ISO National Mirror Committees Training with Lesotho, Malawi, & Zambia: ISO/TC-82 - Mining

Prepared for:
Southern African Development Community & Standards Alliance

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Acknowledgement & Thank You

SOUTHERN AFRICAN DEVELOPMENT COMMUNITY
TOWARDS A COMMON FUTURE
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1: How to enhance the National Mirror Committee to ISO/TC 82: Mining 101
Mining 101

- What is where?
- How much is where?
- How do we get it out of there?
- How much does it cost to get it out?
- What do we do with it when its out?
- How much is it worth?
How Much of What is Where?

- Drill Holes
- Complete cross-section
- Determine amount via:
  - USGS Circular 891
  - SEC
  - Canada (NI 43-101)
  - Australia (JORC code)
  - South Africa (SAMREC code)
Reserve Classifications

- **Inferred** (speculative) = Resource = (3/4 to 3 miles)
- **Indicated** (+/- 50%) = Reserve (1/4 to ¾ mile)
- **Measured** (+/- 20%) (1/4 mile)

These 3 categories show relative reserve reliability based on distance from known points of measurement.
Reserve Calculations: Recoverable Tons

<table>
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<th>Average Seam Thickness</th>
<th>Reserves Acres</th>
<th>Seam Density</th>
<th>Tons In-Place</th>
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<td>6.50'</td>
<td>104.05</td>
<td>1863</td>
<td>1,259,993</td>
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Tons In-Place x Mine Recovery x Wash Recovery = Clean Recoverable Tons

1,259,993 x 60% x 87.16% = 658,926
Types of Mining

- **Drainage**
  - Above drainage – surface mining
  - Below drainage – underground mining

- **Surface Mining**
  - Strip or Mountain top removal (Central App)
  - Open-Pit (PRB)

- **Underground**
  - Shaft
  - Drift
  - Slope
  - Bench
Types of Mining - Surface
Types of Mining - Surface

1: Remove overburden, rock
2: Upper seams removed
3: Seams removed, washed and loaded
4: Begin restoration
5: Final restoration
Types of Mining – Surface with Bench
Many operations include both surface and underground facilities at the same mine.
Types of Mining - Underground
Types of Mining - Underground
TC-82 encompasses...

- Equipment design
- Equipment manufacturing
- Equipment safety
- Engineering plans & drawings
- Estimation of mineral reserves
- Mine Reclamation
- Mine Structures
ISO/TC 82 Mining

2: Specific ISO/TC 82 Issues
Scope

Standardization of:

- specifications relating to specialized *mining machinery and equipment* used in opencast mines (e.g. conveyors, high wall miners, rock drill rigs and continuous surface miners) and all underground mining machinery and equipment for the extraction of solid mineral substances, but excluding the preparation and processing of the minerals;

- recommended practice in the presentation of *plans and drawings* used in mine surveying;

- methods of *calculation of mineral reserves*;

- *mine reclamation management*;

- design of *structures for mining* industry.

Excluded:

- standardization of equipment and protective systems to be used in explosive atmospheres (dealt with by IEC/TC 31);

- earth-moving machinery dealt with by ISO/TC 127.
ISO/TC 82 Mining was founded in June 1955

2 plenary meetings in 1959 and 1962

In the following years work has been carried out in the subcommittees

Since the end of 1990s no activities, until

- April 2013 in Germany,
- December 2013 in South Africa, and
- September 2014 in Seoul, South Korea
Motivation for Re-Activation

- Mining industry is increasing worldwide
- Mining companies & suppliers are engaged worldwide
- Great interest for international standards for the mining industry desired
- As being not active, standardization work on mining equipment has been carried outside ISO/TC 82, e.g. on mobile underground mining machines in ISO/TC 127 Earth-moving machines
Request for re-activation was submitted in October 2012 to ISO Central Secretariat

ISO/TMB-Resolution 141/2012:

- Re-activation of ISO/TC 82 The Technical Management Board,
- Approves the re-activation of ISO/TC 82 "mining" and the allocation of the secretariat to DIN (Germany),
- Appoints Mr. Reinhard Reinartz (Germany) as chairperson for the term 2013-2018,
- Requests that the ISO TC 82 review its scope in coordination with ISO/TC 127 and ISO/TC 195 to avoid overlaps and ensure transparency for experts and stakeholders.
TC-82 Status

- Chairman: Reinhard Reinartz, Germany
- Secretariat: Hans Georg Blasgude, DIN, Germany
- Responsible for 36 International Standards
  - Graphical symbols for use on detailed maps, plans and geological cross sections
  - Chain conveyors
  - Wire ropes for mine hoisting
  - Rotary core diamond drilling equipment
  - Rock drilling equipment
ISO/TC 82 Mining

3: Lesotho, Malawi, & Zambia Integration to ISO/TC 82
ISO TC 82 – CCS Organization

Secretariat

Germany

Members

Countries

Liaisons

Participants

P-Member Nations

O-Member Nations

NGOs & Liaisons
ISO TC 82 – P-Members

18 Participating Countries:

Australia  Korea
Canada     Mongolia
Chile      Russia
China      South Africa
Czech Republic Spain
Finland    Sweden
France     UK
Germany    USA
Iran       Zambia

✔ Voting Members
✔ Guaranteed International Expert Participation on all WGs
ISO TC 82 – O-Members

22 Observing Countries:

Austria    Moldavia
Bulgaria   Pakistan
Croatia    Peru
Cuba       Poland
Ecuador    Romania
Egypt      Serbia
Greece     Tanzania
Hong Kong  Thailand
India      Tunisia
Indonesia  Turkey
Japan      Ukraine

✓ Non-voting Members
✓ May upgrade to P-Member at any time
ISO TC 82 – Liaisons

• ISO/TC 127 Earth-moving machinery
• ISO/TC 195 Building construction machinery and equipment
• ISO/TC 211 Geographic information/Geomatics
• European Commission
• World Customs Organization

✗ Non-voting Members
✓ Guaranteed International Expert Participation on all WGs
US MC to ISO TC 82

World’s leading manufactures of mining equipment
US MC to ISO TC 82

Leading global mining consulting firms

Ausenco
MARSTON
Willis

Advanced Resources International, Inc.

ECSI LLC
US MC to ISO TC 82

World’s leading academic, risk, and NGO’s on mining
US MC to ISO TC 82

World’s leading international firms and expertise
TC-82 Working Groups

ISO/TC 82/JWG 1: Rock drill rigs
TC-82 Working Groups

ISO/TC 82/WG 2: Continuous surface miners
TC-82 Working Groups

ISO/TC 82/WG 3: Shearer loaders and plough systems
TC-82 Working Groups

ISO/TC 82/WG 4: Structures for mine shafts

• No current US experts on this Working Group
ISO/TC 82/JWG 5: Safety of mining and earthmoving mobile machines working
ISO/TC 82/WG 6: Classification of Mine Accidents

- **US has the preeminent expertise**…

- **…currently has no experts on the Working Group**
TC-82 Working Groups

ISO/TC 82/SC 7: Mine Reclamation Management

- Canada
- China
- France
- Germany
- Mongolia
- South Africa
TC-82 Working Groups

ISO/TC 82/JWG 7: Autonomous Machine Safety
Future NWIP: Reserve Estimation

Methods of estimation of mineral reserves:

- US (SEC Guide 7)
- Canadian (CN 43-101)
- Australian (JORC)
- SME & CRIRSCO Template

- **Inferred** (speculative) = Resource = (3/4 to 3 miles)
- **Indicated** (+/- 50%) = Reserve (1/4 to 3/4 mile)
- **Measured** (+/- 20%) (1/4 mile)
Future NWIP: VAM/CMM & UCG

- Ventilation Air Methane
- Coal Mine Methane
- Underground Coal Gasification
ISO/TC 82 Mining

4: Why Participate?
Getting involved in ISO Standards provides significant benefits to industry and participating companies.

**Industry Benefits**

- Early access to information that could shape the market in the future
- A voice for a company in the development of standards
- Helping to keep market access

**ISO Certification**

Delivers *Tangible Benefits* to Clients
Standards reduces the regulatory burden and harmonizes rules across jurisdictions

Helping Regulations

- Standards have a built in change process and can typically change faster than regulations
- Standards referenced in regulation can speed up the regulatory approval process
- Standards provide industry interests and other stakeholders a decision-making role
- Written by people more directly linked to actual operations

Cost Savings

- Reduce environmental and safety risks through broad based industry experience
- Improve public acceptance through trust in ISO brand and independent third party process
- Help advance operational processes, technologies, through external stamp of approval
- Leverage resources through shared effort to address common issues
Real-world application

“Standards, smart local and global standards, are essential to the timely advancement of the technologies and equipment that will be necessary to make safe reliable power with the capture of emissions from hydrocarbon fueled power plants.”

Mike Monea
President, Carbon Capture & Storage Initiatives - Saskatchewan Power Corporation (Boundary Dam)
Regulatory Confusion

Source: Edison Electric Institute and Dick Winschel, CONSOL Energy
Regulatory Conflict

CGS REGULATORY FRAMEWORK

White House
IAJTFCCS

Set price of carbon

Perpetual Event Horizon

Payment of Storage Fee

Operational Bond

Site Licensing and Certification

Site and Well Operations

Individual Well Bonds

Bond Released as Wells Plugged

Site Closure and Well Plugging

State Administered Trust Fund Assumes Responsibility for Oversight and Liability

Storage

Bond Released 10 Years After Injection Ceases

Long Term

Advanced Resources International, Inc.
Lack of ...

...Regulatory Framework:
- Malaysia
- Argentina
- Iran
- Brazil
- Egypt

...Industry Experience – expands membership:
- Saudi Arabia
- Mexico
International Plenary Meeting - Birmingham
Access to US MC to ISO TC 82
ISO/TC 82 Mining

5: Next Steps & Takeaways
Monday’s Introduction Comments

- Twinning opportunities
- Secretariat vs. Chair – how to run a MC
- Academics vs. Industry – stakeholder engagement
- Motivation and Morale
- Stakeholder engagement, Establish Linkages & Networks – we don’t know how to do it!
- Best practices (BPM)
- Crosscutting issues
- TC Chair training
Erratic Internet access & connectivity

Consistency – change of job, ZABS foot the bill – aren’t they sustaining anyway, can ZABS allow the “individual” to remain as member – top down driven…consider options

Lesotho identified that the “demand” for standards work is low – educate benefits of other uses for participation – BPM, etc.

Standards are voluntary (problem for many countries) but can be made mandatory
...Monday’s Introduction Comments

- Appoint liaison between the SC, WG, JWG (ad hoc) – appoint as needed (or only if experts are available) to the TC

- NSB doesn’t write the standard, the experts do! Are NSB writing standard?

- HoD report to ANSI
Minerals and Assets

- Stone aggregates
- Limestone
- Gemstones
- Uranium
- Coal (neighboring countries)
- Natural gas (neighboring countries)
- Copper
Current WG: What is Important?

- JWG 1: Rock Drills
- WG 2: Continuous Surface Miner
- WG 3: Shear Loaders and Ploughs
- WG 4: Mine Structures
- JWG 5: Equipment Safety
- WG 6: Mine Accidents
- JWG 7: Mine Reclamation
- SC 7: Autonomous Machine Safety
Future WG: What is Important?

- Methods of estimation of mineral reserves
- Ventilation Air Methane
- Coal Mine Methane
- Underground Coal Gasification
Key Takeaways

- Potential Twinning Opportunity – SA, USA
- Possible 2016 Plenary in southern Africa (Zambia)
- Participate in meetings
- Tie mining to GHG emissions & TC-242 & TC-265
Advanced Resources’ Experience in
SOUTHERN AFRICA REGION
Botswana, Mozambique, South Africa, Zimbabwe

Clients
AfPenn Exploration (ZM)
Anglo Coal (SA)
Botswana Geological Survey (BW)
EIB (ZM)
Gas Corporation of Botswana (BW)
IDC (SA)
INGWE (SA)
ISCOR (SA)
NATA Energy (BW)
Sasol (SA)
Shell (BW)
U.S. TDA (BW)
VALE (MZ)
Advanced Resources’ Experience in CHINA
Advanced Resources’ Experience in

INDIA

Clients
Essar Oil
GAIL
MCN
ONGC
Reliance Gas Ltd
U.S. TDA
Advanced Resources' Experience in Middle East
Jordan, Iraq, Pakistan, Turkey

Clients
- EPA - CMOP (Turkey)
- Hema (Turkey)
- TKI (Turkey)
- TKK (Turkey)
- Kingdom of Jordan
- DGPC (Pakistan)
- U.S. AID (Iraq & Pakistan)
Advanced Resources’ Experience in

**EASTERN EUROPE**

Czech Republic, Kazakhstan, Poland, Russia, Ukraine

Clients

- DPB (CZ)
- ECOMETAN (UK)
- GPO (CZ)
- Industrial Union of Donbass (UK)
- MMS Petroleum (UK) (PL)
- PEER (UK)
- TEMCO (KZ)
- Texaco Poland (PL)
- TKI (TU)
- Ukraine Methane Partners (UK)
- USAID/Burns and Roe (RU)
- U.S DOE (PL)
- U.S. TDA (UK)
Thank You

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