

New Mining Projects: Developing Early Stage Projects: Guinea Case Study

23rd Bauxite & Alumina Conference
Thursday 16th March, 2017

Presenter: Mark Campodonic, SRK Consulting (UK) Ltd

Location: Conrad Miami, Miami, USA

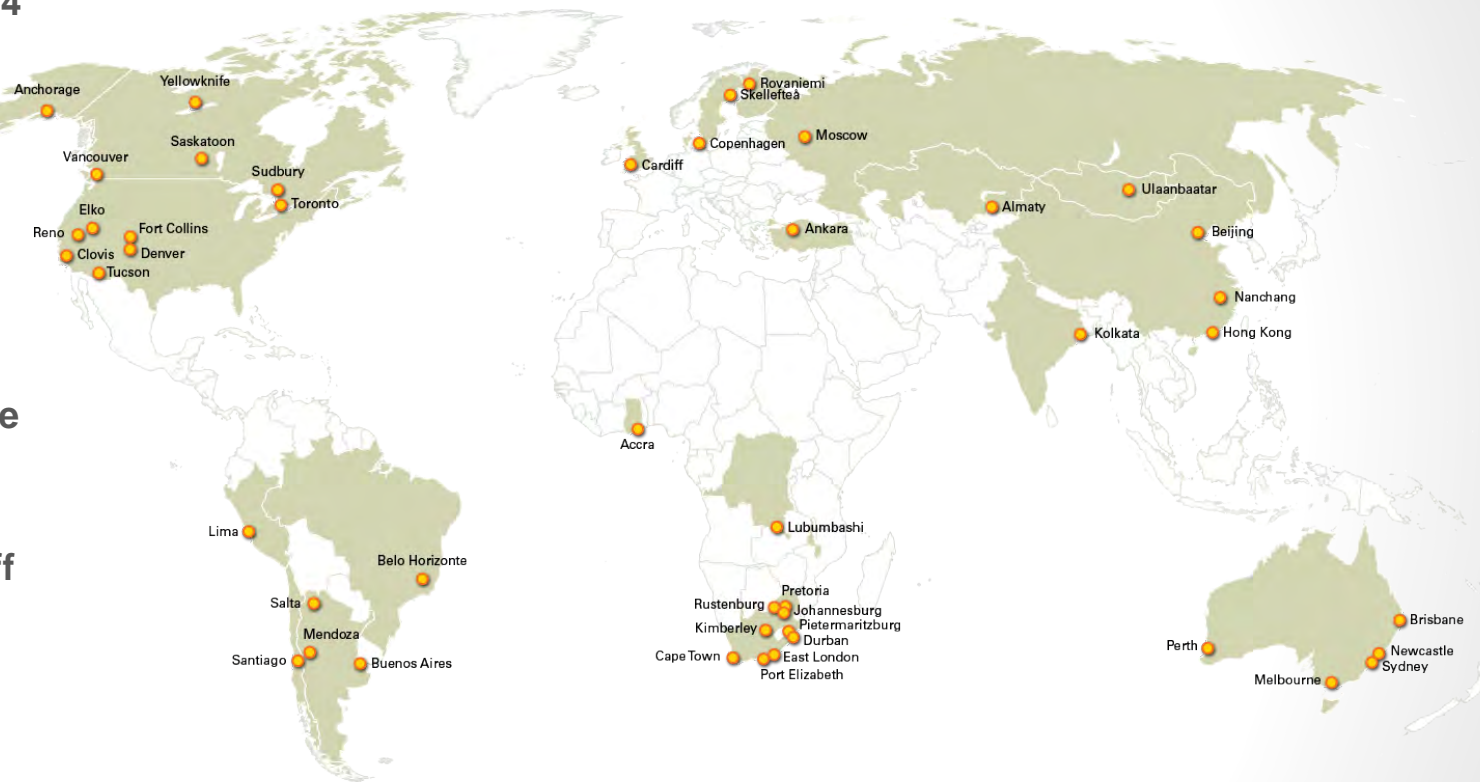


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INTRODUCTION TO SRK



- Mining industry consultancy
- Established in 1974
- Globally employ over 1400 staff
- 45 Offices
- Services from exploration to mine closure
- Multi-National Staff
- Independent - 100% owned by employees



• **Strong and Experienced track-record in Bauxite and Alumina Projects**

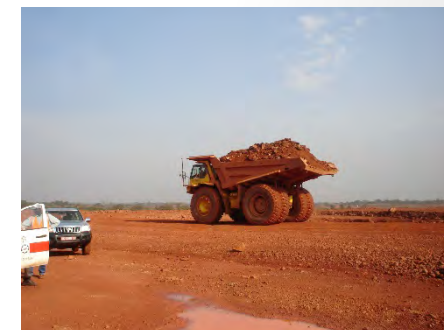
Expertise:

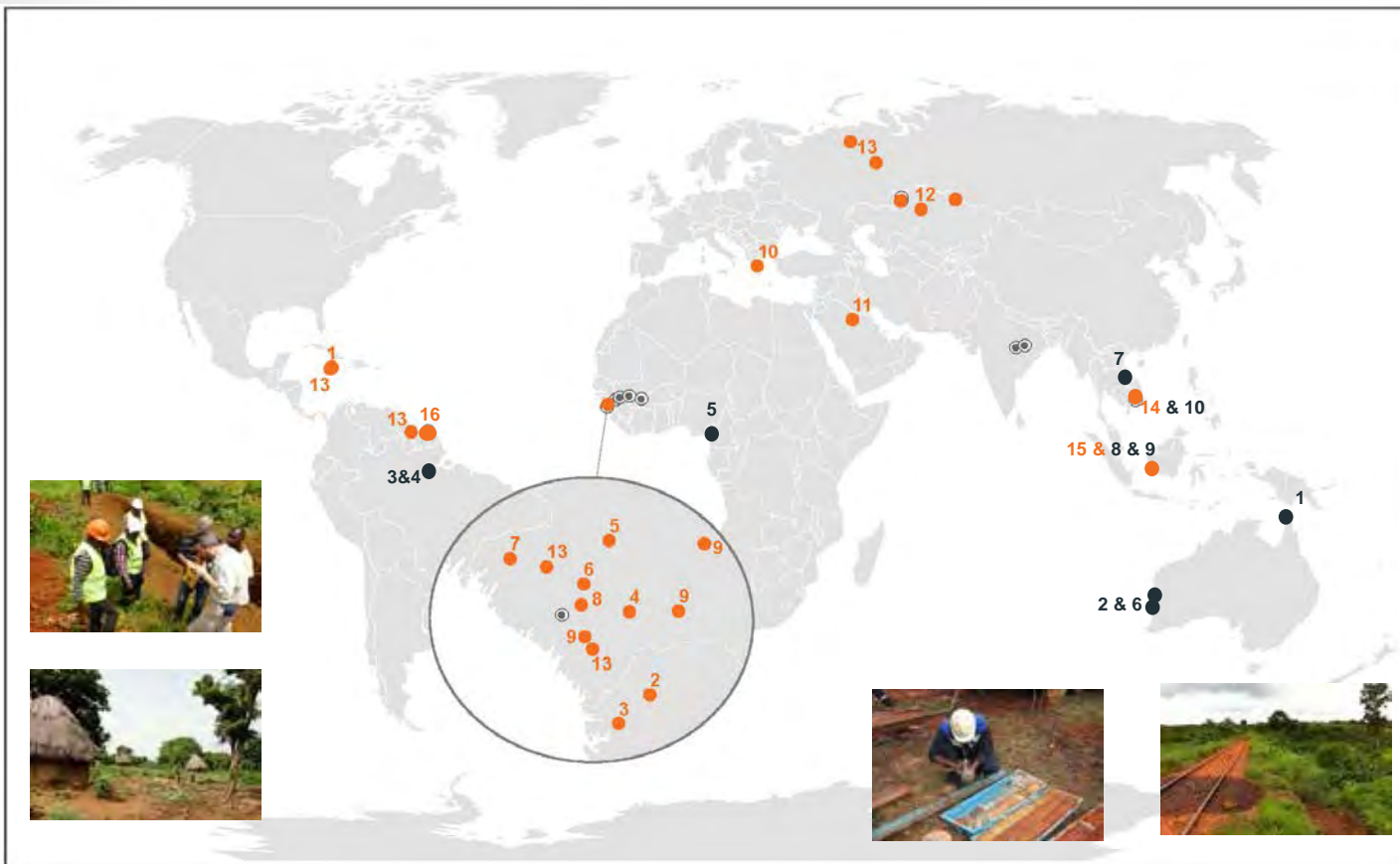
- Exploration and Geology
- Resource Estimation
- Mining
- Geotechnical Engineering
- Tailings and Waste Management
- Metallurgy and Mineral Processing
- Water Management
- Geochemistry
- Infrastructure and Logistics
- Environmental and Social



Specialised Consulting Services:

- Exploration
- Scoping, Pre-Feasibility & Feasibility Studies
- ESIA's
- Acquisition/Vendor Due Diligence
- Independent Engineers Reports
- CPRs
- 43-101 Technical Reports
- Mineral Asset Valuations



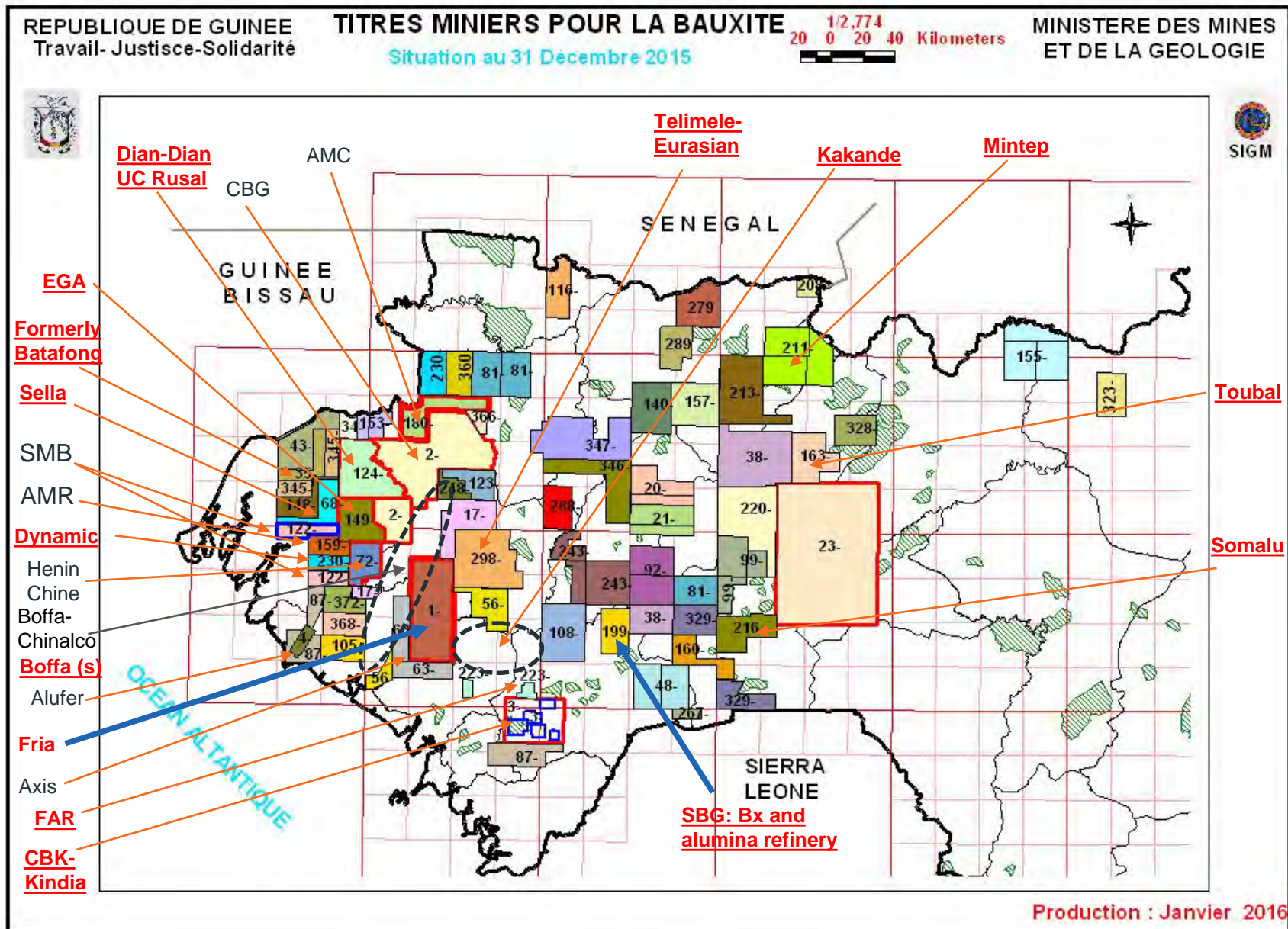


SRK AU (selected):

1. Weipa, Australia
2. Worsley, Australia
3. Rondon, Brazil
4. MRN/BH, Brazil
5. Cameroon Alumina
6. Aurora, Australia
7. Bolaven, Laos
8. Landak & South Tayan, Indonesia
9. Kalbar Dua, Indonesia
10. Lam Dong, Vietnam

SRK UK:

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Mincenco Resource Estimate and NI43-101, Jamaica 2. Makumre Review, Sierra Leone 3. Port Loko Bauxite Project, Sierra Leone 4. Garafiri, Guinea 5. Amer Technical Due Diligence, Guinea 6. Telimele Bauxite Project, Guinea 7. Batafong Technical Review and Mineral Resource estimate, Guinea 8. Kakande Mineral Resource Estimate and JORC Report, Guinea | <ol style="list-style-type: none"> 9. Anglo African Minerals plc, Technical Review and Mineral Resource estimates, Guinea 10. Independent Technical review, Greece 11. Zabirah North, Central, Al Ba'itha, Saudi Arabia 12. Aluminium of Kazakhstan, Kazakhstan 13. UC Rusal Hong Kong Stock Exchange Listing, Global Assets 14. Vietnamese Exploration Program Review, JORC compliant Mineral Resource Estimate 15. West Kalimantan Bauxite Review, (Confidential) 16. Suriname ESIA, MRE's and Reviews |
|---|--|



INTRODUCTION

Bauxite Industry Participants

Mining Industry structure, Participants and
Development

Participants:

- Mining Companies:
 - Exploration
 - Juniors
 - Mid-Tier

▪ Majors

• Trading Companies

• Alumina Companies

• Aluminium Companies

• Industrial/Chemical
Companies

The Off - takers

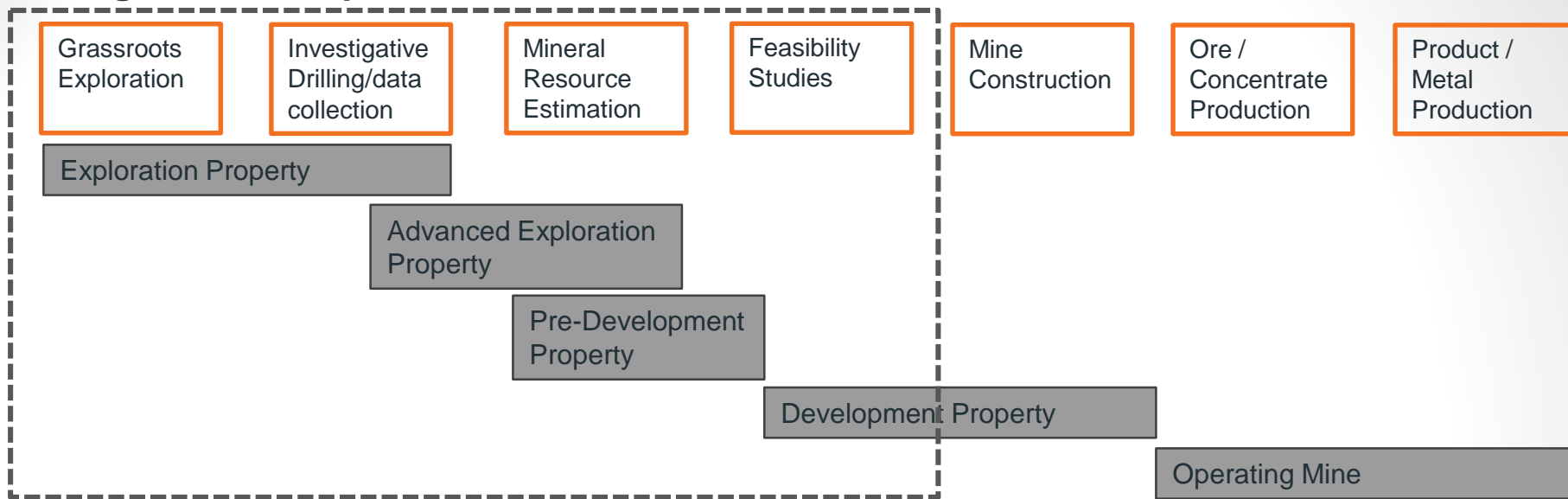
Focus is variable:

- Bauxite export only
- Vertically integrated:
 - Mine to alumina refinery
 - Mine to smelter
 - Mine to aluminium products
- Trading only

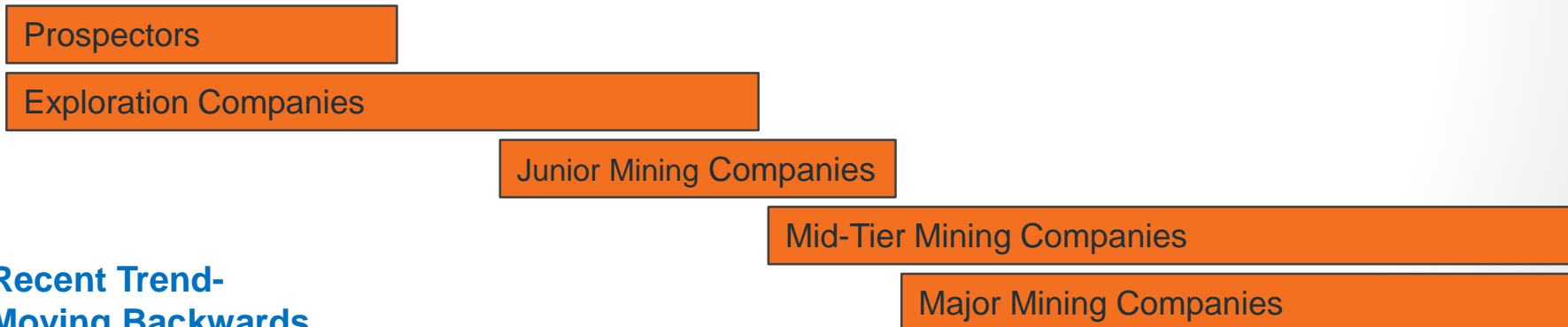
A Dynamic Market:

- Local or global market
- Different alumina refineries (specifications)
- Freight constraints
- Supply/demand driven

Stages & Developmental Status:



Participants:

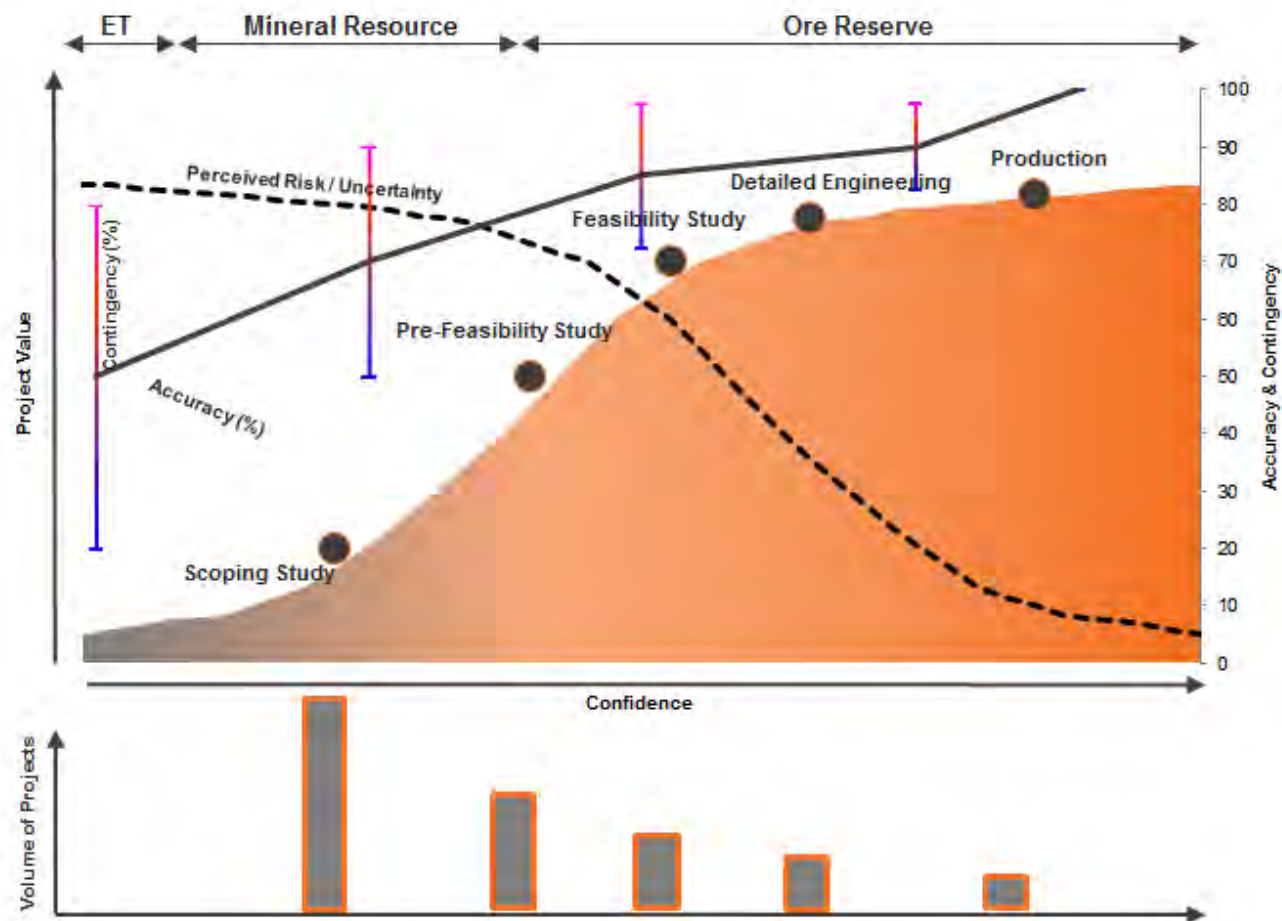
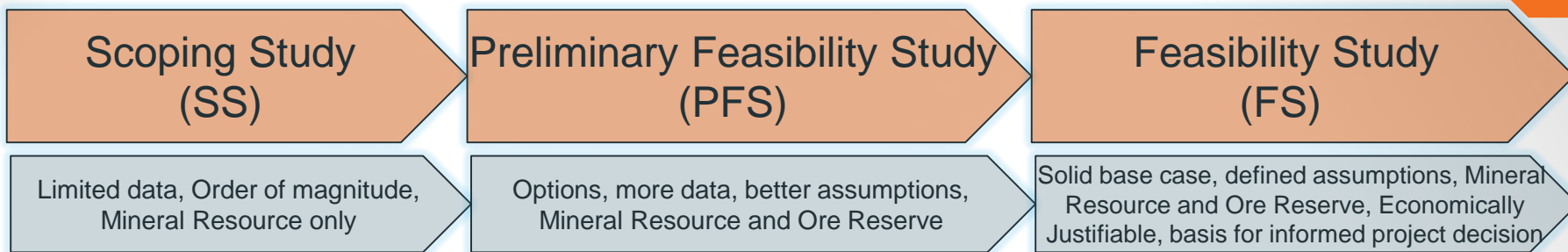


**Recent Trend-
Moving Backwards
to Vertically
Integrate in earlier-
stage projects**



MULTI-DISCIPLINARY TECHNICAL STUDIES

Overview



Key Scope Criteria:

- **Mineral Resource**
- **Overall study objectives**
- **Data/information available**
- **Degree of engineering completed**
- **Design basis and cost Estimation method**
- **Accuracy of OPEX and CAPEX**
- **Contingency applicable**

- Comprehensive and detailed technical and economic study necessary to understand risks and demonstrate economic viability to a defined accuracy and level of detail
- Allows the presentation of all available data and analysis in a consistent, understandable and familiar basis.
- Defining and following international guidelines for technical study stages **allows for investors/off-takers to more clearly understand the project data, details, options, accuracy, contingencies, risks and opportunities.**
- **More detailed studies** will be accompanied with further data and higher confidence Mineral Resource and Ore Reserve estimates, which accompanied with more detailed metallurgical and processing test-work information **will allow a more informed decision to be made by an investor/off-taker.**
- **Earlier-stage, higher risk projects with less technical study work may present an opportunity to invest/off-take on more preferable terms or acquire the project.**
- Investors/off-takers may want to do their own due-diligence, and multi-disciplinary technical reports make it much easier to facilitate their requirements.

International Reporting Codes and Standards

- Experienced team and Qualified/Competent Persons are critical to the process
- Reporting Standards can be onerous, but it is value and confidence adding
- Do the right technical work in the right way (**data = quantity + quality + robust**)
- Makes reporting and due diligence (for finance/off-take) easier
- International Reporting Codes accompanied with Higher Confidence reporting of Mineral Resources and Ore Reserves

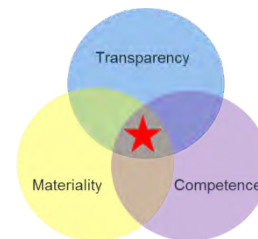
→ Results in more confident Investors/Off-Takers



NATIONAL INSTRUMENT 43-101
STANDARDS OF DISCLOSURE FOR MINERAL PROJECTS



London
Stock Exchange



CIM DEFINITION STANDARDS - For Mineral Resources and Mineral Reserves

SCOPING / CONCEPTUAL STUDIES

Disciplines Covered

Understanding and defining Project
Options

Technical and economic Analysis

Why Important?

Key Areas Covered:

- Exploration, Geology and Mineral Resource
- Mining Engineering
- Mineral/Metallurgical Processing
- Infrastructure & Logistics (transport corridor/port)
- Operating Expenditure
- Capital Expenditure
- Financial Analysis and Funding
- Risk and Opportunities

Other Areas, often scoped for next work stages only:

- Mining Geotechnical
- Hydrogeology/Hydrology
- Human Resources
- Waste Management Facilities
- Occupational Health and Safety
- Environmental and Social
- Project Execution
- Marketing
- Legal (ownership, tenure, approvals)

Key: Resource-Mining-Infrastructure-Financial

Discipline	Key Focus	Complexity	Impact Level
Geology	Understanding style and extends of mineralisation, mineralogy/processing characteristics and quality	Low	High
Mining	To define mining method and strategic mining sequence	Low	Low to Moderate
Geotechnics	Excavatability	Low	Low
Hydrology	To identify potential water management issues	Low	Low
Hydrogeology	To establish ground water sources	Low	Low
Water Supply	To define potential water sources	Low	Low (if no washing or processing)
Mineral Processing and Waste Management	Depends on beneficiation and if alumina refining	Low-Moderate	Low (bauxite-export: if no beneficiation required)
Logistics	To understand existing infrastructure, identify all available and realistic options, and economic comparisons	High	High
Site Infrastructure	To consider potential supply options (incl. Power)	Low	Low (bauxite export)
Environmental and Social Study	Environmental and social scan	Moderate	Moderate

- **Project Development Options:**

- Production rate/Export bauxite tonnage/alumina output
- Bauxite Export only
- Vertically integrated with alumina refinery
- Combined approach



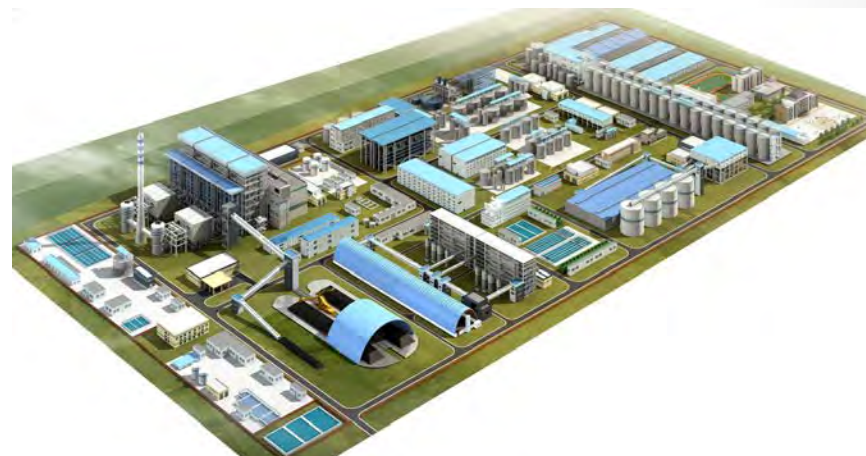
- **Mining:**

- Open-Pit/Underground
- Conventional drill and blast, truck and shovel or rip with truck and shovel, or continuous surface miners.
- Blending v stockpiling v limited handling



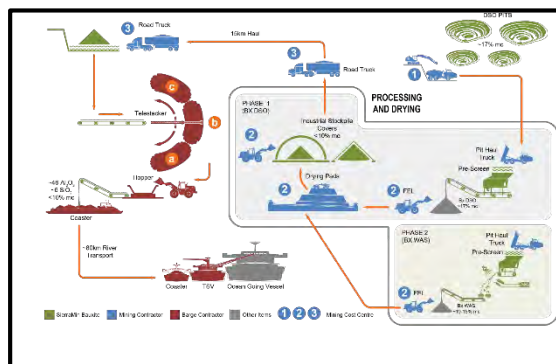
- **Processing:**

- Beneficiation (if required/beneficial)
- Crushing (bauxite export) and loading
- Drying: Kilns, air drying, etc.
- Low or high temperature Bayer refinery

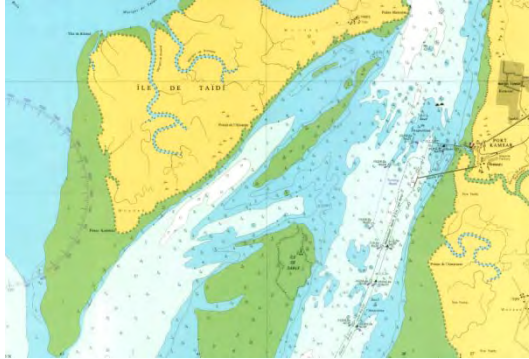


Infrastructure & Logistics:

- Understanding of handling constraints/considerations
- Bauxite export very different to alumina export (and consumables import, i.e. coal/HFO, Caustic Soda, Lime, etc., import)
- In-pit v ex-pit truck fleet
- Road Haulage v Conveying v Slurry Pipeline v Rail
- Route selections and options v impacts (Financial and ESIA)
- River/Barge port v Marine Port v transshipment v vessel size v marine conditions
- Utilizing existing infrastructure v building own/dedicated v Shared infrastructure
- Materials Handling, Storage requirements and loading



General Considerations



- Existing Ports / Regional Development
- Cargo Type/Volume
- Vessel Type/Size/Frequency
- Marine Conditions
- Land / Access
- Environmental and Social
- Export Options

Marine Ports



- Direct Loading or Transhipment
- Dredging, Berthing and Breakwater Infrastructure Trade-off Studies
- On-Shore Infrastructure
- Off-shore Infrastructure

River Ports



- Barging and Transhipment
- Capital and Maintenance Dredging
- Flood Susceptibility
- Relatively Simple Infrastructure

General Considerations



- Existing Road Network /Condition
- Existing Users
- Local Communities
- Geographical Features and Land Use
- Flood Susceptibility
- Proximity to Deposit and Export Port

Traffic Assessment



- Fleet Options
- Speed and Operating Hours
- Turnaround Time
- Availability
- Traffic Frequency
- Loading, Discharge and Marshalling

Other Considerations



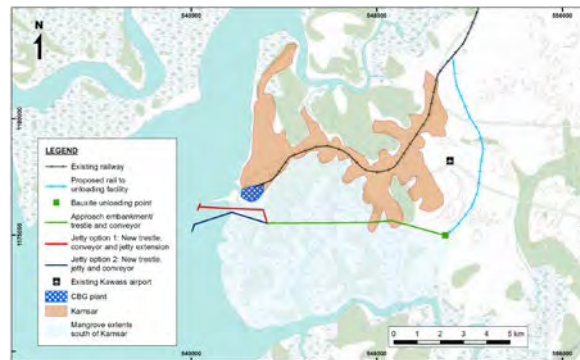
- Environmental and Social
- Project Specific Haulage Route
- Crossings (Water/Road/Rail/Utilities)
- Route Selection
- Route and Fleet Maintenance
- Opportunity for Contract Haulage

General Considerations



- Existing Infrastructure
- Proximity to Deposit and Export Port
- Existing Users, Condition and Capacity
- Sharing of Routes with Other Operators
- Rolling Stock Maintenance

Route Selection



- Geographical Features
- Land Use
- Crossings (Water/Road/Utilities)
- Environmental and Social
- Route Options Trade-off Study
- Transfer Station and Spur Opportunities

Preliminary Operating Costs



- Axle Load and Speed Limit
- Turnaround Time and Availability
- Fuel and Labour
- User Charges
- Maintenance Costs
- Opportunity for Logistics Provider

Slurry Pipelines



- Extensive crushing, filtering and dewatering equipment
- Material Characteristics and Performance
- Erosion and Corrosion
- Generally only economic over long distances or when more conventional methods are not practical
- MBP, Brazil. World's first commercial long distance bauxite slurry pipeline. Up to 13 Mtpa over 244 km.

Conveying



- Overland, Pipe or Aerial
- Material Characteristics and Performance
- Minimal Footprint in Challenging Terrain
- High CAPEX but Low OPEX

Crushing



- Is crushing required?

Hopper Loading



Direct Loading



- Load at working face where practical
- Simplify the logistics chain by reducing double handling

Kilns



- Are Kilns required?
- What is the product Moisture requirement
- Managing seasonal variations in moisture
- High capital and operating costs
- What are off-taker/buyer requirements

Air Drying



- Cultivation and disturbance/homogenisation to promote moisture loss
- Utilising climate for evaporation and drawing out of moisture
- Successful in bentonite industry

Open Storage



- Buffer and Export Stockyards
- Storage Capacity
- Stacking and Reclaiming
- Vessel Loading Rate

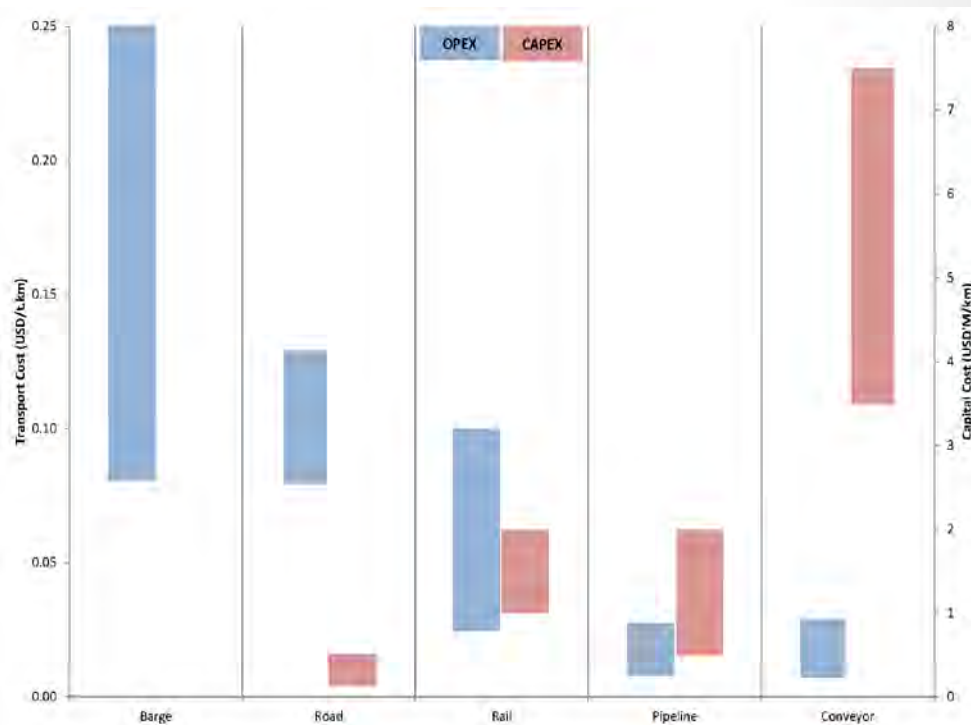
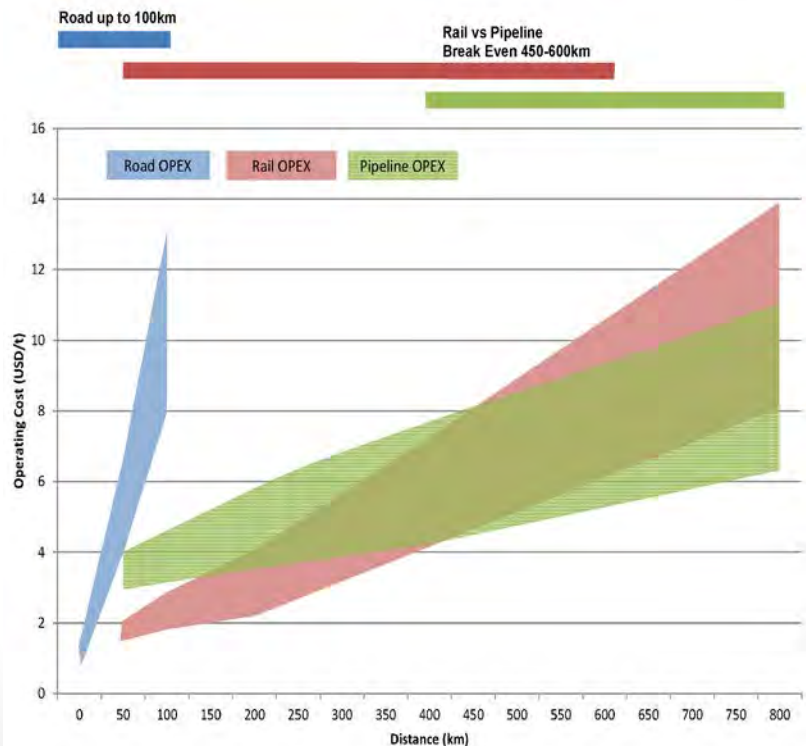
Covered Storage



- Moisture control
- Climate
- Loading
- Reclaiming

- **Economic Analysis (For all Options):**

- Comparison of all options on both technical and economic basis.
- Owner v contractor operations (amortized capital into operating costs)
- Trade-off studies and Sensitivity to different Technical Options (mainly infrastructure driven)
- Sensitivity to Operating Costs (Total cash operating costs/tonne of product)
- Capital Cost v Operating Cost



- Early-Stage Understanding of Project economics
- Order of Magnitude Assessment
- Importance of early logistical assessment must not be underestimated, inclusive of utilising existing and sharing of infrastructure
- Identification of Potential Fatal Flaws (quality/infrastructure-economics)
- Defining of Project Technical and economic Options
- Undertaken Prior to Extensive data collection:
 - Exploration drilling, sampling, etc.
 - ESIA/Baseline
 - Beneficiation/Processing Testwork
- Defines scope of work for subsequent studies
- High-level, therefore low cost and relatively quick to complete
- Often sufficiently detailed to support Licence applications/renewals
- Informs decision (and scope) to proceed with further data collection and studies or abandon the project
- Assist in early-stage financing/discussions with off-takers/investors

**High-level, relatively low cost and quick opinion.
Very Important for Guinea Projects**

NEW MINING PROJECTS

CASE STUDIES

Société des bauxites de guinée

S.A (SBG)

Garafiri Project

Guinea

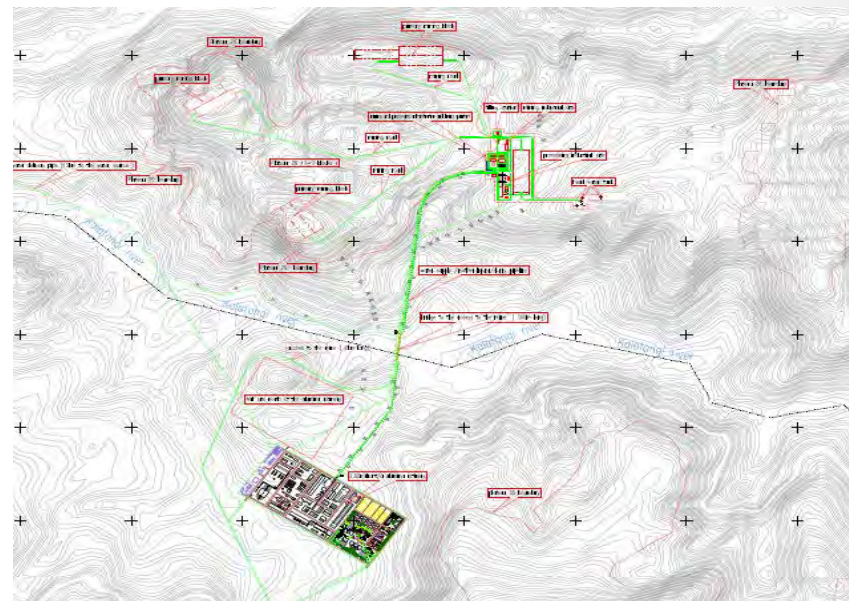
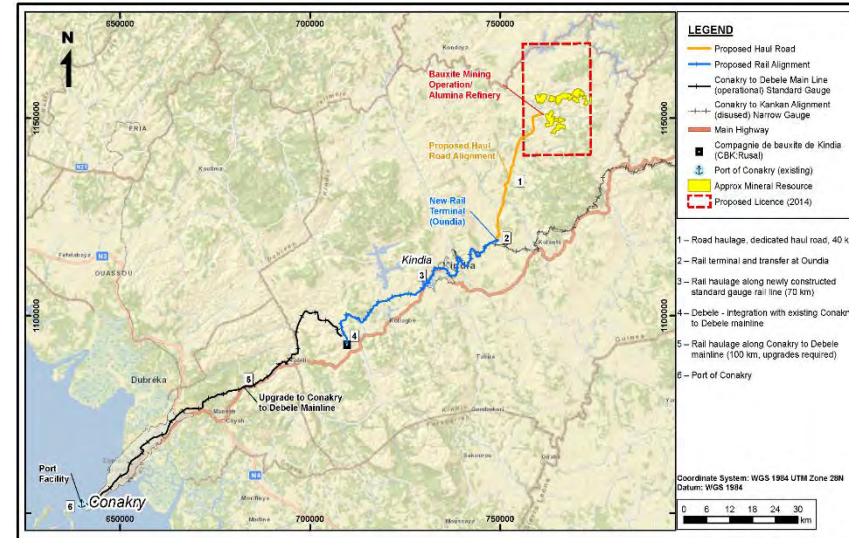


Introduction:

- Garafiri Project (#199)
- Subsidiary of Metalcorp, BAGR, WP Holdings
- **Mining Concession granted**
- International Management and Consultants
- 160km NW of Conakry, 40km from Oundia, 70km from CBK Railway
- **Status:** Mining convention and further technical optimisation and studies underway

Project Overview:

- **3mtpa bauxite** export and **1.6mtpa alumina** output planned for **Q3 2019 and Q2 2020**
- Vertically integrated open-pit bauxite mine and alumina refinery
- Mine haul roads from pit to onsite alumina refinery (under review)
- Dedicated haul road of 40km to new rail terminal at Oundia
- New 70km Rail extension from Debele to Oundia
- Rail infrastructure (increased capacity) to Conakry ~110km
- New Port facility at Conakry (consumables import, bauxite and alumina export)



Geology & Mineral Resource:

- 935 Auger Holes, >12 diamond holes
- Garfiri Plateaux 26 and 35
- JORC Mineral Resource: 300Mt(w) @41.4% Al₂O₃, 2.5% SiO₂

Mining:

- Open-Pit mine,
- Drill & Blast, Truck & Shovel contractor operation
- 28 year mine life

Processing:

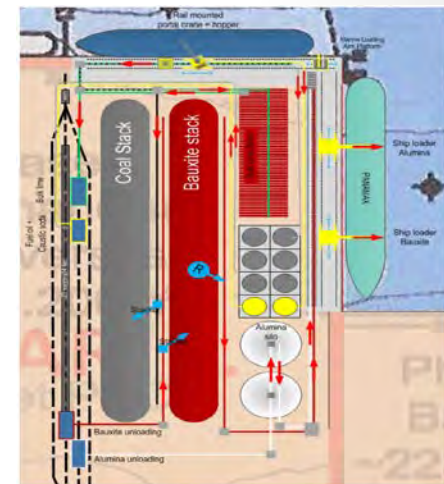
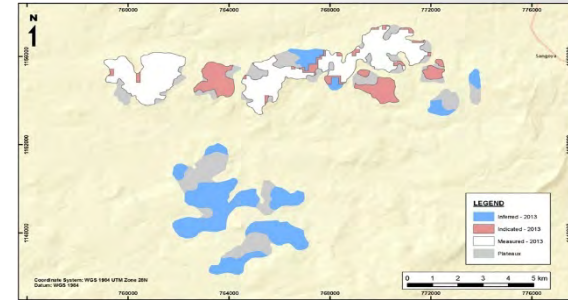
- Gibbsite, very low boehmite, low reactive silica
- Low-temperature 1.6mtpa Bayer refinery
- Tailings facility 10km from plant (Red mud and ash)
- Integrated 80MW power/steam plant (coal)

Infrastructure & Logistics:

- 40km haul to Oudia (Rail Head/Dry Port)
- 70km rail extension (Oundia to Debele)
- Utilise ~110km CBK railway (upgrading)
- ~7 trains per day (4 bauxite, 2 alumina, 1 coal (incl caustic, HFO, Lime))
- Development of new port area
- Bauxite export: Offshore Transshipment onto Capesize vessels

Environmental and Social:

- ESIS Delivered to Ministry, ongoing consultation and completion of Management Plans
- Manpower of >1800 direct, >1000 indirect, >5000 construction



Capital Cost Estimate:

- Project Capital: **USD1,482m**
- Sustaining Capital (LoMp): USD548m
- USD1,268/annual ton alumina output

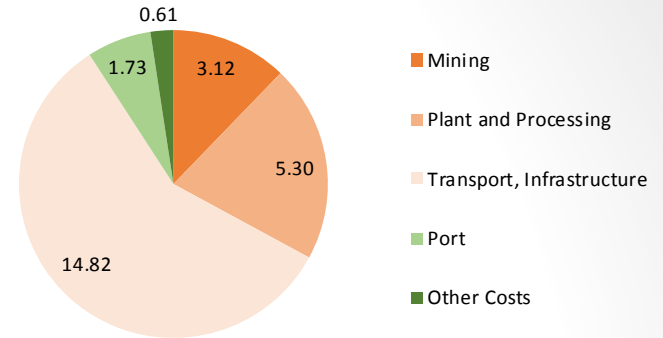
Operating Cost Estimate (USD/t bx/USD/t Al):

- Mining: USD3.1/t (Bx) / USD9.6/t (Al)
- Processing, infrastructure, Power: USD5.3/USD137.1
- Export Logistics: USD16.6 / USD47.6
- Other (G&A, LDA, Fees, Royalties): USD0.61/USD1.81
- **TOTAL: USD25.6/t bx / USD196/t Al**

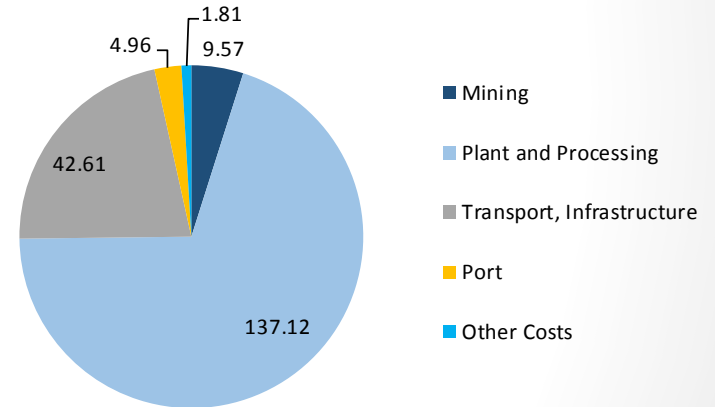
Economic Assessment:

- NPV@5% (Post-tax): USD1,418m

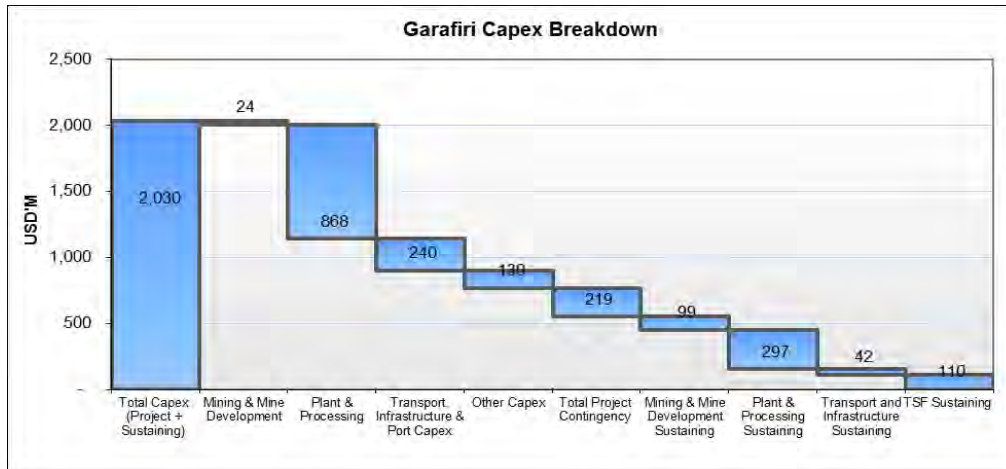
Bauxite Operations - UNIT COST SUMMARY - Unit Cost by export tonnes -]



Alumina Operations - UNIT COST SUMMARY - Unit Cost by tonne export -]



Garafiri Capex Breakdown

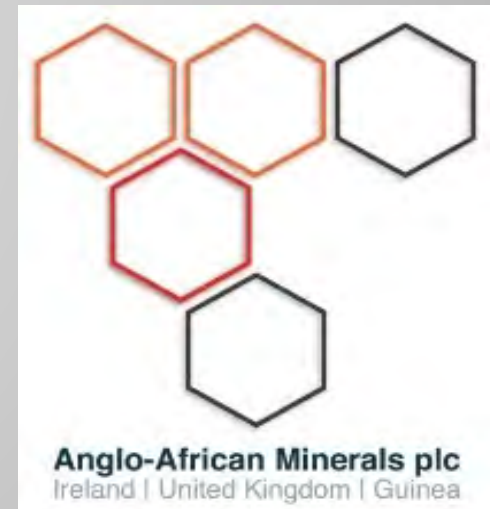


CASE STUDIES

Forward African Resources

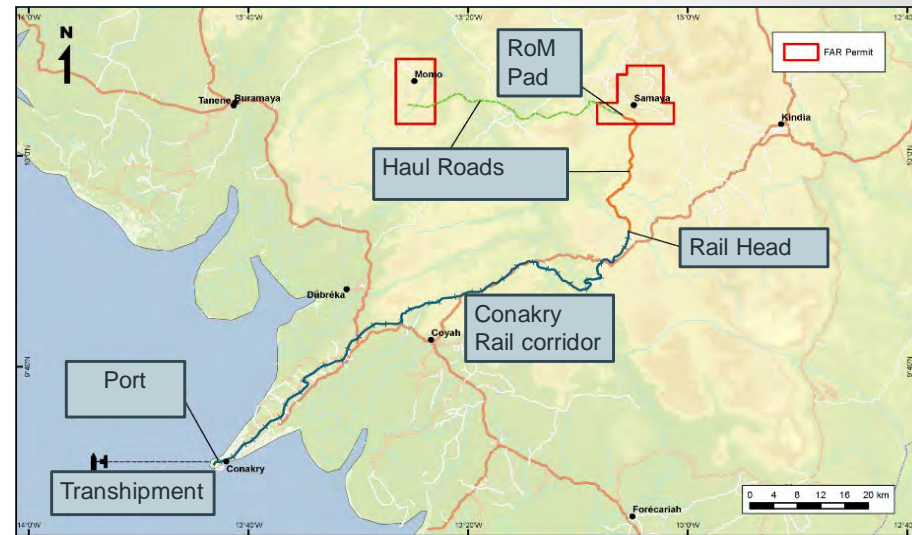
FAR Project

Guinea



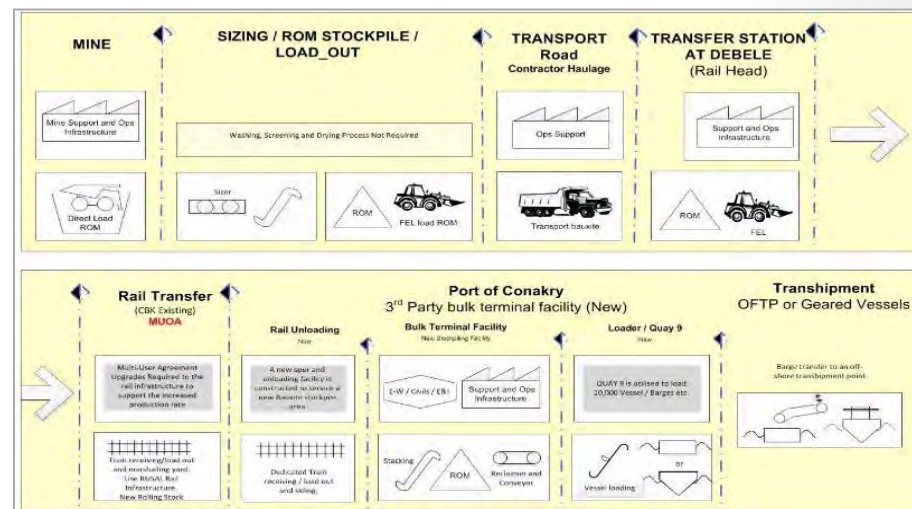
Introduction:

- Far Project (#223)
- Subsidiary of Anglo African Minerals
- FAR, Toubal (Touge) and Somalu Projects
- **Exploitation Licence granted**
- International Management and Consultants
- 120km from Conakry, 23km from CBK Railway, North of CBK operations
- **Status:** USD200m JV with Chinese consortium, Further Technical studies ongoing, mining convention ongoing



Project Overview:

- **3mtpa** bauxite output planned for **Q3 2018**
- Open-Pit bauxite mine
- Mine haul roads from pit to crusher
- Bauxite crushing and screening
- Dedicated haul road of 26km to Debele
- Storage and rail loading facility at Debele
- Rail infrastructure (increased capacity) to Conakry, ~110km
- New Port facility at Conakry
- Offshore transshipment to global market



Geology & Mineral Resource:

- 531 Auger Holes, 15 diamond holes
- Samaya, Elevation and Momo
- JORC Mineral Resource: 73Mt (d) @40% Al₂O₃, 4.8% SiO₂

Mining:

- Open-Pit mine,
- Drill & Blast, Truck & Shovel contractor operation (355 working days)
- 21 year mine life
- Average in-pit haul of 7km over mine life

Processing:

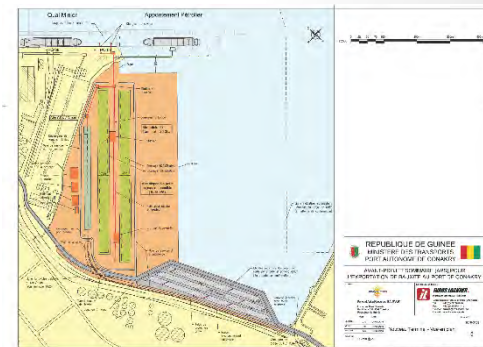
- Gibbsite, very low boehmite, low reactive silica
- Low-temperature Bayer

Infrastructure & Logistics:

- 26km haul to Debele
- Rail Head/Dry Port
- Utilise ~110km CBK railway (upgrading)
- Development of new port area, barge loading at Quay 9 (Conakry)
- Offshore Transhipment (20km away) onto Capesize vessels

Environmental and Social:

- ESIS Delivered to Ministry, ongoing consultation and completion of Management Plans
- Manpower of >700 direct, >1000 indirect, ~1200 construction



Capital Cost Estimate:

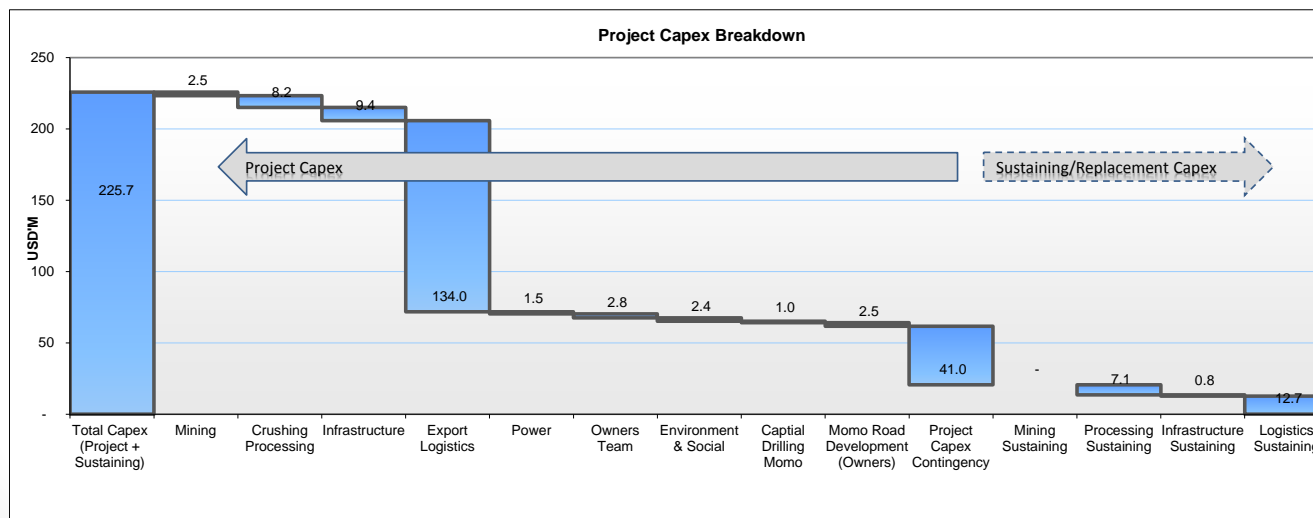
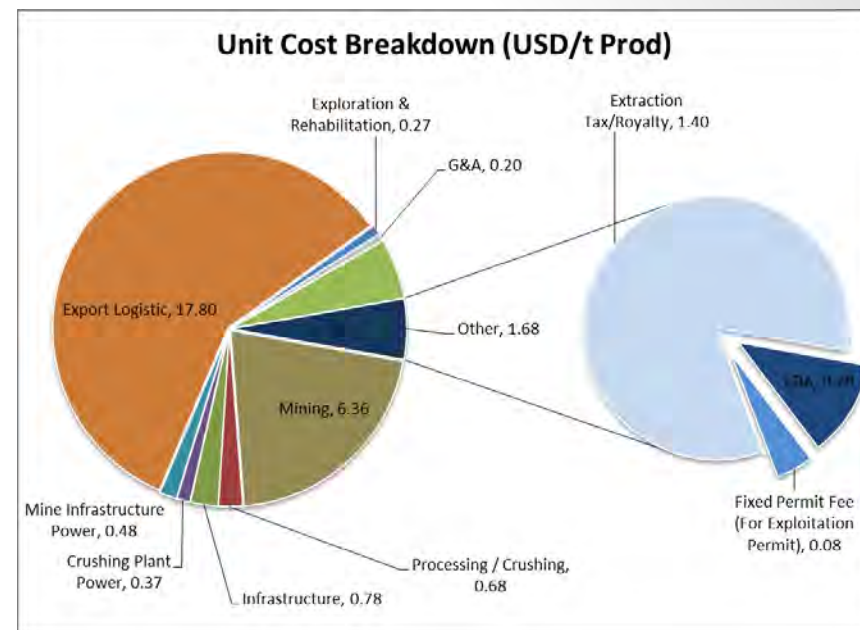
- Project Capital: **USD205m** (65% export logistics)
- Sustaining Capital (LoMp): USD20.6m

Operating Cost Estimate (USD/t product):

- Mining: USD6.36/t
- Processing, infrastructure, Power: USD2.31/t
- Export Logistics: USD17.8/t
- Other (G&A, LDA, Fees, Royalties): USD2.15
- TOTAL: **USD28.6/t product**

Economic Assessment:

- NPV @10% (Post-tax): USD46.3m



CASE STUDIES

Dynamic Mining

Boké Project (#230)

Guinea



DYNAMIC MINING

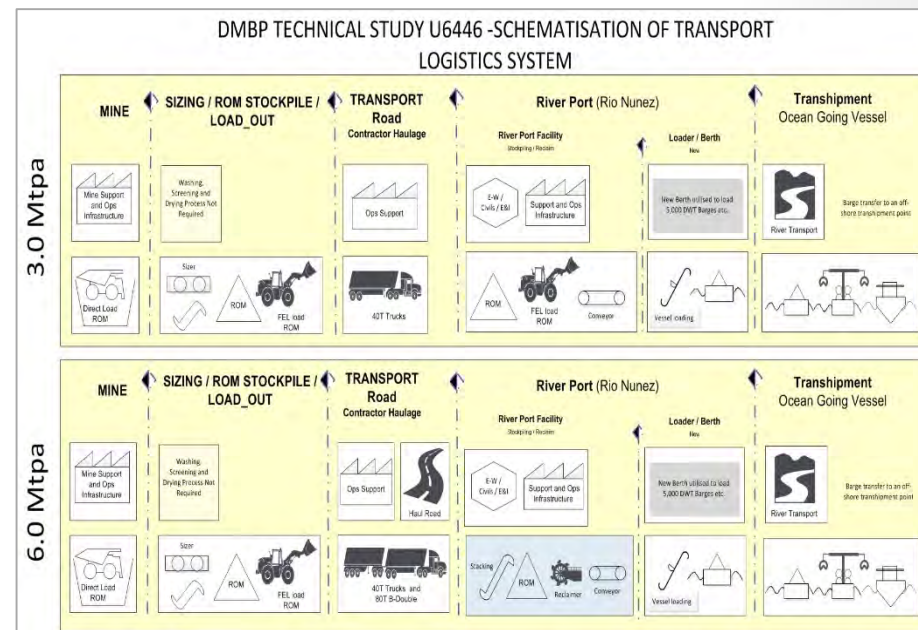
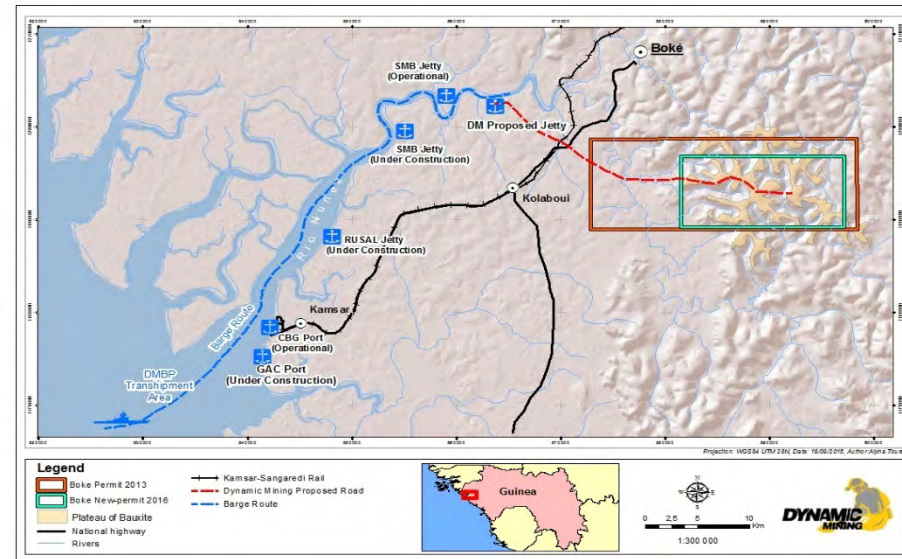
A Trusted Partner

Introduction:

- Boké Project (#230)
- Supported by Jaguar Group & PGI Group
- **Exploitation Licence Pending**
- International Management and Consultants
- 150km N-NW of Conakry, 10km S of Boké
- **Status:** Pending Licence and further technical optimisation, fast-track production

Project Overview:

- **3mtpa bauxite** output planned for **Q2 2018**, ramping up to 6mtpa
- Open-Pit bauxite mine
- Mine haul roads from pit to crusher
- Bauxite crushing and screening
- Dedicated haul road of 42km to River Port
- **Potential Utilisation of SMB Port / transshipment**
- **OR**
- New River Port facility on Rio Nunez
- Barge transportation (48 nautical miles)
- Offshore transshipment to global market (capesize vessels)



Geology & Mineral Resource:

- 742 Auger Holes, 15 diamond holes
- Numerous Plateaux
- JORC Mineral Resource: 277Mt (d) @40% Al_2O_3 , 2.1% SiO_2

Mining:

- Open-Pit mine,
- Drill & Blast, Truck & Shovel contractor operation
- 25 year mine life

Processing:

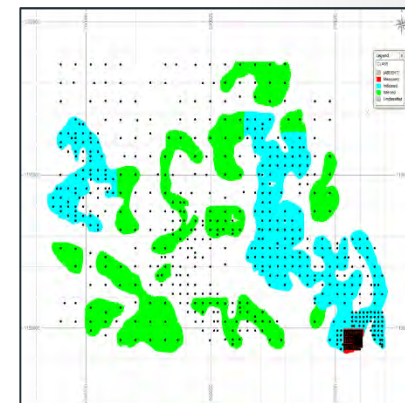
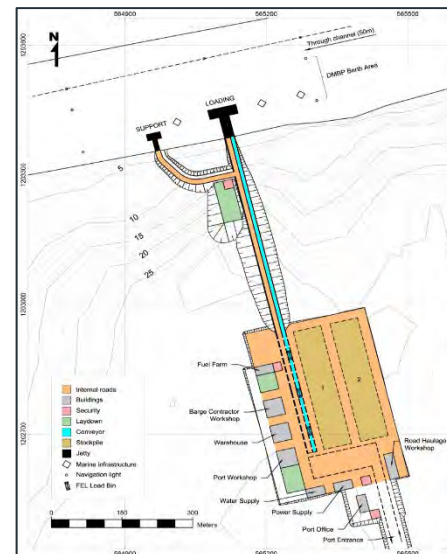
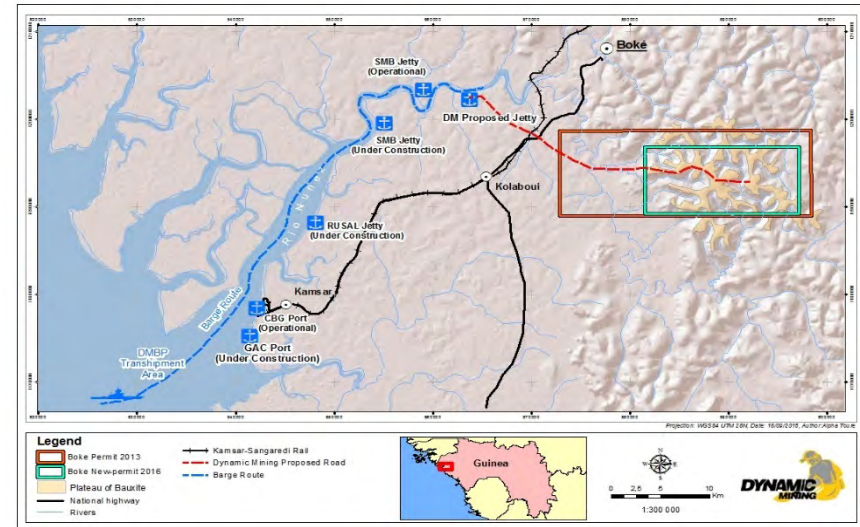
- Gibbsite, very low boehmite, low reactive silica
- Low-temperature Bayer

Infrastructure & Logistics:

- 42km haul to River Port
- Potential Utilisation of SMB Port/transhipment
- OR:
- New dedicated River Port facility
- Offshore Transhipment by floating crane (48 nautical miles away) onto Capesize vessels

Environmental and Social:

- ESIS Delivered to Ministry, ongoing consultation and completion of Management Plans
- Manpower of >1000 direct employees



Capital Cost Estimate:

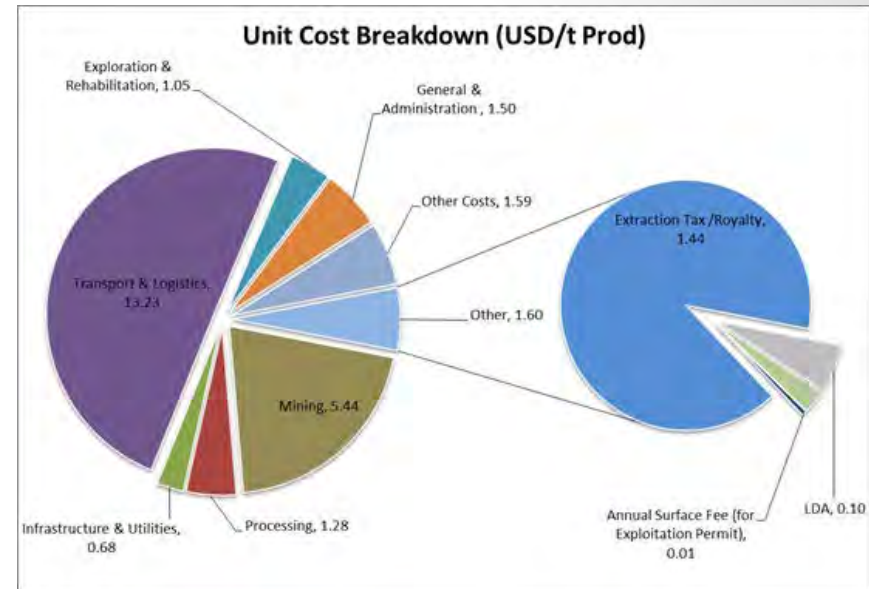
- Project Capital: **USD80m** (3mtpa), additional USD44m to expand capacity to 6mtpa (USD138m total) (own facilities)
- Sustaining Capital (LoMp): USD20.6m

Operating Cost Estimate (USD/t product):

- Mining: USD5.4/t
- Processing, infrastructure, utilities, Power: USD2.0/t
- Export Logistics: USD13.2/t
- Other (G&A, LDA, Fees, Royalties): USD3.5
- TOTAL: **USD24.1/t product**

Economic Assessment:

- NPV @10% (Post-tax): USD398m



CASE STUDIES

SierraMin

Port Loko Project

Sierra Leone

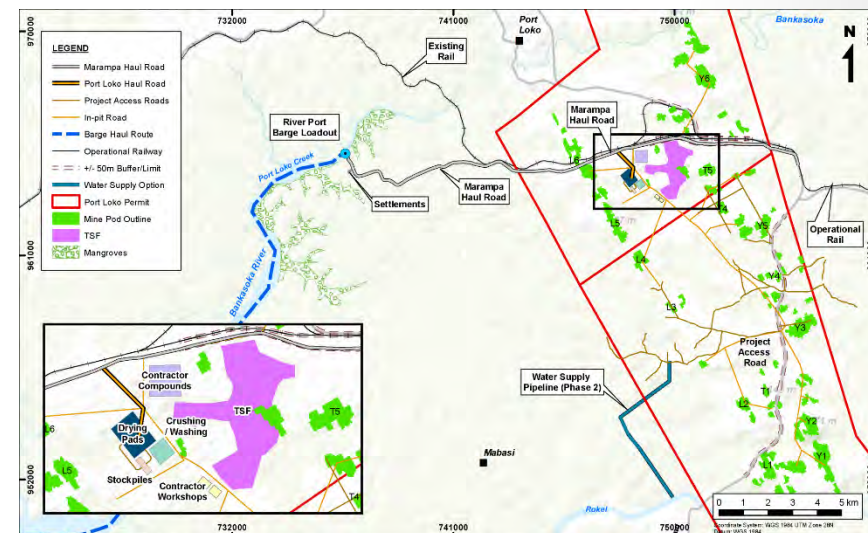


Introduction:

- Port Loko Project, Sierra Leone
- **Mining Concession & Environmental Approvals**
- International Management and Consultants
- 125km of Freetown
- **Status:** Further technical optimisation, contractor quotations, fast-track production

Project Overview:

- Phase 1 DSO (2 years), Phase 2 washed bauxite Year 2 onwards (**3mtpa up to 4.5mtpa**)
- Open-Pit bauxite mine
- Mine haul roads from pit to crusher/plant
- Bauxite crushing and screening only (Phase 1) then beneficiation (Phase 2)
- Short haul road linking into former Marampa Haul Road.
- **Utilisation of former Marampa (Thofeyim) river port (Fe Ore)**
- Barge transportation
- Offshore transshipment to global market (capesize vessels)



Geology & Mineral Resource:

- 885 Recent pits, historical holes > 4000
- Numerous Plateaux
- JORC Mineral Resource: 99Mt (d) @ 45.6% Al₂O₃, 6.4% SiO₂ (tonnes on an unwashed DSO and washed basis, low reactive silica, 150-350t Exploration Potential)

Mining:

- Open-Pit mine,
- Rip and dig (No blasting), Truck & Shovel contractor operation
- 17+ year mine life

Processing:

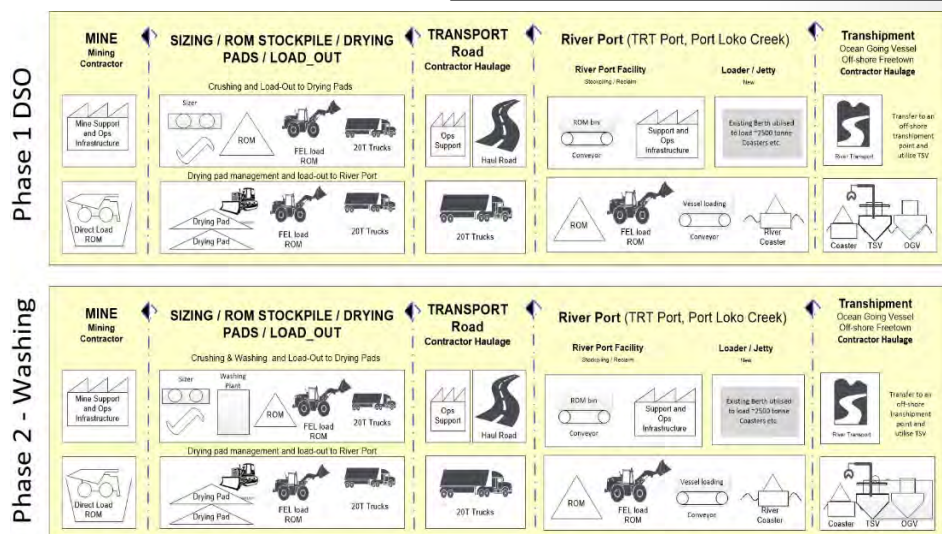
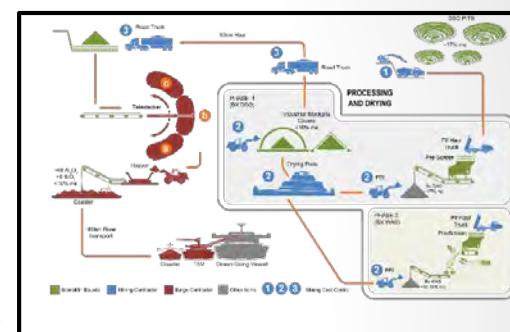
- Gibbsite, very low boehmite, low reactive silica
- Low-temperature Bayer
- 75% beneficiation recovery (mass yield)

Infrastructure & Logistics:

- 2.5km owner haul road, link into former Marampa Haul Road, further 20km to port
- **Utilisation of former Marampa (Thofeyim) river port (Fe Ore), contract operation**
- Barge transportation
- Offshore transhipment to global market (capesize vessels)

Environmental and Social:

- Environmental permits in place



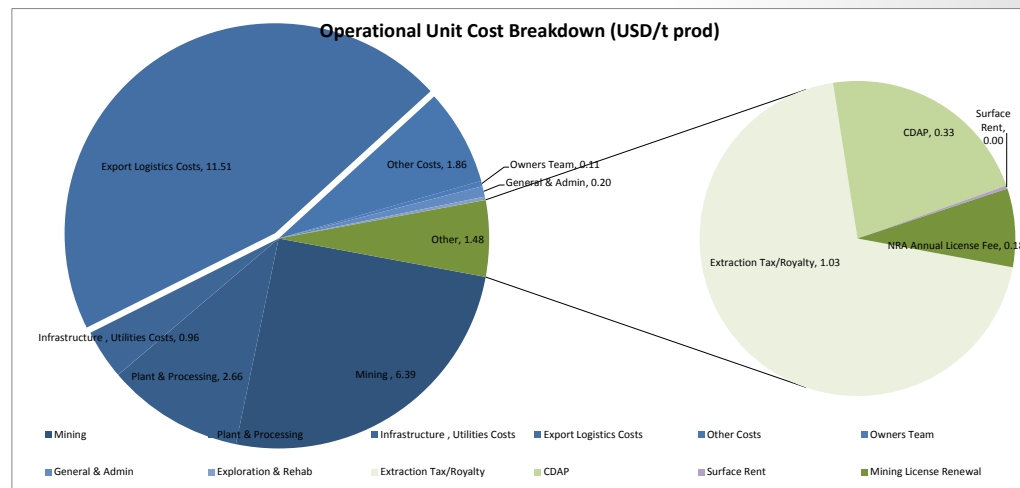
Capital Cost Estimate:

- Project Capital: **USD41.7m**
- Sustaining Capital (LoMp): USD21.1m

Operating Cost Estimate

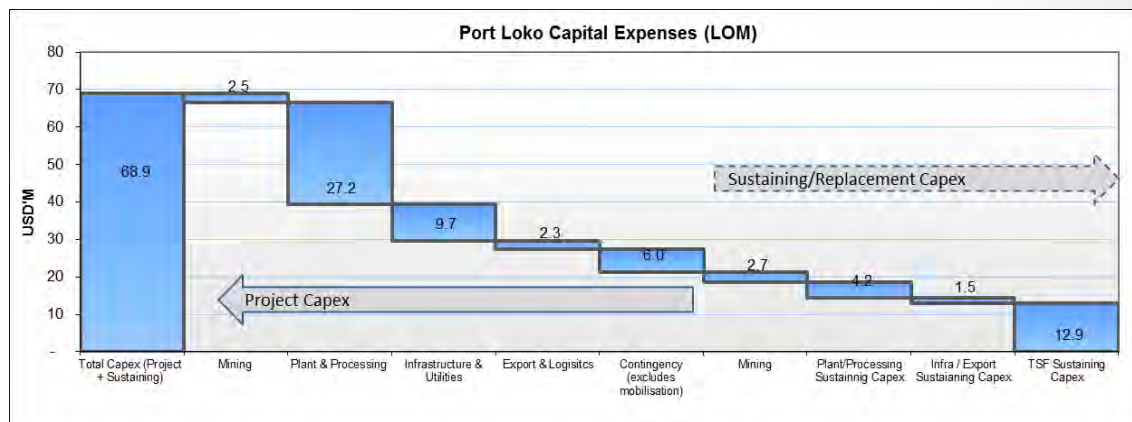
(USD/t product):

- Mining: USD6.4/t
- Processing, infrastructure, utilities, Power: USD3.6/t
- Export Logistics: USD11.5/t
- Other (G&A, LDA, Fees, Royalties): USD1.9
- **TOTAL: USD23.4/t product (average)**



Economic Assessment:

- NPV @ 10% (Post-tax): USD207m



CASE STUDIES

Woula Project

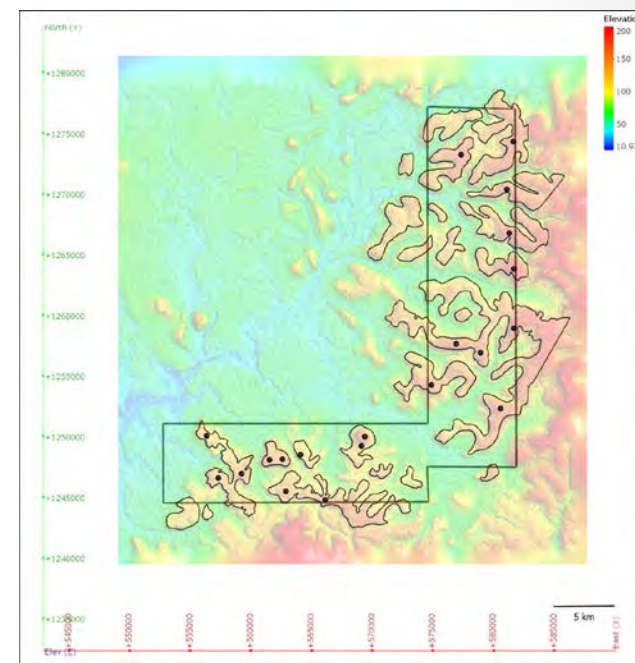
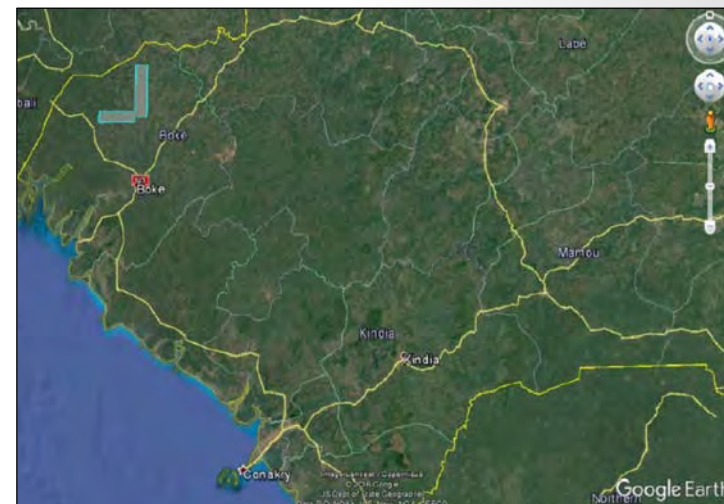
Guinea

Introduction:

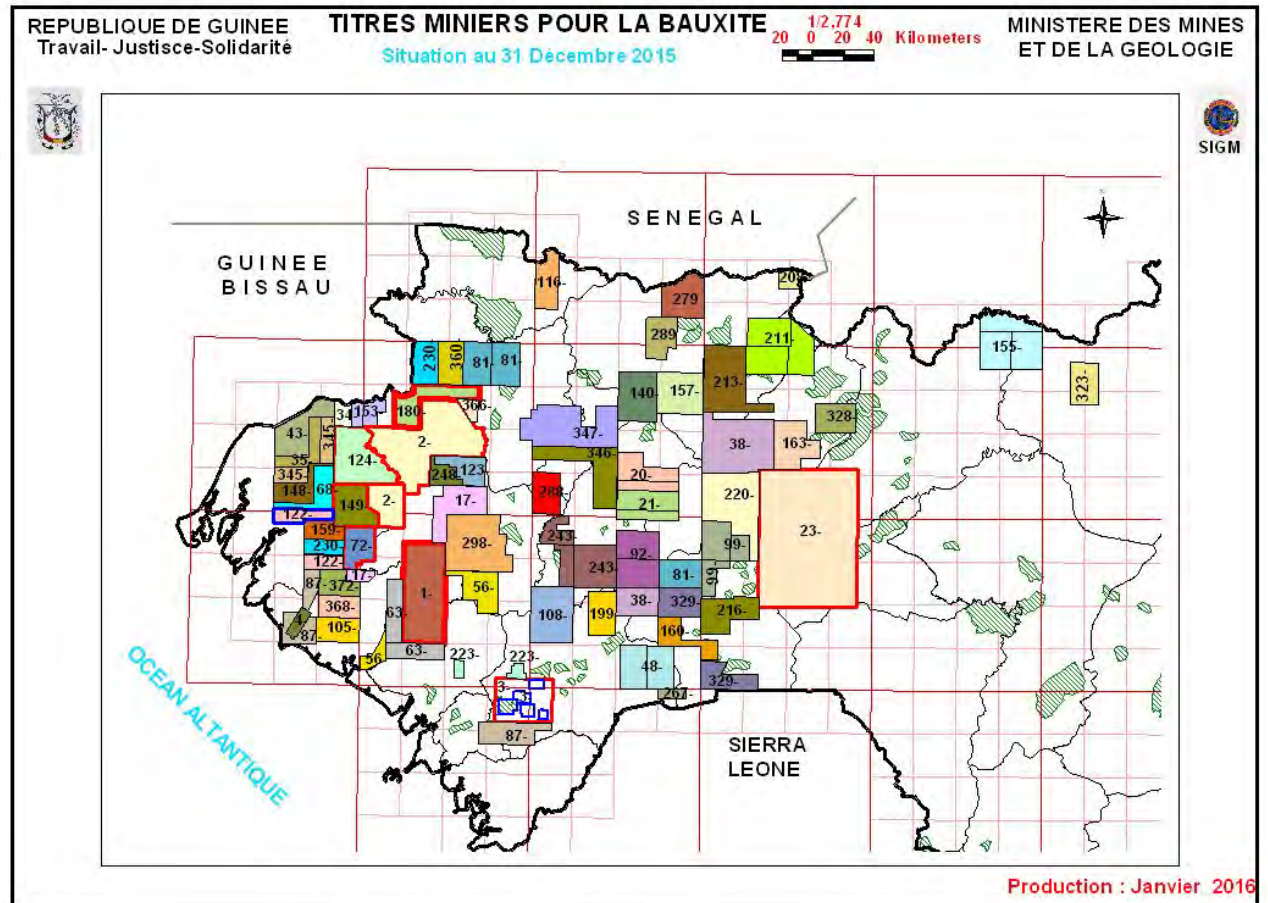
- Woula Bauxite Project, near Boké
- **Exploration Concession, 357km²**
- Historically drilled by Mitsubishi/BRGM
- International Management and Consultants
- 205km NW from Conakry, Boké Region, close to SMB river port
- **Status:** Early stage Exploration.

Project Overview:

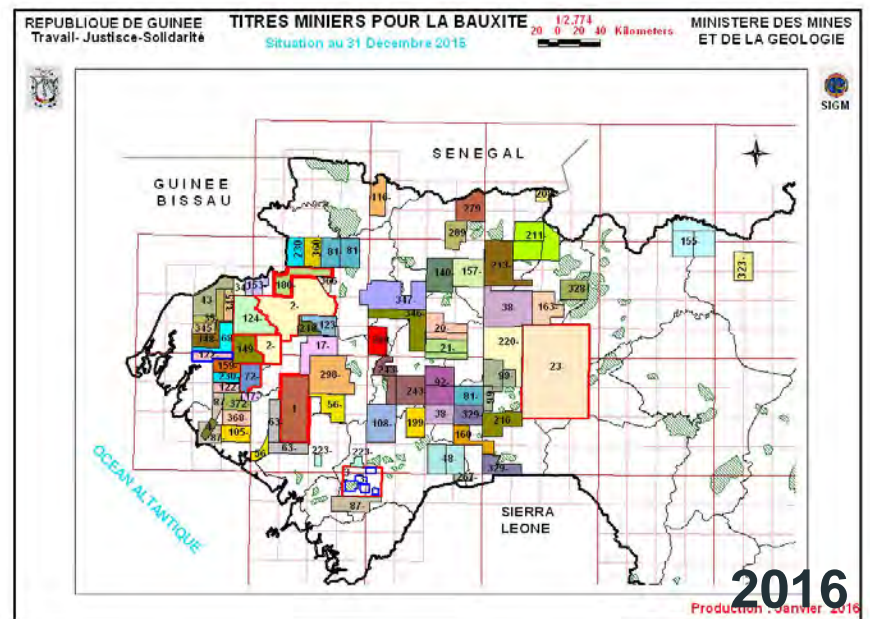
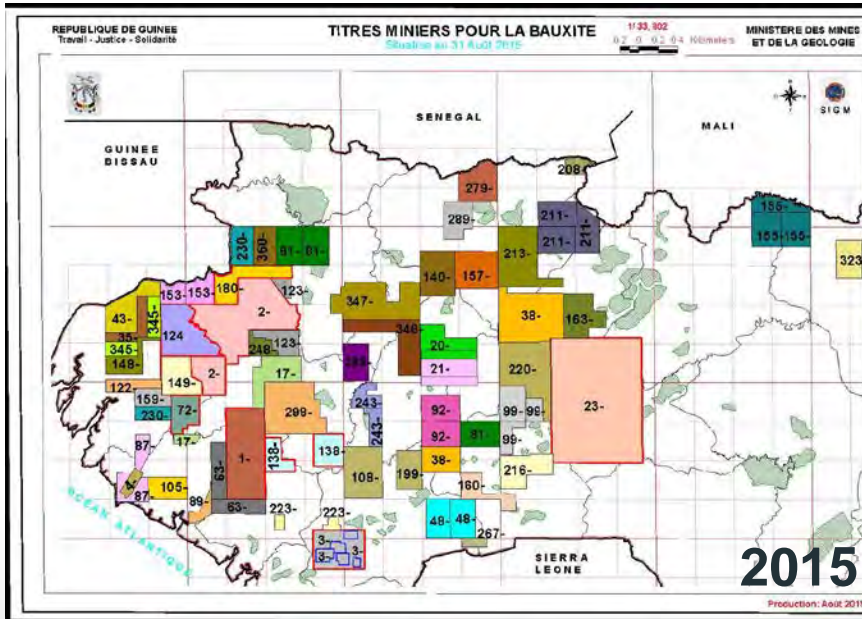
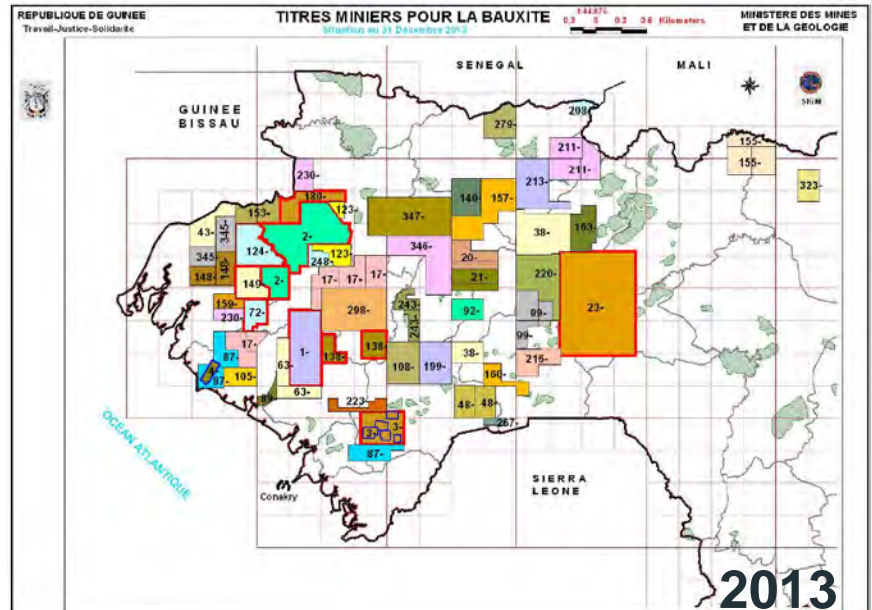
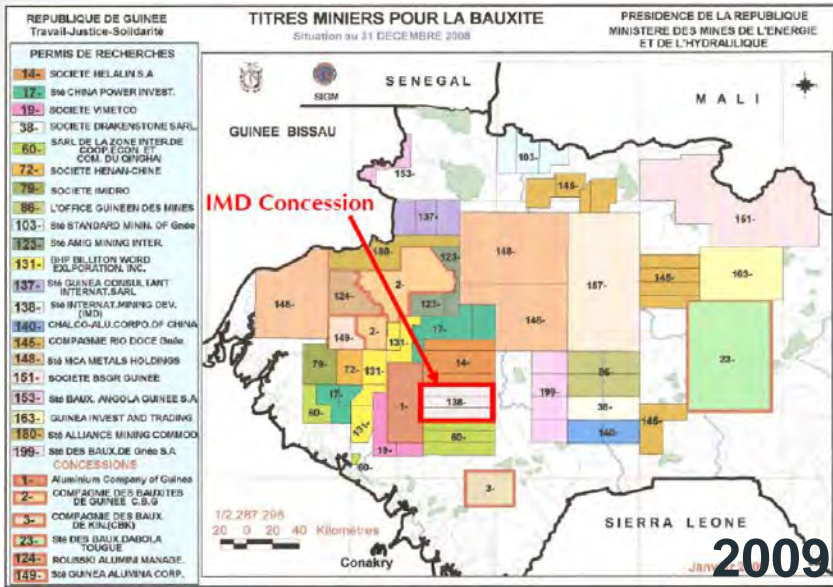
- Early Stage Exploration
- Good bauxite potential
- Potential to export bauxite through SMB infrastructure
- Drilling planned for Q2 2018, up to 200 holes
- Fast-track to development

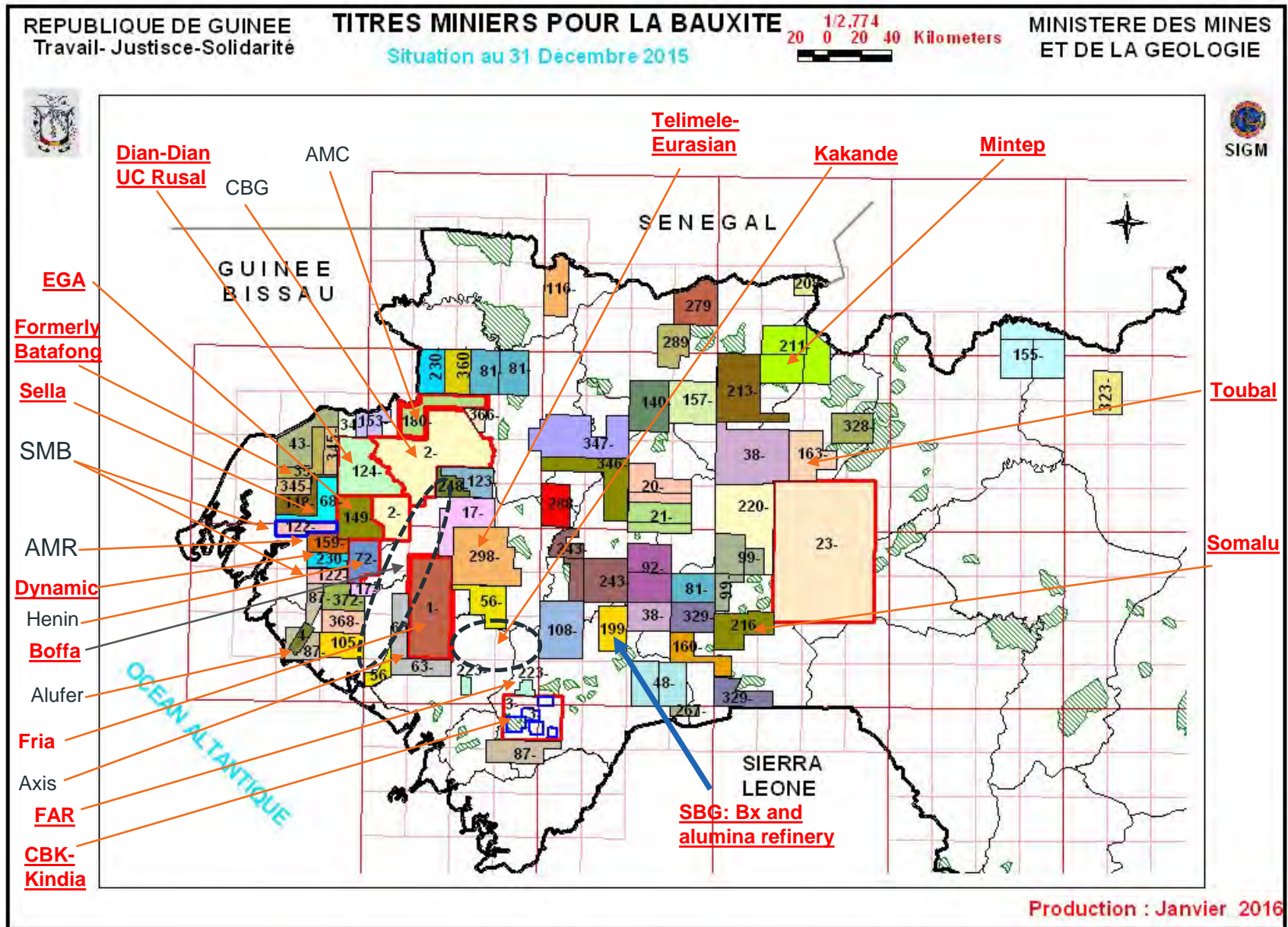


GUINEA



Guinea-Licence Map Development over the Years: Changing Picture....





ROAD

- ❑ Haul roads = 1 (Conta)
- ❑ Haul roads associated to SMB Winning River Port.

RAIL

- 2 operational railway corridors
- Conakry / central
 - Boke / northern
- Provide access to bauxite mining areas but are leased under concession.

PORT (RIVER / SEA)

- ❖ Operational ports = 3
- ❖ 2 are leased under concession (sea ports)
- ❖ New river port (SMB-Winning)
- ❖ Ports under construction = 2 (Rusal and GAC)
- ❖ Moth-balled river port = 1 (Conta)

FUTURE

- Simandou Rail Corridor and Port (Trans-Guinean Railway / South Guinea Growth Corridor)
- Development of Central Corridor Rail and Port / Central Guinea Growth Corridor (Press release by “China Railway”)?
- Planned extensions at the Port of Conakry and inland port (Bollere)
- Larger River Port by SMB-Winning
- Boffa Region infrastructure?



Guinea Mining Projects need new infrastructure...

Challenge 1: Getting material from mine to the coast / access to existing:

- Gaining access to existing rail infrastructure under current concession agreements.
- New rail infrastructure and rolling stock is very expensive.
- Existing road infrastructure isn't suitable for economic tonnages.
- New regional infrastructure projects are only at Planning / Feasibility Stage and require time and money, and have environmental impacts which must be assessed.
- Arrangements / ownership / operation of new regional infrastructure aren't defined.

Challenge 2: Loading ocean going vessels / access to existing:

- Gaining access to existing bulk facilities, which are under current concession agreements.
- New facilities purpose built, lack capacity (GAC, RUSAL) or limited information (SMB-Winning)
- Reported Multi-user facilities lack publicised tariffs (uncertainty)
- The plethora of road / barging operations will eventually create capacity issues.
- New regional infrastructure projects are only at Planning / Feasibility Stage and require time and money, and have environmental impacts which must be assessed.
- Arrangements / ownership / operation of new regional infrastructure aren't defined.

Guinea has many opportunities...

- Excellent Bauxite resource base (tri-hydrate-Gibbsitic, low reactive silica, **however future trend is lower grade and further from coast**)
- Leveraging existing infrastructure (e.g. Boke corridor)
- Development of shared infrastructure using external funding.

Possible Solutions: in-country transport agreements and development

- Agreement and implementation of further multi-user rail operational agreements
- Countrywide planning and building of shared infrastructure
- Provide certainty and reduce risk through consultation and publication of ownership / operational agreements, anticipated costs and construction schedules.

Possible Solutions: loading ocean going vessels

- Agree and publicise access tariffs for reported multi-user ports
- Use of river ports and in-land waterway transportation – will eventually require a “joined-up” solution but that this solution needs to be developed and potential users consulted.

Issues/Risks

- Security of Tenure
- Too many planned projects simultaneously in relation too market demand.

CONCLUDING REMARKS:

Developing new Projects:

- Understand your project options, technical risks/opportunities, economics at an early stage, quickly, and at a relatively low cost, prior to committing to further work/costs, and rule out fatal flaws.
- Bauxite tonnages and quality affects the market and potential revenue, infrastructure gets it to market and it all needs to be economically viable, focus on these key areas early in a project.
- Do quality technical work, and ensure compliance with international codes/best practices if you are looking at international finance.
- Don't be afraid of your project risks, work to mitigate them.
- Understand the economic sensitivity of your project, and work to improve the accuracy of estimates and reduce contingency
- Do sufficient work to make an informed decision on how to proceed (or not) with a project.
- Ensure you have an experienced management team who understand and are well connected in country.
- Set yourselves a realistic project development timeline however you may need to fast-track taking technical (and business) risks to avoid missing the current market opportunities for new off-take agreements, and “get ahead of the rest”

New Projects out there....

- There are many Bauxite export projects being studied.
- Many bauxite projects are now more than 5+ years old and remain undeveloped for many reasons.
- Generally longer-term trend for lower grade bauxite export projects
- There are a number of bauxite export projects in the 3-6mtpa export with upfront capital requirements of <USD100, and operating costs <USD25/t bauxite FOB Panamax/Cape-Size
- Freight costs (to China mainly) will be very important for West African projects.
- Bauxite selling price is critical to the economic evaluation of projects, and there is still limited (available) information, and therefore early engagement with potential off-takers is recommended, along with providing representative sampling and bauxite characterisation results.

Guinea:

- Excellent Resource base, however future projects are likely to be:
 - Lower grade,
 - Further from the coast
 - Generally require more extensive infrastructure/logistics and capital to develop
- Collaboration on sharing existing and developing new infrastructure within the country to facilitate the development of bauxite mines is required, many projects struggle with the capital of covering all of its own/dedicated infrastructure
- Country-level infrastructure studies and a strategic country plan need to be developed further and provided to all parties/licence holders.
- Potentially look at third-party infrastructure development unlinked to bauxite and alumina industry, with clear/transparent Tariff structures
-Don't forget Sierra Leone.

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Thank You for Listening

Any Questions?

Mark Campodonic

Director and Principal Consultant (Resource Geology)

mcampodonic@srk.co.uk

+447841800070