1. Soccer and the Cyanide Code
2. Gold Fields South African Operations
3. Emergency Response Planning
4. Emergency Training Exercises
5. Plant Emergency Exercises
6. TSF Emergency Exercises
7. Gold Fields Health Services
8. Way Forward
1. Soccer and the Cyanide Code

- Small band of teenagers form Soccer team in 1934
- Formation of soccer club in 1937
- Ten years later logo created
- From small beginnings in 1937, a well known Football Club has become more than just one of the most successful soccer teams in South Africa: It is ingrained in the culture of the country. For around eight to ten million fans, there’s no grey area. It’s black and white!
1. Soccer and the Cyanide Code?

Established 1937

1935

SODIUM CYANIDE

TOXIC
2. Gold Fields South African Operations

KDC East Gold Mine

KDC West Gold Mine

South Deep Gold Mine

Beatrix Gold Mine
2. KDC East Mine Cyanide Facilities

KDC East No. 1 Plant

KDC East No. 2 Plant

Kloof 2 TSF (No. 1 Plant)

Leeudoorn TSF (No. 2 Plant)
2. KDC West Mine Cyanide Facilities

KDC West No. 1 Plant

KDC West No. 2 Plant

KDC West No. 3 Plant
2. KDC West Mine Cyanide Facilities

TSF 1 (No.1 Plant)

TSF 2 (No.1 Plant)

TSF 4 (No.2 & No.3 Plants)
2. South Deep Mine Cyanide Facilities

South Deep Gold Plant

Old & New TSF’s

South Deep Backfill Plant

Doornpoort TSF
2. Gold Fields Health Services

Gold Fields Emergency Medical Services (EMS) Libanon Base Station

Gold Fields EMS KDC West

Gold Fields EMS South Deep

Leslie Williams Memorial Hospital (KDC & South Deep)
2. Beatrix Mine Cyanide Facilities

Beatrix No. 1 Plant

Beatrix No. 2 Plant

Beatrix South TSF (No.1 Plant)

Beatrix West TSF (No. 2 Plant)
2. Gold Fields Health Services - Beatrix

Gold Fields Emergency Medical Services (EMS) Base Station at Beatrix Clinic

St Helena Hospital (Welkom)

Gold Fields EMS at Beatrix 4#
3. Emergency Response Planning

The early days...
3. Emergency Response Planning

Develop Emergency Response Plan

- Risk Areas
- Emergency Evaluations – Creation of Emergency Scenarios
- Cyanide First Aid & Emergency Response Equipment
- Train Emergency response teams
- Create Cyanide Medical Protocols
- Dialogue
3. Emergency Response Planning

First Aid Rooms
3. Emergency Response Planning

Plant Emergency Trailer
3. Emergency Response Planning

First Aid Rooms – Lessons Learnt
3. Emergency Response Planning

First Aid Rooms - Lessons Learnt

• You must appoint a responsible person
• Use transparent emergency response lockers
• Keep stock of variety of gumboot sizes
• Obtain separate lockers for maintenance and operational activities
• Use plastic spineboards (no wooden stretchers)
• Use 100% oxygen rebreather masks
• Keep HCN gas respirator and canister together in sealed transparent bag
3. Emergency Response Planning

EMS Emergency Trailer
3. Emergency Response Planning

EMS Portable Decontamination Bays

Structure
“Hot Zone” (Red Bay: 1st stage decontamination)
Low pressure spray nozzle & hose connection

Water Connections
Additional Water Source
“Warm Zone” (Yellow Bay: 2nd stage decontamination)
3. Emergency Response Planning

EMS Response Vehicles & Trauma Unit
4. Emergency Training Sessions
5. Plant Emergency Exercises

Rescue “Randy”

Advanced Drills

Key Role of Control Room Operators

Night Drills
5. Plant Emergency Exercises
5. Plant Emergency Exercises

“Dermagrip” gloves  “Space” blanket  Spine board with head block
5. Plant Emergency Exercises

Spill Cleanup
5. Plant Emergency Exercises

Lessons Learnt

• Mindset change – highly toxic chemical – 3 to 6 minutes response time

• Use rescue dolls for drills

• The value of unannounced night drills (and drills during abnormal situations)

• Use of spill kits

• Communication is very important. Initial response. Plant Control Room Operator plays key role (have observer during drills, communication guideline, SCADA Popup)
5. Plant Emergency Exercises

Lessons Learnt

• Must treat drill exercises as if it is the real emergency.
• Have drill debriefing sessions immediately after drill
• Spend time with emergency response teams – weekly spare shift sessions, practice training drill sessions.
• Standardise use of suits and equipment
• Must train as a team
• Reinforce get help – heavier patients, Buddy - do not battle alone (emotional aspect)
• HCN gas full face masks (respirators) – quick emergency rescue attempts only.
5. Plant Emergency Exercises

Lessons Learnt

- Practice cyanide first aid protocols
  - Supervisors must be trained to handover patient to paramedics
  - Emergency response team members must be trained to monitor the patient
- Involve all emergency teams
- Involve all personnel in drills including engineering personnel
- Use of dermagrip gloves
- Use of space blanket
5. Plant Emergency Exercises

Lessons Learnt

• Have an emergency mock drill schedule
• The goal must be to continually improve response times
• Take photos and videos as far as possible and incorporate into training material
• A journey not a destination.
• “The more I practice, the luckier I get,” Gary Player
6. TSF Emergency Exercises
6. TSF Emergency Exercises

Lessons Learnt

• Use flags to determine wind direction
• Have multiple assembly points based on wind direction
• Have a designated ambulance collection point
• Use TSF Foreman’s LDV (bakkie) to transport patient
• Teamwork
• Correct trigger points for evacuation (HCN gas)
• Do abnormal drills e.g. team leader mandown
• Practice first aid protocols
6. TSF Emergency Exercises

Lessons Learnt

- Train all employees in cyanide first aid
- Communication is CRUCIAL. Use two way radio communication as far possible
  - Between plant and TSF (cyanide emergencies & improves communication & plant efficiencies)
  - Amongst TSF employees
- Do follow ups to make sure ambulance is on its way
- Keep oxygen & medical jump bag with the foreman
- Team leader must wear HCN gas monitor
- Decontamination
7. Gold Fields Health Services

Lessons Learnt

- EMS for backup response not primary
- EMS control room operators must be trained
- Keep PPE in vehicle
- Hospital must keep PPE
- Trauma unit must be barricaded (priority given to cyanide patients)
- Cyanide awareness must be given to medical staff
- Teamwork
8. The Way Forward

• Implement major emergency exercise involving senior management and the Vice President and Head of Operations

• Have a drill competition between plants

• Create a centralised training mock up center

• Practice, practice and more practice…
Acknowledgments

• T. Cierenberg
• P. Viviers
• LJ Joubert
• M Venter
• H. Rossouw
• R. Redelinghuys
• M. Bosch
• J. Viljoen
• R. Steyn
• B. Smit
• S. Gouwer
• S. Kotze