



NEW LAMPS FOR OLD

Good Health is Still Good Business

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'Improving health and safety in challenging times'

AGENDA

- Some history
- Some reality
- Some thoughts



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WHAT IS H&S ABOUT: WHERE DOES OH FIT?

- To protect the worker from the working environment and himself
- Prevent ill-health
- Improve health
- Assist the company and the employee to manage risk

Better health = better productivity, better safety,
reduced cost, reduced legal risk



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TRADITIONAL VIEW OF OH

- Company doctor
- Fitness for work
- Treatment of sickness at work
- Management of absenteeism
- Perception of bias towards the employer
- Mistrust by workers and Unions



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OLD LAMPS

- Occupational disease was common
- Work was hard and dangerous
- Workers/ Miners had to be tough
- Occupational health was about fitness for work and occupational disease
- The value was in keeping men at work
- Mining towns and communities
- Company doctor is also the town GP



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OLD MINERS



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THINGS HAVE CHANGED

- The workplace
- Social environment
- The worker



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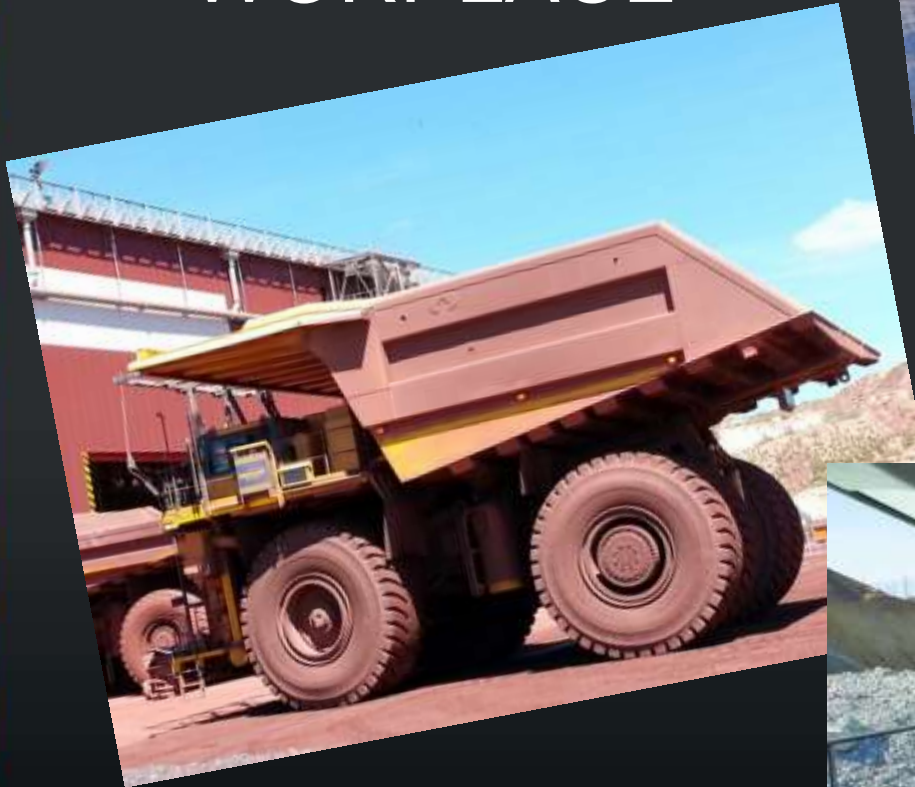
THE WORKPLACE

- Engineering
- Mechanisation
- Mining methods



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THE NEW WORPLACE



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SOCIAL CHANGES

- Better education and training
- Better pay
- Migrant mining communities – fly-in fly-out
- Shorter mining careers
- Miners retire somewhere better



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THE NEW MINER



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OUTCOME

- Less exposure
- Less time exposed
- Less visible disease
- Perception of problem solved
- OH a legal compliance issue – doesn't add value



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THE JOURNEY

- Engineering improved
- Disease less common
- Fitness still an issue
- The medical model is unchanged – still a focus on ill-health management and diagnosis of occupational disease
- Perception of value changed – expensive, unnecessary
- Union mistrust still there
- OH is a legal requirement so we go through the motions (as cheaply as possible)
- Data is not used



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REALITY

- New workplace – new risks?
- Exposure may be different – diesel, nanoparticles
- Long shifts
- Exposure may be going back to previous levels
- Changing worker risks
 - lifestyle diseases, obesity, aging
- Changing workplace
 - Shift work, mechanisation, automation, fly-in fly-out
- Changing demographics - age



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OUTCOME

- Dose may be increasing and disease may come back
- Exposure may be different – smaller particles
- Diseases may be different – immune system changes due to age and lifestyle
- Stresses are different (long shifts in sedentary work)
- Occupational health needs to refocus on prevention in a different workplace
- There is value lost in the gap between the traditional view of fitness for work and medical surveillance and the developing reality



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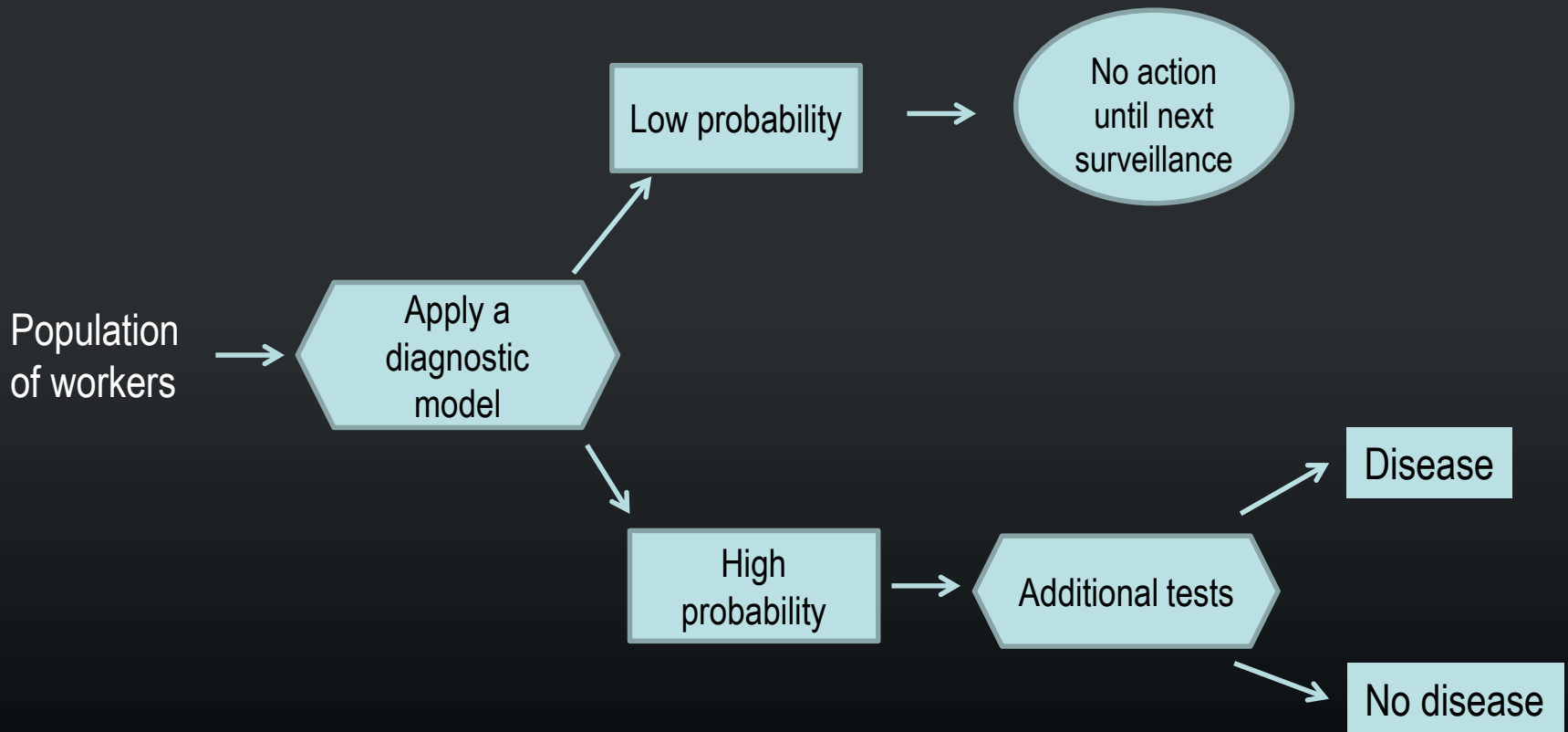
ADDING VALUE

- The employer perception needs to change
- The Union perception needs to change
- The medical paradigm needs to change?



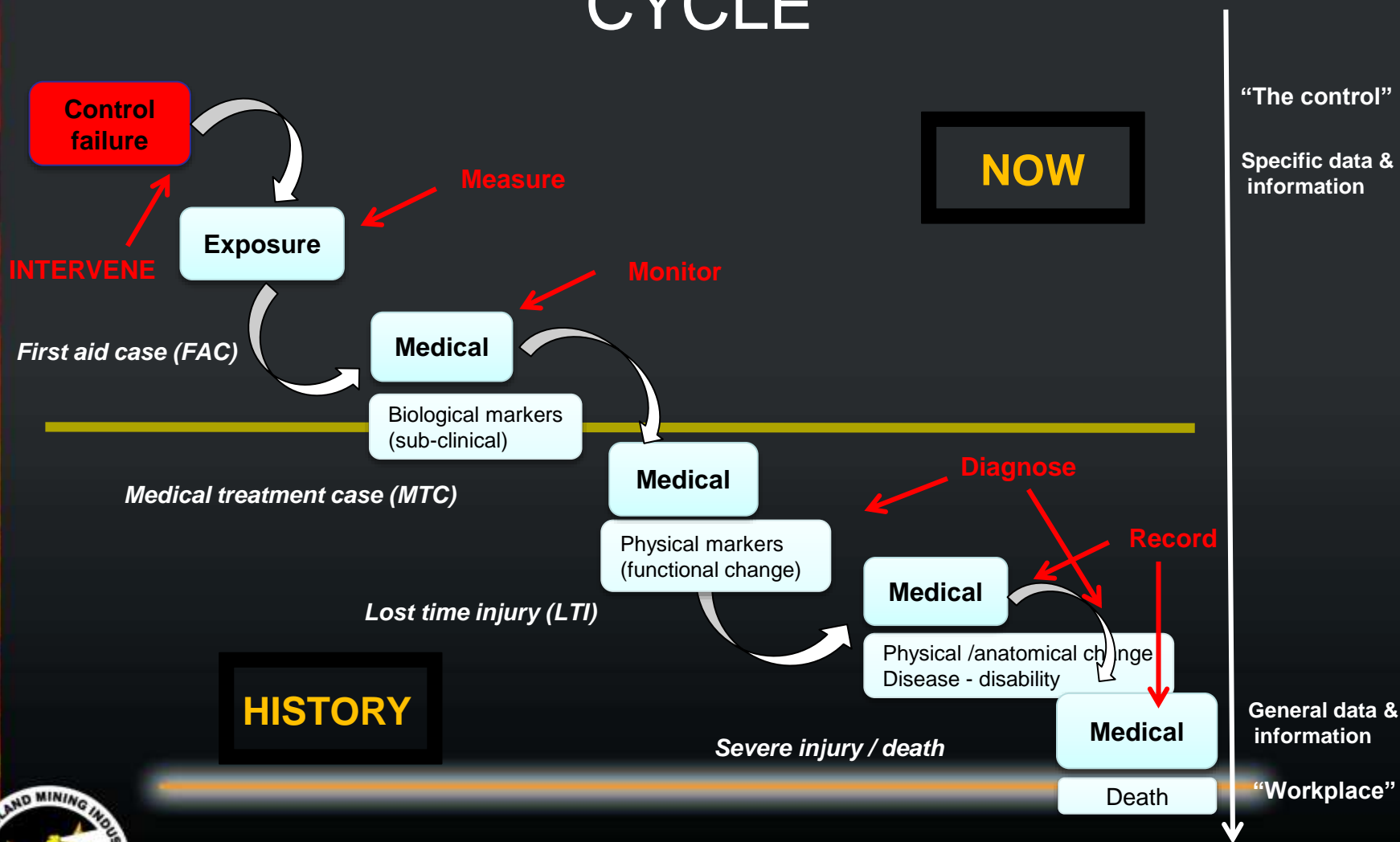
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THE MEDICAL SURVEILLANCE MODEL



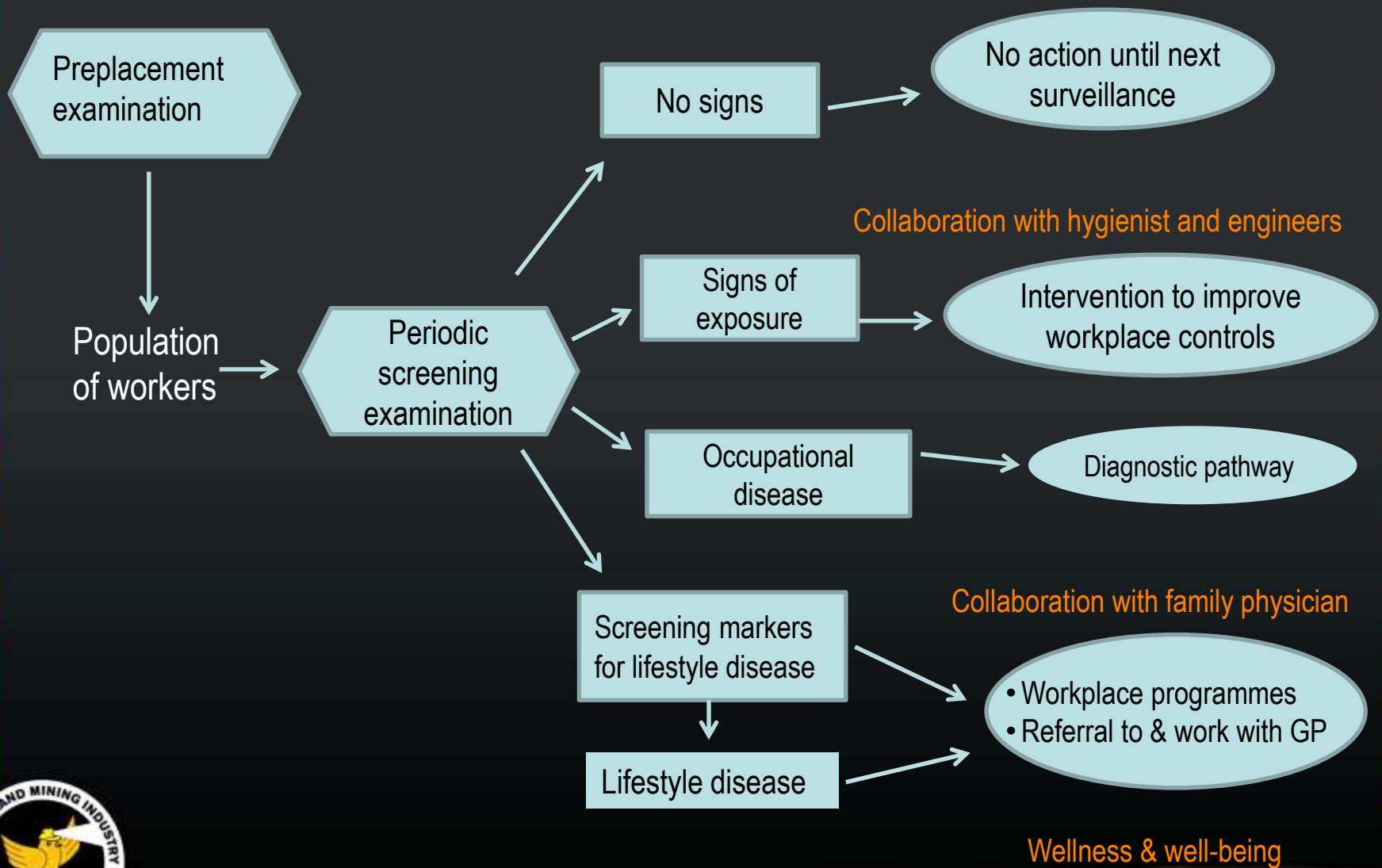
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THE OCCUPATIONAL HEALTH LIFE-CYCLE



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VALUE-ADDING MEDICAL SURVEILLANCE



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ESSENTIALS FOR SUCCESS

- Management commitment
- Programmatic approach – multidisciplinary
- Supporting policy
- Data driven (within the bounds of medical confidentiality)
- Collaboration
 - Workers and Union
 - Health team (internal and external)
 - Managers
- The goal is improved health and productivity “Fit3”



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BEYOND OCCUPATIONAL HYGIENE MEASUREMENTS

BACK TO BASICS WITH A DIFFERENCE

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OCCUPATIONAL HEALTH

Occupational health is driven by two functions – occupational hygiene and occupational medicine. The two work in tandem through a process of health risk assessment and management.

OCCUPATIONAL HYGIENE



Occupational Hygiene is the scientific discipline of anticipating, recognising, evaluating and controlling health hazards in the working environment with the objective of protecting worker health and wellbeing.

OCCUPATIONAL MEDICINE



Occupational Medicine is a branch of clinical medicine concerned with employee fitness for work; the prevention and management of occupational disease, medical emergency management; and the management of return to work in the event of injury or illness.



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OCCUPATIONAL HYGIENE

The definition used by the International Occupational Hygiene Association (IOHA) is:

'Occupational Hygiene is the discipline of anticipating, recognizing, evaluating and controlling health hazards in the working environment with the objective of protecting worker health and well-being and safeguarding the community at large.'

Occupational Hygiene has also been defined as the practice of identifying of hazardous agents; chemical, physical and biological; in the workplace that could cause disease or discomfort, evaluating the extent of the risk due to exposure to these hazardous agents, and the control of those risks to prevent ill-health in the long or short term.

there is more....

The key to preventing occupational disease lies in **control of exposure at source**. Occupational hygiene includes the development of corrective measures in order to control health hazards by either reducing or eliminating the exposure at source.



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RISK & EXPOSURE

Health risk (*HR*) arises from the presence of a health hazard in the workplace and the subsequent exposure of individuals to the health hazard at a level which can cause harm either in the short or long term.

$$HR = f (C \cdot PrE \cdot PeE \cdot U)$$

here:

- HR* = health risk
- C* = consequence
- PrE* = probability of exposure (as a likelihood of exceeding the OEL)
- PeE* = period of exposure
- U* = uncertainty (in extent of hazard risk and exposure assessment)

Health risk management requires:

- reduction of *C* (eliminate at source for example using less hazardous substance); or
- reduction of *PrE* (reducing concentration / level in the workplace); and/or,
- reduction of *PeE* (reducing the frequency and or duration of exposure; and/or,
- reduction of *U* (reducing uncertainty around hazards, exposures and individual sensitivities)



OCCUPATIONAL HEALTH RISK MANAGEMENT

Risk reduction approach

Anticipation & Identification

- **What is there that could harm the health of employees and what are the sources?**
- Information / data (sources, exposure, workplace levels, controls, etc.)
- Who could be exposed? How?
- Similar exposure groups (SEGs)
- What are the current control?
- Health risk & control registers

Evaluation

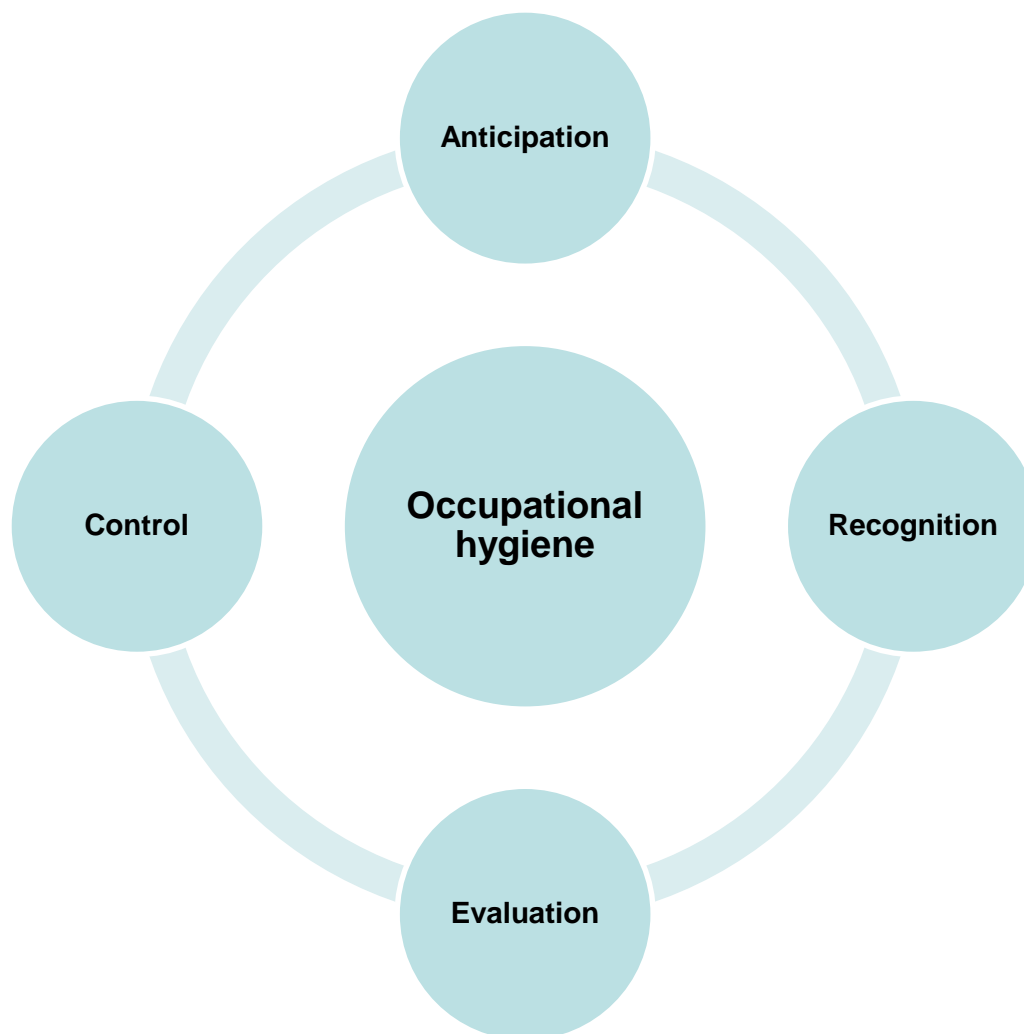
- **How much?**
- Exposure and workplace data and exposure trend analysis
- Quantitative, semi-qualitative or qualitative
- Degree of exposure, frequency of exposure and exposure patterns
- Personal exposure measurements & workplace measurements

Control

- **What is done and can we do more?**
- Control at source principle
- Identify & quantify current controls (original design and performance parameters, current performance, availability, efficiency, maintenance schedule)
- Control improvements &/or additional controls
- Workplace environment incidents
- Reporting and communication



OCCUPATIONAL HYGIENE



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Anticipation

Objective

To infer the type of health hazards and the degree of risk which may be present.

Tools

Data related to a process, plant or activity

Past experience

Information about hazardous substances (incl. SDSs)

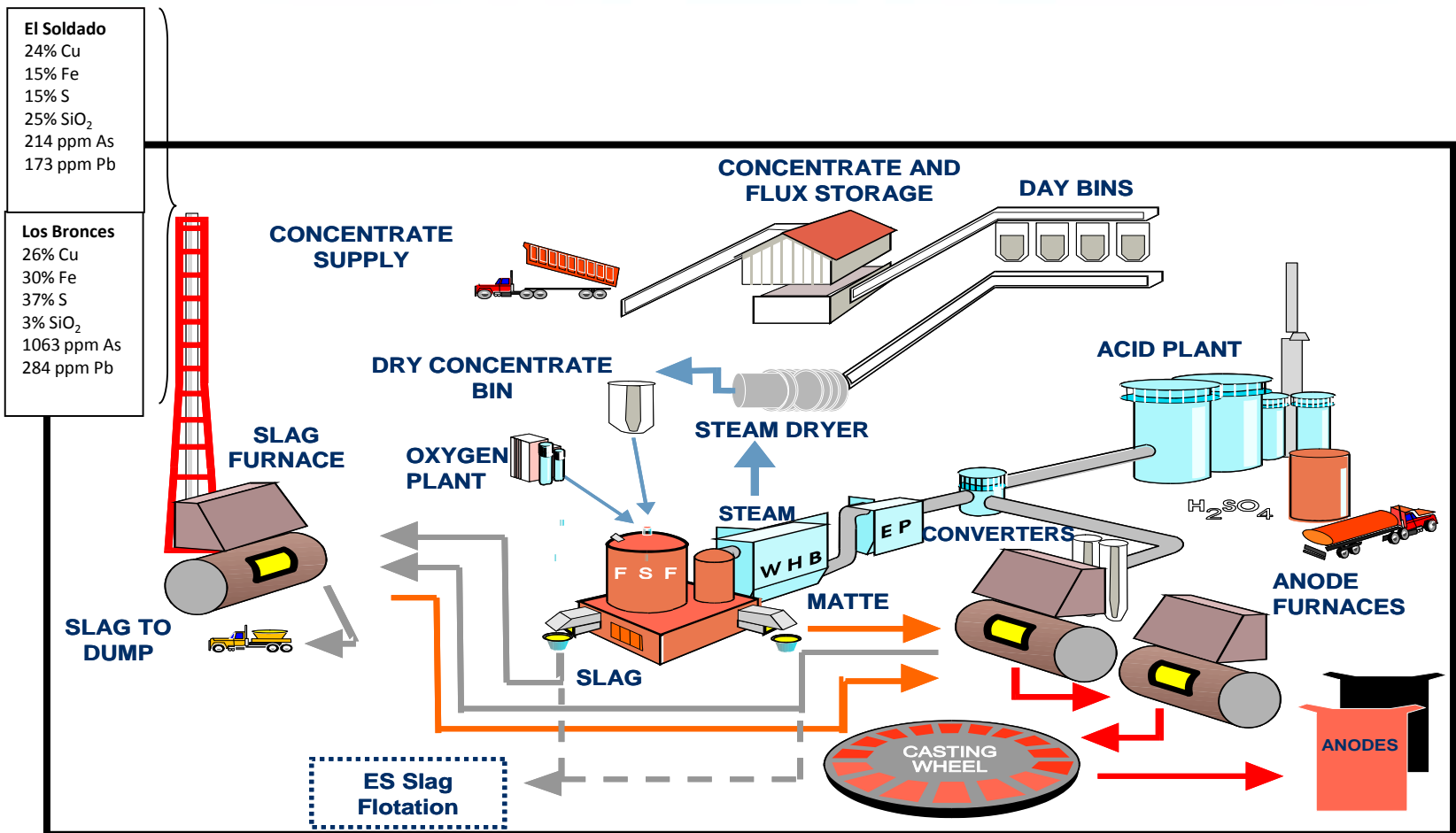
Publications

Geological information

Incident records & employee complaints

Walk-through assessments – look for health hazards





- Raw materials / contents of the ore?
- Natural resources?
- Additives?
- Products & by-products?
- Waste products?



QUESTIONS & OBSERVATIONS – WALK-THROUGH

First impressions on entering the work area

- i) Is the workplace tidy, cluttered? Poor housekeeping?
- ii) Visible dust on equipment and structures?
- iii) Condition of the ablution facilities? Clean, tidy, have hand washing/showering and drying facilities?
- iv) Condition of eating areas? Clean, tidy?

Is there any specific signage or demarcation indicating occupational hygiene issues?

- i) Noise zone demarcation signage?
- ii) Respiratory protection zone demarcation signage?
- iii) Are the correct and appropriate type of hearing protection and respiratory protection prescribed and worn?

What do you see / experience?

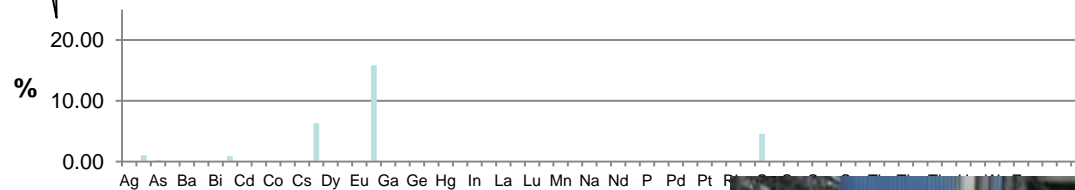
- i) Do you need to raise your voice in order to have a conversation?
- ii) Hot (is cool drinking water available?) / cold?
- iii) Smells? From what/where?
- iv) Visible dust in the air? Visible dust emissions from sources in the workplace? Evidence of settled dust on structures and equipment?
- v) Poor / flickering lightning? Dark spots?
- vi) Tasks with bad lifting/posture/repetition concerns?
- vii) Availability of Material Safety Data Sheets? Are these current?



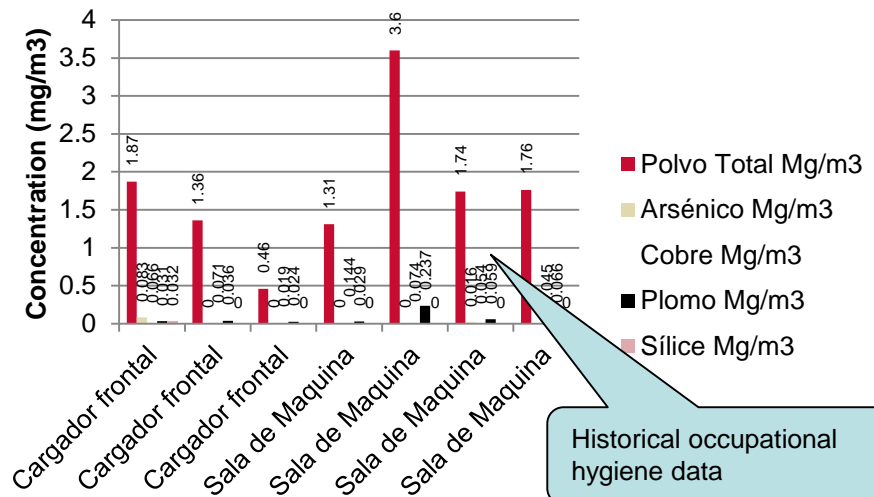
Bulk samples
Area samples



32-element scan analysis
of dust sample collected
from structure

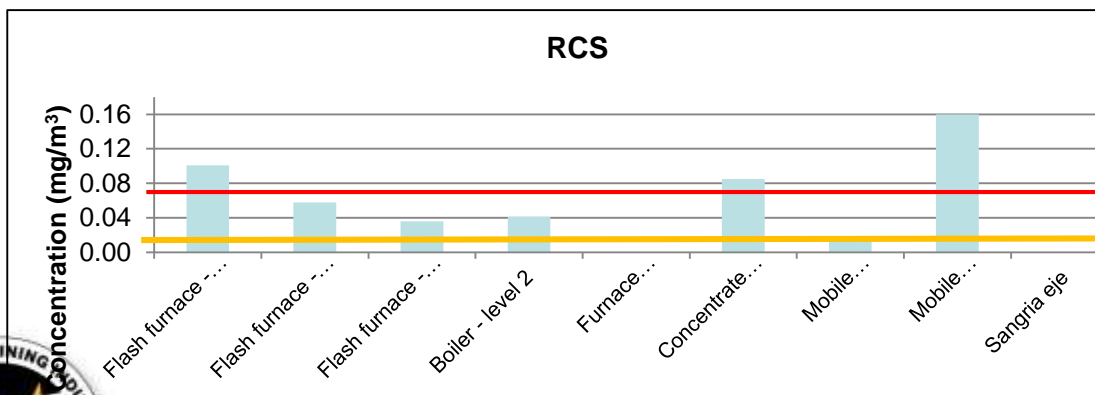


Stationary area sampling results for 2008



Historical occupational
hygiene data

RCS



RECOGNITION

Objective

- i) To observe and recognise potential health hazards present in the workplace;
- ii) To understand the health hazards present in the workplace;
- ii) To identify existing control measures and their effectiveness, incl. PPE

Tools

Past exposure measurements & records of medical surveillance

Clinical research data

Past experience

Research records

Scientific publications

Walk-through survey

Assessment of current control effectiveness



UNDERSTAND THE HAZARD



Do we understand the Health Risks?

- What is in the dust?
- Chemical composition
- Physical size and form of the particulates
- How much? For how long?
- Synergistic effects of combined exposures to different pollutants

What have been done to measure and assess the risks?

- Who is exposed?
- Can the exposures be linked to individuals? and to their medical records?
- What have been done to control and monitor the identified health risks?
- Have the control of health risks been optimised?



EVALUATION

Objective

- i) To obtain or predict data on exposure of employees to the identified health hazards.
- ii) To obtain or predict data on emissions from sources
- iii) To obtain data or predict data on the performance of existing controls

Tools

Measurement of identified health hazards

Source emission models

Exposure models to predict exposure levels

Measurement of control parameters



WHY DO WE MEASURE?

- Assessment of compliance
- Assessment of Health Risk
- Epidemiology
- Selection of Control Requirements
- Assessment of Control Performance
- Litigation



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CONTROL

Objective

To eliminate or if not possible, reduce identified health risks

Principles

- Curtail emissions of substances from sources
- Take into account all relevant routes of exposure
- Control exposure by measures that are proportionate to the health risk
- Choose the most effective and reliable control options
- Where needed, provide suitable PPE
- Review regularly all elements of control
- Inform and train all employees
- Ensure control measures do not increase overall risk



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BACK TO BASICS

Basic questions

- **What is there that could make employees ill?**
- **What are the sources?** *and how much?*
- **What are the controls?** *and how effective?*
- **What is the plan for improvement?** *WHWW?*



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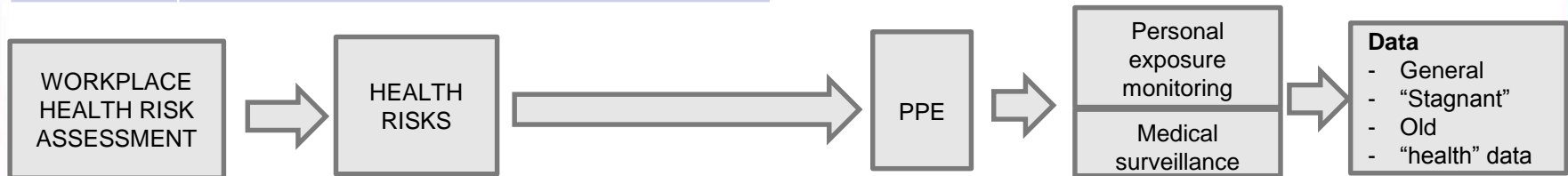
BEST PRACTICE

- **Knowing the hazard (anticipating and identifying).**
- **Understanding the risk (quantifying).**
- **Managing the risk (control at source, elimination, substitution, process change etc.)**
- **Monitoring (occupational hygiene programmes, medical surveillance)**
- **Review (audit, management review)**
- **Continuous improvement**



POINT OF DEPARTURE

| | |
|--------------|---|
| Focus | Legal compliance |
| Role players | Occ Hygienist & Occupational Medical Practitioner |



- Doing things by the text book for years & reasonable data
- Declining disease rates

BUT

Are we confident that we are really preventing disease?

- We measure personal exposure in SEGs that is focussed on legal compliance;
- We measure medical parameters that indicate exposure but "this is not disease", so we don't use or act on the information



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WHERE TO?

- Back to basics
- Change the question
“who is exposed to how much” vs. “**why are employees exposed**”
- Source based, controlled centred approach
- Occupational hygiene is not just about personal exposure sampling for the purposes of legal compliance
- Medical surveillance is not just about finding occupational disease
- The hygienist must monitor **control performance** (i.e. that controls work according to design specifications) and ensure **control availability**
- Sampling must be directed to provide information about the availability and efficacy of controls and enable management decisions



BACK TO BASICS WITH A DIFFERENCE

- Engage all available resources
 - Professionals, employees, managers
- Put ownership of hazard and controls with production & engineering
- Occupational hygiene is not just about measuring personal exposure as a proxy for the control of the working environment – the information is too generic for source control
- Refocus occ. Hygiene on source control
 - That means measuring the availability and performance of controls
 - Provide useful information to assist management
- Team approach
 - Inform, engage and involve all employees in preventing exposure
- The worker
 - Must be involved in the process, he is at the centre of our control efforts
 - Must be shown how to use control measures properly, and how to check that they are working and **how to report control failures**



Past / present position – compliance driven

Focus Legal compliance

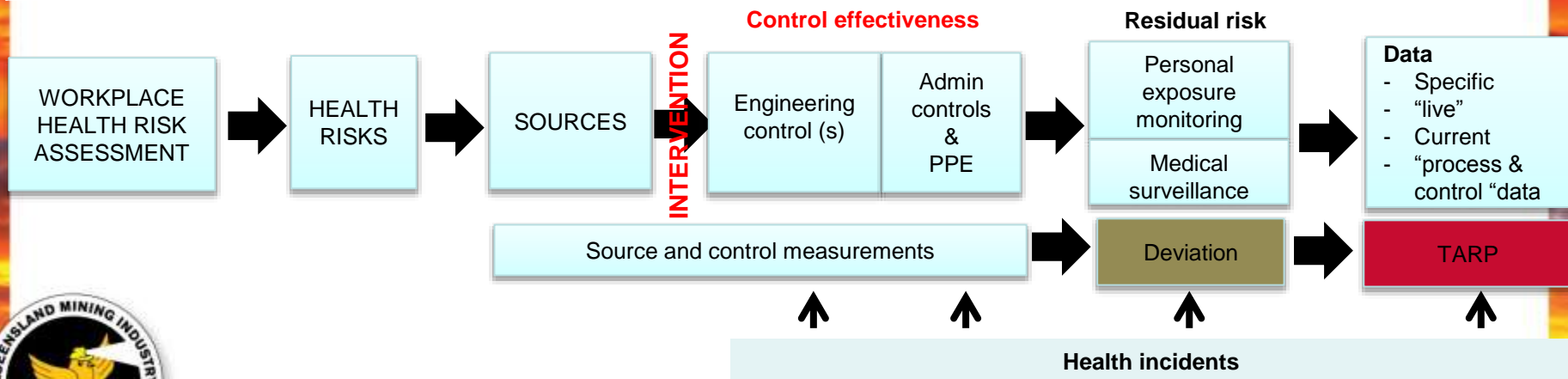
Role players Occ Hygienist & Occupational Medical Practitioner



Future position “beyond legal compliance”

Focus Business value / People / Sustainability

Role players Cross-functional



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BUSINESS CASE - *beyond the prevention of occupational disease*

Health & safety



Value leakage



Worker wellbeing & productivity



Legal & social



Structure integrity & asset damage



Environment & community



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POTENTIAL PERFORMANCE PARAMETERS

- Availability of control = % time operating
- Efficacy of control = % compliance with design performance
- % critical controls available > 90% time and operating to > 90% design specifications
- Mean time between control failures (example: > 20 hours)
- Mean time to repair (example: < 5 hours)
- Number of control failures during month
- Controls reinstated within expected time
- “medical incidents” in a period

Targets can be set against these “true” leading indicators for health



TAKE HOME BULLETS

- Occupational hygiene is not just about personal exposure sampling for the purposes of legal compliance;
- Occupational hygiene is something that we do every day, not just when you run a sampling programme.
- The hygienist must monitor control performance (i.e. that controls work according to design specifications) and ensure control availability;
- Manage aspects of the work environment in order to reduce worker exposure
- Team approach – inform, engage & involve all employees in preventing exposure

