

HARNESSING THE POWER OF CHANGE



Professor Anthony Turton is a political scientist with 24 years of strategic level experience. In an exclusive interview, he shared his involvement in the water and mining industry with Debbie Besseling.

What is your role in the water and mining industry in South Africa?

The reality is that South Africa is a mining-based economy, which for the last 120 years of mining has been largely unregulated. As a result there are now a number of unintended consequences. Mining is useful, but it has been harmful in the past due to inadequate oversight and governance. The work that I am involved in is to assist the mining sector, to reposition themselves in

a way whereby they can harness the overall benefits of mining, which are many. In doing so, this will ultimately decrease the dis-benefits, in other words, the environmental footprint and associated impact. This will result in redistributing the benefits to society in a more equitable manner.

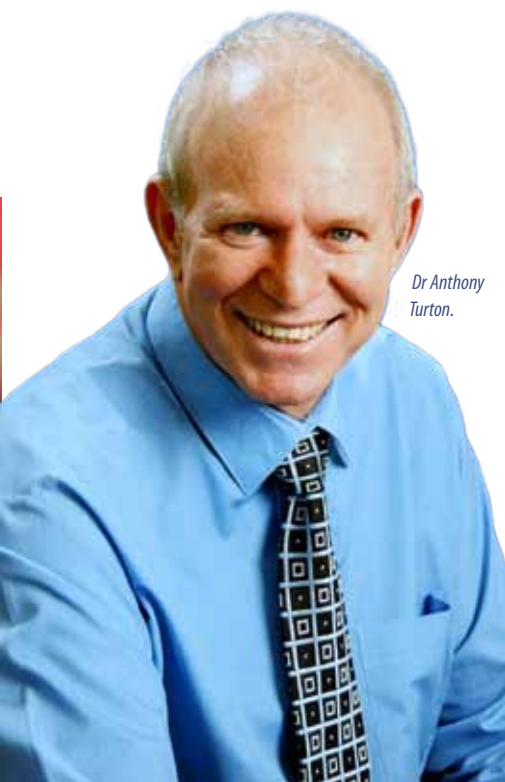
It is about understanding how to reinvent a business case that will enable you to still raise capital in mining, but in areas that are water constrained, and in many cases environmentally sensitive, as well as both culturally and extremely significant.

Overall the model brings about greater equity in mining, whereby mining then repositions itself from being a standalone entity that is extractive, to becoming a partnership for development. This involves resourcing the closure strategy

throughout the life of the mine. Three aspects are critical being, technology, capital and oversight known as governance. When you bring these three elements together you are planning for the entire life cycle of a mine.

What is your motto “harnessing the power of change” about?

My entire life, I’ve lived under conditions of extreme uncertainty, for reasons of which I’ve had no control and the only thing that I know is that change is constant. If you can understand the magnitude of the change and the driver of the change, it will position you in such a way that you can actually, potentially, benefit from that change. In my role as a strategist, I help my clients to understand the power of change and how to harness that through strategy.



Dr Anthony
Turton.

What is your role in terms of being a strategic advisor?

The difference with strategic issues are that they typically have a very long time horizon, they typically have multiple drivers or entry points and they are typically very high impact if you don't get it right.

I advise my clients about the risks and opportunities that are arising from their changing world. Within that process of change, there are lots of risks, but there are also opportunities.

A good example of this is in the work that I am currently involved in, in the mining industry. Typically the business case for mining is such that you start off with an asset, the resource in the ground, and you end up over the life of a mine, with a liability. At the end of the life of the mine, you cannot sue the mine because there are no more assets.

One just needs to consider what is going to happen in South Africa with our water resources, 25 years from now, taking the impact of climate change into the equation. Why don't we use a mining void as an alternate method of strategic storage? Instead of having a liability at

the end of the life of mine, the liability can be converted into an asset? It is about understanding the unknown and stepping out of the box.

Tell us about the Water Stewardship Council Trust of South Africa?

I am involved in a public-benefit organisation (PBO) of which I am a founding trustee, known as the Water Stewardship Council (WSC) Trust of South Africa. Overall, the WSC trust is about helping people to understand how we have to change our behavior from being consumers of water to becoming custodians of water, and doing that in a way that's underpinned by positive inducement. The Mission statement is: incentivising behavioural change from consumption to the custodianship of water through structured stewardship programs that are based on a set of clearly articulated core values.

You have been developing a mine closure strategy that will inform the design criteria of future mining operations in water-constrained areas. Can you provide an insight into this project?

Mine closure is a serious problem not only in South Africa, but globally. In South Africa, there are some 12 000 mines that have reached the end of their life, but have not been closed according to legislation, i.e. there are no formal closure certificates.

Mine closure is something that I am deeply involved in now, whereby we plan the entire life of mine upfront. Part of the closure strategy is to limit the negative impact of mining and to turn water infrastructure into a useful asset.

I have been involved in developing what is called a Legacy policy for a client of mine. The significance of this is that it changes the business case for mining. Instead of now having to set aside a massive amount to pay for the liability at the

end, if it is turned into infrastructure or even an engineered aquifer that is useful, the result is a nett benefit to society post-mining. This makes mining more attractive from an investment perspective while reducing the negative impacts and thus opening up a broader basket of benefits to be shared by a larger range of beneficiaries. Overall it creates a good environmental outcome and social outcome and it is a good business transaction. I call this the new social charter for mining.

Which individual has had a great influence on your life?

I attribute part of the success in my career to the fact that I have adopted mentors throughout my life. I have accepted that I cannot know everything and have associated myself with people that are outstanding in their particular field of expertise.

One of those people is Malin Falkenmark. She is a remarkable woman who I first got to know from her work in the 1980s when she was doing her post-graduate research. At that time, she asked a simply question that no man had ever thought to ask: Is there a finite limit to number of people that a given unit of water can sustain?

In 1989, the work she did on this topic was published in a paper in *AMBIO – A Journal of the Human Environment*. That paper was one of the most important papers that I have ever read in my life. It explained what she called the water barrier. Malin undertook a global study and her findings were that there is no evidence of a country retaining its social cohesion and economic stability where there are more than

“One just needs to consider what is going to happen in South Africa with our water resources, 25 years from now, taking the impact of climate change into the equation.”

A paddock below a large tailings dam filled with acid mine drainage and inside a large wetland that is severely degraded. Turton is currently developing a closure strategy that will rehabilitate this wetland by using the existing aquatic ecosystem as the foundation of the rehab.



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Below: Hydraulic mining of a large tailings dam as part of a rehabilitation programme.

Bottom: Dr Anthony Turton at an abandoned mine shaft that has been opened by illegal miners.

2 000 people per million m³ of water, per annum. I am therefore alarmed that in Limpopo we are already double that value and will be two-and-a-half times over it by 2025, which could drive the loss of social cohesion if left unmanaged. This is central to my current thinking on mine closure strategies.

In 2011, Malin was awarded a lifetime achievement award by the

Royal Swedish Academy of Sciences (RSAS). I was invited to come to Stockholm as a guest of the RSAS to celebrate the lifetime achievement of Marlin. Unbeknown to me, part of her prize was that she could invite up to 10 scientists from anywhere in the world that she thought had made a difference. I was one of seven scientists that she had chosen and was humbled with this honour.

What research projects have you worked on more recently?

I have been involved in significant international research work and in this year have had a large publication output, with four major international publications. Overall, the research that I have been involved in is based on preventative outcomes and is very much goal specific.

One of the four high impact projects that I have undertaken this year is a research project that is being published in the *International Handbook of Engineering Hydrology*. This is the first paper on engineering an aquifer as part of the deliberate mining act that I am aware of. We are describing what is called an anthropogenic aquifer. This concept involves taking an opencast mine, and as part of the formal closure strategy, turning it into an engineered aquifer. I conceptualised the idea and it forms part of the mine closure strategy for one of the mines in South Africa. This is one of the

first mines that I know of that has been planned for closure before it has even been opened. It has gone in as part of the definitive feasibility study, to raise capital for the mine and has given rise to a whole new way of thinking, but there are still many engineering problems to overcome as the concept has not been tried before. These are baby steps in a new direction.

A team of researchers being led by Malin Falkenmark, of which I am one, have written a paper entitled: Water Source Management in Anthropocene, also being published in *AMBIO*. The paper focuses on the geological epoch in which the earth formation processes are being impacted on by humans. We have transitioned from the Holocene to the Anthropocene. We are thus 1st generation Anthropocenians. Management of water in the Anthropocene is going to differ fundamentally from what it was in the Holocene. Therefore all our science and technology is no longer adequate, as it is based on Newtonian physics and reductionist Holocene logic.

The *Bulletin of Atomic Scientists* currently has a round table underway. The topic is the role of nuclear energy in water resource management under conditions of climate change, and they commissioned me to write a series of articles. People worldwide may participate in the discussion. My comments on this have been that whilst I am not necessarily pro-nuclear, I don't see a future in which the survival of the species will not depend on us understanding nuclear energy and doing useful things with it, and one of these technologies will be desalination.

I am co-author to two chapters of the *UN World Water Development Report 2012* (Chapters 5 & 11). This forms part of Volume 1: *Managing Water under Conditions of Uncertainty and Risk*.

- To view the interview with Dr Anthony Turton, Visit: <http://youtu.be/xRULvoVzU1Q> 



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