PERC PAN-EUROPEAN RESERVES & RESOURCES REPORTING COMMITTEE

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PERC and the Role of a Competent Person in Reporting Mineral Resources & Reserves

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EFG Vice-President, PERC Committe Member

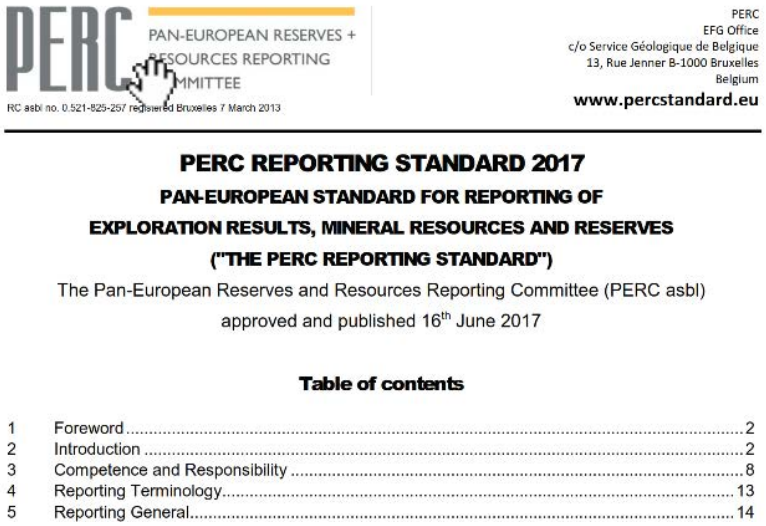
Conference on “Best practice guidelines for mineral exploration and mining perspectives in Estonia”
Tallinn, Estonia
May 2019

What is PERC ?

The **Pan-European Reserves and Resources Reporting Committee**

- The National Reporting Organisation (NRO) which is responsible for developing mineral reporting standards and guidelines in Europe.
- A constituent member of CRIRSCO, the Committee for Mineral Reserves International Reporting Standards.
- Established by professional geologists, mining and processing engineers.
- A 'not-for-profit ' organisation registered in Brussels
- Funded largely through sponsorship.

What is PERC ?



PERC PAN-EUROPEAN RESERVES + RESOURCES REPORTING COMMITTEE

RC asbl no. 0.521-825-257 registered Brussels 7 March 2013

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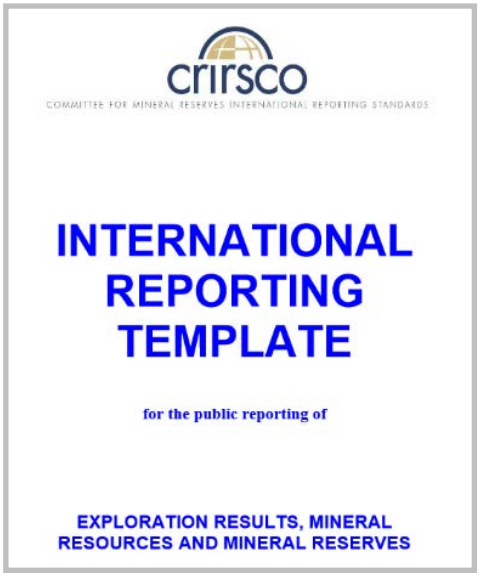
PERC REPORTING STANDARD 2017

PAN-EUROPEAN STANDARD FOR REPORTING OF EXPLORATION RESULTS, MINERAL RESOURCES AND RESERVES ("THE PERC REPORTING STANDARD")

The Pan-European Reserves and Resources Reporting Committee (PERC asbl) approved and published 16th June 2017

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COMMITTEE FOR MINERAL RESERVES INTERNATIONAL REPORTING STANDARDS

INTERNATIONAL REPORTING TEMPLATE

for the public reporting of

EXPLORATION RESULTS, MINERAL RESOURCES AND MINERAL RESERVES

For more details and contact information visit the PERC website at:
www.percstandard.eu

Founding organisations



Additional member organisations



See PERC website for additional information:
www.percstandard.eu

The PERC Committee

- Comprised of four representatives from each of the six constituent organisations, which are the Recognised Professional Organisations (RPOs) responsible for accreditation of geologists, and mining and processing engineers as Competent Persons (CPs)
  - In addition, a number of individual members are co-opted as special advisers

- The principal activities of the committee are to:
  - maintain, improve and promote the use of the PERC reporting standard
  - represent the minerals industry of reserve and resource reporting matters
  - maintain international reciprocity of recognition of professional accreditation



PERC constituent organisations

PERC Principles

- In common with all CRIRSCO aligned reporting codes and standards, the PERC Standard provides minimum requirements for Public Reporting of exploration results, mineral resources, and mineral reserves and follows four key principles:

Transparency

- Adequate information is presented clearly and unambiguously

Materiality

- Considers all relevant information available at the date of reporting

Competence

- Work is prepared by suitably qualified and experienced Competent Persons

Impartiality

- The Competent Person is not unduly influenced by the reporting company

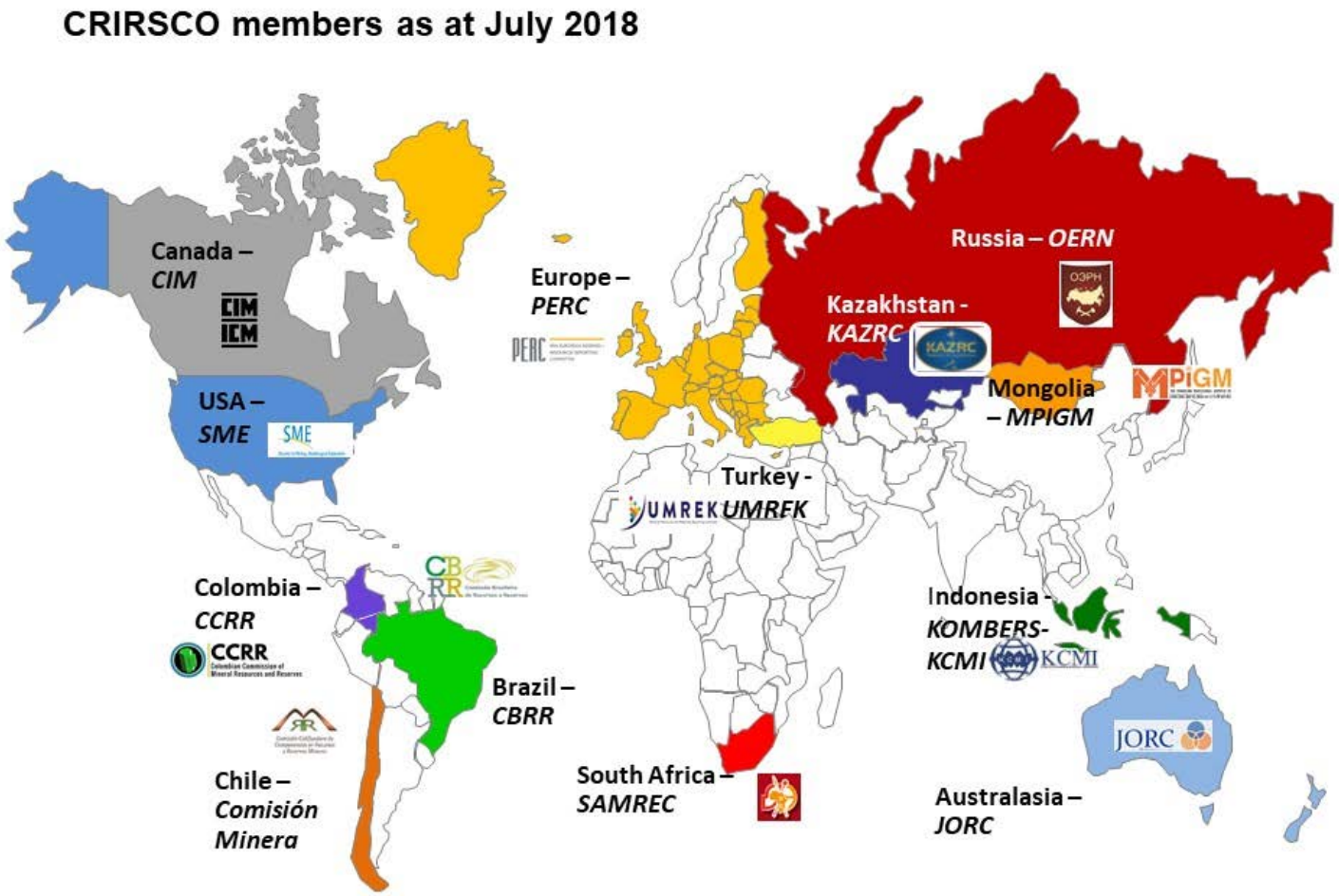
The CRIRSCO codes and standards

- Each code or standard is tailored to accommodate local legal and investment requirements, local industry or language requirements
- Common to all codes and standards is that all reporting requires sign-off by a 'Competent', 'Responsible' or 'Qualified' Person, registered through a nationally-based Recognised Professional Organisation
- The thirteen CRIRSCO codes and standards have consistent definitions and reporting criteria:

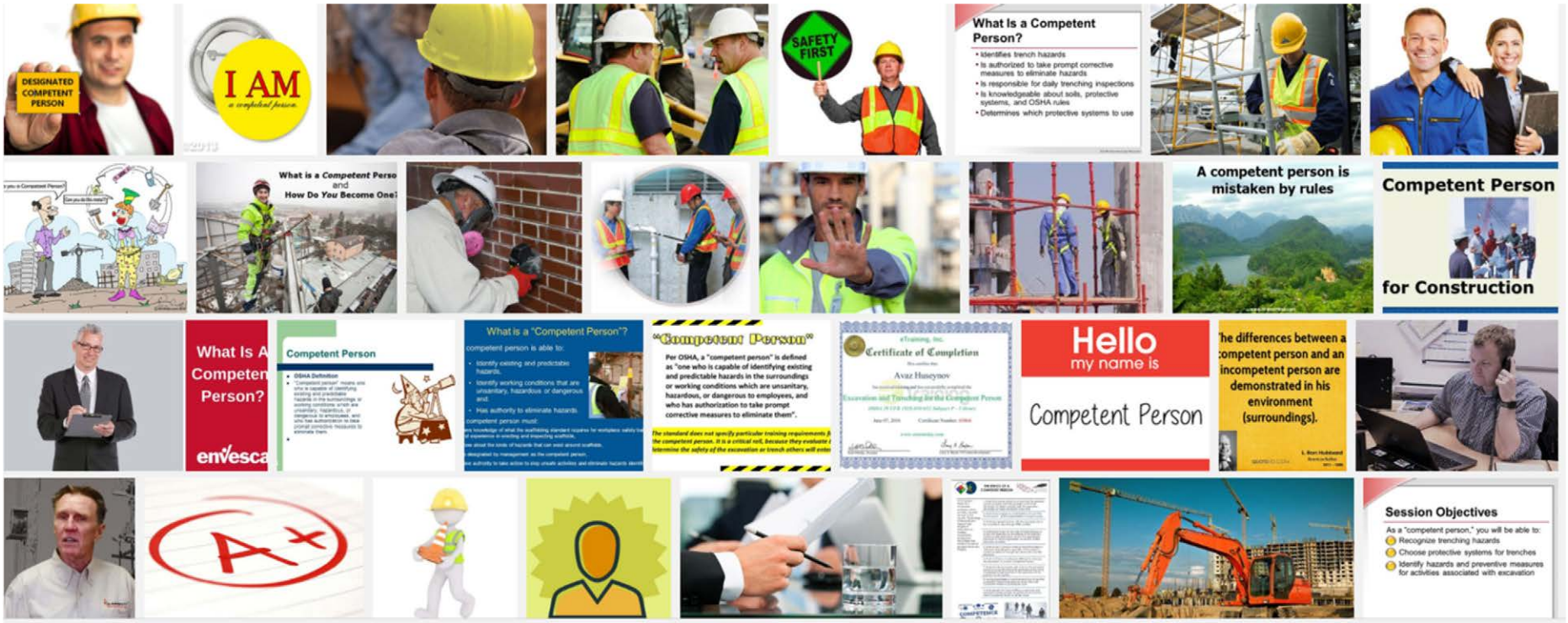
JORC (Australasia)
CBRR (Brazil)
CIM (Canada)
Comisión Minera (Chile)
CCRR (Colombia)
PERC (Europe)
KOMPERS (Indonesia)

KAZRC (Kazakhstan)
MPIGM (Mongolia)
OERN (Russia)
SAMCODES (South Africa)
UMREK (Turkey)
SME (United States of America)

The CRIRSCO codes and standards



The Competent Person (CP) between Competence and Qualification



The Competent Person (CP)

Occupational Safety & Health Administration definition

- "Competent Person means one who is capable of identifying existing and predictable hazards in the surroundings
- or working conditions which are unsanitary, hazardous, or dangerous to employees,
- and who has authorisation to take prompt corrective measures to eliminate them.

Mineral Resource & Reserve Reporting

- Protecting shareholders and other investors
- Avoiding misleading public reporting
- Reducing the chances of deliberate fraud occurring
- Providing adequate information on potential risks and uncertainties
- Maintaining the reputation of mining industry professionals

The Competent Person (CP) – The PERC Definition

3.1	***Definition***	**A Competent Person is a minerals industry professional, defined as a corporate member, registrant or licensee of a recognised professional body (including mutually recognised international professional organisations) with enforceable disciplinary processes including the powers to suspend or expel a member.** **A Competent Person must have a minimum of five years relevant experience in the style of mineralisation or type of deposit under consideration and in the activity which that person is undertaking. Acceptable professional bodies and classes of membership under the Standard, which meet these requirements, within Europe or elsewhere (Recognised Professional Organisations - 'RPOs') are listed separately in documents which are specified in Appendix 5 and updated lists which may be published from time to time.** **This definition of 'Competent Person' is subject to any additional restrictions or conditions which may be required by the appropriate stock exchange or regulatory authority.**

The Competent Person (CP) – Key Elements

- Key elements
  - Relevant academic or technical qualification
  - Approved professional membership
    - Participating organisations or RPO
    - All have an enforceable disciplinary processes
  - Sufficient experience
    - Minimum of 5 years relevant experience
  - Impartiality
    - Not unduly influenced by reporting entity
- 'Self-certification'
  - On a project-by-project basis
  - Some jurisdictions use a registration list

The Competent Person (CP) – Qualification Aspects

- Acceptable professional bodies
  - Must have a code of ethics
    - + code(s) of practice
  - Must have a complaints and disciplinary process
  - Continued Professional Development (CPD) requirement

- Types
  - Statutory
    - Legal requirement in order to practice
    - Enables legal redress in case of dispute
    - May require registration for a particular field of practice
  - Membership-based professional bodies
    - Maintain and promote reputation of the profession

The Competent Person (CP) - The RPO Titles

- PERC RPOs (May 2017)

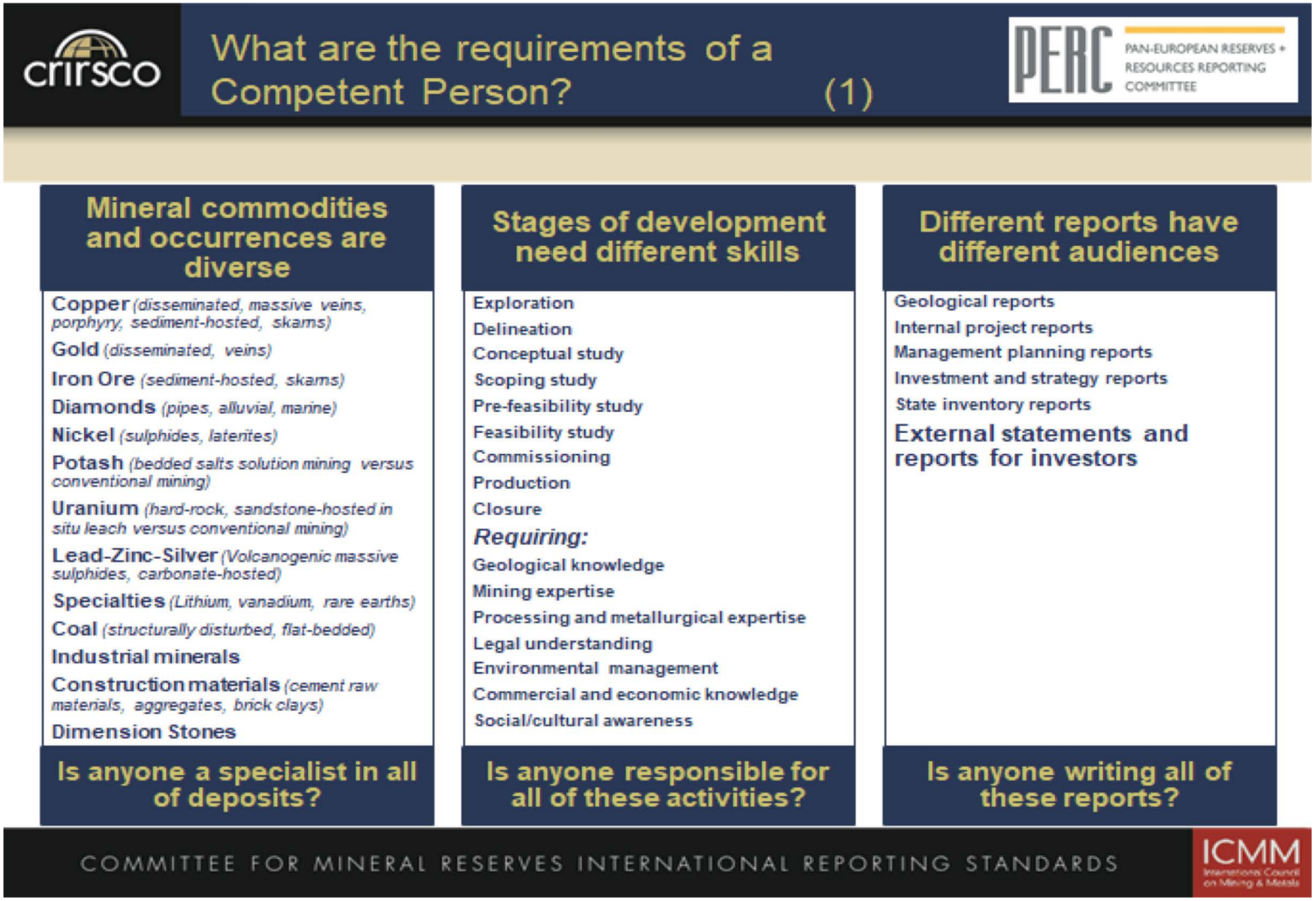
EUROPEAN RPOs RECOGNISED BY PERC, AND MEMBERSHIP LEVELS REQUIRED	
Organisation	**Minimum membership class required**
The Institute of Materials Minerals and Mining (IOM3)	'Member' (MIMMM) or 'Fellow' (FIMMM)
National Associations which constitute the European Federation of Geologists (EFG)	'European Geologist' (EurGeol)
The Institute of Geologists of Ireland	'Professional Geologist' (PGeo)
The Geological Society of London (GSL)	'Chartered Geologist' (CGeol) or 'Chartered Scientist' (CSci)

- Addition of FAMMP (Scandinavia) and IMEB (Spain & Portugal) memberships are awaiting final approval

The Competent Person (CP) – Self Certification

- Be prepared to defend work in front of peers
- Allow for ‘comparable’ experience
- Beware of over-confidence

The Competent Person (CP)



The Competent Person (CP)

Full expertise

- In all deposit types
- In all stages of development
- And that is adequate for all types of reporting

Is unlikely or impossible.

Therefore

- A Competent Person must have relevant experience (a minimum of five years) in the style of mineralisation or type of deposit under consideration and in the activity which that person is undertaking.
- The person's specific experience qualifies him/her for the mineral reporting task.

The Competent Person (CP)

Requirements for a Competent Person

A minerals industry professional

- Often a geologist or mining engineer
- Employed to work with mineral deposit occurrences in geological environments
- Exchanges & sharing of information with other countries & companies

A member of a Recognised Professional Organization (RPO)

- Appropriate membership level
- Subject to ethics and disciplinary codes

Minimum 5 years relevant experience

"Competent Persons should be clearly satisfied in their own minds that they could face their peers and demonstrate competence in the commodity, type of deposit and situation under consideration. If doubt exists, the person should either seek opinions from appropriately experienced colleagues or should decline to act as a Competent Person."

The Competent Person (CP) - Activities

Reporting

Primary responsibility

- May be annual, or for specific purpose
- Include 'first time' reporting, bond issues, results updates, divestments, privatization, press releases, etc.
- Exploration geologists report exploration results
- Mining (or estimation) geologists estimate and report mineral resources
- Mining engineers estimate and report mineral/ore reserves

Leading a team

Co-ordinating other specialists

- Can include other Competent Persons
- Oversees and directs work on those not Competent Persons in their own right
- Could include metallurgists, environmental engineers, economists, marketing experts, etc.
- Responsibility for the work included in reports done by others

Organizing audits and reviews

- Legacy information
- Geological confidence
- Modifying factors

- Experience from similar or analogue deposits can be important in making assumptions about poorly drilled deposits or unknown aspects in initial stages, but can also be misleading.

The Competent Person (CP) – Reporting Consent

The Competent Person Consent

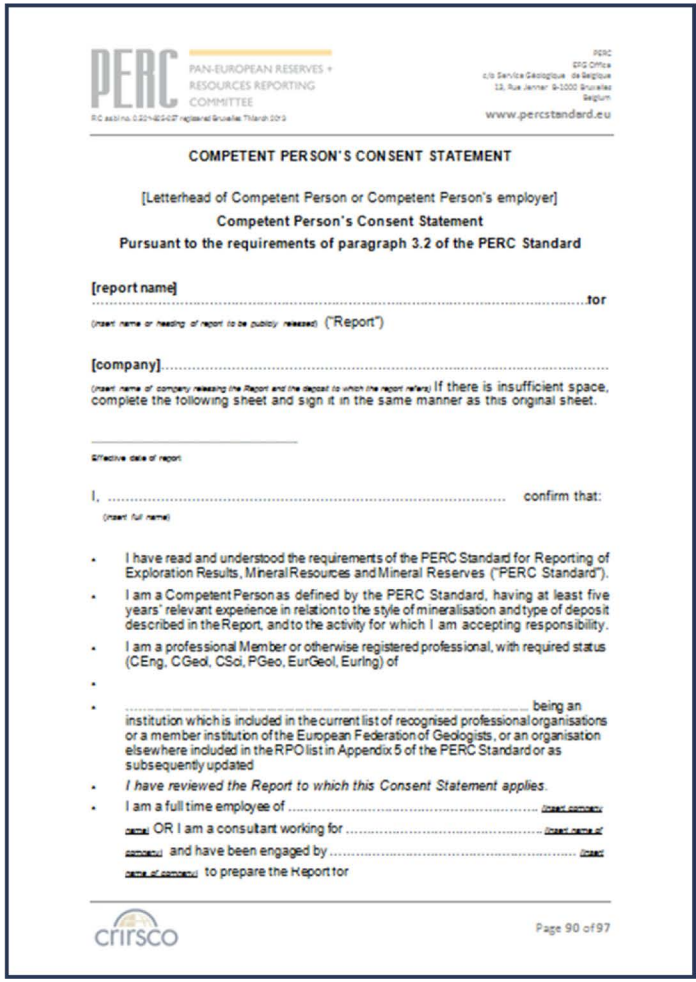
A legally binding document

Necessary for all reports released

Confirms the name of the Competent Person, professional qualifications, and experience relevant to the report

Can be a stand-alone statement

Can be included as a compliance statement in the report



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COMPETENT PERSON'S CONSENT STATEMENT

[Letterhead of Competent Person or Competent Person's employer]

Competent Person's Consent Statement

Pursuant to the requirements of paragraph 3.2 of the PERC Standard

[report name] .....for

(insert name or heading of report to be publicly released) ("Report")

[company].....

(insert name of company releasing the Report and the deposit to which the report refers) If there is insufficient space, complete the following sheet and sign it in the same manner as this original sheet.

.....

Effective date of report

I, ... confirm that:

(insert full name)

- I have read and understood the requirements of the PERC Standard for Reporting of Exploration Results, Mineral Resources and Mineral Reserves ("PERC Standard").
- I am a Competent Person as defined by the PERC Standard, having at least five years' relevant experience in relation to the style of mineralisation and type of deposit described in the Report, and to the activity for which I am accepting responsibility.
- I am a professional Member or otherwise registered professional, with required status (CEng, CGeol, CSci, PGeo, EurGeol, EurIng) of
- .....
- ..... being an institution which is included in the current list of recognised professional organisations or a member institution of the European Federation of Geologists, or an organisation elsewhere included in the RPO list in Appendix 5 of the PERC Standard or as subsequently updated
- *I have reviewed the Report to which this Consent Statement applies.*
- I am a full time employee of ..... *(insert company name)* OR I am a consultant working for ..... *(insert name of company)* and have been engaged by ..... *(insert name of company)* to prepare the Report for

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The Competent Person (CP) – Table 1

Areas of Risk	PERC T1 Entries	Examples of aspects where CP Report should assess risks that may affect the outcomes of investment
Context & History	6	Who was the report prepared for and why? Project description outline Previous work and its reliability Previous, existing and/or nearby operations. Location, geography (e.g. in a city?) climate & environment.
Legal Aspects and Tenure	3	Issuer's rights • Prospecting, mining, environmental licenses & permits • Land ownership, access, infrastructure rights • Security, present & future & and legal proceedings Cultural, wilderness, parks or other impediments
CP Knowledge of Project	1	Visits made The extent to which CP has personally verified the data
Deposit Sampling & Data	11	Surveying, drilling, trenching, logging, sampling Locating, analysis, assaying, testing, quality control & assurance, data accumulation, verification & storage
Exploration Results	10	Access & ownership rights, geology, mineralogy, geophysics, geochemistry, drilling, environmental liability. **Reporting balance to avoid unrealistic expectations**
Audits or Reviews	2	Independent technical assessment of data & methods Valuable safeguards for the investor

The Competent Person (CP) – Table 1 (2)

Areas of Risk	PERC T1 Entries	Examples of aspects where CP Report should assess risks that may affect the outcomes of investment
Geological estimation Mineral Resources	7	Database integrity. geological interpretation (+alternatives) modelling, estimation (+appropriateness), validation, accuracy, values of multiple products - deleterious minerals
Mine Planning Mineral Reserves	4	Cut-off grades, qualities or value. Evidence and/or assumptions of dilution, recovery, access, geotechnical (slopes, stability, support), hydrogeology, equipment, safety
Processing & Metallurgy	1	Flowsheet (new / conventional), recovery & upgrading factors deleterious minerals, environmental impact, health & safety
Economics	1	Land lease / purchase, Royalties, taxes, prices, penalties, transport & treatment, Capital & operating costs, revenues, Financial model & analysis
Market	1	Demand, supply and stocks. Customer & competitor analysis. Price & volume forecasts. **If market cannot accommodate max. quantities, adjust Reserves.**
Other Modifying Factors	1	Natural risks – earthquakes, flooding, volcanos, climate Infrastructure – transport, power, water, employees Environment – land use, groundwater, discharges, visual Social – local to national employment & economy changes Governmental – local to national mining policy & perceptions
Specialised Minerals	9	Diamonds

The Competent Person (CP)



Rock Grade and Quality

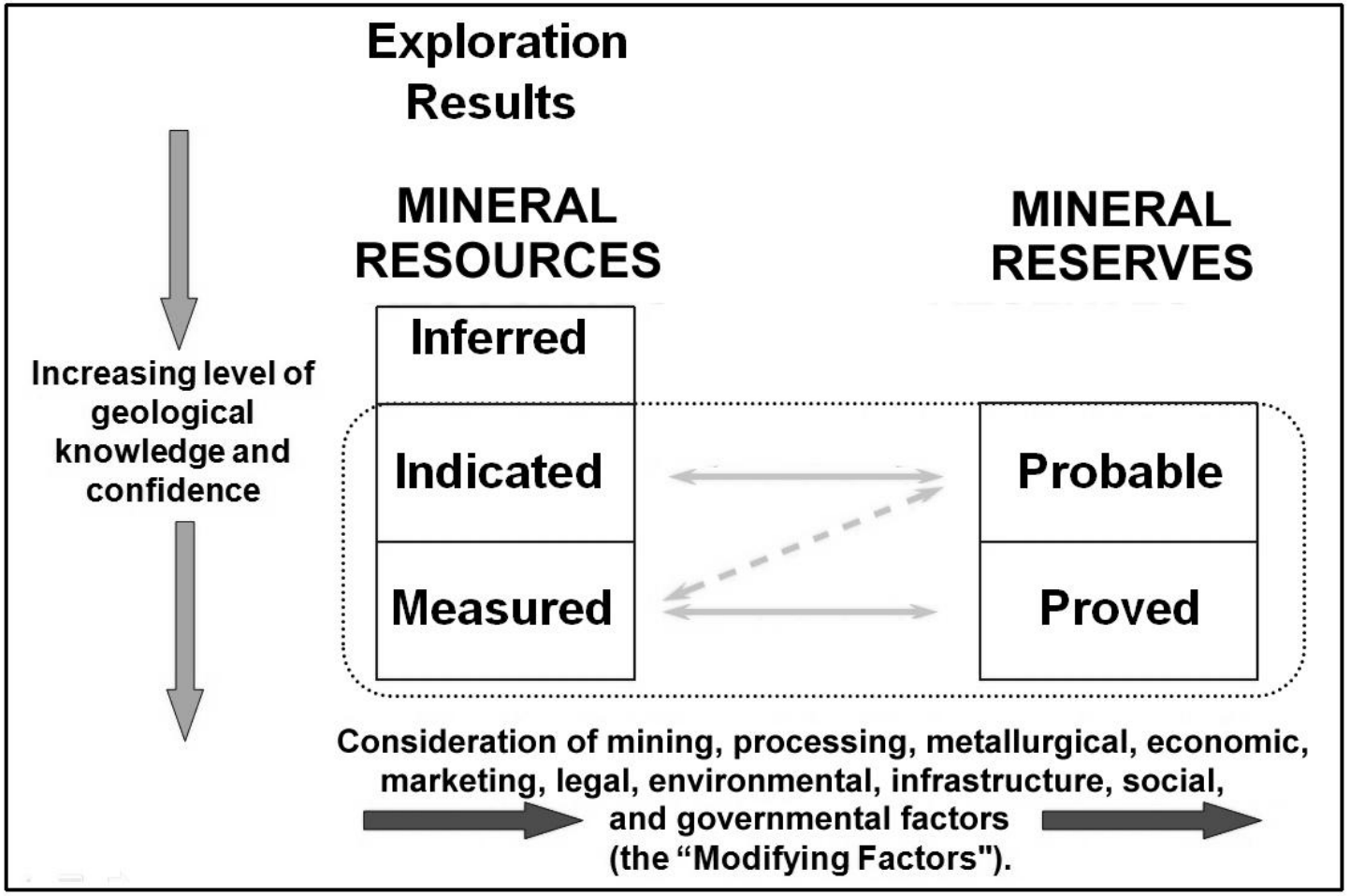
- define value, but in different ways & contexts, needing different competences.

In Carrara, Italy, they ask “Can this…

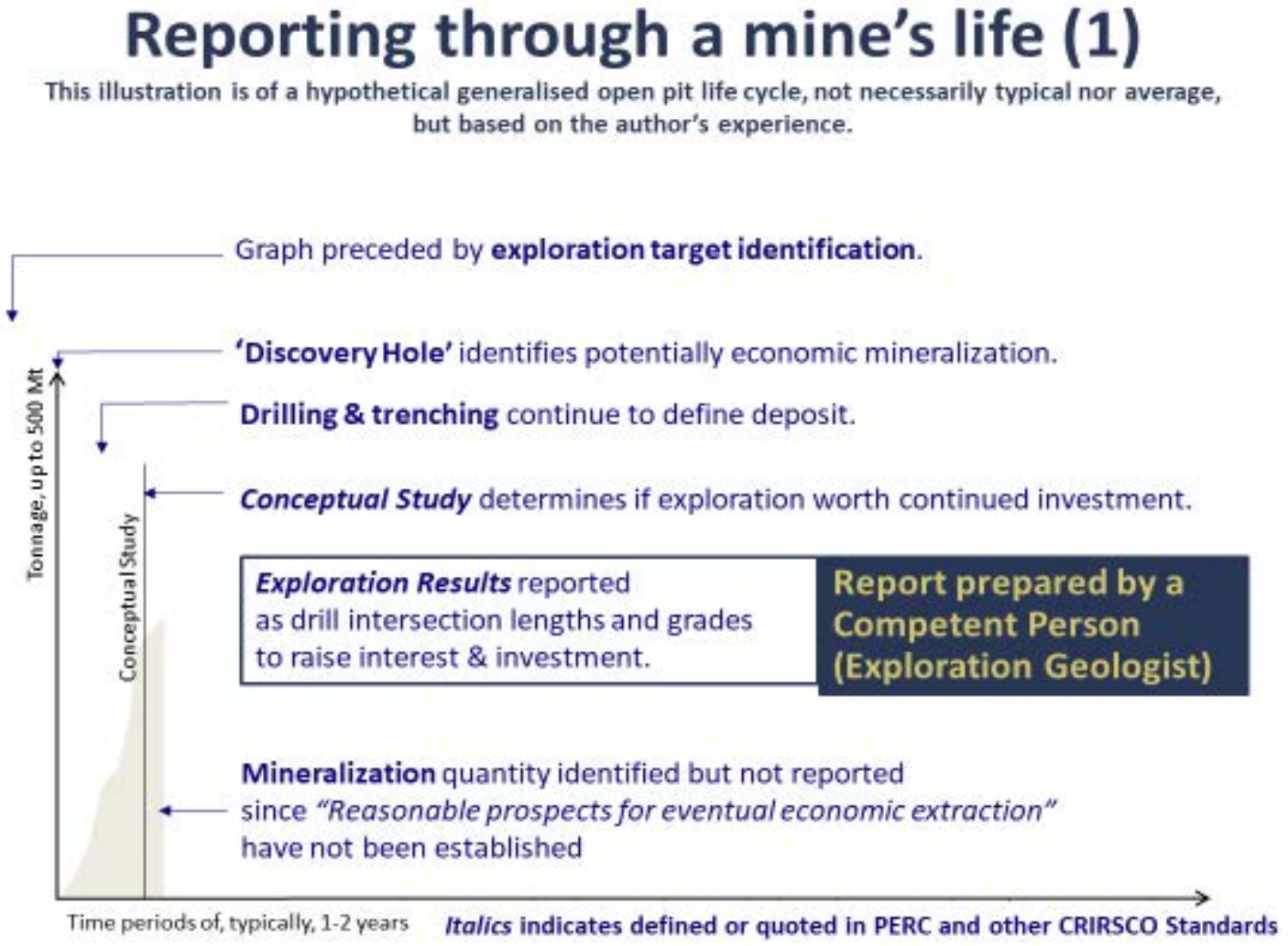


…be carved into this?”

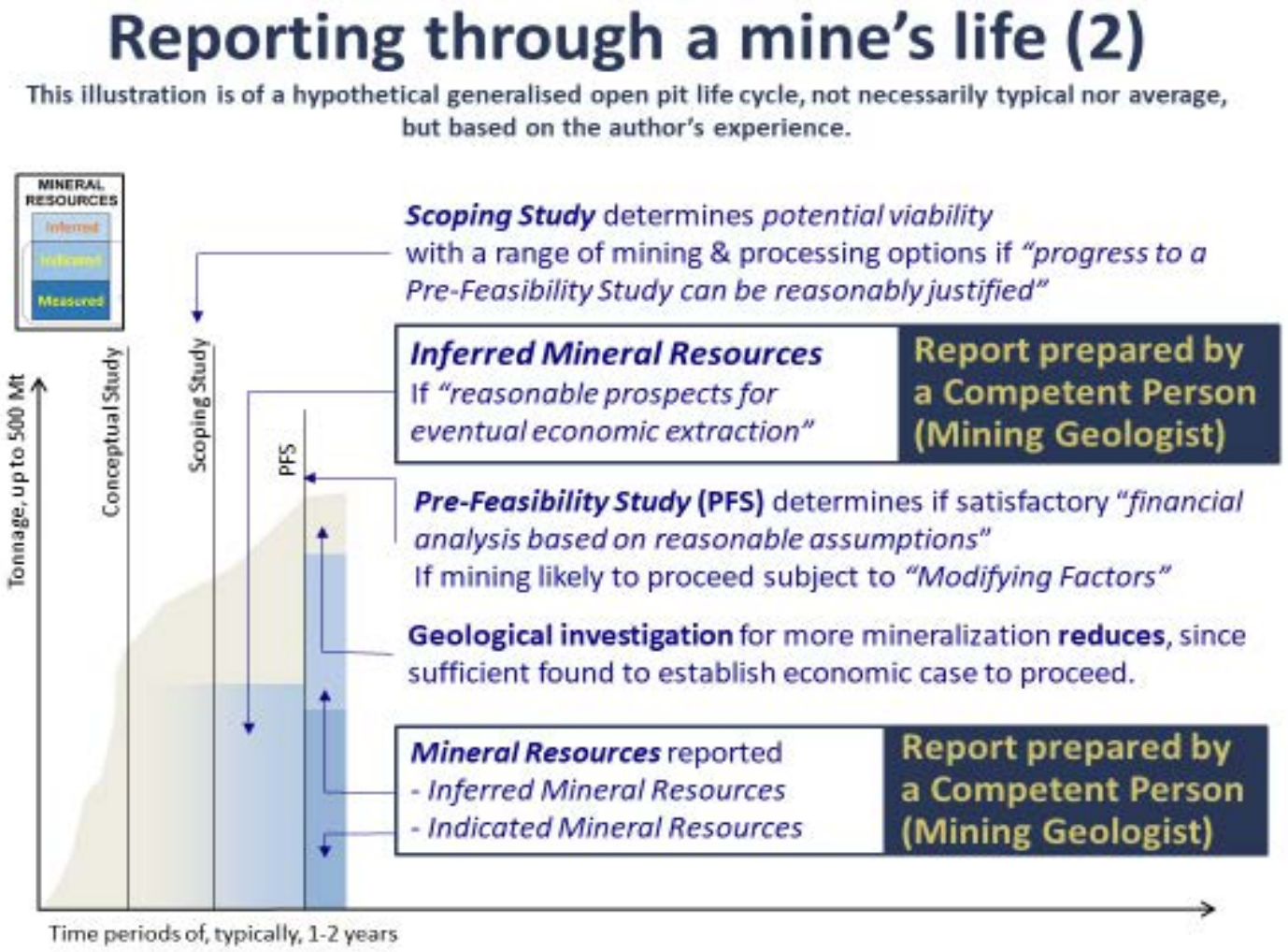
The Competent Person (CP) – Relationship between Exploration results, Resources and reserves



The Competent Person (CP)



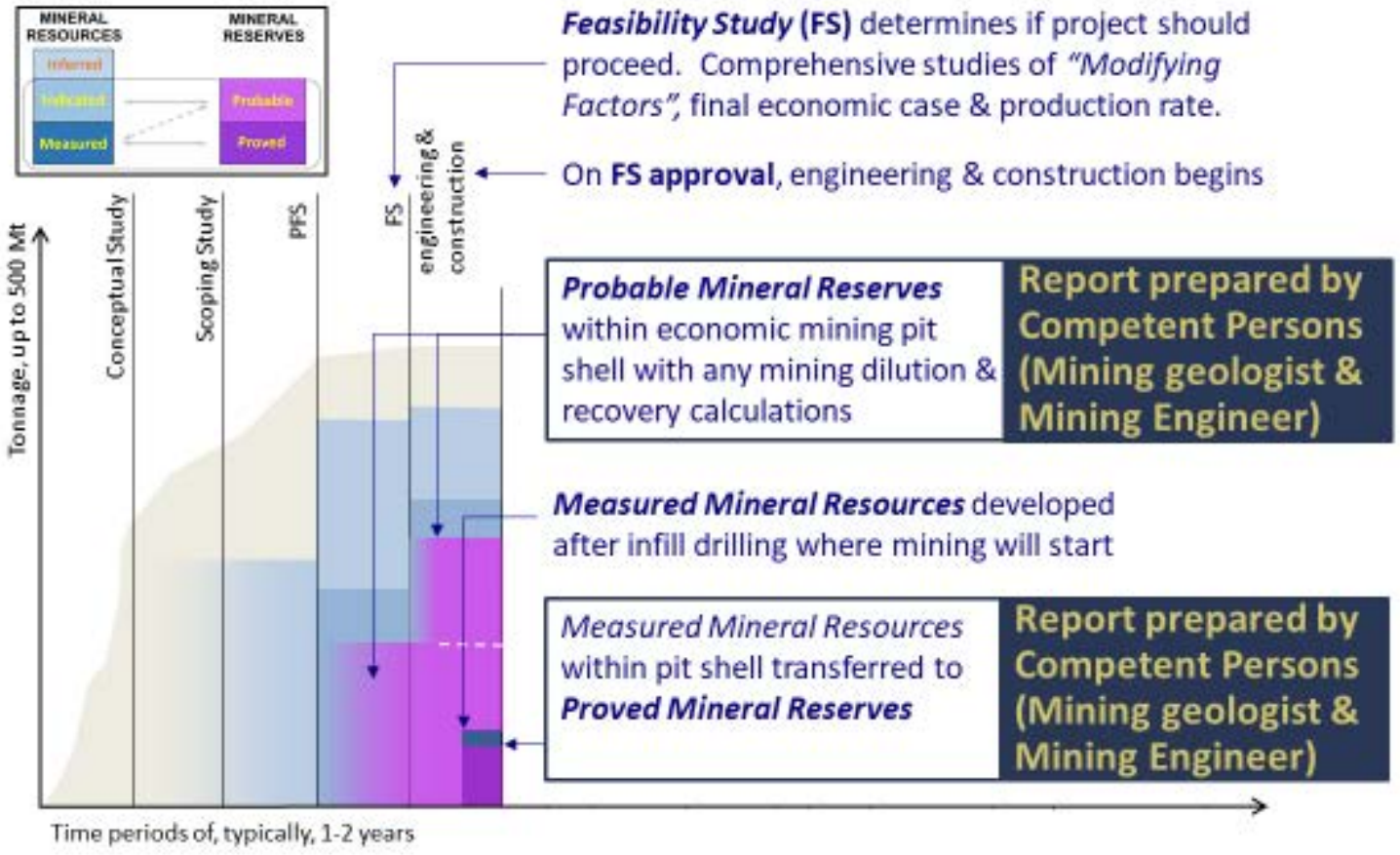
The Competent Person (CP)



The Competent Person (CP)

Reporting through a mine's life (3)

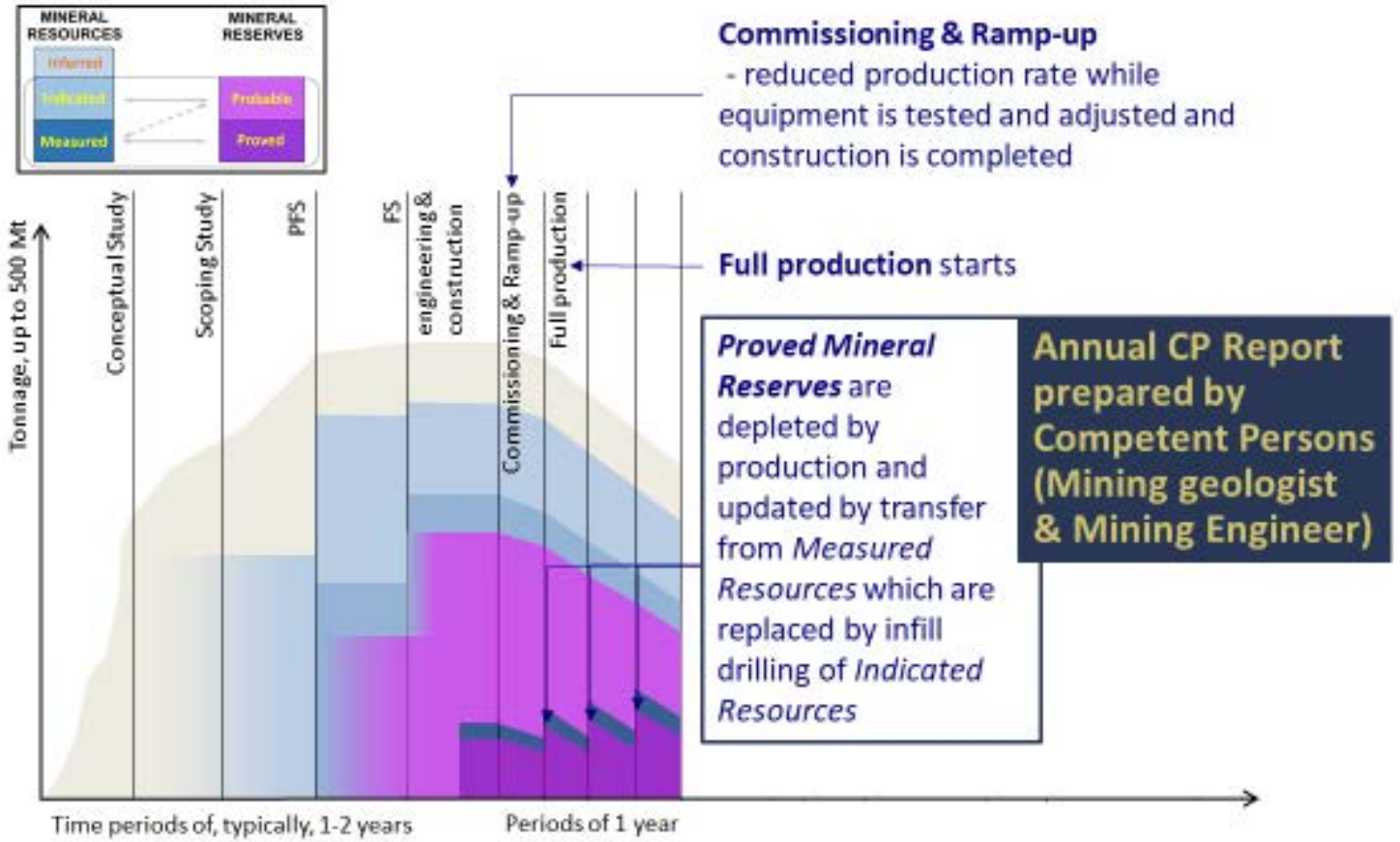
This illustration is of a hypothetical generalised open pit life cycle, not necessarily typical nor average, but based on the author's experience.



The Competent Person (CP)

Reporting through a mine's life (4)

This illustration is of a hypothetical generalised open pit life cycle, not necessarily typical nor average, but based on the author's experience.



Commissioning & Ramp-up
- reduced production rate while equipment is tested and adjusted and construction is completed

Full production starts

Proved Mineral Reserves are depleted by production and updated by transfer from *Measured Resources* which are replaced by infill drilling of *Indicated Resources*

Annual CP Report prepared by Competent Persons (Mining geologist & Mining Engineer)

The Competent Person (CP)

Reporting through a mine's life (5)

This illustration is of a hypothetical generalised open pit life cycle, not necessarily typical nor average, but based on the author's experience.

Mine planning revised to include all *Indicated & Measured Mineral Resources* as *Probable & Proved* Reserves, also may include economic stockpiles e.g. low-grade *Measured Resources* mined but not processed yet

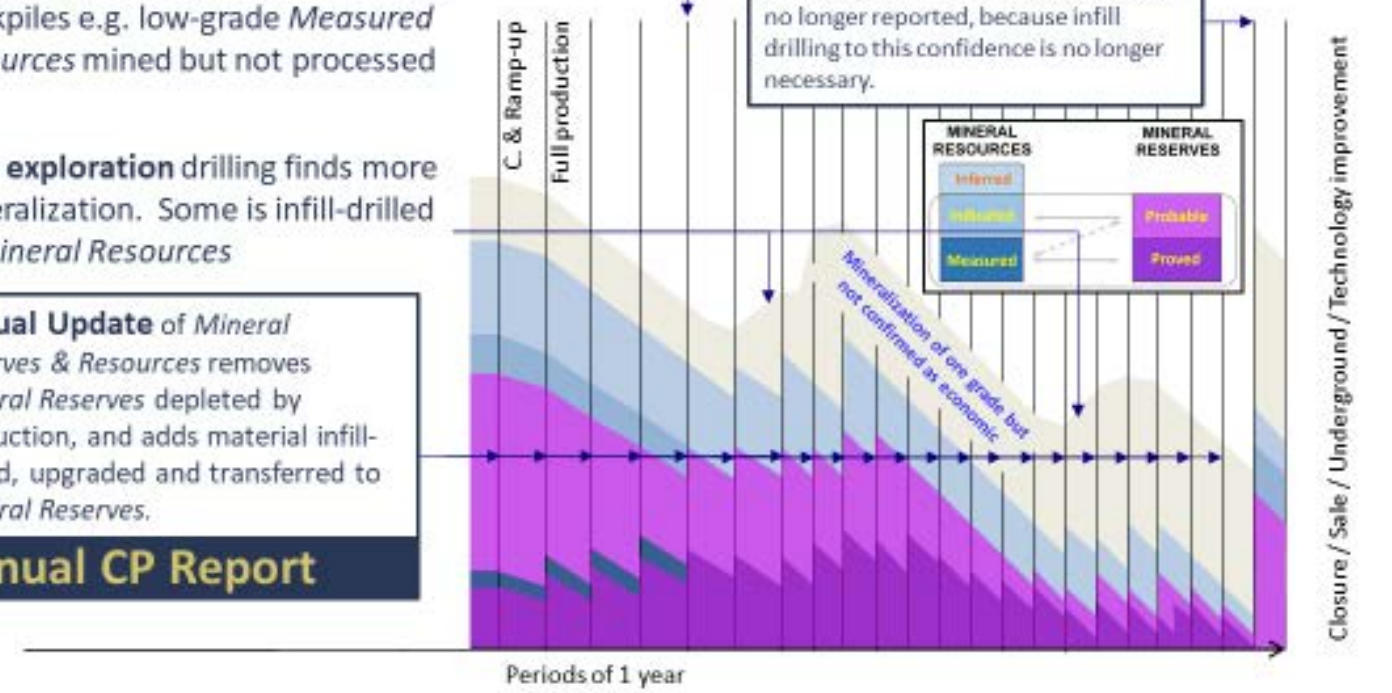
New exploration drilling finds more mineralization. Some is infill-drilled to *Mineral Resources*

Annual Update of *Mineral Reserves & Resources* removes *Mineral Reserves* depleted by production, and adds material infill-drilled, upgraded and transferred to *Mineral Reserves.*

Annual CP Report

Mining Strategy Revision reduces cut-off to substantially to increase *Mineral Resources & Reserves*, including from marginal stockpiles (Dumps). *Proved Mineral Reserves* are no longer reported, because infill drilling to this confidence is no longer necessary.

CP Report



The Competent Person (CP)

Education + Qualification + Experience
+ (CPD + Ethics)
=
Competence

The Competent Person (CP)

An honour
or
a burden
to take the responsibility

Whose competence do you trust – the physician or the plummer







Thank you,
Glückauf

tänan väga!

Contact:
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This presentation is partly based on older presentations from Mark Howson, Ed Sides and Ed Swindell.