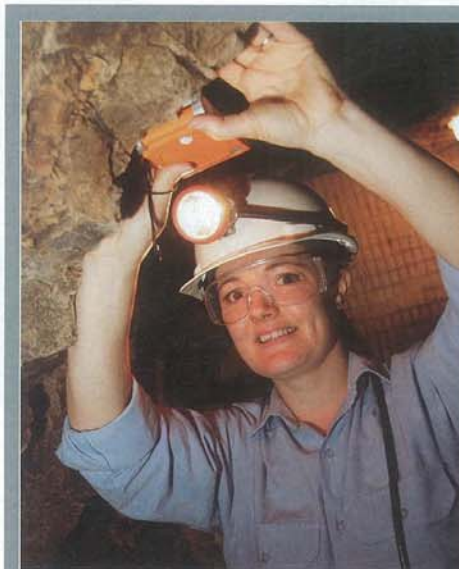
"I thought the ecstasy would have been out of my bloodstream because mates had told me it would be gone.

"I almost lost an \$80,000 a year job, lost the respect of my workmates and could have put lives at risk," he said.

How effective most methods of beating drug tests are remains doubtful according to the man who "wrote the book on drug testing in the workplace" Gary Sorensen, of Mackay's Tropical Investigations.

Mr Sorensen said he buys products offered on the net and then

Continued on page 3



Shedding light on a narrow vein of research. See page 8 and visit: www.ferret.com.au/unearthed



PROSPECT AWARDS

4th annual campaign lift off! P.4



UNITE & CONQUER

Alliance contracting P.32



MOTORS & DRIVES

What's new? P.42



COAL IN CONTROL

Hunter Valley Spotlight P.52



WESTERN POWER

The WA energy market P.64

Surprise audits in Queensland target incident records and high risk areas

MINES inspectors in Queensland are conducting a series of safety audits at selected mines across the State with a focus on strata control, ventilation, fire prevention, vehicle control, fatigue management and electrical safety.

Mines inspectors are targeting a range of coal and metalliferous mines based on their recent incident record and potential high-risk areas.

Mines inspectors will arrive unannounced to carry out the audits at several mines.

They will be the first of a number of safety audits to be conducted over the next three-to-six months.

Queensland Mines and Energy Minister Geoff Wilson said mines inspectors involved in the audits will include those who are familiar with

the sites, and others who aren't normally inspectors of these particular mines.

"The audits will target safety systems and will include extensive site inspections. External mining specialists will also assist the audit team," he said.

"Nothing is more important than the safety of those working in our mining industry."

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An easier way through the daily grind

Capital and operating costs are not the only considerations when it comes to grinding circuits. Operators need to account for energy efficiency, availability, serviceability, support and the impact of the circuit on down stream processes.

*Brenton Burford talks to *Australian Mining*

AM: How has grinding technology changed in, say, the last 20 years?

BB: Grinding technology has been dominated by the ball mill for over 100 years.

While there have been advances in the technology over the years, with bigger mills, energy efficient liner profiles, improvements to media etc, the ball mill is still an inefficient way to grind particles.

The introduction of the tower mill has been an improvement in grinding technology, where the vertical mill moved away from the impact grinding of ball mills to more efficient abrasion grinding.

However, tower mills are limited with respect to the amount of power they can provide, the need to have a dedicated classification circuit, the size of media they can handle as well as the production of iron from the media, that all need to be overcome in circuit design.

The next major advancement in grinding is still happening. It is the development of the IsaMill.

The mill was developed for ultrafine grinding applications, but the introduction of ceramic media, and the increase in available sizes of the mill, has allowed this mill to be used in coarser applications.

The largest mill, the M10,000, is now powered with a 3 MW motor, and can use ceramic as its grinding media.

The inert ceramic media, ranging up to 3.5 mm in coarser applications, means there are a large amount of grinding particles per volume in the mills' grinding chamber, which increases the chances of contact with a mineral particle.

In comparison other grinding technology has less grinding particles per mill volume, and have lower power efficiency (i.e. tower mills use typically 12mm steel media, and ball mills 30mm balls in fine applications).

The IsaMill also has the ability to produce particles with a very steep classification curve, due to the integration of an internal classification device at the end of the grinding chamber. This device only allows the particles of a predetermined size to leave the mill, while the oversize material is forced back into the grinding chamber.

The net effect is a tight size distribution of particles dis-



IsaMill manager – South African Projects Dan Curry atop a M10,000 IsaMill. Inset: Brenton Burford: "design the most efficient circuit possible from an energy perspective; don't grind unless you have to"

charging from the mill that do not require further treatment of a classification circuit.

AM: What are mine operators demanding in grinding technology solutions?

BB: Mineral processing plants are not about grinding mills or flotation cells. They are about minerals.

The right minerals need to be liberated in the right places of the circuit, with the minimum amount of power.

Also the surfaces of the minerals must be prepared to allow for maximum selectivity of the valuable minerals against gangue.

Entrainment must be minimised and the circuit must respond

to the needs of different size fractions.

Summarising, it is getting the best metallurgy with a simple, operable, circuit.

Operators want to ensure that the technology solution they are getting, is simple and works

Entrainment must be minimised and the circuit must respond to the needs of different size fractions

for their site, as well as getting dedicated support from the supplier. This is very important in today's environment, where there is a high turnover of site personnel. They also want equipment that is simple to work on,

as well as having high availability to fit into planned maintenance schedules.

Xstrata Technology handles the concerns of operators by providing the operator with a product that has been developed and proven at its parent com-

pany's sites at Mount Isa Mines, and McArthur River.

The development at these sites has resulted in long lasting wear materials, as well as new products, while at the same time enabling operators to see for

themselves the high availabilities that the mills can achieve.

The other important factor that is sometimes overlooked for new equipment is the serviceability of the machine, and whether simple skills can be used to maintain it.

The IsaMill was developed with serviceability in mind.

A slide out shell enables the maintainers to observe all the wear items in the mill, and allows it to be stripped relatively easy along the central shaft.

The mill's rubber shell lining is steel backed, and is easily fitted inside the shell once it is split.

Finally, it is important that the material that is having a grind-

ing circuit designed around it, is tested at the start of the project to determine the power requirements for that material.

Too often this is overlooked, and circuits are designed that aren't optimal for the duty required.

Xstrata Technology uses a small scale IsaMill, the M4 (4 L chamber), to treat 15kg of sample, to produce power/sizing signature plots that determine what is the best installed power for an operators site. This technique provides 100% scale up accuracy.

AM: What are the latest trends and developments in grinding technology?

BB: Mineral processing equipment, including grinding technology, is getting more power intensive with greater power efficiency in a smaller installed footprint.

There is a trend away from multiple units, with a preference for single machines, often with greater amounts of installed power.

The IsaMill is typical of modern machine design. It has been designed to provide a small grinding chamber, with high power input, so that power input in excess of 300 KW/m³ is imparted



The M10,000 IsaMill at the Kumtor Operating Company, a subsidiary of Centerra Gold, in the Kyrgyzstan Republic

into the feed material.

At the same time it is highly efficient, due to the amount of media particles that are in the chamber to do the grinding.

The design of the IsaMill with an internal classifier also does away with the need for an external classification circuit, making IsaMill installations

smaller than conventional circuits, as there are no cyclones, pumps or cyclones that are normally required to classify the discharge.

The IsaMill has now got an expanded range, and can cope with installations where installed power can be as low as 355kw, as in the case of the smallest IsaMill, the M1000, to the largest 3.0MW powered M10,000.

The larger M10,000 has opened up a larger application for the IsaMill, and where an average sized ball mill, or multiple tower mills could have done the duty, it can now be achieved with 1 x M10,000 IsaMill.

Xstrata Technology has developed a grinding technology – IsaMill – based on high intensity stirred milling.

AM: For what purpose was IsaMill technology developed?

BB: The IsaMill was developed in the late 80s, with the first full scale mill, the M3000, installed into Xstrata's Lead/Zinc Concentrator at Mount Isa, in 1993.

While ball mills and tower mills were available at the time, there was nothing capable to reduce the concentrate down to 7um to allow for adequate liberation of the galena and sphalerite.

Continued on page 60

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Continued from page 59

The successful installation of these mills were followed by their installation into the MRM circuit, without which the mine would not have been developed.

Since 1999, the mills have been available to the open market.

Today there has been over 50MW installed in the three size categories available, M1000 (355KW and 500KW), the M3000 (1.1MW and 1.5MW), and the M10,000 (2.6MW and 3.0 MW).

Many of the mills currently being installed are treating material a lot coarser than those at the Mount Isa and MRM sites, with feed generally ranging between 75 to 100um.

AM: What key message(s) would you have for operators about grinding technology today?

BB: Firstly, design the most efficient circuit possible from an energy perspective; don't grind unless you have to.

Secondly, liberate the right minerals in the right place, with the minimum of grinding power, and prepare the surfaces for maximum selectivity for valuable minerals against gangue.

IsaMill benefits

1. High intensity

The highest intensity grinding technology available, >300kW/m³, meaning it is also the most compact. Sizes up to 10,000 litres with 3MW.

2. No screens, able to run in open circuit

The centripetal classification action of the Product Separator removes the need for troublesome fine screens to separate the media and product.

3. Improved flotation/leach recovery

Inert grinding media allows control of downstream chemistry and produces clean, polished mineral surfaces providing improved downstream performance while avoiding expensive pulp treatments in flotation or leaching processes. A steep particle size distribution is produced, even in open circuit configuration.

4. Proven technology

Specifically developed for rugged metalliferous applications. Designed and proven in Xstrata's own operations, with every installation operating to design.

5. Accurate scale-up

Pilot results are directly scaled to commercial size with 100% accuracy. IsaMills have a proven 1:1 direct scale-up to reduce project risk.

6. Range of IsaMill sizes

Available in three sizes to meet the needs of various applications, which allows the operator to take advantage of capital and operating cost savings by minimising the number of mills in the flow sheet.

7. Large size reduction

The possible reduction ratio of IsaMills is far greater than other types of grinding mills at fine sizes. Reduction ratios for full scale IsaMills range from 2:1 to over 18:1.

8. Compact

The complete mill and drive train is at one level and is one-fifth the height of typical competitors.

9. Simple, fast maintenance

Uses a fully sealed, disposable rubber lining with simple inspection access. A shut down for inspection and replacement of internal wear parts takes less than 8 hours. Availability of 99% and utilisation of 96% are typical of IsaMills.

10. Horizontal design

The horizontal layout was selected for its plug-flow type design. This avoids short circuiting and makes the mill far less sensitive to process disturbances.

Thirdly, minimise entrainment.

Respond to the needs of different size fractions and get the best metallurgy with a simple, operable, circuit.

Grinding circuits are the most

important part of a circuit and uses large amounts of power.

Not only is the capital and operating cost need to be considered, but the operator needs to take account of the energy efficiency, availability, servicea-

bility, support as well as the impact of the circuit on downstream processes. It is certainly worth the operator to talk direct to the equipment supplier, visit their latest installations and talk to their clients.

**Brenton is senior IP coordinator for Xstrata Technology.*

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