



**MGEI**  
12th Annual Convention 2020  
Strengthening Discovery and Mining Culture,  
Welcome Tomorrow

#INSPIRING**MGEI** +

# RPEEE for Coal Resource

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# Discussion Limits

## RPEEE Reasonable Prospect for Eventual Economic Extraction

- This presentation will discuss RPEEE as one of the key concepts for reporting of Mineral Resources.
- The discussion will focus to Coal Resources.
- An example will be shown for an open pit.



# Mineral Resources

- A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade (or quality), and quantity that there are **reasonable prospects for eventual economic extraction.**
- All reports of Mineral Resources must satisfy the requirement that there are reasonable prospect for eventual economic extraction (i.e. more likely than not), regardless of the classification of the resource.
- Portions of a deposit that do not have reasonable prospects for eventually economic extraction must not be included in a Mineral Resource. The basis for the reasonable prospect assumption is always a material matter, and must be explicitly disclosed and discussed by the Competent Person within the Public Report using the criteria listed in Table 1 for guidance. The reasonable prospects disclosure must also include a discussion if the technical and economic support for the cut-off assumptions applied.

(The JORC Code 2012, point 20, p11)



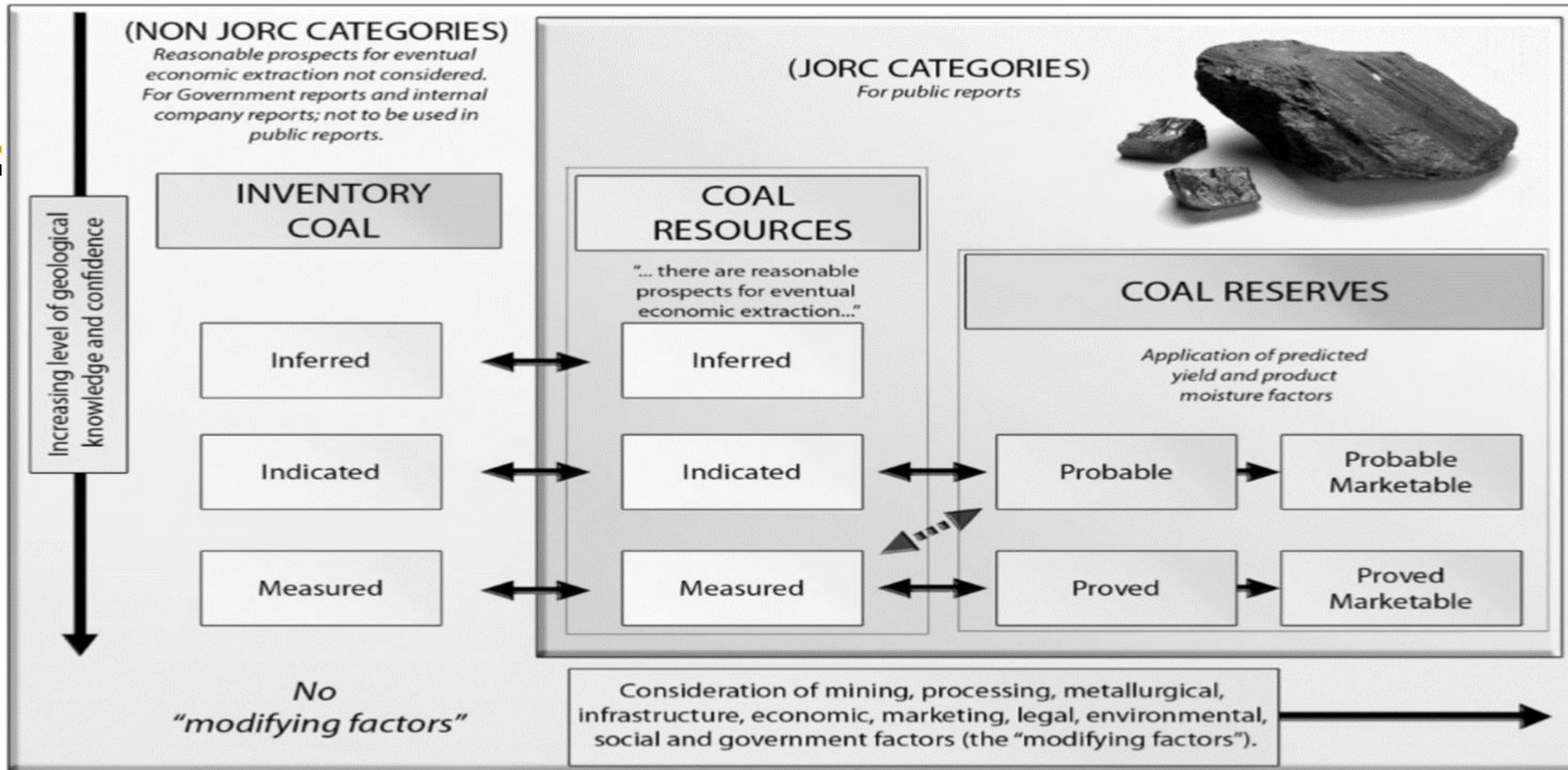
# Inventory Coal Vs Coal Resources

- Inventory Coal is any occurrence of coal in the ground that can be estimated and reported without being constrained by economic potential or other modifying factors. That is to say, estimates of Inventory Coal tonnages are not subject to or constrained by **the reasonable prospects test**. By definition Inventory Coal includes all known Coal, (Coal Guidelines 2014)
- A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade (or quality), and quantity that **there are reasonable prospects for eventual economic extraction**, (JORC Code 2012)






# Inventory Coal-Resource-Reserve



Relationships between Inventory coal, Resource and Reserve Classifications (Coal Guideline 2014)



# What is RPEEE



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The term '**reasonable prospects for eventual economic extraction**' implies an assessment (albeit preliminary) by the Competent Person in respect of all matters likely to influence the prospect of economic extraction including the approximate mining parameters. In other words, a Mineral Resource is not an inventory of all mineralisation drilled or sampled, regardless of cut-off grade, likely mining dimensions location or continuity. It is a realistic inventory of mineralisation which, under assumed and justifiable technical, economic and development conditions, might, in whole or in part, become economically extractable.

*JORC 2012*





# What is RPEEE

A test or an assessment to limit the Coal Resource from the Inventory Coal using 3 principles; Reasonable Prospect, Eventual, and Economic Extraction.

- **Reasonable Prospect – More likely than not**

The body of mineralisation needs to have a reasonable prospect to become a mine.

- **Eventual – Time Period**

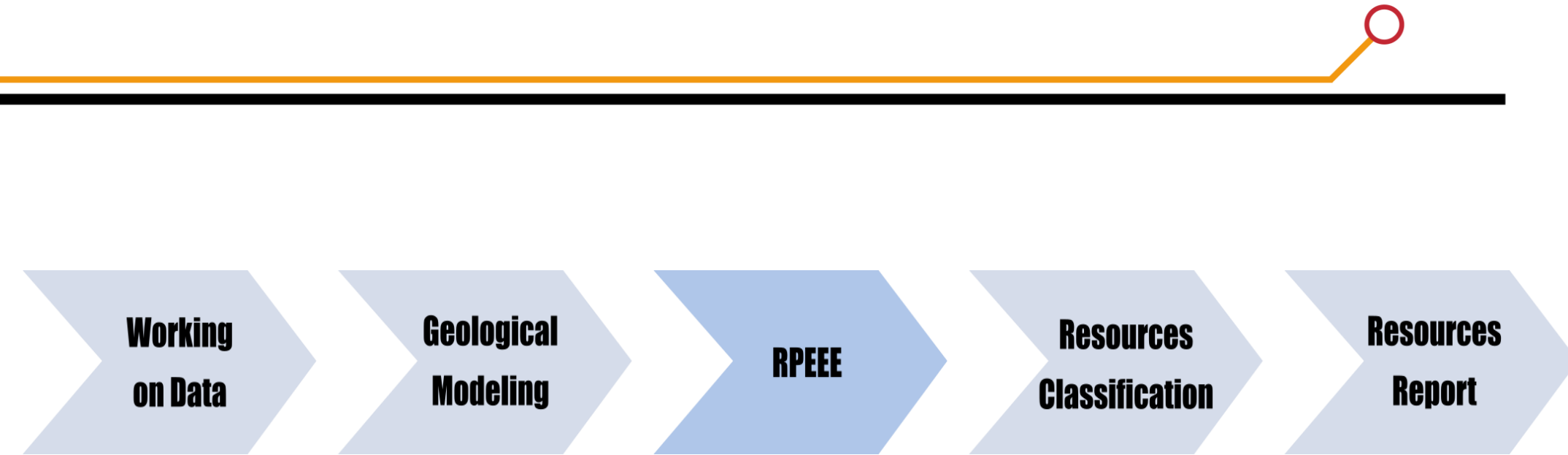
For Coal, iron ore, bauxite and other bulk minerals or commodities, it may be reasonable to envisage 'eventual economic extraction' as covering time periods in excess of **50** years.. (JORC 2012).

- **Economic Extraction – Positive Return**

The Resource needs to have a positive return.



# Resourcing Process



# Limits of the RPEEE



Further guidance about the limits of the RPEEE in the 2014 Edition of the Australian Guidelines for The Estimation and Classification of Coal Resources:

- Clearly the reasonable prospects test is sensitive to the geological, geotechnical, and coal quality parameters that will have been investigated as a precursor to the estimation process. In some cases the prospectivity of a coal deposit can be assessed by comparing the known parameters with analogue in nearby areas. However, rarely is it easy to properly assess the economic worth of a coal deposit without at least a basic appreciation of costs of extraction and likely revenues to be received. These matters are normally considered during the Resource study and in concert with engineers and other specialists.
- In a potential open cut mining scenario, emphasis on **strip ratio, minimum mineable seam thickness, maximum non-separable parting thickness, pit wall stability and depth of weathering are important considerations**. If beneficiation of the raw coal is envisaged, the clean coal yields should be factored into cut-off considerations, including strip ratios. It may be desirable to consider optimisation techniques to examine various options to support an assessment of cut-offs.



# Limits of the RPEEE

In the case of Bulk commodities, the JORC code contemplates a period of up to 50 years when discussing reasonable prospects. SMGC has considered a number of limits in forming an opinion on reasonable prospects to technical and economic extraction within the next 50 years. These limits may be thought of in three categories; **Hard limits** such as concession boundaries, **technical limits** such as maximum depth of extraction and **economic limits** dependent on price forecasts and cost.



# Limits of the RPEEE



- Hard limits
- Technical limitations
- Economical assumptions



# Limits of the RPEEE

## ○ Hard limits



## ○ Technical limitations

## ○ Economical assumptions

- **The Concession Boundary**

In Indonesia, there is an Izin Usaha Pertambangan (IUP) approved by the government.

The IUP defines the tenure information.

- **The Geological Model Boundary**

The geological model is limited by a maximum extrapolation distance from the data.





# Limits of the RPEEE

○ Hard limits

○ Technical limitations →

○ Economical assumptions

- **The Depth of Final Highwall**

Refers to the geotechnical analysis report.

In SMGC's experience, geotechnical analysis sign off by internationally accredited groups has been given in Kalimantan, Indonesia up to a 450 m highwall depth – a few pits exist at or near this depth.

Assumption on overall slope if no geotechnical analysis report has not been completed yet.



# Limits of the RPEEE

○ Hard limits

○ Technical limitations →

○ Economical assumptions

- **Maximum Practical Stripping Ratio**

Technically Beyond a strip ratio 20:1 or thereabouts equipment congestion, required dump room, and support infrastructure requirements render operations increasingly less efficient.

maximum practical stripping ratio is ~ 20:1



# Limits of the RPEEE

○ Hard limits

○ Technical limitations →

○ Economical assumptions

- **Determine Weathering Surface**

Generated using weathered material in the lithological log or using a default depth of weathering.

- **Apply minimum mineable thickness**

Reference to experience regarding similar operations.



# Limits of the RPEEE

○ Hard limits

○ Technical limitations →

○ Economical assumptions

- **Apply maximum coal parting**

Very high ash can be due to merged parting

- **Prohibited To Be Mined Area**

Forests classification

Rivers

Public Infrastructure



# Limits of the RPEEE

- Hard limits
- Technical limitations
- Economical assumptions



- **Coal Price**

Based on recorded data, maximum coal prices for thermal coal—were achieved in February 2011. Given the latest major coal price spike in 2011, it is plausible that conditions may occurs within the timeframe contemplated to reproduce these prices.

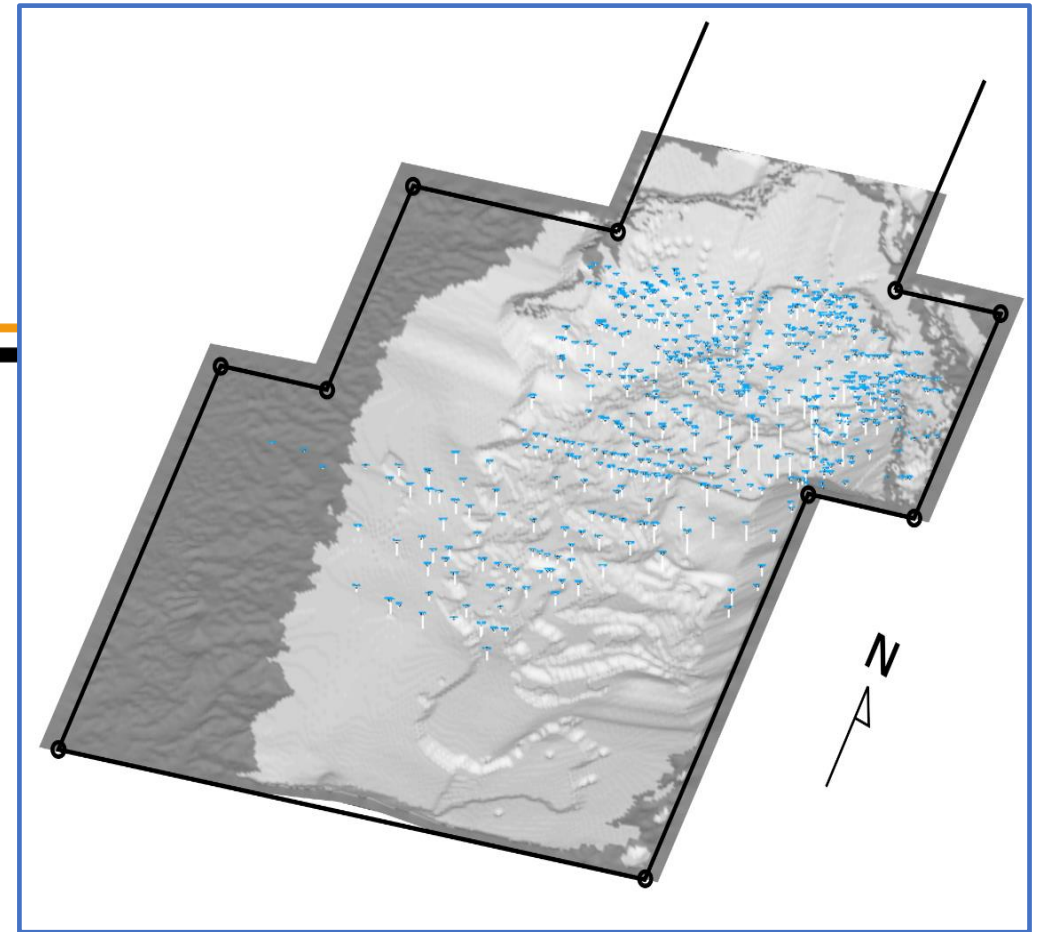
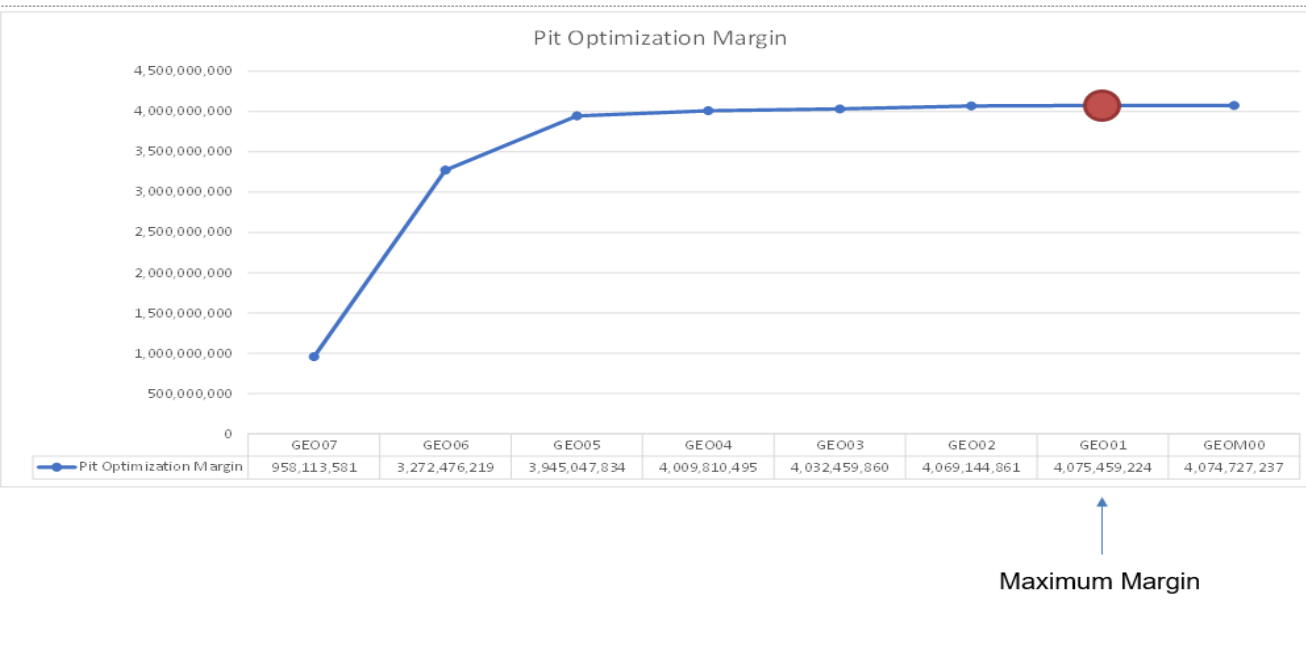
- **Cost**

Apply actual waste and ore cost for production mining or use general parameter for green field mining.



# Pit Optimization

- Base on the design limits, a series of incremental pit shells is generate using the Lerch Grossman algorithm.

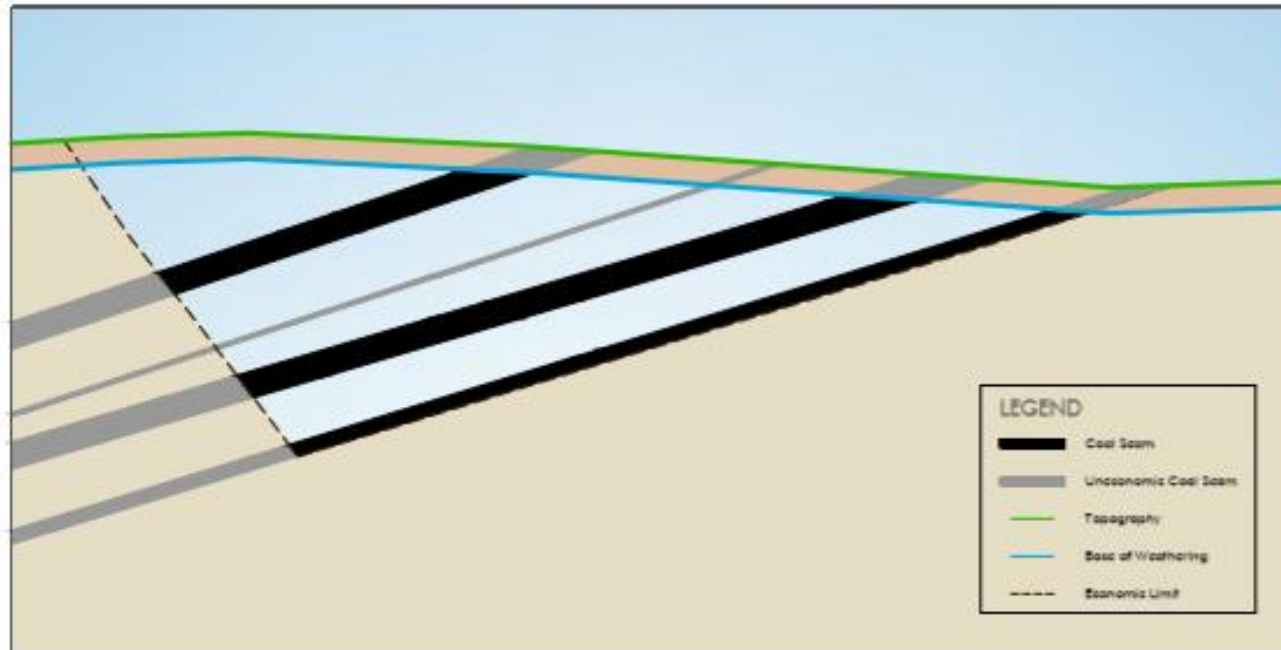


- An economic pit determined from the maximum margin of the pit optimization can be used as base for the RPEEE.





# Economic Limit



Section Illustrating the RPEEE base

- **Coal Resource**

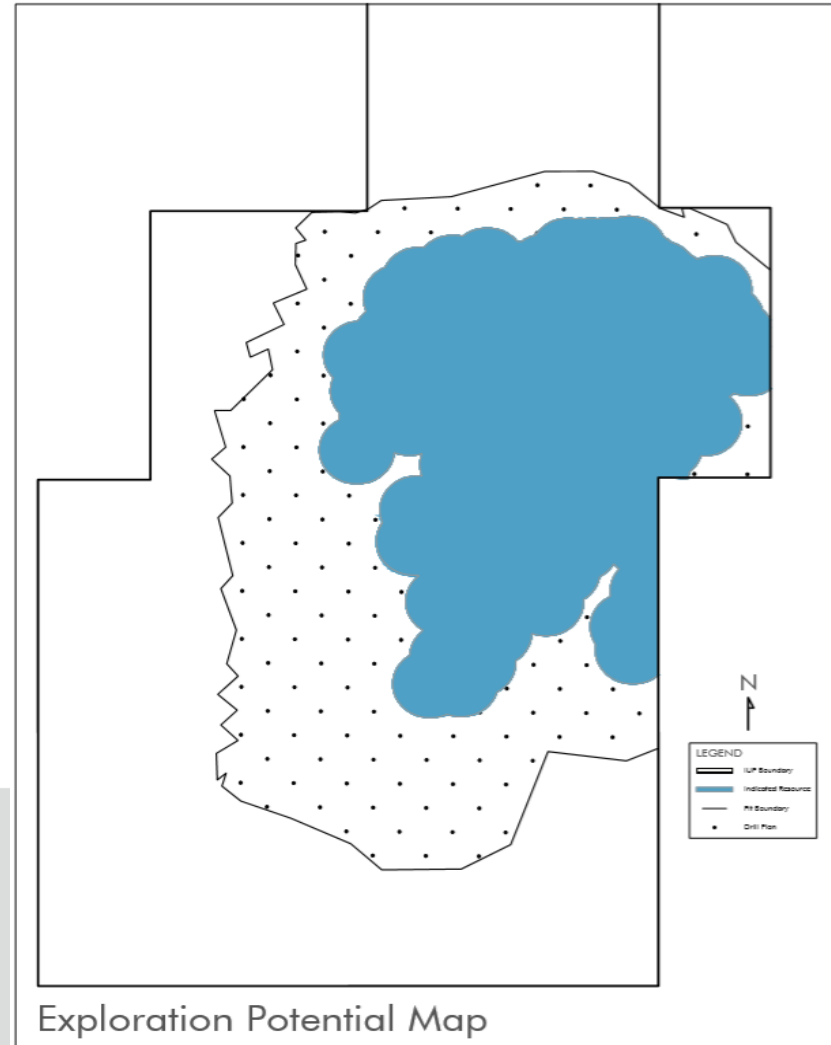
Use the economic pit to limit the Coal Resource from the Inventory Coal

Define the Classification then report Resource



# Exploration Potential

**Guide to determine the exploration potential and make drill plan**





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