



# MCL NEWS

A Publication of Maamba Collieries Limited | April - June 2016 . Issue No. 15



## HIGHLIGHTS

■ **Pollution Mitigation Measures in the Thermal Power Plant**

Maamba Collieries Limited (MCL) was conferred **Environmental award for Overall Contribution to Sound Environmental Management Practices in Industry** for the Year 2016 by **Zambia Environmental Management Agency**

**Co-Sponsor ZCCM-IH team visits MCL**

Special Assistant to the President for project implementation  
Lucky Mulusa visits MCL

MCL engages Traditional Leaders

Livelihood Restoration Programme for Project Affected Persons (PAPs)

# Contents

Section A: Executive Messages.....	3
Section B: MCL Scoopes Environmental Award .....	4
Section C: MCL Events .....	5
Section D: Thermal Power Plant (TPP) Updates .....	10
Section E: Miscellaneous .....	11
Section F: Corporate Social Responsibility (CSR) Activities.....	12

## EDITORIAL TEAM

Gurram Venkata Narayana (Patron)  
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 Mayford Chikoya  
 Patrick Nalumino  
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## On the cover

MCL's CEO, Rear Admiral (Retd) Venkat Shankar and SHEQ Manager Mr. Yotham Phiri with the Awards



## Executive Messages



■ Mr Ashwin Devineni - Resident Director

### Foreword by the Resident Director(RD)

As at 30th June 2016, the Thermal Power plant (TPP) is almost 96% complete; in this regard I would like to take this opportunity to thank the members of staff, the contractors and the sub-contractors for the effort and commitment displayed in their respective activities.

This quarter saw a major milestone activity of successful completion of steam blowing of Unit 1 boiler.

This quarter under review also witnessed the start of mining of coal from Izuma "A" which marks our preparedness for the commissioning of the TPP.

I wish to further congratulate you all on Maamba Collieries Limited (MCL) being conferred the Environmental award for "the Overall Contribution to Sound Environmental Management Practices in Industry" for the year 2016 by Zambia Environmental Management Agency (ZEMA) on 17 June 2016.

We now look forward to the commissioning of the TPP in the coming quarter.

Enjoy the reading

**Ndalumba kapati, Natotela sana, Dzikomo kwambiri**



■ Rear Admiral (Retd.) Mr. Venkat Shankar - CEO

### Message by the Chief Executive Officer (CEO)

Dear Readers,

The quarter under review has a great deal of activity in the mine and in the power-plant as we inch towards the finish line.

Many systems in the TPP have been commissioned, new road from the coal stockpile to TPP coal yard laid, steam blowing of Unit 1 boiler completed, generator back charged etc. Under these circumstances, it is important that MCL team, by which I mean MCL employees and all our contractors, must maintain focus. The next quarter should see us generating power and this will be possible only by consistent and unwavering focus on all areas of work.

This quarter also witnessed MCL entering into a two-year partnership with Monze Diocese Development Department for providing sewing and carpentry training to our Project Affected Persons (PAPs) as part of MCL's Livelihood Restoration Program. This is in keeping with the company's policy to constantly look for opportunities to enhance skills among the PAPs and the community.

My team engaged traditional leaders during this period as well - again it is an example of the respect MCL has for traditional leaders and the important role they play.

I wish all the members of MCL team a productive quarter ahead.

# MCL Scoopes Environmental Award



■ MCL's CEO, Rear Admiral (Retd) Venkat Shankar and SHEQ Manager Mr. Yotham Phiri with the Awards

On Friday, 17th June, 2016, Maamba Collieries Limited was awarded the Environmental Award for Overall Contribution to sound Management practices in industry 2016 Environmental and Climate Change Awards Ceremony held at the Intercontinental Hotel in Lusaka, by Interim Climate Change Secretariat (ICCS) and Zambia Environmental Management Agency (ZEMA).

This awards ceremony is an annual event, which aims to promote environmental stewardship by

recognizing one industry in Zambia, which has a record of 'sustained regulatory compliance and has shown commitment to continuous environmental improvement'.

According to the awarding institutions, MCL was selected for the award based on the following:

- History of sustained regulatory compliance (2/3 years consistency);
- Demonstrated commitment to continuous environmental improvement;
- Timely submission of statutory returns which are within limits;
- No penalization or issue of enforcement notice or order by ZEMA since 2014;
- Demonstrated corporate social responsibility that promotes environmental management;
- Environmental policy and management system in place thus showing management commitment;
- Specialized unit/department specifically dedicated to environmental management
- Utilization of the Best available Environmental Technology (BET) and Best Environmental Practices (BEP).

The Award was presented by the Deputy Minister in the Ministry of Lands and Natural Resources (which regulates ZEMA), and was attended by senior Government Officials, members of the Diplomatic Corps, International Environmental and Climate Change Activists as well as journalists from the print and electronic media.

MCL congratulates all members of staff on their contribution towards achieving this prestigious award.



MCL's CEO with other Recipients of various Awards.

# Special Assistant to the President for project implementation, Lucky Mulusa visits MCL

On the 25th April 2016 the Special Assistant to the Republican President for Projects Implementation and Monitoring – Mr. Lucky Mulusa paid a courtesy call to MCL. His visit was meant to familiarize himself with the progress at the construction site of the Thermal Power Plant. His entourage included Mr. Joseph Mwape Mukupa, the Chief Analyst – Policy Implementation and Monitoring at State House, Officials from State House and a number of journalists from different media houses.

Mr. Mulusa was met at Maamba by the Resident Director Mr. Ashwin Devineni, the CEO, Admiral (Retd) Venkat Shankar and other MCL Senior Staff.

Mr. Mulusa was led on a conducted tour of the plant and after the tour, Mr. Mulusa stated that he was impressed with the progress being made by MCL towards the completion of the project.



## Site visit by CEO, ZCCM-IH and his team

■ Dr. Pius Kasolo, ZCCM-IH with his entourage on a conducted tour of the TPP

MCL hosted the CEO of ZCCM-IH, Dr. Pius Kasolo and his team at MCL on 18th May 2016. The team of seven, which included Mr. Chipata Mabvuto (CFO), spent a day at the site visiting the Power Plant and Mine areas. The CEO and his team evinced keen interest in the plant and the other activities and praised the engineers

and employees of MCL for their sustained effort to commission the Power Plant at the earliest.

It was a proud moment for MCL management to welcome the CEO and his team who are the co-sponsors of the project and have been fully supportive of all our endeavors to commission the plant at the earliest.

## MCL engages traditional leaders

Due to alleged vandalism of the 330kV DCTL from Maamba Mine to Muzuma Substation by suspected villagers, a meeting between MCL Management and traditional leaders was held at Chief Cooma's Palace on 28th June, 2016. A total of 239 village headmen turned up for the meeting. MCL Management sensitized the community against vandalising the infrastructure. The headmen pledged to address their subjects on the issue.

The meeting was also attended by His Royal Highness Chief Cooma while the Security Manager (Mr. Henry L. Chaile) and MDT Manager (Mr. Jethro M. Sikalunda) represented MCL Management.

During the same meeting, MCL communicated its Emergency Response Plan, which has since been displayed in most of the strategic places.

MCL is appealing to all community members to report any form of vandalism to any of the company infrastructure to MCL Management, Zambia Police or to the nearest headman. Vandalism can lead to serious consequences, such as imprisonment, electrocution leading to injuries or death, fine, etc. It can also pose serious danger to the community, if unchecked.



## District Education Board Secretary (DEBS) staff visit MCL

On Friday, 24th June, 2016, District Education Board Secretary (DEBS) staff visited MCL to acquaint themselves with operations at MCL, especially with regard to the construction of the Thermal Power Plant. The team was led by Mr. Aden Kambunga, the District Education Board Secretary. They were addressed by the CEO in the boardroom, who highlighted the activities of MCL in all spheres and the benefits of the project to Zambia.

The Safety, Health, Environment and Quality (SHEQ) Manager, Mr. Yotham Maxwell Phiri, gave a brief on measures MCL had put in place to address environmental issues.

The DEBS expressed gratitude to MCL for taking particular interest in the development of education in and around Maamba Township. He informed the CEO that construction of some infrastructure by MCL and donation of building materials to some schools had greatly assisted the affected schools. He further appreciated MCL for according his staff an opportunity to visit the Mine and the TPP. He said the visit was very educative.

Recently, MCL constructed a 1 X 3 classroom block at Mweela School, donated a 30kV Gen Set at Maamba Special School for children with special needs as well as some building materials at Maamba GRZ School.



■ Mine Manager, Mr. Scott Phiri, explaining a point to staff from DEBS' Office at the Pit View Point.

## Grievance Management System (GMS)

MCL has established a grievance management system (GMS) as a formal and documented process to receive, assess, record and resolve grievances concerning the performance or behavior of MCL, its contractors or its employees. The GMS has been fully integrated into MCL's Environmental and Social Management System (ESMS) and has also been included in internal ESMS reporting as well as external audits. The objectives of the GMS are to:

- Address grievances;
- Promote and establish open and clear lines of community engagement around grievances;
- Establish a consistent, transparent, accessible and credible grievance management process for individuals, households and communities affected by the MCL project;

- Create grievance outcomes that are considered by all parties as realistic, fair, effective, and sustainable;
- More effectively manage and reduce community and company risks;
- Identify grievance trends and implement preventive measures;
- Efficiently report (including to communities) and measure performance of grievance handling;
- Ensure that all project grievances are recorded and consolidated in one database;
- Minimise the number of complaints that are resolved through legal recourse rather than negotiation in good-faith.

Details of contact numbers of key personnel have been printed and displayed at key locations in the township.

# Mining activities

**A**t Maamba Collieries Limited mine activities are conducted in designated and targeted areas with minimal environmental disturbances. Natural vegetation is left undisturbed after establishing the open pit boundaries, waste and coal dumps and access roads.

## Dust Suppression

All access roads are maintained in order to arrest erosion and a number of water bowsers have been assigned to carry out dust suppression by constant water spraying in all mine and township roads.

De-watering in the pits is carried out by initially treating the water within the pit before pumping it out into the settling ponds where the quality is ascertained before discharge into the environment.



## Spontaneous Combustion

Waste dumps are covered with inert material to stop spontaneous combustion and thereby ensuring that the atmospheric air around Maamba is free from pollution.



■ Some of the environmental management activities at the Mine

## Coal Handling Processing Plant

The old Coal Processing Plant, which had a lot of effluent discharge, has been replaced by a new zero-effluent discharge Coal Handling and Processing Plant, (CHPP). All the previous contamination in the surrounding streams has been cleaned up.

# Safety, Health, Environment and Quality

In order to ensure that operations of MCL are conducted in a safe and healthy environment as required by international (World Bank) standards, MCL has in place management plans for Health, Safety and Environment monitoring in the form of Air Quality Management Plan, Noise and Vibration Management Plan and Water Management Plan. These plans provide for monitoring of Air quality, noise, vibration and Water (surface and groundwater).



## Air Quality / Noise and Vibration

MCL has set up an air quality monitoring network as per the Air Quality Management Plan. This helps MCL to understand the quality of air in and around Maamba and permits MCL to ensure that the air emanating from Mine and Power Plant operations is free from air pollution. Results are collected on monthly basis. There are also noise and vibration measuring equipment installed to help ensure compliance to World Bank standards.

The air quality monitoring network is measuring:

- Sulphur dioxide
- Nitrogen dioxide
- Volatile Organic Compounds
- Particulate matter with an aerodynamic diameter of less than 10  $\mu\text{m}$  (PM10)
- Particulate matter with an aerodynamic diameter of less than 2.5  $\mu\text{m}$  (PM2.5) Fallout dust

The equipment are installed at the following places to ensure full coverage of the areas where the community lives:

- Maamba Township
- Sikalonzo Village
- Siankandobo Village
- Suncrest Camp
- MCL offices
- Siankandobo Village
- South of Mine
- North of Mine
- Middle of Mine
- Near TPP.

## Dust Extraction System

Another facet of the pollution mitigation measures are the dust extraction systems installed in our dust intensive areas such as coal and lime handling systems. In this area the DMC Series Pulse Bag Dust Collectors are utilized. Dust is mostly released at the point that coal or lime falls from a chute onto a conveyor. At this point, the intake of the dust collector is installed so that the dust is immediately sucked in. In the collector this air mixed with dust is passed through a filter and the dust is collected while only the pure air is released to the atmosphere.

## The Industrial Waste Water Treatment Plant

There are three categories of waste water, namely, sewage, oily water and industrial waste water from various parts of the plant. The treated water will be reused within the plant for gardening, lawn maintenance, dust suppression and cleaning of plant equipment. Therefore no water is released to the outside environment.



## MCL commences training programme in tailoring for Project Affected Persons

**M**aamba Collieries Limited recognises the fact that resettlement of Project Affected Households (PAPs) may result in some social, economic and environmental impacts. These problems include the dismantling of production systems, loss of productive assets and income for the people being relocated. MCL has put in place a Livelihood Restoration and Improvement Plan (LRIP) as a mitigation measure.

### Purpose

The LRIP is designed to stimulate sustainable development of the PAPs so that their standard of living is improved. The plan covers land, home management, enterprise and skill based livelihoods. In this regard, MCL in collaboration with relevant stakeholders has put in place a detailed programme which includes:

### Enterprise Training

The PAPs are being offered skills enhancement, specifically in the areas of tailoring and carpentry. MCL has signed a Two (2) year Memorandum of Understanding (MOU) with Monze Diocese Development Department (MDDD) to train PAPs in tailoring and carpentry. A training period of six (6) months has been agreed and will cater for twenty (20) trainees in tailoring and carpentry. Thus over the next two years, eighty (80) members of the community will be trained in tailoring and eighty (80) members in carpentry.

The tailoring programme commenced on Monday, 13th June, 2016, at Maamba Catholic Church Youth Training Centre, with twenty (20) female trainees.



■ Project Affected Persons (PAPs) undergoing training in tailoring

The Carpentry Training Programme is scheduled to commence before the end of July, 2016.

Apart from focusing on the PAPs, the training programmes shall also cater for non- PAPs.

## Technical skills training

MCL is providing technical skills training at its Vocational Training Centre in basic Metal Fabrication and Welding and basic electrician course to some PAPs and community members. The training programme is affiliated to TEVETA. The trainees undergo a six (6) month training programme, after which they graduate with a Trade Certificate - Level 2. It is anticipated that this training will equip the participants with a skill that will improve their livelihood as well as their chances of getting formal employment.



■ Trainees during a practical lesson at MCL Vocational Training Centre

Out of the Eleven (11) PAPs that have so far been trained, four (4) are in formal employment with MCL contractors.

The Vocational Training Centre has the following facilities:

### Metal Fabrication / Welding Training Section:

- DC Welding Machines, AC Welding Machines, Rectifier Welding Machine, T/G Welding Set, Gas Cylinders and various cutting discs



■ Students at practical work at MCL Vocational Training Centre

### Power Electrical Technical Training Section:

Various switches, sockets and circuit breaker AMPs, Various electric cables, conduit pipes, Thermo overhead relays, Coil contactors, multimeter testers, Starter / stop buttons, Various CB Amps.

The training programmes at the Vocational Training Centre are open to all members of the community who are in possession of a Grade 9 or higher Certificate. The trainees undergo a 6 month training program, after which they graduate with a nationally recognised certificate.

For more details on enrolment in these courses, please contact the MCL Human Resource Department on the following mobile numbers; 0963468544, 0966946904, 0977390812.

# Thermal Power Plant (TPP)

## Steam Blowing

On 19th June 2016 Maamba witnessed the awakening of the TPP in the form of 'Steam blowing' which is a key milestone activity prior to generation of power. There were many curious spectators from the workforce and anxious queries from local population as 'Steam blowing' is accompanied with periodic loud noise when steam under pressure is allowed to exit to the atmosphere.

This process eventually cleans the boilers of rust, dust and other impurities which, if left in place, would affect the functioning of the boiler.

The procedure is harmless to the community, barring the inconvenience of the noise.



■ Steam blowing of Unit #1 piping

Maamba Collieries Limited conducted this purging process for Unit # 1, which is called Steam Blowing, from 19th June, 2016 and successfully completed on 26th June, 2016. The same process will be repeated for Unit # 2.

## Pollution Mitigation Measures in the Thermal Power Plant

International regulations such as those on the pollution and environmental protection have strictly been followed in the design, construction, operation and maintenance of the Thermal Power Plant. The following are some of the pollution mitigation measures and systems put in place to reduce plant emissions:

### Electro - Static Precipitators (ESP)

These are devices that are used to control air pollution by capturing the particulate matter (particles) contained in the flue gases from the boiler furnace. They can handle large gas volumes with a wide range of inlet temperatures, pressures, dust volumes, and acid gas conditions. They can also collect a wide range of particle sizes in dry and wet states with the collection efficiency of 99% plus.



■ Electrostatic Precipitator for Unit #1

The particles collect on the collection plates inside the ESP by an electro static process creating ash layer which is then removed and transferred to Fly Ash Silos for eventual disposal by pneumatic system through pipes. This process purifies the flue gases which are finally exited to the atmosphere through the chimney thereby controlling the air pollution caused due to burning of coal.



■ Industrial Waste Water Treatment Plant



■ Mine Shift Boss, Misozi Gondwe at work

**M**s Misozi Gondwe, born on 6th September, 1990, is a Mine Planning Engineer who joined MCL on 9th May, 2016 as a Shift Boss. She did her secondary school at Matero Girls Secondary School in Lusaka and later proceeded to the Copperbelt University where she was awarded a Bachelor of Engineering Degree in Mining in the year 2015. Well, some may ask, why Misozi, a lady is chosen as a Mining Engineer. She says she loves overcoming challenges and has a very strong passion for natural resources, especially minerals. She states that she has always desired to work hard, study hard and reach the top in her profession. She remembers being discouraged by others from pursuing Mining Engineering. A lot of people urged her to change her program to something easier. Actually, others thought she would not make it to the final year but she believed in herself and forged ahead. She says, with God on her side, she knew that she would make it. For sure, with determination and a positive attitude towards her studies, she made it! Misozi has this to say to her fellow women,

## Personal profile **Ms. Misozi Gondwe**

– newly recruited Mine Shift Boss

*“you can be anything you want to be if only you believe in yourself. The mining sector needs more women. This is just the beginning of my career. I would like to further my studies. My main objective in life is to be a competent professional in Mining and contribute positively to the Mining industry”.*

She remarks, “I am very excited to be a part of MCL and would love to contribute positively to its growth. To my fellow employees, let us ensure there is good communication, embrace team work and most importantly, think safety all the time. Remember, if safety does not begin with you, then it will not begin at all. Zero Tolerance to Harm is our responsibility”.

Misozi becomes the first woman Mining Engineer in the history of Maamba Collieries Limited. We wish Misozi a very fulfilling career at MCL.

## MCL interaction with Community Members

**V**arious community groups from within and outside Maamba have been visiting MCL to acquaint themselves with operations at MCL. These visits are organized on Fridays. Any community group (in batches of 15 – 20) wanting to visit MCL may call the MDT Manager (0966946904) or the Community Services Officer (0979420011).

Sixty (60) Grade 12 pupils and three (3) staff members from Maamba Secondary School visited the Mine on Friday, 17th June, 2016 as part of their preparations for their Geography Practical Government Examination. The students were addressed by the Chief Operating Officer before they were taken on a conducted tour of the Mine by the Mine Manager. The students asked a number of questions with regard to uses of coal, mining equipment, environment management, etc.

# MCL Sponsors "Keep Maamba Township Free From Litter" Campaign

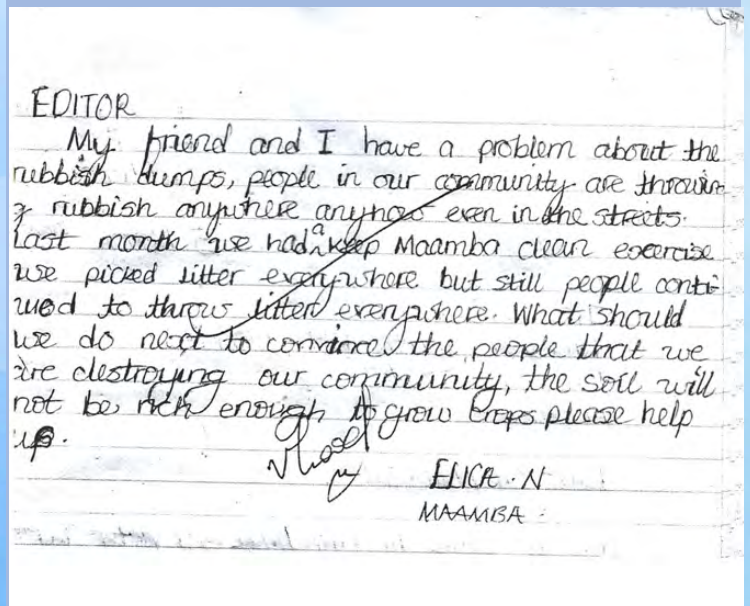
In its quest to keep Maamba Township free from litter, MCL sponsored local schools to pick litter in the Township on 4th June, 2016 by providing Personal Protective Equipment (PPE), transport and snacks to school children.

The activity was flagged off by the CEO, Rear Admiral (Retd) Mr. Venkat Shankar, and the Sinazongwe District Education Board Secretary, Mr. Aiden Kambunga, in the MCL Kanzinze Stadium.

Community leaders and members and staff members from the local schools participated in the activity.

MCL wishes to thank all those who participated in the event, especially the school pupils. Once again, we would like to remind all community members to use designated places to dump litter if we have to keep our Township clean. For some time now, solid waste management in Maamba Township has been an eye sore.

Following a school assignment requesting pupils to write about one major problem in the community, one pupil had this to say a month after the "Keep Maamba Litter Free Campaign"; indeed an emotive statement from an affected young student.



## Maamba Private School gets computers

Maamba Private School, through Parent Teacher Association (PTA) initiative, has procured Twelve (12) computers at a cost of ZMW 15 181.00. The computers were purchased from Camara Zambia – Educational Institution Service, an NGO based in Lusaka, Zambia.

Camara Zambia works with the Ministry of Education to provide ICT education courses to teachers and equip schools with computers.

MCL wishes to thank all parents who contributed towards the purchase of the said computers. The computers will go a long way in addressing the needs of learners at the school. Further, MCL wants to assure parents and teachers that the MCL IT Team will be available 24/7 to provide any assistance the school may require in the wake of the newly purchased computers.



# MCL participates in the 2016 ZAMBIA INTERNATIONAL TRADE FAIR

MCL participated in the just ended Zambia International Trade Fair (ZITF) which ran from the 29th June to the 5th July 2016. The theme of the show was *“Enhanced value addition through job creation”*. MCL partnered ZCCM-IH (35% Shareholder in MCL) and show cased the Thermal Power Plant (TPP) with linkage with coal mining. A ‘Mock up’ model of the Thermal Power Plant was the centre of attraction and drew a large number of visitors to the stand. The ZCCM-IH stand won 1st position in the Mining sector.



■ MCL’s Representative Mr. Roopesh Nekkanti – Business Development Manager and Mr. Mayford Chikoya – Senior Manager Corporate Affairs explain the processes of the TPP to visitors.



■ The award



■ The award



■ The winning team

# Frenzy catches Kanzinze Stadium as Zamcoal Football Club changes gear!

By Mwiinga Haamazongo

**Z**AMCOAL Diggers Football Club, a FAZ Division 2 South side sponsored by MCL, has brought a lot of excitement to soccer lovers who frequent Kanzinze Stadium. The stadium, which is usually packed to capacity erupts into a frenzy as the team scores in style.

The team started its 2016 season promotion campaign into division 1 with a 2 – 0 win over Zimba United Football Club at Kanzinze Stadium and since then the MCL sponsored outfit has had a string of wins, draws and no loss so far. The team has so far played 12 games with 8 wins and 4 draws with a total of 21 goals for and only three goals against.

Standing at position 1 with 28 points with only 3 games before the close of the first round, the team has all the chances of bouncing back to Division One football next season. MCL has continued its sponsorship responsibility and has procured new nets, balls, boots, jerseys and other equipment for the club. This has propelled the team's morale and performance. With this level of commitment, ZAMCOAL Diggers will surely play Division 1 football next year, as the boys smell the aroma of an upper league and sing, "one, one, wanunkila". We can only wish the boys all the best as they change gear and move towards the Division slot.



■ The Chief Operating Officer, Mr. Gurram Venkata Narayana, handing over assorted sports equipment to ZAMCOAL Diggers Football Club.



## MCL organises school youth soccer tournament

**I**n its quest to improve football in Maamba, MCL sponsored a two – day school youth soccer tournament which took place on the 28th April, 2016 and 5th May, 2016.

The tournament saw schools in Maamba Township compete for the top spot which saw the winner walk away with a brand new set of jerseys and an Adidas Tango ball. All the participating schools received one Tango ball each.

Maamba Mine School emerged winners with Maamba GRZ Schools as runners up. The Sinazongwe Education Board Secretary (DEBS), Mr. Kambunga, witnessed the closing ceremony and thanked MCL Management for the initiative and urged them to consider bringing more of such activities in the future. He further said that such tournaments would not only help Maamba based schools but the entire district as it prepares its teams for the provincial assignments.

Mr Gustaf Jr was adjudged as the player of the tournament.



■ Finalists waiting to receive prizes during the Youth Soccer Tournament sponsored by MCL on 5th June, 2016



■ Chief Executive Officer, Rear Admiral (Rtd) Venkat Shankar flanked by DEBS, Mr. Kambunga, presenting awards during Youth Sports Tournament organized by MCL





■ Current state of the Thermal Power Plant


# Coal Product Specifications

MCL established a modern, Coal Handling and Processing Plant (CHPP) which has facilitated production of washed coal of different specifications with consistent quality and eliminated pollution of nearby streams.

## Product Specifications

Washed Coal Nuts	Parameter	Min & max
	Size	+20 - 50 mm
	Inherent moisture %	1.5 - 1.9
	Total moisture %	3.0 - 9.0
	Ash %	18 - 20
	Volatile Matter %	18 - 21
	Fixed Carbon %	59.1 - 60.5
	Phosphorous % (Average)	0.0025
	Total Sulphur %	0.7 - 1.5
	Gross Calorific Value (kcal/kg)	6294 - 6482

Washed Coal Peas	Parameter	Min & max
	Size	+10 - 20 mm
	Inherent moisture %	1.5 - 1.9
	Total moisture %	3.0 - 9.0
	Ash %	18 - 20
	Volatile Matter %	18 - 20
	Fixed Carbon %	60.1 - 60.5
	Phosphorous % (Average)	0.0025
	Total Sulphur %	0.7 - 1.5
	Gross Calorific Value (kcal/kg)	6294 - 6482

Washed Coal Fines	Parameter	Min & max
	Size	+0.5 - 10 mm
	Inherent moisture %	1.5 - 1.9
	Total moisture %	5.0 - 12
	Ash %	18 - 20
	Volatile Matter %	18 - 20
	Fixed Carbon %	60.1 - 60.5
	Phosphorous % (Average)	0.0025
	Total Sulphur %	0.7 - 1.5
	Gross Calorific Value (kcal/kg)	6294 - 6482

Unwashed Coal Fines	Parameter	Min & max
	Size	+0.5 - 10 mm
	Inherent moisture %	1.0 - 1.4
	Total moisture %	5.0 - 12
	Ash %	21 - 25
	Volatile Matter %	17 - 19
	Fixed Carbon %	55 - 59.6
	Phosphorous % (Average)	0.0025
	Total Sulphur %	1.6 - 2.5
	Gross Calorific Value (kcal/kg)	5824 - 6200

### Maamba Collieries Limited Head Office

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