



REPUBLIC OF ZAMBIA

MINISTRY OF ENERGY AND WATER DEVELOPMENT

**MINISTERIAL STATEMENT ON THE IMPLEMENTATION OF THE
KARIBA DAM REHABILITATION PROJECT**

BY

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Mr. Speaker,

I thank you for giving me this opportunity to update the nation through this August House on the rehabilitation of the Kariba Dam.

As Hon. Members may be aware, the Kariba Dam is a hydro-electric dam in the Kariba Gorge of the Zambezi River Basin between the Republics of Zambia and Zimbabwe. The Kariba Dam, which is a double curvature concrete arch structure, was constructed over the period 1956 to 1959. The dam has a centrally located submerged spillway comprising 6 sluice gates. Each sluice gate has a discharge capacity of 1,500 cubic meters of water per second.

The Governments of the Republics of Zambia and Zimbabwe have mandated the Zambezi River Authority, an organization which is jointly and equally owned by the two countries, with the responsibility of operating and maintaining the Kariba Dam Complex, investigation and development of new dam sites on the shared section of the Zambezi River and analyzing and disseminating hydrological and environmental information pertaining to the Zambezi River and Lake Kariba.

Mr. Speaker,

The Zambezi River Authority, through a series of studies and investigations, identified some safety concerns which pose risks to the structural integrity of the Kariba Dam. These safety concerns are mainly with respect to the plunge pool which is an 80m deep hole in the bedrock

immediately downstream of the dam foundation. The plunge pool requires reshaping to improve its ability to dissipate the energy of the jets of water from the open flood gates when spilling. This reshaping will involve excavation of 300,000 cubic meters of rock. A larger pool volume will limit scouring and erosion that occurs during spilling. The second safety concern was the spillway features of the dam. The concrete on the spillway upstream has deteriorated and requires to be replaced to prevent potential failure ~~which would result in water levels dropping below the minimum operation levels~~. In this case, urgent remedial measures are required to help secure the long-term safety and reliability of the dam. In order to finance these remedial measures, the Governments of the Republics of Zambia and Zimbabwe, through the ZRA's Council of Ministers at its 28th meeting held in October 2009, approved the mobilization of funds to cover the estimated cost of implementing the rehabilitation measures.

Based on the approval, between 2009 and 2012, ZRA engaged Engineering Consultants, Tractebel Engineering of France, who carried studies and investigations, aimed at designing solutions to rectify the identified safety concerns. In July 2012, the consultant submitted design reports of the remedial measures which included the prescription of plunge Pool Reshaping and Spillway Refurbishment as a solution to address the safety concerns. Further, in November 2012, a panel of Experts was engaged by ZRA to review the design reports of the consultants who reaffirmed the overall rehabilitation design and the associated cost estimate of US\$294.2 million.

Based on the series of feasibility and design studies done, I wish to elaborate more on the two major components that constitute the Kariba Dam Rehabilitation Project:

i. Reshaping of the plunge pool and protection of the fault zone in the plunge pool using reinforced concrete mattress.

While the plunge pool was originally intended to be formed from the natural scour (gradual erosion by the force of water jets during spilling), it has progressively widened and deepened vertically to create an 80m deep scour hole in the bedrock immediately downstream of the dam foundations. A hydraulic model was established to assess how the plunge pool scouring progress and excavation works would affect the stress field of the dam foundation. In the absence of measures to prevent the current trend, the scouring would only be controlled if the spillway is operated with no more than three gates ^{to} open ^{at a time}, which would limit the spillway discharge capacity to 50%, thereby adversely affecting the ability to manage large floods.

ii. Refurbishment of the spillway to improve the operation and reduce the risk of possible failure of the upstream spillway control facility.

This will involve installation of an Emergency Gate and a New Gantry (bridge-like overhead structure with a platform supporting equipment such as a crane) for operation of the emergency gate as well as rehabilitation of ancillary infrastructure affected by the swelling of

concrete, a condition referred to as Alkaline Aggregate Reaction (AAR).

Mr. Speaker,

Following the clearly spelled out components of the project, on 23 January, 2013, the ZRA's Council of Ministers at its 30th Meeting approved the formation of the Resources Mobilization Committee (RMC) for the Kariba Dam Rehabilitation Project which was chaired by the Ministries of Finance for the Republics of Zambia and Zimbabwe to mobilize resources for the rehabilitation works. The Committee was mandated to consider all possible sources and modes of financing and to pursue the most economic and quickest mode of project financing considering the urgent nature of the rehabilitation works.

The Resources Mobilization Committee (RMC) held consultative meetings, some of which included engagement with various possible financiers that offered to provide financing on commercial terms and also financing through concessionary loans and grants.

Based on thorough consultative meeting with various possible financiers, the Resources Mobilization Committee (RMC) engaged the following development partners who were offering financing on concessionary terms:

1. African Development Bank (AfDB)
2. European Union (EU)

3. Swedish Government (SIDA); and
4. The World Bank (WB)

It is worth-noting that in engaging the afore-mentioned development partners, the Resources Mobilization Committee took into consideration the cost of financing with regard to the impact of repayments on the electricity tariffs, given the fact that ZRA's operations are financed through the sale of water to the Electricity Utilities for power generation. To this end, the Resources Mobilization Committee settled on concessionary financing as this would have favourable repayment terms with the least impact on electricity tariffs.

In this regard, the total cost of the Kariba Dam Rehabilitation Project is US\$294.2 million and this would be provided by the Cooperating Partners as follows:

Source	Amount (\$Million)		Total (\$million)
	Loan	Grant	
AfDB	39	36	75
SIDA		25	25
EU		100	100
WB	75		75
ZRA	19.2		19.2
TOTALS	133.2	161	294.2

Mr. Speaker,

On account of the financial commitments made by our development partners, the Authority has developed a program of works to cover a period of 10 years. This program provides a clear, predictable and measured response that takes cognizance of the continued safe operation of the dam and its related infrastructure.

The Status of the Implementation of the Kariba Dam Rehabilitation Project

Mr. Speaker,

Allow me to bring to the attention of the members of the house, the key milestones that have been achieved under the Kariba Dam Rehabilitation project. ~~These are as follows;~~

- i. On 20th February 2015, a signing Ceremony for the Project financing was held where the Ministers of Finance in Zambia and Zimbabwe signed on behalf of the Contracting States. All On-lending Agreements have been signed between the Government of the Republic of Zambia and the Authority while conditions precedent to the effectiveness of the loan and grant agreements were met on 21st August, 2015.

- ii. An independent Panel of Experts on Dam Safety was engaged in March 2015 and undertook its first site visit in May 2015. Further, the Panel undertook its second visit in November 2015 and is scheduled to undertake the third and fourth site visits in May 2016 and September 2016, respectively. During each site visit, the panel carries out independent reviews aimed at ensuring successful implementation of the project.
- iii. The Environmental and Social Impact Assessment study for the project was completed in July 2015. The study was carried out with a view to ensuring that the project is implemented in an environmentally sustainable manner.
- iv. On 16th December, 2015, the Contract for the Technical Services & Supervision Consultant who will be responsible for reviewing the technical designs and preparing project tender documents was signed. The consultant is currently carrying out the review of the Designs and will also prepare tender documents for the actual works to be undertaken.

Mr. Speaker,

The Kariba Dam Rehabilitation Project is required to avoid a potential emergency situation. Without reshaping the plunge pool and refurbishment of the spillway upstream facility, the Kariba Dam will not operate as

intended. The limitation with regard to the operation of the spillway gates as well as the deepening of the plunge pool has put the Dam at risk as the Authority may not be able to operate all the six gates at once. This has the potential to hinder the Authority from successfully managing flood control and therefore implying that the dam's rehabilitation is therefore a very urgent and significant undertaking. In cognizance of this fact, on 4th December 2015, my Ministry convened a meeting with the Cooperating Partners with a view of exploring ways of expediting the rehabilitation process. At this meeting, the following milestones were agreed upon:

- 1) The contract for the Plunge Pool reshaping works will be awarded in November 2016 with the works being scheduled for completion by December 2019; and
- 2) The contract for Spillway gates refurbishment will be awarded in June 2017 while the rehabilitation works are scheduled to be completed by December 2025.

Mr. Speaker,

In addition to the above and in order to ensure that these works are completed as scheduled, the following measures have also put in place:

- a. A Project Steering Committee (PSC) was set up to oversee the implementation of the project and to also ensure timely resolution of issues;
- b. A coordination Mechanism was agreed upon amongst the Cooperating Partners with a view to ensuring greater transparency in project implementation and information sharing;
- c. The Coordination roles for each cooperating partner were agreed upon as follows:
 - i. The World Bank would perform the role of Secretariat for all Joint Missions;
 - ii. ZRA and Cooperating Partners would convene bi-weekly meetings; and that
 - iii. Bi-annual Joint Missions meeting will be held at which the Directors of Energy from the two Contracting States would brief the Cooperating Partners on the progress recorded regarding the implementation of the project.

As a Ministry we envisage that the above measures will be critical in ensuring the successful implementation of this important bi-national project.

Further, members of this August House may recall that in the statement I made on the power crisis, I did stress that based on the rainfall forecast for the 2016 season, which our Meteorological Department indicated would be normal to below normal, the Authority allocated 20 billion cubic meters of water to be shared equally between ZESCO Limited and Zimbabwe Power Company for power generation activities at Kariba. This represented a 50 percent reduction compared to the allocation of 40 billion cubic meters in 2015 to the two power utilities. It is important that my Ministry continues to spearhead efforts to ensure sustainable utilisation of the available water at Kariba in the face of below average rainfall.

Honourable members of the house may also recall that I did indicate that it may take up to 3 years of normal rainfall to fill the Kariba reservoir, especially in the wake of this drought. While this is alarming for hydro power generation, the low water levels do, however, present an opportunity for the Authority to expedite the rehabilitation works for the Kariba Dam. This is actually an opportune time at which to undertake the rehabilitation works.

I also wish to dispel rumours that the Kariba Dam has cracks. An array of instruments is installed at the dam to monitor movements, stresses, deformations and discharges. Visual surveillance are also conducted at regular intervals to look for symptoms that warn of a developing failure.

equal This house may wish to note that what is perceived as cracks is actually called "Hairline cracks" which are superficial cracks caused by the expansion and contraction of the concrete. You may also wish to note that,

at its base, the thickness of the Kariba Dam is 24 meters while its crest thickness is 13 meters.

Members of the house will also recall, Zambia experienced a mini tremor on the 9th January 2016. However, this tremor did not leave any structural damage on the Kariba dam.

I thank you.