

# **Development of International Standards for Mine Reclamation**

*W. Lee Daniels, Virginia Tech  
Crop & Soil Environmental Sciences*

*Steven Michael Carpenter, Univ. of Wyoming  
Enhanced Oil Recovery Institute*

# Topics for Today

- **Background on ISO Standards**
- **History & Context of ISO Technical Committee for Mining (TC-82)**
- **Development of Reclamation Subcommittee (SC – 7)**
- **Reclamation Proposals and Status to Date**

# What are ISO Standards?

- Consensus based
- Designed as a rule, guideline or definition
- Revisable and updateable
- Voluntary
- Standards must fit to intended purpose:
  - Prescriptive based
  - Objectives based
  - Performance based
  - Principles based
  - Hybrids

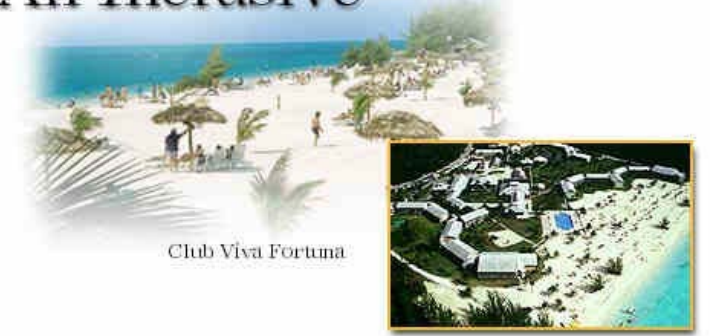
# Why Standards?

- Because they are not laws...
  - *Standards & regulations can work together*
- Not Mandated
- Typically initiated by industry...
  - *And therefore better received and used by industry because they are part of the process*
- Demonstrate regulatory compliance
- Streamline the regulatory process
- Harmonize across jurisdictions
- International fiduciary requirements for some sectors

# Process Must INCLUDE any and all...

- MSHA
- OSHA
- EPA, OSM, DMME, etc.
- EU European Directives
- NGO's (WRI, GCCSI, etc.)
- Federal, Provincial, State regulations
- Future expected directives

All-Inclusive



- Based in Geneva, Switzerland
- 163 Countries
- 97% of the World's population
- >100,000 international experts
- >600 organizations in liaison
- >19,000 International Standards
- ANSI = US Member body (NYC)
- CSA Group manages TAG 82 for ANSI



International  
Organization for  
Standardization



# ISO Standards Development

- ISO does not write standards
- ISO does not influence the technical content
- Technical Committees (TC) write standards
- P-Member countries approve standards
- Member countries have parallel Technical Advisory Groups (TAGs) that participate in national review and approval process (TAG 82 for USA)
- Nations adopt ISO standards (USA - one vote by ANSI)

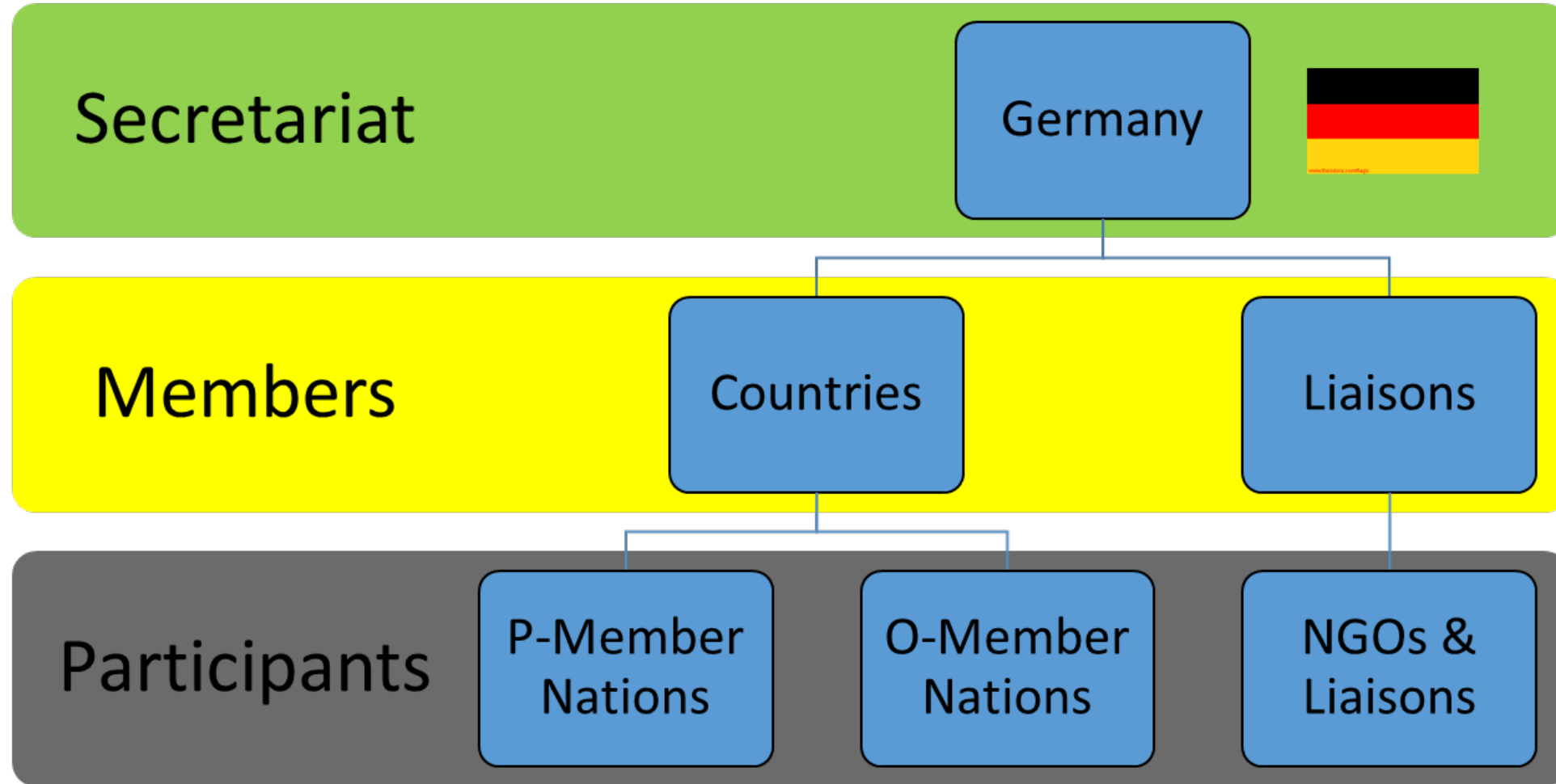


# History

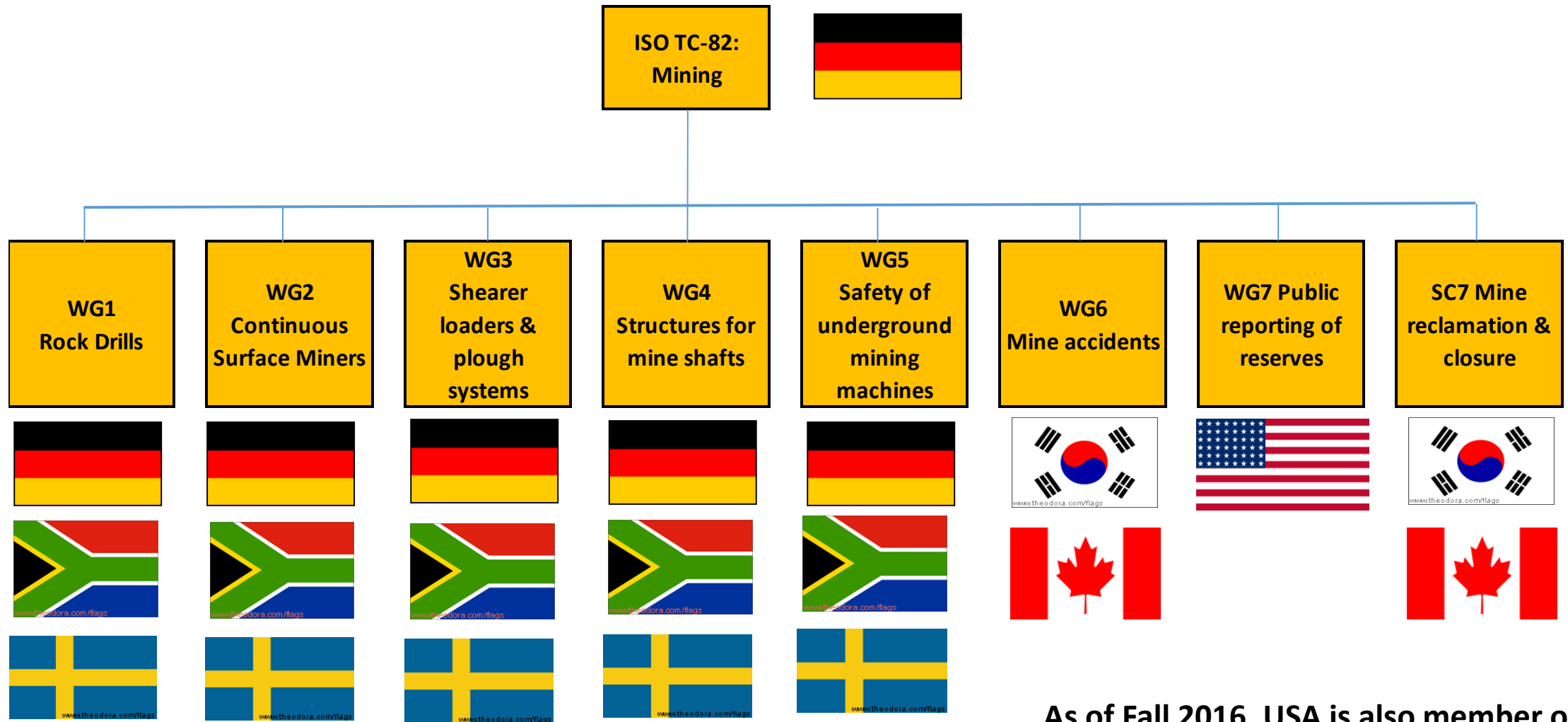
- ISO/TC 82 Mining was founded in June 1955
- 2 plenary meetings in 1959 and 1962
- In the following years work has been carried out in the subcommittees
- Since the end of 1990s no activities, until
  - April 2013 in Germany,
  - December 2013 in South Africa,
  - September 2014 in Seoul, South Korea, and
  - September 2015 in Cleveland, Ohio
  - October 2016 in Helsinki, Finland



# ISO TC 82 – Organization



# TC-82 Working Groups



As of Fall 2016, USA is also member of two WG's for SC-7

# ISO TC 82 – P-Members

Australia

Canada

Chile

China

Czech Republic

Finland

France

Germany

Iran

Korea

Mongolia

Russia

South Africa

Spain

Sweden

UK

USA

Zambia

## 18 Participating Countries:

- ✓ *Voting Members*
- ✓ *Guaranteed International Expert Participation on all WGs*

# ISO TC 82 – O-Members

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

## 22 Observing Countries:

- ✓ Non-voting Members
- ✓ *May request International Expert Participation on all WGs*
- ✓ May upgrade to P-Member at any time

# Member Affiliations of Current U.S. Technical Advisory Group (TAG - 82)



**CATERPILLAR**<sup>®</sup>



**Fletcher**<sup>®</sup>  
MINING EQUIPMENT



**JOYGLOBAL**  
P&H JOY



**Vermeer**<sup>®</sup>



  
School of  
Energy Resources  
UNIVERSITY OF WYOMING



  
Enhanced Oil  
Recovery Institute  
UNIVERSITY OF WYOMING



**Ausenco**



WIRTTGEN  
GROUP



United States Department of Labor  
**MSHA**  
Mine Safety and Health Administration



**ICCI**  
Illinois Clean Coal Institute  
Energy Research for a Cleaner Environment



**Willis**



 **MARSTON**  
A Golder Associates Company



 **VirginiaTech**  
Invent the Future



 **TharPak**



 **AWF**  
APPALACHIAN WILDLIFE  
FOUNDATION



  
**Advanced Resources  
International, Inc.**



  
Carbon Management  
Institute  
UNIVERSITY OF WYOMING

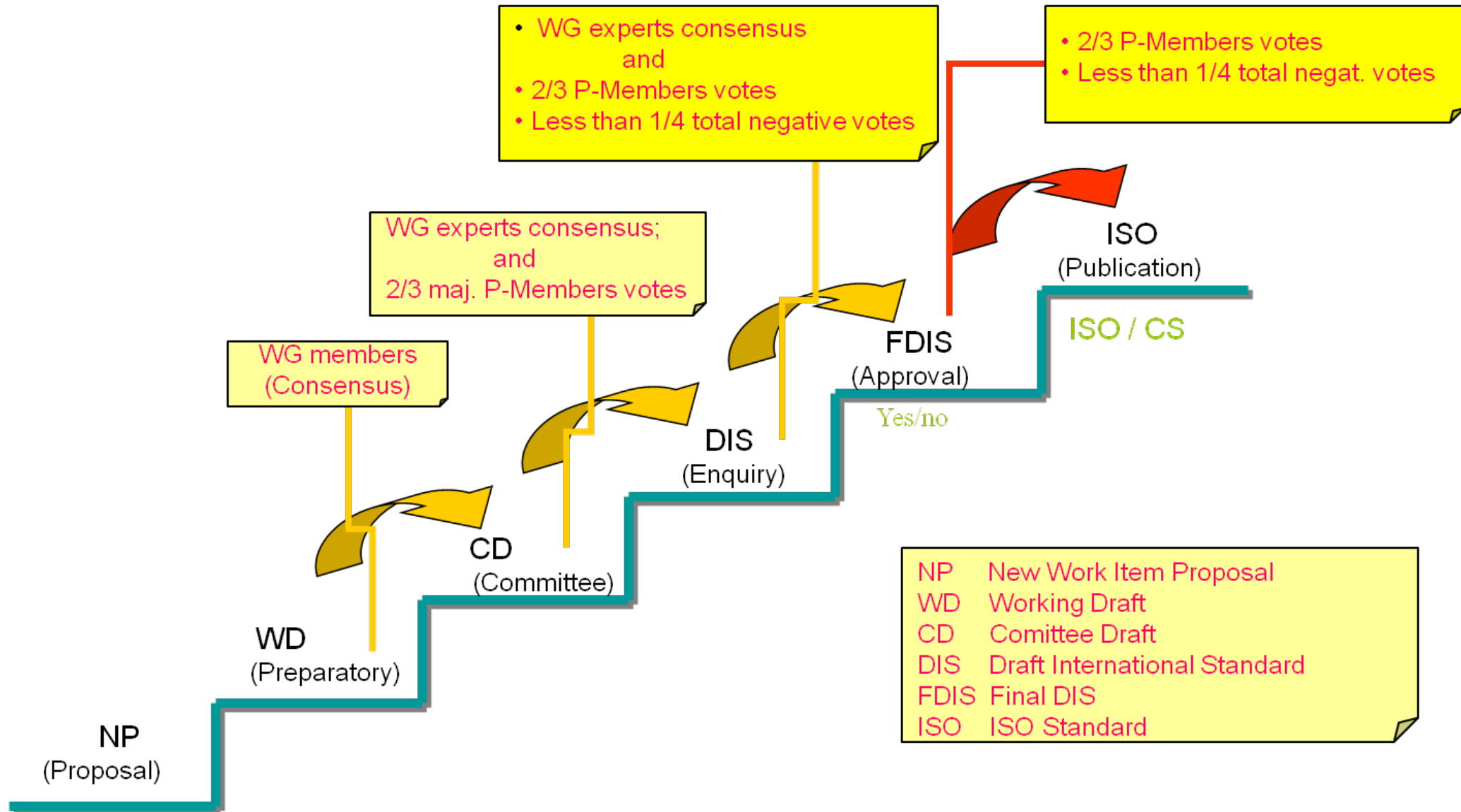


**ECSI** LLC



 **AFRICAPRY**  
African Carbon Energy

# ISO Standards Development



# History of Reclamation Standards?

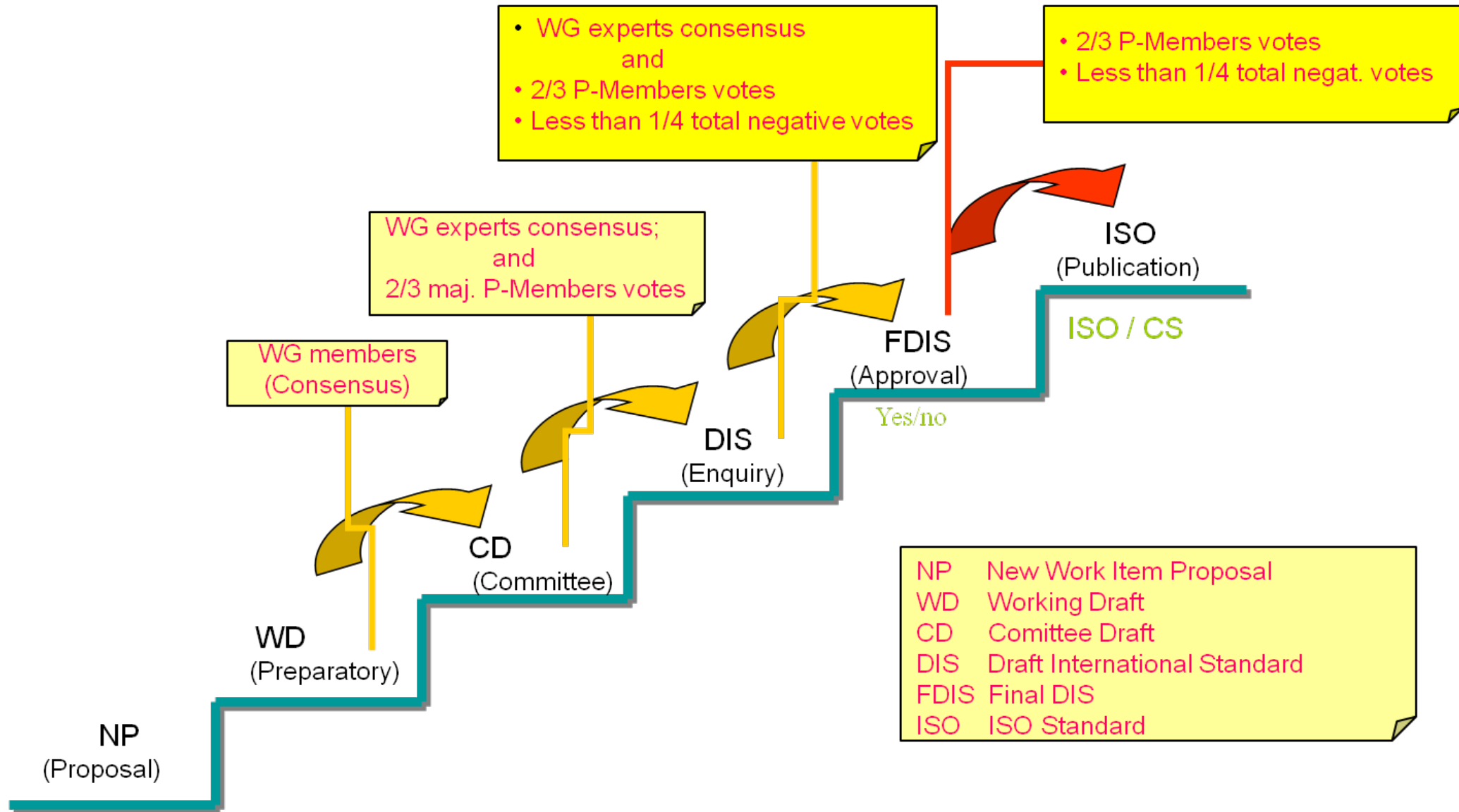
- Introduced by South Korea at 2014 plenary; Surprised many in attendance in Seoul. South Korea remains lead, but current chair is now from France (C. Didiere).
- Working Group 1 (*Terminology*) approved in 2015 at Cleveland plenary. South Korea is lead with substantial input from Canada, France (new chair) and USA.
- Working Group 2 (*Mine Closure and Reclamation Management Planning*) approved in October 2016 at Helsinki plenary. Canada is lead, USA, France & Australia active participants. *Does not address health & safety.*

# Status of Reclamation Standards?

- New work item proposals on abandoned mine land reclamation and water sampling were submitted by S. Korea and not approved to date. Revisions due in mid-2017. Both were viewed as prescribing existing technologies and not broadly applicable to international conditions.
- WG-1 has developed a third draft of the terminology base document
- WG-2 is currently developing a detailed outline



# ISO Standards Development



# Who is Participating and How?

- All TAG-82 members review and vote on all ballots for New Work Initiatives and/or confirmation of Working Group products.
- Each step requires Yes/No/Abstain votes from all TAG-82 members (with or without comment).
- For USA, W. Lee Daniels (VT), Tarunjit Butalia (OSU), and Steve Carpenter (UWY) have been primary reviewers/voters to date.

# **Additional USA Reviewers – Thanks!!**

- **Greg Conrad – IMCC**
- **Joe Friedlander – North American Coal**
- **Pete Stahl – University of Wyoming**
- **Jeff Skousen – West Virginia University**

***We welcome additional reviewers, particularly from industry, as long as we can maintain a modest level of confidentiality on draft content.***

# **Acknowledgments**

- **Julie Cairns and Brian Zupancic at CSA Cleveland have given us tremendous guidance and insight on how to manage and adapt to the ISO process and culture**
- **All of our USA reviewers**
- **Michael Karmis at Virginia Tech for recognizing the need for direct USA involvement in this and other TC-82 developments**