

➤ **AZMET TECHNOLOGY & PROJECTS**

SERVICES, CAPACITY, RESOURCE AND EXPERIENCE STATEMENT



AZMET would like to thank the Reader for the opportunity to present our applicable company structure, services, capacity, and experience.

AZMET is a Professional Engineering Company with a dedicated focus on the development of value-added, and in many cases revolutionary, process technologies and products.

AZMET is familiar with various global engineering standards and certifications for project executions.

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Our capabilities and experience will be highlighted as follows:

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1. AZMET PRODUCTS AND TECHNOLOGY SERVICES

It is the innovative nature of AZMET that has led to the development of various value-added and intellectual proprietary products and process technologies, in which, the following services are offered, specifically structured around these developments:

► General Overview of Services

The services that AZMET can offer in the Hydrometallurgical Sector, are as follows:

- » Project Studies - from Scoping to Bankable Feasibility Studies
- » Process Plant Design for integration of equipment and process technology designs
- » Project Management
- » Installation & Commissioning Supervision
- » Site Training
- » Process Plant Optimisation and Expansions
- » Cashflow Development and Financial Modelling to show the impact on IRR & NPV in using AZMET's products and technologies
- » Testwork - on-site, laboratory and pilot plant testwork

► Engineering Service Deliverables

Our engineering and process design deliverables can be broken down into the following deliverables:

Project Engineering Services

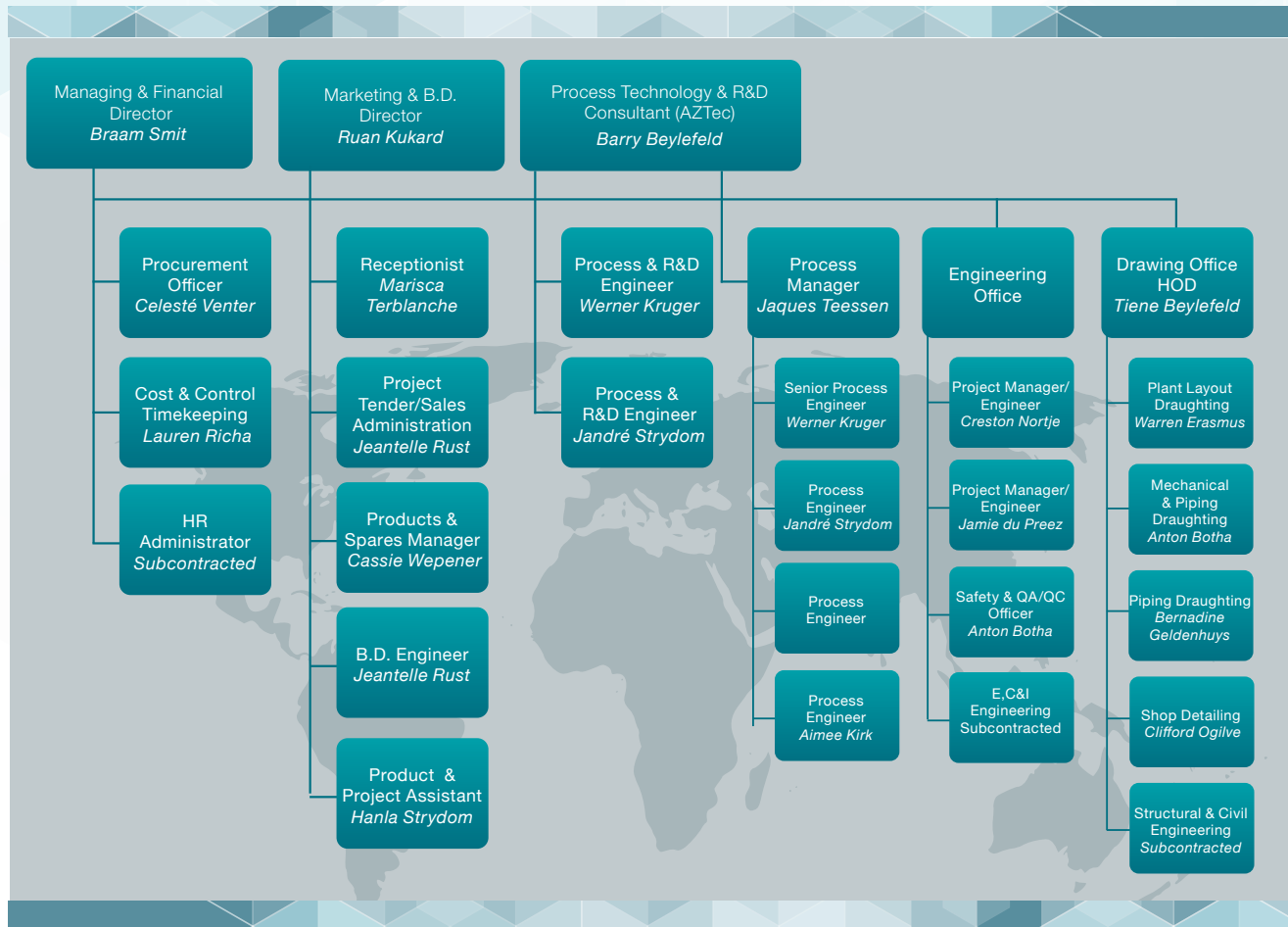
- » Project Management
- » Project Engineering
- » Procurement
- » Logistics
- » EC&I design
- » Civil and Structural design
- » Product GA and layout drawings including 3D capabilities

Process Engineering Services

- » Trade-off studies - to show comparative benefits of AZMET's products and technologies
- » Process Flow Diagram (PFD's) integration
- » Equipment sizing and selection
- » Product and Technology Process Descriptions
- » Plant Layout Integration
- » OPEX - Plant Operating Costs
- » Reagent Make-up & Dosing Systems
- » Control Philosophy
- » Testwork report
- » Participation in Client HAZOP studies, where applicable to proprietary equipment
- » Functional Specification
- » Operating Manual
- » Commissioning Procedures
- » Commissioning Supervision

► **AZMET, GLOBAL
SPECIALIST IN THE
SUPPLY OF INNOVATIVE
PRODUCTS AND
TECHNOLOGIES FOR
INCREASED GOLD
RECOVERIES!**

2. AZMET COMPANY & PROJECT ORGANOGRAM



► Engineering & Management Employees

AZMET employment methodology is to employ highly multi-skilled personnel including:

- » Managers
- » Mechanical Engineers
- » Process Engineers
- » Procurement & Cost Control Employees
- » Civil & Structural Engineers
- » EC&I Engineers
- » Engineering Designers
 - Plant Layout
 - Mechanical
 - Piping
 - 3D Modeling
 - Civil & Structural

AZMET Management & Staff includes the following:

- » Qualified Person (QP)
- » Three (3) off Pr.Eng:
 - 2x Metallurgical
 - 1 x Mechanical
- » Bachelor Engineering Degrees (B.Eng):
 - 3 x Mechanical
 - 5 x Chemical (with specialization in Mineral extraction)
 - 4 x Metallurgical
- » 1 x Qualified SHE Officer
- » 5 x Qualified Designers
- » 2 x Qualified and Trained Procurement & Cost Control personnel
- » 2 x Administration & Document Control
- » 1 x Cleaning & House Keeping

3. AZMET CAPACITY STATEMENT

► Current Capacity

AZMET's current capacity for study and project executions are as follows:

- » Current Staff compliment has the capacity to execute projects up to the value of USD150 million per annum



4. APPLICABLE AZMET REFERENCE LIST

► Technology Implementation

AZMET distinguishes itself by constantly striving to provide our clients with the latest process technologies, innovative products and engineering designs, that will maximize profit and minimize cost, with an unparalleled safety and environmental consciousness. One of these process technologies is the AZMET Cyanide Reduction process technology (AZ-CRP®). This technology provides the following benefits:

- » Reducing Plant Detox Requirements (CAPEX & OPEX Saving)
- » Discharge of Cyanide well below the regulation of the International Cyanide Code
- » Recovery of additional Gold (Au), Silver (Ag) and Copper (Cu) from the Tailings Discharge.

In 2019 the following on-site testwork and trade-off studies were performed at the following clients:

- » **BARRICK** - Cyanide Detox versus Cyanide Reduction (AZ-CRP) testwork and Trade-off study – Kibali, DRC
- » **BARRICK** - Cyanide Detox versus Cyanide Reduction (AZ-CRP) testwork and Trade-off study – Loulo, Mali
- » **GPM** - Cyanide Detox versus Cyanide Reduction (AZ-CRP) testwork and Trade-off study – Armenia
- » **Client** (NDA Signed not to disclose name) - Cyanide Detox Feasibility Study with AZ Cyanide Reduction (AZ-CRP) trade-off - Africa
- » **DRD Gold** - Cyanide Detox versus Cyanide Reduction (AZ-CRP) testwork and Trade-off study – South Africa
- » **Sibanye Stillwater** - Copper removal and Cyanide Reduction (partial AZ-CRP) testwork and Trade-off study – South Africa

In Q3, 2019 GPM has placed an AZ-CRP order on a pilot plant to conduct on-site test work for full implementation in 2020.

► Reference to projects executed for BARRICK GOLD CORPORATION

AZMET Technology and Projects has also executed the following projects for **BARRICK**

- » Bulyanhulu Gold Mine - Design & Engineering, Upgrade Project
- » Tongon Gold Mine - Quaternary Crushing & Screening Upgrade Project, including installation and commissioning (±\$3 million CAPEX)
- » Kibali Gold Plant - Desliming Cyclones SMPP Project, including installation and commissioning (±\$1.3 million CAPEX)
- » Tongon Gold Mine - Goldroom scrubber Project, including design, installation and commissioning
- » Kibali Gold Plant - Carbon Management System Training and Optimisation
- » Tongon Gold Mine - Crusher upgrade design and capital cost estimate study

► Reference to AZMET Desorption & Recovery Plants

AZMET Technology and Projects also executed the following projects with similar scope as requested - **Gold Projects:**

- » Gold 10 tpd Carbon Desorption and Recovery Plant - Nordgold
- » Gold 10 tpd Carbon Desorption and Recovery Plant - Doup Gold Project, Indonesia Gold 6 tpd Carbon Adsorption, Desorption & Recovery Plant – Poboya Gold Mine, Indonesia

- » Gold and Silver 2 tpd Carbon Adsorption, Desorption & Recovery Plant, with Zinc precipitation and associated Reagents – Hassai Gold Project, Sudan
- » Gold and Silver 8 tpd Carbon Adsorption, Desorption & Recovery Plant, with Zinc precipitation and including Reagent Packages for a 10.5 Mtpa HL Project – Lydian, Armenia
- » Gold 2 tpd Carbon Adsorption, Desorption & Recovery Plant – Meli Gold Mine, Ethiopia
- » Gold 2 tpd Carbon Adsorption, Desorption & Recovery Plant and Reagent Packages – Eti Bakir, Turkey

► Other Design and Studies Completed

Other Design and Studies completed are listed below:

- » Komarovckoye gold plant detailed process design for execution (2.5MTPA, Kazakhstan)
- » Asmara gold and copper bankable feasibility optimisation study, which focused on the trade-off between using Carbon in Leach (CIL) versus Heap Leach (HL) for the gold portion of the resource.
- » VBKOM - Zandheuvel Phosphate Scoping Study
- » Xtract Resources DFS for a 0.5MTPA gold production plant – Manica, Mozambique
- » Copper, Silver & Gold study, including financial trade-off studies looking at Copper leach, SX-EW vs. precipitation, followed by Silver & Gold cyanide leaching and recovery - Morocco
- » Luisha South Copper & Cobalt Optimisation study – DRC





5. EXCO MEMBERS' EXPERIENCE

Collectively the executive members of AZMET have been involved in:

- » More than **36 execution projects** with project values ranging up to US\$500M.
- » More than **46 successfully completed project studies**
- » The execution of projects in over **24 different countries**.

» Studies and Projects - Applicable EXCO members Gold References

The EXCO Members of AZMET has been involved in the following referenced projects:

»» 2013 to 2014: True Gold, Burkina Faso

Project Execution, Karma Heap Leach (4 Mtpa, ±\$170 million CAPEX)

Crushing, Agglomeration, Stacking, Recovery Circuit, Plant Services, Reagents

»» 2013 to 2014: True Gold, Burkina Faso

Feasibility Study, Karma Heap Leach (4 Mtpa, ±\$170 million CAPEX estimate)

Crushing, Agglomeration, Stacking, Recovery Circuit, Plant Services, Reagents

»» 2013: Goldfields, Mali

De-risking Scoping Study, Yanfolila Gold Plant (2 Mtpa, ±\$105 million CAPEX estimate)

Crushing, Milling, CIL, Recovery Circuit, Plant Services, Reagents

»» 2013: Altyn Almas, Kazakhstan

Prefeasibility Study, Akbakai Gold Plant (1.0 Mtpa, ±\$300 million CAPEX estimate)

Crushing, Milling, Flotation, BIOX, CIL, Recovery Circuit, Plant Services, Reagents

»» 2012 to 2013: Sunridge, Eritrea

Feasibility Study, Asmara Project (4 Mtpa, ±\$665 million CAPEX estimate)

Crushing, SAG & Ball milling, Gold plant and Copper & Zinc Flotation with Fine Grind, Pressure Filtration

»» 2011 to 2013: **Nyota, Ethiopia**

Feasibility Study, Tulu Kapi Gold Plant (2 Mtpa, ±\$288 million CAPEX estimate)

Crushing, SAG & Ball milling, CIL, Gold Recovery Circuit

»» 2012: **Gold Fields, Ghana**

Prefeasibility Study, Greater Damang Gold Plant (10 Mtpa, ±\$489 million CAPEX estimate)

Two Stage Crushing, HPGR & Ball milling, CIL, Gold Recovery Circuit

»» 2012: **Randgold, Mali**

Project Execution, Upgrade Loulo Gold Project (4.2 Mtpa, ±\$32 million CAPEX)

Addition of Stockpile and 3rd Mill into existing CIL plant, new Gravity Screens, new Linear Screens and changing Tailings Thickener to Preleach Thickener duty

»» 2012 to 2013: **Altyn Almas, Kazakhstan**

Feasibility Study, Bakyrchik Gold Plant (1.5 Mtpa, ±\$450 million CAPEX estimate)

Crushing, Milling, Flotation, BIOX, CIL, HiTeCC, Aster, Recovery Circuit, Plant Services, Reagents

»» 2012: **Endeavour Mining, Cote D'Ivoire (Ivory Coast)**

Feasibility Study, Agbaou Gold Plant (1.6 Mtpa, ±\$160 million CAPEX estimate)

Crushing, Milling, CIL, Recovery Circuit, Plant Services, Reagents

»» 2012: **AXMIN, Central African Republic**

Detailed Design, Passendro Gold Plant (2 Mtpa, ±\$315 million CAPEX estimate)

Crushing, Milling, CIL, Recovery Circuit, Plant Services, Reagentsoje86 11AZMET (29638) fax +27 86 628 azmet.co.za

»» 2012: **Anglogold Ashanti, Guinea**

Pre-Feasibility Study, Siguiri Gold Plant (±\$45 million CAPEX estimate)

Increasing plant capacity from 12 Mtpa to 14 Mtpa by debottlenecking the process plant and reviewing conveyor designs

»» 2012: **Gold Fields, South Africa**

Prefeasibility Study, KDC Tailings Re-treatment (28 Mtpa, \$200 million CAPEX estimate)

Hydraulic Reclamation, Gold Flotation with Fine Grind, CIL, Recovery Circuit

»» 2011 to 2012: **Cluff Mining, Sierra Leone**

Feasibility Study, Baomahun Gold Plant (2 & 4 Mtpa, ±\$315 million CAPEX estimate)

Crushing, Milling, Oxidation via High Shear Reactors, CIL, Recovery Circuit, Plant Services, Reagents

»» 2008 to 2011: **Randgold, Ivory Coast**

Project Execution, Tongon Gold Plant (3.6 Mtpa, \$160 million CAPEX)

Three Stage Crushing, Ball milling, Flash Flotation with Fine Grind, Oxidation via High Shear Reactors, CIL, Recovery Circuit

»» 2010 to 2012: **Sunridge, Eritrea**

Feasibility Study, Debarwa Copper & Gold Plant (270 ktpa, ±\$159 million CAPEX estimate)

Three Stage Crushing, Ball milling, Direct Shipping Ore, Copper Flotation with Fine Grind, Pressure Filtration

Three Stage Crushing, Ball milling, CIL, Gold Recovery Circuit

»» 2010 to 2011: **Randgold, Senegal**

Feasibility Study, Massawa Gold Plant (3.6 Mtpa, ±\$484 million CAPEX estimate)

Three Stage Crushing, Ball milling, Gold Flotation with Fine Grind, Pressure Oxidation, CIL, Recovery Circuit

»» 2010 to 2011: **Randgold, Democratic Republic of the Congo**

Feasibility Study, Kibali Gold Plant (4 Mtpa, ±\$508 million CAPEX estimate)

Three Stage Crushing, Ball milling, Gold Flotation with Fine Grind, Oxidation via High Shear Reactors, CIL, Recovery Circuit

»» 2009 to 2011 **Banro, Democratic Republic of the Congo**

Project Execution, Twangiza Gold Plant (1.3 Mtpa, ±\$86 million CAPEX)

Crushing, Scrubbing, Milling, CIL, Recovery Circuit, Plant Services, Reagents

»» 2007 to 2011: **Nevsun - Bisha Mining Share Company, Eritrea**

Project Execution & Commissioning – Bisha Gold - Phase 1 (2 Mtpa, ±\$252 million CAPEX)

Crushing, SAG & Ball milling, CIL, Gold Recovery Circuit

»» 2011: **Anglogold Ashanti, Guinea**

Scoping Study, Siguiri Gold Plant (±\$30 million CAPEX estimate)

Determining of the optimal processing route for gold recovery from transition ore body through the current CIP circuit.

»» 2010 to 2011 **Banro, Democratic Republic of the Congo**

Scoping Study, Twangiza Gold Plant (±\$20 million CAPEX estimate)

Upgrading of the 1.3 Mtpa plant to 1.7 Mtpa

»» 2010: **Centamin PGM, Egypt**

Feasibility Study, Sukari Gold Plant Expansion (10 Mtpa, ±\$130 million CAPEX estimate)

Three Stage Crushing, Ball milling, Gold Flotation with Fine Grind, CIL, Recovery Circuit

»» 2010: **Centamin PGM, Egypt**

Feasibility Study, Sukari Crushing & Screening Upgrade (5 Mtpa)

Three Stage Crushing

»» 2008 to 2009 **Anglogold Ashanti, Guinea**

Pre-Feasibility Study, Siguiri Gold Plant (±\$40 million CAPEX estimate)

Increasing plant capacity from 10 Mtpa to 11.5 Mtpa by debottlenecking the process plant

»» 2009: **Banro, Democratic Republic of the Congo**

Feasibility Study, Twangiza Gold Plant (5 Mtpa, ±\$380 million CAPEX estimate)

Crushing, Sag & Ball Milling, CIL, Recovery Circuit, Plant Services, Reagents

»» 2007 to 2009 **Redback Mining, Mauritania**

Plant Expansion, Tasiast Gold Plant (2.5 Mtpa, ±\$26 million CAPEX)

Increasing plant throughput from 1.25 Mtpa to 2.5 Mtpa

»» 2006 to 2007: **Somita SA, Burkina Faso**

Project Execution & Commissioning – Taparko Gold Project (1 Mtpa, ±\$28 million CAPEX)

Oxide ore - Rolls Crusher, Ball milling, Gravity, CIL, Gold Recovery Circuit

Sulphide ore - Three Stage Crushing, Ball milling, Gravity, CIL, Recovery Circuit

»» 2005 to 2006: **Guinor Gold Corporation Ltd, Guinea**

Project Execution & Commissioning – LEFA Corridor Gold Project (8 Mtpa, ±\$80 million CAPEX)

Second Hand Plant used - Crushing, SAG & Ball milling, Gravity, CIL, Recovery Circuit

»» 2004 to 2005: **Randgold, Mali**

Project Execution – Loulo Gold Plant

Soft rock - Rolls Crusher, Ball milling, Gravity, CIL, Gold Recovery Circuit

Hard rock - Three Stage Crushing, Ball milling, Gravity, CIL, Recovery Circuit

Exco Members' CV's

The EXCO members of AZMET are:

Braam Smit

Managing & Finance Director

- » B.Eng (Metallurgical)
- » Over 19 years Post Graduate Experience

Ruan Kukard

Marketing/Business Development & HR Director

- » B.Eng (Chemical with Specialization in Mineral Extraction)
- » Over 20 years Post Graduate Experience

Barry Beylefeld

R&D Consultant

- » B.Eng (Metallurgical)
- » Over 20 years Post Graduate Experience

Note: Comprehensive CV's can be supplied on request

6. AZMET QUALITY POLICY STATEMENT



AZMET QUALITY POLICY

Commitment

The executive management team of AZMET Technology & Projects is committed to identifying and fulfilling its clients' requirements to ensure their complete satisfaction with the service it provides.

Take Care

AZMET will take care in its work to ensure that the finished product meets or exceeds client, legal and regulatory requirements.

Be Proactive

AZMET will train staff and ensure that people have the right competency to do their work to the required standard.

Internal Standards

AZMET will implement internal standards to streamline the customer experience and increase efficiency.

Be Aware

AZMET will be aware of best practice methodologies, exceptional products and the latest innovations to provide a quality finished product.

Transparency

AZMET will be transparent with its clients to ensure that issues are communicated and resolved as quickly as possible.

Learn & Improve

AZMET will learn from the lessons and experiences gained internally and by others and set targets to keep improving its overall performance.

Lead from the Top

People with responsibility will lead by example to ensure that the customer requirements are always delivered on its projects.

Reward Success

AZMET will identify and reward innovation and extraordinary performance to maintain a positive quality culture.

Braam Smit
Director

Ruan Kukard
Director

VAT REG NO: 4450265527 / COMPANY REG NO: 2013/235088/07

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7. AZMET AWARDS & ACCOLADES

AZMET has received the following Awards and Accolades:

► 2016:

- » Business of the year – Gold Winner – Engineering Category

► 2017:

- » Business of the year – Gold Winner – Engineering Category
- » Business of the Year – Silver Winner – Innovation

► 2018:

- » Business of the year – Gold Winner – Engineering Category
- » Exporter of the Year – Services Business
- » Exporter of the year – African Exports

► 2019:

- » Business of the year – Diamond Winner – Engineering Category
- » Diamond Award is given for winning a category three (3) consecutive years.

► 2023:

- » Steel Awards – Winner – Mining & Industrial Category
- » Steel Awards – Winner – Best Export Project Category
- » SACEEC Exporter of the Year Awards – Winner – Allied service exporter of the year Category
- » SACEEC Exporter of the Year Awards – Runner-up – Exporter of the Year (R150 - R200 Million per Annum) Category



AZMET extends its sincere gratitude to the Reader for granting us the opportunity to present our company structure, services, capacity, and experience. It has been our privilege to share insights into how AZMET can serve your needs and contribute to the success of your endeavors. Should you require any further information or assistance, please do not hesitate to reach out to us. We look forward to the possibility of collaborating with you in the future.

CONTACT DETAILS

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