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CERA Global Association

Virtual Conference – November 2019

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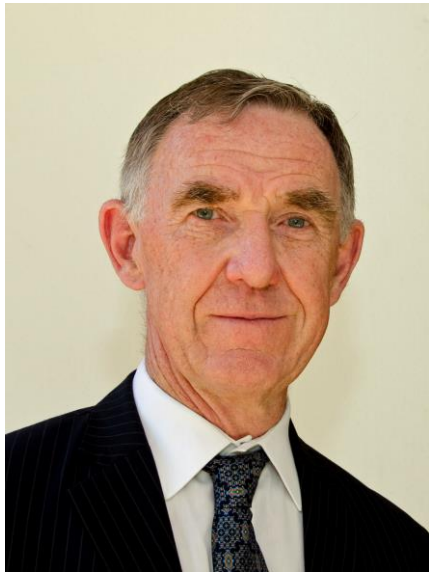
"A CERA IN THE WIDER FIELD

Lessons learned when things go wrong"



Arthur Els ***(FIA FASSA CFP CFA CAIA FRM CERA)***

Senior Actuary

SNG ARGEN Actuarial Solutions

Johannesburg, South Africa

Symbol of an actuary in the non-financial arena!

- concrete
- steel
- electronics etc

Expect to be bruised!

Risk

Actuary in a hard hat

Arthur Els shares some of his experiences in a major construction company after taking the CERA qualification and encourages others to venture beyond the financial arena

The Chartered Enterprise Risk Actuary (CERA) qualification is opening new doors to actuaries. We have traditionally been restricted to financial institutions but now have an opportunity to add real value in the non-financial business arena, which dwarfs the financial arena. As a CERA I was fortunate to be appointed to the chief risk officer's task team in a major construction firm three years ago.

I have been a pension fund valuator, an well as a life office statutory actuary, and thought that I had a good idea of what risk involves. However, my exposure to the construction industry has given me a whole new perspective.

Consider a construction company that has won a tender to construct a power plant in a remote area in a foreign country. The price is a fixed amount, and guarantees have been given regarding the project completion date and the minimum amount of power that will be generated.

The list of risks to which the construction company is exposed is mindboggling – funding, counterparty, geographical, the elements, corruption, labour, culture, politics, and many more. Yet there are many non-financial companies whose regular business it is to take on this level of risk.

It is not easy for actuaries to enter the non-financial business world, since the CERA qualification is still unknown outside actuarial circles. However, the marketing material provided by the CERA Global Association is helping to raise our profile.

I have also found helpful the chapter in Robert J Chapman's book, *Simple Tools and Techniques for Enterprise Risk Management*, which gives practical advice on securing a consulting appointment.

Being part of my client's CRO task team gave me exposure to other professions that I would not normally encounter as an actuary, including engineers and corporate lawyers. I quickly came to realise that engineers, in particular, have a different mindset to actuaries. They work in a world of concrete and have little tolerance for, in their view, 'airy-fairy' concepts such as value-at-risk. This has led to some robust debates during our presentations to the client's executive committee. Fortunately, not all engineers feel this way and those high up the corporate ladder appreciate that the CERA can play a part in the company's risk management.

CERA's role

Large non-financial companies have been doing risk management for many years, but this has generally been limited to mitigating risks based on risk registers. Thus, from my observations, the level of ERM in most non-financial companies is immature relative to financial institutions that need to comply with the Basel and Solvency directives.

The CERA study materials and examination equip the actuary with certain ERM skills and tools. It can add real value in the non-financial arena by incorporating the company's balance sheet in the risk management process – the company bribes aware of its financial risk-bearing capacity (RBC).

The CERA is also able to quantify many of the risks to which the company is already exposed, using the value-at-risk approach. These two sets of values allow the client's risk committee to check that the company has not overcommitted itself and determine what capacity is still available for new projects. The client is thus able to directly link future strategy, the strength of its balance sheet and current risks.

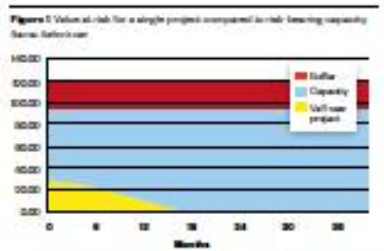
Many of the members of the client's board of directors are non-executive. I have observed that the non-executive directors draw reassurance from the fact that an independent and impartial ERM report, the CERA, is involved in the compilation of risk reports that are presented to them.

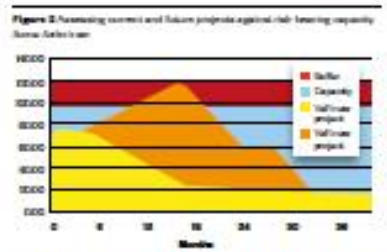
Risk appetite

The RBC exercise determines the amount of capital that is available to meet expected and unexpected losses. We currently take this as the value that a potential debtholder would place on the company, using a derivative of the Merton model.

One input in the probability of the company defaulting on its debt. Thus the company's credit rating is a major factor, and any changes in credit rating have a very substantial impact on the level of the RBC. This is particularly relevant in South Africa at the moment – the sovereign rating is hovering just above junk status, which impacts the credit rating of South African companies.

The company needs to decide how much of the RBC it is willing to place at risk, that is its 'risk appetite'. For this we re-run the RBC exercise but assuming a credit rating one notch lower than the actual credit rating. This has resulted in the risk appetite being set at about 80% of the RBC. We show this figure in our reports to the risk committee, but the final decision lies with the board of directors.





Value at risk

The value-at-risk (VaR) for a project is the figure that is expected, with 95% confidence, to exceed losses arising from the project.

For this exercise the key risk drivers for the company need to be identified with their probabilities – these are based on historical information adjusted for expected future developments. The methodology is adapted as more is understood about the business and further information becomes available.

Figure 1 gives an example of a VaR run-off profile for a project that has 18 months until completion. Note that as the VaR reduces, the company's capacity to take on more work increases. Our client closely examines the risk graphs when considering taking on new work. It is possible, for example, that the VaR for a potential new project might increase the total VaR above the risk appetite, as shown in Figure 2.

In this case, the client has to consider whether to: not tender for the project; or delay commencement until sufficient capacity becomes available; or enter into a joint venture with another company, which will reduce the client's portion of the VaR.

The inclusion of a CERA in the ERM process has resulted in the risk report becoming an important tool in the client's business strategy.

The non-financial business arena is enormous and actuaries are well placed to add real value in the risk management process. We must grasp the opportunity that the CERA qualification has created, and play our part in that arena ●

ARTHUR ELS is MD of actuary at ARGEN Actuarial Solutions in Johannesburg

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March 2016 · THE ACTUARY 31

The Actuary magazine – March 2016

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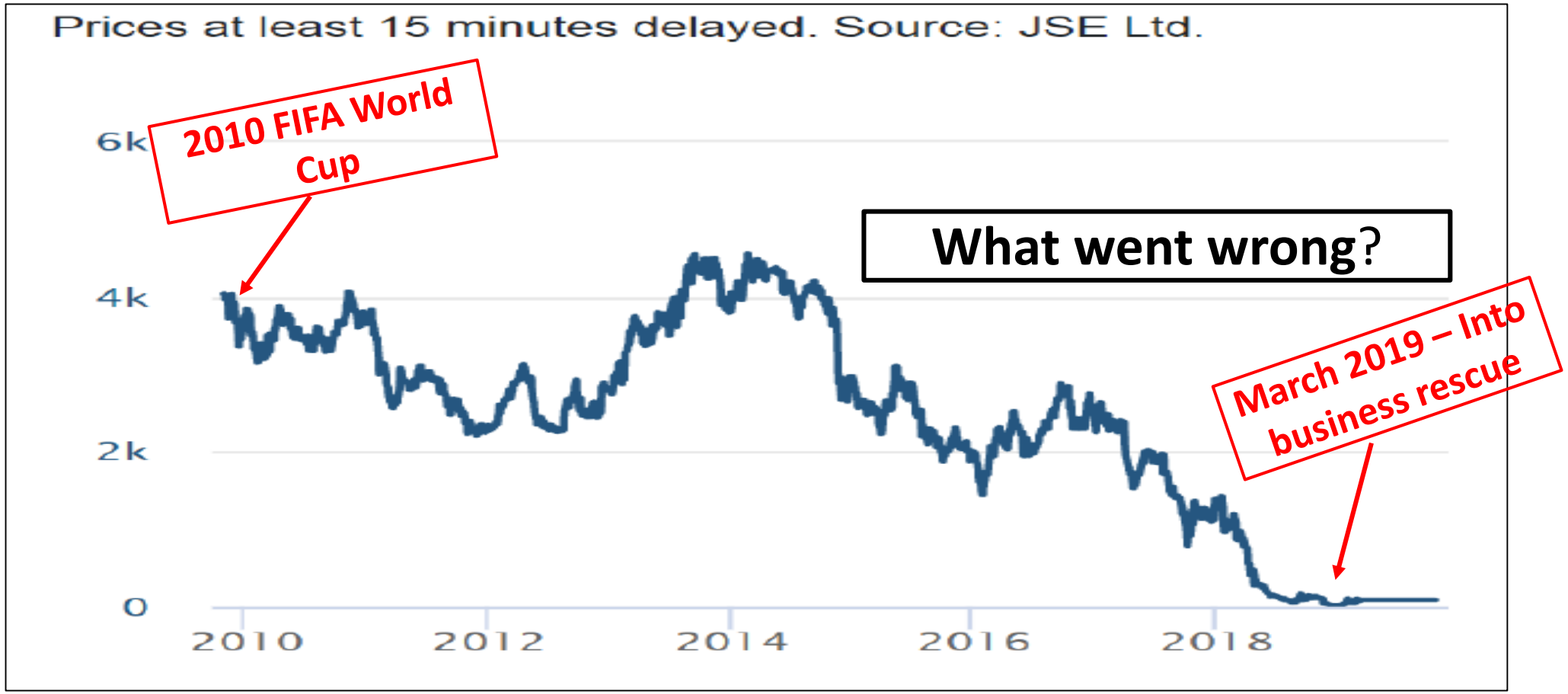
Client's share price (10 years)



Source: Sharenet 29.08.2019

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Purpose of this presentation

- For us, as CERA's/actuaries,
  - to learn from my experience
  - so that we are better prepared in future

- **NOTE:** I am subject to a confidentiality agreement, thus
  - *"the client",* no names given
  - only publicly available information used

Agenda

1. My entry to CERA wider fields
2. Background to Construction Industry in SA
   a. *Pause – How CERA's can add value here*
3. About my Client
   a. *Pause – How I (a CERA) assisted the Client*
4. What went wrong?
5. Lessons learned
6. Closing

1. My entry to CERA wider fields

1. 2011 - approached a client in construction industry

2. Appointed in 2013
   – *exciting - diverse construction sector!*

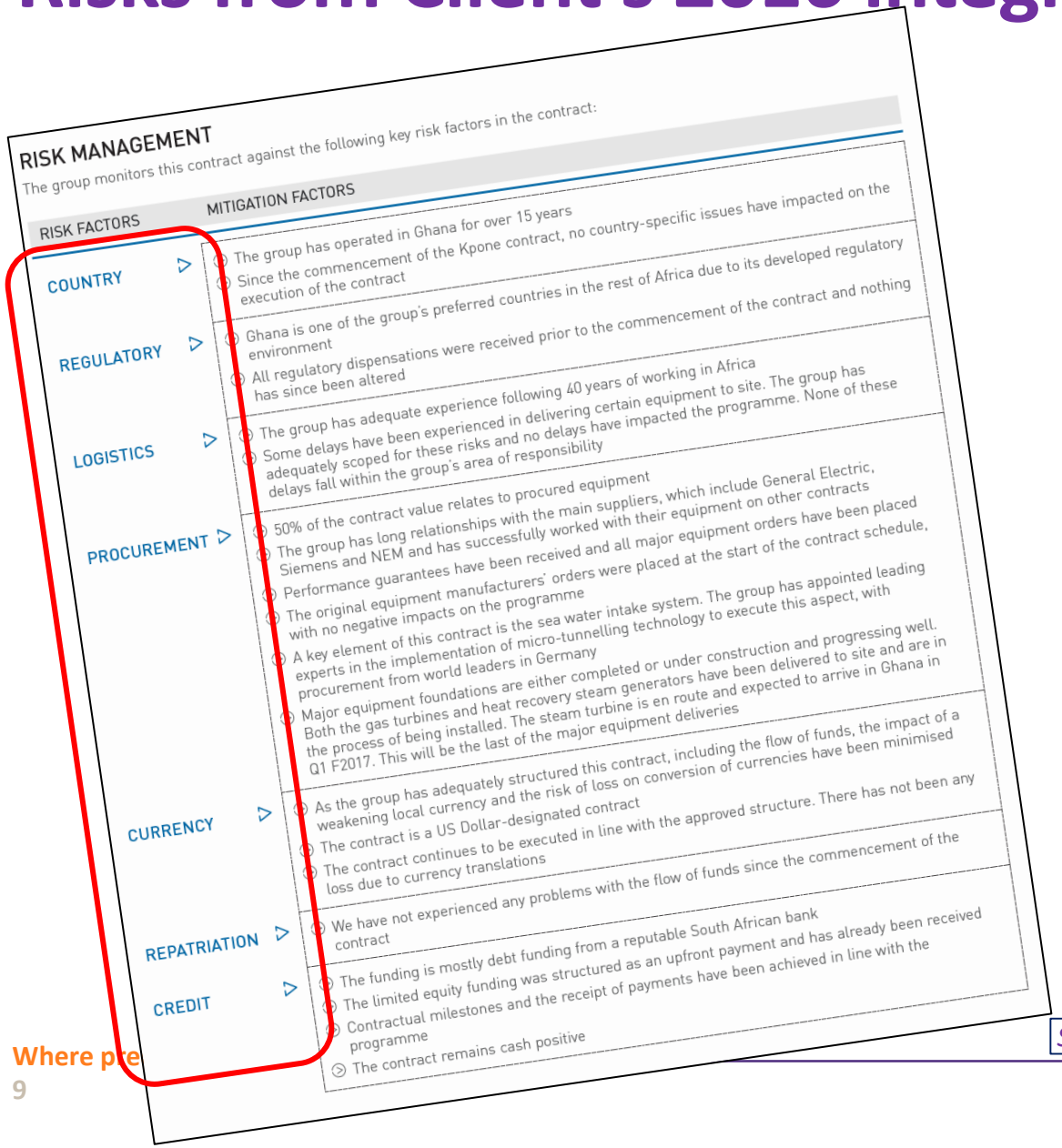
3. Regarding my appointment:
   a. Limited brief
   b. Limited budget
   c. Reported directly to CRO

   – *little exposure to Risk Committee*

2. Background to the construction industry in SA

1. Risks faced in the construction industry are an eye-opener!

Risks from Client's 2016 integrated report



RISK MANAGEMENT

The group monitors this contract against the following key risk factors in the contract:

RISK FACTORS	MITIGATION FACTORS
COUNTRY	The group has operated in Ghana for over 15 years Since the commencement of the Kpone contract, no country-specific issues have impacted on the execution of the contract
REGULATORY	Ghana is one of the group's preferred countries in the rest of Africa due to its developed regulatory environment All regulatory dispensations were received prior to the commencement of the contract and nothing has since been altered
LOGISTICS	The group has adequate experience following 40 years of working in Africa Some delays have been experienced in delivering certain equipment to site. The group has adequately scoped for these risks and no delays have impacted the programme. None of these delays fall within the group's area of responsibility
PROCUREMENT	50% of the contract value relates to procured equipment The group has long relationships with the main suppliers, which include General Electric, Siemens and NEM and has successfully worked with their equipment on other contracts Performance guarantees have been received and all major equipment orders have been placed The original equipment manufacturers' orders were placed at the start of the contract schedule, with no negative impacts on the programme A key element of this contract is the sea water intake system. The group has appointed leading experts in the implementation of micro-tunnelling technology to execute this aspect, with procurement from world leaders in Germany Major equipment foundations are either completed or under construction and progressing well. Both the gas turbines and heat recovery steam generators have been delivered to site and are in the process of being installed. The steam turbine is en route and expected to arrive in Ghana in Q1 F2017. This will be the last of the major equipment deliveries
CURRENCY	As the group has adequately structured this contract, including the flow of funds, the impact of a weakening local currency and the risk of loss on conversion of currencies have been minimised The contract is a US Dollar-designated contract The contract continues to be executed in line with the approved structure. There has not been any loss due to currency translations
REPATRIATION	We have not experienced any problems with the flow of funds since the commencement of the contract
CREDIT	The funding is mostly debt funding from a reputable South African bank The limited equity funding was structured as an upfront payment and has already been received Contractual milestones and the receipt of payments have been achieved in line with the programme The contract remains cash positive

- **Country** – culture, corruption, labour, politics, revolution, terrorism, climate, geography
- **Regulatory** – domestic and foreign laws, changes in laws
- **Logistics** – transport, costs, terrain
- **Procurement** – supplier, quality, deadlines, lead times
- **Currency** - exchange rates, inflation, repatriation
- **Funding** – availability of credit, cost, equity vs debt, performance bonds
- **Design** – expertise, quality control, flaws, timing, penalties
- **etc etc**

Source: Client's 2016 Integrated report

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2. Background to the construction industry in SA

1. Risks faced in the construction industry are an eye-opener!

2. The guarantees given are mind-boggling
   - example –solar panel plant:

Each solar photovoltaic plant will produce 82.5 MW DC

So the construction company will often design for a higher output to ensure guarantees are met

Source: Client's 2016 Integrated report

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2. Background to the construction industry in SA

1. Risks faced in the construction industry are an eye-opener!

2. Guarantees given are mind-boggling
   - example –solar panel farm:

3. "Performance bor
   deadlines

4. Little new construc
   - 0% profit margi
   - many companies folded

3. We are exposed to other professions e.g. engineers!

There appears to be little light at the end of the tunnel for South Africa's beleaguered construction industry, with many major listed construction companies still fighting for their survival.

Basil Read, Group Five, Esor Construction and Liviero Group are in business rescue while others, such as Aveng, have been forced to downscale their operations to strengthen their balance sheets and improve their liquidity.

Source: Moneyweb 18.07.2019

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2(a) How CERA's can add value in construction sector

1. Usually just use risk registers
2. CERA can assist Board of Directors to:
   a. *Link risks (VaR) to balance sheet (using Merton model)*
   b. *Set Risk Appetite*
   c. *Determine if there is capacity to take on new projects*
   d. *And so help Board with strategy!*
3. *CERA seen as impartial ERM expert – credible in eyes of , especially, non-executive directors*
4. ***Thus definitely a place here for CERA's!!***

3. About my Client

1. Large SA construction company with 40-year history
   - *typical projects (requiring VaR calculations)*

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3. About my Client

1. Large SA construction company with 40-year history
2. Robust ERM framework

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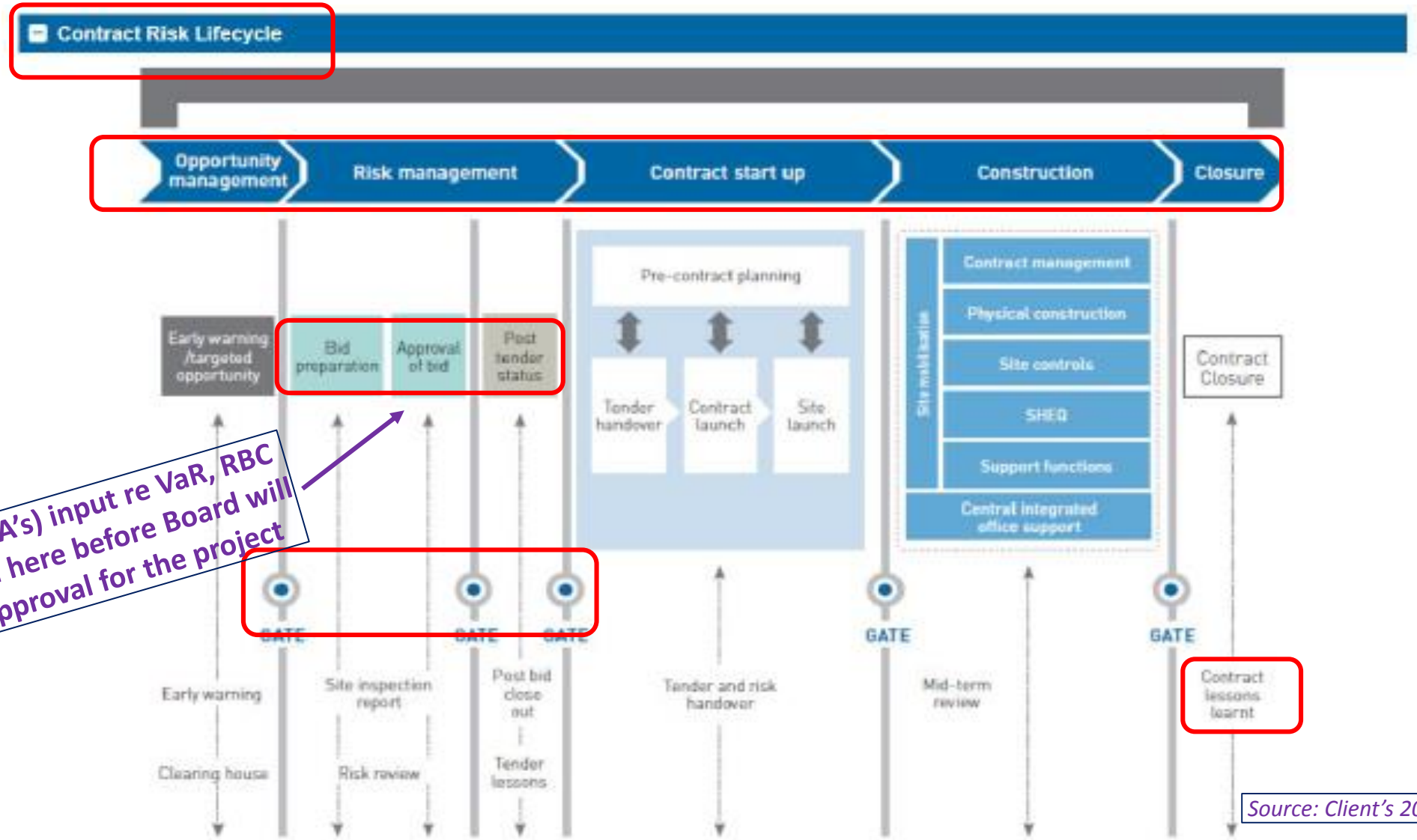
Risk management framework



My (CERA's) input re VaR, RBC required here before Board will give approval for the project

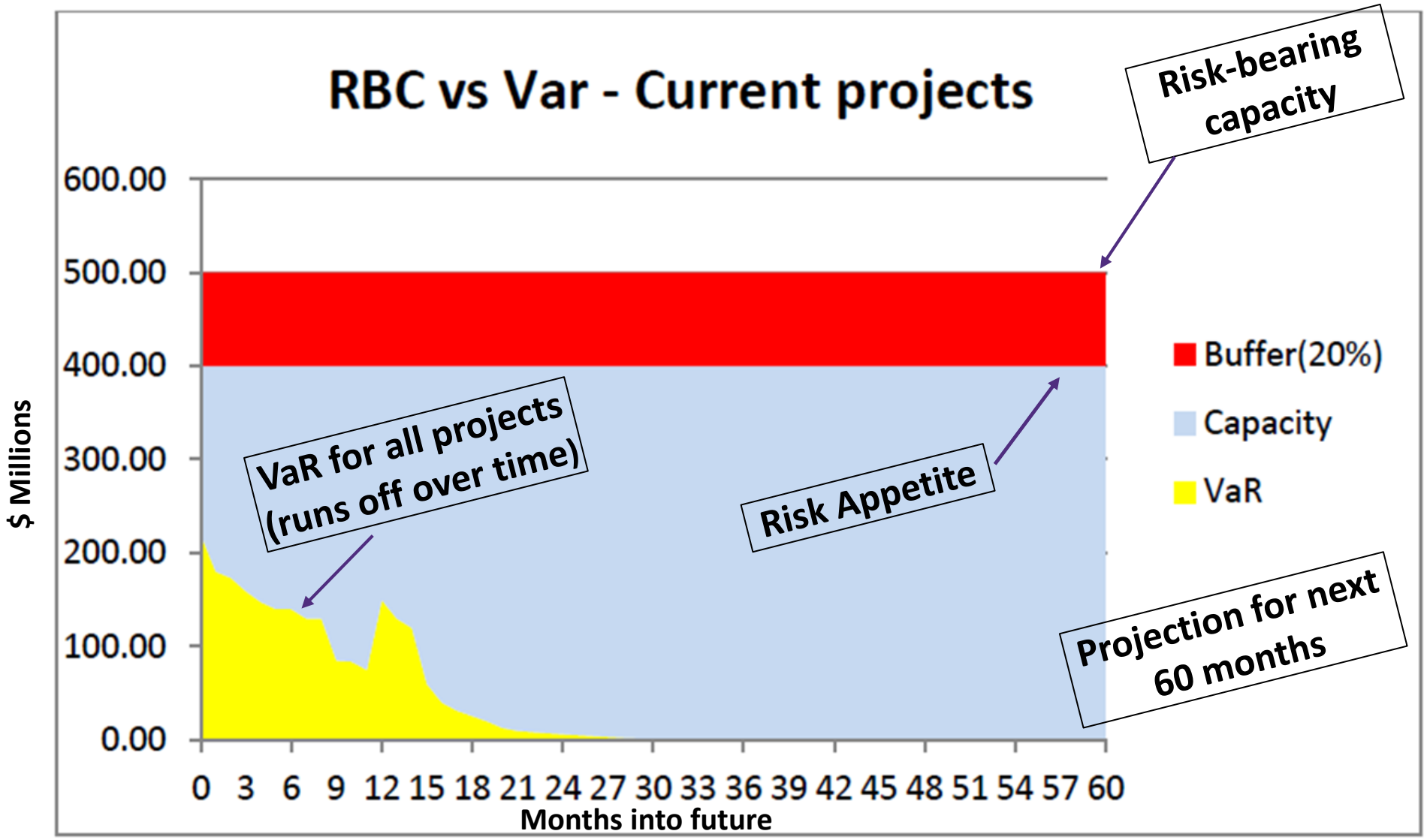
Source: Client's 2016 integrated report

3. About my Client

1. Large SA construction company with 40-year history
2. Robust ERM framework
3. Shareholder pressure ⇨ seek work outside SA, riskier projects

3(a) My CERA work at Client

1. Appointed by client in 2013
2. Took two years to:
   a. *Determine main risk drivers (experts)*
   b. *Obtain loss data (a challenge!)*
   c. *Calculate VaR for each of current projects*
   d. *Place value on balance sheet (credit rating =BB then)*
   e. *Set formula for Risk Appetite*
   f. *Determine capacity for more projects*
   g. *Do future projections allowing for run-off of projects*



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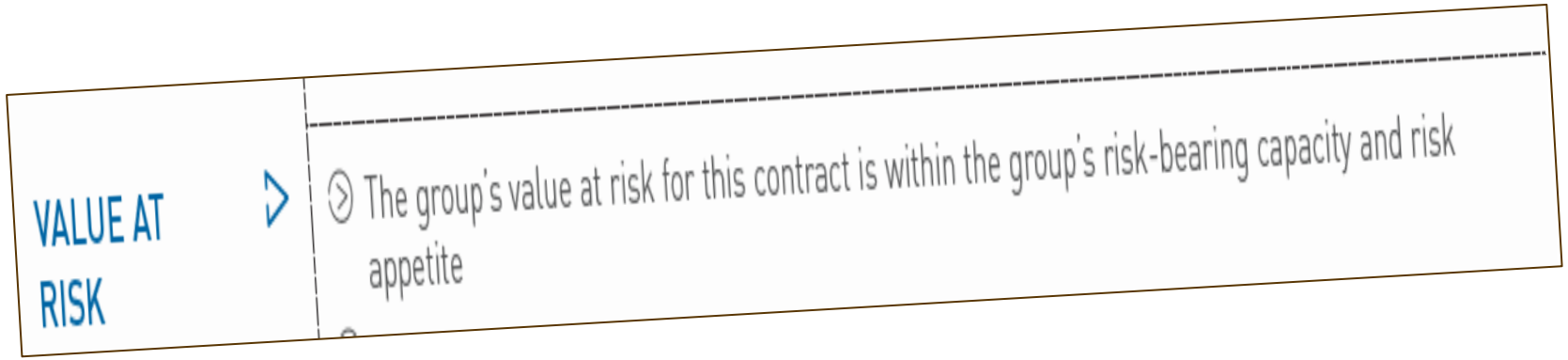
3(a) My CERA work at Client - ctd

3. 6-monthly report for CRO
4. This scientific approach to risk quickly found favour with Board of Directors
   a. *Board would not approve a project without this report*
   b. *CERA's work mentioned in annual reports:*



5. CERA assisted Board to set <u>strategy</u> for company
   a. ***This is where CERA can add real value!***

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4. What went wrong at Client?

1. Substantial losses made on $400m power plant project
2. In addition, missed deadlines ⇨ penalties of $106m
3. Reasons for loss:

NB: This is my personal view based purely on publicly available information

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Problems with Power Plant project

Delays in design, tunnelling

the contract is expected to be completed in the fourth quarter of the 2017 calendar year.

As outlined with the F2017 interim results release in February 2017 and in the market announcement in May 2017, design and certain tunnelling delays have been experienced. The tunnelling delays have been resolved and the completion of the steam pipe system, as well as the on-shore and off-shore seawater intake chamber system is now on the critical path to completion.

The design delays, together with the late arrival of procured items on site following a change in Ghanaian law during the contract, negatively impacted the completion date. These delays will result in a completion date post the contractual date, with potential penalties. However, when considered together with claims on the contract to which the group has assessed its entitlement, we do not expect this to further negatively impact the contract's profit recognition reported to 30 June 2017. The contract continues to receive dedicated senior and executive management attention in line with its contract size.

Missed deadline – penalties

Source: Client's 2017 Integrated Report

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Problems with Power Plant project (ctd)

The design challenge had been identified previously and mitigated:

- A key element of this contract is the sea water intake system. The group has appointed leading experts in the implementation of micro-tunnelling technology to execute this aspect, with procurement from world leaders in Germany

- An essential element is the professional design input. The group has contracted with reputable partner RSA and USA as the design engineering partner. Their scope includes concept and detail design, procurement, construction and commissioning support until handover to the client's team

Source: Client's 2016 Integrated Report

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5. Lessons learned

I believe that there are 4 main lessons to be learned:

Lesson 1:

CERA's can add value in the non-financial arena

Be bold - plant the seed and be patient!

Lesson 2:

Include in your brief: scenario analysis, stress testing

Lesson 3:

Ensure that client understands limitations of VaR

Lesson 4:

Develop a close relationship with the Risk Committee

6. Closing

I was recently told by a (non-CERA) actuary:

"What a pity that this had to happen to you, Arthur. It has destroyed the 7 years of good work that you have put in."

My View:

- *profit-driven companies need to take on more risk than public-interest entities*
- *hence must expect things go wrong from time to time*

CERA's and actuaries: When things go wrong, don't give up – learn, and continue!

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Thank you!

Arthur Els

PS: Some good news - the business rescue managers have announced that 3 500 of the 9 000 jobs at the Client have been saved