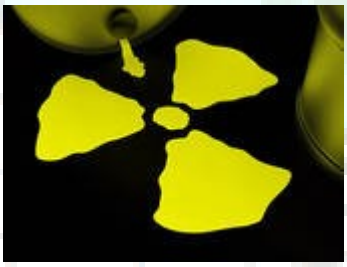
URANIUM MINING IN MALAWI



PERSPECTIVES ON NATIONAL LEGISLATION

THE LICENSE TO LOOT AND PLUNDER

Prepared by

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FOREWORD

"In 2006 the Managing Director of Paladin John Borshoff said, "Australia and Canada have become overly sophisticated ... *There's been an over-compensation in terms of thinking about environmental issues and social issues", forcing companies like Paladin into Africa"*. Melbourne Sun Herald, April 3rd, 2006. This is the same company which claims to export Australia's best mining regulatory standards.

Sub-sahara Africa has been ranked as a top destination by the mining industry, arguing that the region is in tandem with good governance principles. The reality on the ground however is different. Most Sub-Sahara African countries score poorly on the governance index, enforcement of legal and policy frameworks is almost non-existent. It's therefore important that countries which are a target of western mining companies put their legal and policy frameworks in order.

One of Citizens for Justice-(CFJ) primary objectives is to ensure that the mining industry complies with the international human rights principles and principles of ecologically sustainable development and social justice to ensure that necessary policies and practices are in place to protect public interest. As an institution, we have gained significant expertise in the application of the international human rights law and environmental protection principles to the mining sector.

CFJ has been involved in policy and legal review of the mining sector in Malawi and it's in that light that we instituted a study of the policy and legal frameworks regulating the uranium mining industry in Malawi. It has to be acknowledged that Government of Malawi granted Paladin Energy Ltd a license to mine uranium before the necessary legislation to regulate the uranium industry was developed. You rush, you crash.

Following civil society calls, legislation was introduced at a later stage. Citizens for Justice-(CFJ), Centre for Human Rights and Rehabilitation-(CHRR), Institute of Policy Interaction-(IPI), Catholic Commission for Justice and Peace-(CCJP), Foundation for Community Support Services-(FOCUS), Uraha Foundation Malawi-(UFM) and other members of the mining network were among the key actors that pressed government to protect the environmental and human rights laws.

Our active interventions in the mining policy and legal review are geared at ensuring that the industry respects, promotes and supports Economic, Social and Cultural rights in Malawi and this piece is therefore a review of the Mines and Minerals Act, the Uranium mining legislation, the Atomic Energy Bill and explosives Act and other policy and legal frameworks regulating the uranium mining industry in Malawi.

Firstly, poorly regulated mining activities have a devastating, long-term effect on the environment, the social situation and public health. This risk is highest in Uranium mining as opposed to other forms of mining due to the

radioactivity of the ore and the tailings and the toxicity of the heavy metal uranium. Due to generation of radioactive and toxic dust, mining uranium in an open pit makes the process even more disastrous, negatively affecting the health of the workers and communities surrounded by the industry.

Radiation is harmful to all living things on the planet, and the genetic heritage developed over millions of years can be lost forever if radiation is allowed to mutate and damage animal and plant genes. This is more reasons why uranium mining has to be regulated by stringent mining standards so that best available technology is utilised. The industry has for a long time argued about practicable technology, but this is wrong because it allows the uranium mining companies to employ cheap mining methods with the intent of maximizing on profits.

Sadly for Malawi, our uranium legislation allows uranium mining companies to dispose of hazardous effluents into the river systems and the environment and then it reports such disposal to the government. Such hazardous effluents contain un-treated water which can pollute the river systems and the environment. This practice is criminal in countries like Australia where most of the uranium companies operating in Malawi are from. We believe that the industry is getting away with in this kind of behavior in light of what John Borshoff said to the Australian people---these are double standards which will cost the life of generations of Malawians.

It is also shocking that some mining companies seek legal exemptions. Legal agreements between the Malawi Government and the mining industry should not have stabilization clauses. Such a practice prevents governments from making improvements in the environmental laws that apply to strengthen the environmental protection from time to time. In countries like Australia, the law clearly states that the operation will be subject to whatever legislation to protect the environment or public safety as is put in place from time to time- there is no requirement to compensate the company for the cost of measures to ensure that Australian public is protected from the impacts of the operation. It's only fair that such practice be exercised in Malawi. Attempts to the contrary constitute double standards by the companies which claim to export best practice.

Malawian citizenry should lobby for stringent uranium mining standards and this will only happen if the government heads to the voice of its people by introducing policy and legal frameworks which protects, promotes and defends the human rights so that Malawians should enjoy a clean and safe environment.

CFJ is indebted to the Dutch government for the support it provides through the International Alliance for Natural Resources in Africa-(IANRA) to allow us undertake this work.

The International Alliance on Natural Resources in Africa (IANRA) is a grouping of civil society organisations which are concerned with natural resource use and exploitation and its implications for pro-poor development in Africa and that promote and support community-centred, sustainable natural resources management on the continent.

As IANRA, we believe that communities should not be disadvantaged by natural resource use or extraction and we strive to promote equitable benefits in communities impacted by Natural Resources use or extraction for the greater good of their societies. IANRA supports and encourage people's participation in the development process as the norm or the policy and not an option or a privilege.

It is our hope that this publication will draw more interests for Malawians to engage in debates regarding the economic benefits, risks and liabilities brought about by mining in our "warm heart of Africa".

Enjoy the read and the debates.

Reinford Mwangonde
Executive Director
Citizens for Justice-(CFJ), Friends of the Earth Malawi
March 1st, 2011

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1. URANIUM MINING REGULATIONS

1.1 INTRODUCTION

In 2006 the Malawi government gave consent to an Australian company, Paladin Resources, to undertake a feasibility study on the Kayelekera uranium deposit in the north of the country which it conducted and completed in the same year. The mine is currently estimated to contain about 11,600 tonnes of high-grade deposits, and, at an expected production rate of 1,270 t/y, would have a lifespan of 10-11 years. The government expects the mine to generate US$1.6bn in tax revenue during its lifetime.

In 2008, the Malawian government made a decision to exploit its uranium reserves, inviting junior Australian mining company Paladin to mine and process uranium at Kayelekera. This decision was accompanied by numerous expressions of public concern, based mainly upon the lack of consultation with affected people and the lack of appropriate legislation and regulatory systems designed to deal with nuclear materials. In response, the Economic and Legal Section of the Special Advisory Services Division of the Commonwealth Secretariat in London prepared a set of draft uranium mining regulations for the Government of Malawi in October 2008. These were provided to Civil Society Organisations (CSOs) in Malawi for comment in early 2009.

This paper is a critique of the draft uranium mining legislation in Malawi prepared for the Commonwealth Secretariat in the anticipation that the discussions to follow lead to the development of a comprehensive and coherent regulatory and legislative framework. Among others the anticipated regime is expected to deal with the question of uranium mining with due reference and regard to the values and principles of the constitution of Malawi and the Commonwealth.

Purpose

The paper therefore aims at generating constructive criticism through an impartial debate on the issues raised particularly those addressing deficiencies in the mining regulation. Specific areas of interest include; environmental and ecological sustainability, workers' and community health, community cultural and socio-economic safeguards and fair public-private partnership agreements. It is our conviction that economic development from mining is only possible where there is a proper regulation of prospecting and extraction activity designed to ensure economic viability to investors as well as equitable benefits to Malawi and her citizens while eliminating undue environmental, health and socio-economic risks and liabilities for current and future generations of Malawians.

We urge the Commonwealth Secretariat now and in the future to develop its recommendations to the government of Malawi by consulting beyond its traditional sphere of knowledge and practice. Although there is an expectation from the mining industry that rapid resolution can be achieved, there is also an expectation from other affected parties that wide and on-going consultation and several iterations of the draft regulations may be required before a final document is issued.

The contents of this critique have to a great extent already been drawn from the Commonwealth which has an extensive history in the global and Africa region mining industry. In particular are experiences in tropical environmental management and in the administration of Australian Commonwealth and Northern Territory legislation and regulations as they apply to uranium exploration, mining, production and transportation.

Benchmark

Specifically, the regulatory system to which the draft mining regulation are evaluated against is that applied to the Ranger Uranium Mine situated adjacent to a World Heritage Listed National Park (Kakadu) in Australia's Northern Territory, making is necessary to institute the highest

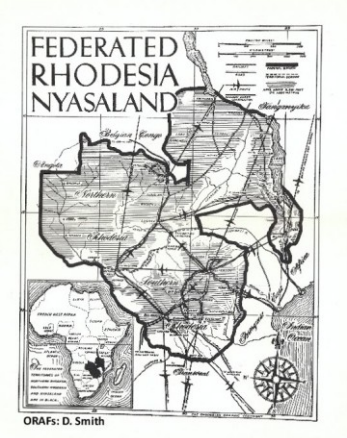
regulatory standards in the world. The 30 years old plus system has therefore stood the test of time. The methods at use in Ranger offer a dynamic system that allows continual review in line with advancing best practice in the technology applied to mining and milling of uranium. It is a system that encourages input from all affected parties with the aim of continually improving the standard of environmental, health and safety management while ensuring profitable production of uranium.

As an institution with an interest in the extractive industry, Citizens for Justice-(CFJ) is committed to ensuring that such standards characterize mining legislation and regulation Malawi.

The Australian experience has shown that addressing the emotive, health, safety and environmental issues associated with all facets of the nuclear industry is of vital importance. Regulatory systems and legislation must be strict, high in quality and well thought out if the risks and dangers associated with the nuclear industry are to be dealt with in an appropriate manner. Ensuring this is done properly is an administratively and politically intensive, difficult and time-consuming process requiring the support of other uranium producing countries and worldwide bodies such as the International Atomic Energy Agency (IAEA). In the same vein, Malawi should not have bargained for less or lower standards.

Consequently, CFJ had recommended that the Commonwealth Secretariat and the Government of Malawi should have considered seriously what can be learned from the Australian experience; and accept the recommendations and criticisms contained within this document when it embarked on revising its own draft regulations into a final form for application to Malawi's nuclear industry.

1.2 HISTORY OF MINING LEGISLATION IN MALAWI



To understand the challenge facing mining legislation in Malawi it is important to appreciate that unlike its neighbors Malawi then a British Protectorate Nyasaland was never established to become a mining economy. Unlike Zambia and Zimbabwe Malawi was fore most considered to be a labour reserve. The backbone of the colonial economy was a struggling plantation economy and this policy was carried forward by the first president Dr Hastings Kamuzu Banda

Mining Legislation in Nyasaland was conceived on exclusively corporate and colonial interest terms.

The Federation of Rhodesia and Nyasaland is in Central Africa, and of great strategic importance to the British colonialists. The countries included in the Federation possess tremendous reserves of such valuable minerals as copper, coal, gold, chromite, asbestos and manganese. Their mining industry is well developed, and the Federation occupies second place in the world in copper production, (Federation of Rhodesia and Nyasaland, International Affairs, No. 5, Vol.5, 1959, page(s): 104-105, Minneapolis-Moscow, USA-Russia)

"Supreme power in the Federation is exercised by a British governor-general. The governor bases his actions on a so-called Federal Government consisting of Europeans (representatives of the local bourgeoisie) and a Federal Assembly. The latter is so formed that Europeans, comprising 4 per cent of the Federation's population, occupy 80 per cent of the seats, i.e., have 47 deputies, whik" the Africans with over 7 million people have only 12.

In actuality, the real masters in the Federation are the big British and American monopolies, and mainly the British South Africa Company founded by the well-known British colonialist, Cecil Rhodes. Until 1923, this company ruled the territories of Southern and Northern Rhodesia and was also undisputed, master of the neighbouring British protectorates of ..."

1.3 OUR CRITIQUE OF THE PROPOSED REGULATIONS

In 2009 the government of Malawi made the following pronouncement during the 2009/10 Budget Statement, delivered to the National Assembly 45th Budget Session by the Minister of Finance, Hon Ken Kandodo.

> *95. Mr. Speaker Sir, let me now address tax revenue measures. During the first term of His Excellency Ngwazi, Dr. Bingu wa Mutharika, Government made great progress towards creating a tax regime in this country that rewards real investors without being open to abuse. We saw our first large investment in mining in the region of US$200million, at Kayelekera.*

The above pronouncement was made under the Tax Revenue Measures highlight the significance of uranium mining to the Malawian economy.

Recognizing that governance within Malawi is primarily the responsibility of the Malawi government, and that revenue from the uranium mining at Kayerekera is exclusively collected and administered by the Malawi government, we place full responsibility for development of the legislation in its jurisdiction. The legislation should have therefore been compliant with national and international best practicable technology and practice, the requirements of the IAEA and any commitments that Malawi has to international bodies such as the United Nations.

1.2.1 Legislation

An examination of the proposed legislation reveals fundamental deficiencies and incoherencies requiring alteration or complete reform.

The need for relevant legislation to support the regulatory framework is therefore indispensable. Section 2 requires compliance with the Mines and Minerals Act, and section 25 (1) states that regulations are to be applied and interpreted in accordance with any legislation governing radiation issues, but does not specify what that legislation might be. Given that uranium mining is new to Malawi, it is doubtful that any legislation dealing with radiation in mining sector specific exists. In a similar vein, it is necessary that legislation dealing with environmental protection and with transportation and security of nuclear materials be integrated with the proposed regulations to maximise the level of control that can be applied by the Malawian government.

In Australia, there is a large body of legislation in place that ensures a high quality of regulation. Attention is drawn to the following legislation: *Atomic Energy Act 1953*; *Environment Protection and Biodiversity Conservation Act 1999; Nuclear Non-Proliferation (Safeguards) Act 1987; Australian Radiation Protection and Nuclear Safety Act 1998; Customs (Prohibited Exports) Regulations 1958* and *Environment Protection (Alligator Rivers Region) Act 1978* – all of which constitutes the principle legislation dealing with nuclear material.

It is imperative that the Malawian government review its legislation dealing with nuclear material and strengthen or develop new legislation accordingly.

1.2.2 Penalties

There are few provisions for prosecution and few penalties in place for breach existing regulations, making it difficult for the government to enforce the proposed regulatory system. Consequently, corporations are likely to pollute the environment with impunity. Although Section 97 of the Mining Act 1981 permits the Minister to prosecute a corporate body or

individual for failure to rehabilitate land subject to a prospecting or mining license, the fines, estimated between K20, 000 or $2000 are grossly insubstantial to compel a corporation to comply. But even if the corporations complied, the sums are peanuts.

The regulations and the Mining Act do not specify any penalty for deliberate or unintentional contamination of the environment, impacts on health and safety of workers and the general public or breaches of security. In comparison, Australia has tough penalties for these types of breaches, particularly where on-going non-compliance with regulatory requirements can be demonstrated, with penalties in the range of hundreds of thousands of dollars for repeat offenders.

Apart from possible seizure of uranium products, which would occur only under extreme circumstances, there are only three penalties stipulated in the regulations – and all of these relate to transportation of packaged products. As indicated earlier these penalties are insubstantial, being $5000 for delay or damage in transport (§ 34); $5000 for damage to a package (§ 35) and only $1000 where persons or the environment are placed in danger.

It is difficult to ascertain the discretion the judiciary may have when applying these penalties, but it is doubtful that a penalty in excess of that cited could be applied for the offences regardless of the degree.

By creating a system that effectively allows for a predominantly self-regulation of corporations and insubstantial penalties for regulatory breaches, the Commonwealth Secretariat and the Malawi government are essentially placing liabilities on Malawi to inherit a long-term and expensive cost for generations to come and for thousands and thousands of years.

The proposed system does not discourage corporate bodies from having low standards of operations, does not encourage the use of best practices and increases the risk of environmental damage and effectively allows the costs of remediation to the regulatory body which is the Malawi government. There is no prescribed penalty for abandonment, so an international company may simply walk away from its responsibilities with impunity, leaving

Malawi with the liability for remediation that exceeds the benefits gained from mining. It is therefore in the best interests of the Malawian government that it revisits provisions in the legislation concerning the scope of penalties and manner in which they should be applied.

1.2.3 Best Practicable Technology

Regulation at the Ranger Uranium Mine also utilises the concept of "best practicable technology". The challenge associated with adopting the concept of "best practicable technology" is economic and it concerns access to the technology one seeks to apply. Inevitably the high cost of best practice and the best technology weighs heavily against minimisation of environmental and health impacts; so inferior products or systems are often substituted, leading to an increased level of risk to the environment.

Using this concept, companies are in a position to use the economic imperative to argue against true improvements in environmental protection standards. The attendant liability occurs when "best practicable technology" leaves a long-term legacy, usually in the form of a high level of contamination. In the case of uranium mining, this liability may last for thousands of years, and ultimately rest with the populace and government of Malawi.

CFJ had therefore suggested to the government of Malawi that it consider replacing "best practicable technology" with "best practice"; or that the economic component of "best practicable technology" be removed from the definition.

The Nation 12 February, 2007

NGOs warn govt on uranium project

by Moses Michael-Phiri

Some civil society groups on Friday warned government that it stands to lose the benefits of uranium mining at Kayelekera Mining Project in Karonga if the issue is not handled properly.

Institute for Policy Interaction (IPI) executive director Rafiq Hajat and Renford Mwangonde from Citizen for Justice told journalists in Blantyre that Malawi would get only five percent of the project output while 95 percent would go to the investors, an observation the two described as unfair to the people of Malawi.

In September last year Paladin's chief geologist Ed Becker said Malawi would be getting K14 billion (about US$100 million) annually from the project which represented about 20 percent of total export income.

But Hajat and Mwangonde said apart from economic benefits, the Malawi Government should also consider life and long-term implications of the project.

"We talk of accidents that occur during mining, environmental degradation and health problems that the project will cause and infrastructure that will be used cannot be covered by the five percent share. What should we accept that? Are we not human beings and deserving the same standards?" Hajat queried.

The two also said people who had been displaced from the mining places had not been adequately compensated as what they had been given does not cover perennial crops like mangoes and bananas, which would take years for the families to start harvesting at their new places.

Hajat and Mangonde were flanked by Gevin Mudd, a visiting environmental expert and lecturer in environmental engineering, who was in the country to assess the environmental impact assessment (EIA) report on the project.

Mudd warned that the Kayelekera EIA report that Paladin International released last year has some flaws that may put the lives of people at risk and urged government to take some studies before mining starts in Karonga.

Representatives from Paladin were not available at the briefing.

1.2.4 Water Management

Water is the most effective means by which radioactive contamination can be transmitted into the environment and into the food chain. Management of water is critical to the operations at the Ranger Uranium Mine and is therefore perhaps the most highly regulated part of the system. All surface water is subjected to varying degrees of treatment and cannot be released into nearby watercourses unless strict quality control procedures and disposal criteria are met.

Similar strictures are placed on groundwater, with both groundwater and surface water monitored by the company, the Territory and the Federal Governments at statutory monitoring points. Systems are also in place to ensure that lines carrying process water cannot be interchanged with potable water lines. Monitoring requirements include measurement of specific chemical parameters on a regular and routine basis; and by comparing these to specific levels of ecological toxicity, a series of triggers (which prompt specific remedial actions) have been devised. The system is designed to measure both chemical and biological impacts and therefore represents a best practice approach.

In consequence, the Ranger Uranium Mine is required annually to provide a detailed Water Management Plan to the mine's regulators. This plan details items such as its objectives; system catchments, storage, treatment and disposal areas; monitoring; planning and management contingencies. This is the practice in Australia, but it remains to be exercised in Malawi as there is no evidence that this has been undertaken.

Except for section 11, the uranium mining legislation makes no specific consideration of water management and give very little thought to the importance of water as a source of transportation of radioactive contamination. There are also occasional, generalised references to "waste streams" that could be interpreted to include water (e.g. 3(d), 3(h), 4(c), 7(2)(d) and 10(3)(d)), but these will not ensure a strong focus on water management. Section 11 suggests that subject to governmental authorisation, contaminated water may be released from a uranium mine or treatment plant. The application of the "precautionary" and "best practicable technology" principles suggest that a system requiring recycling and re-use of water; or treatment to a standard acceptable for discharge is a better option.

The system of regulation that is proposed in section 11 is essentially a self-regulation system, which will ultimately result in releases that are under-reported, uncontrolled and hidden from the affected public. There are no requirements in the proposed regulations for on-going direct measurement of environmental impacts. This will make it difficult to determine the extent of

any impact, and make it hard for the regulators to prove company liability should prosecution under the law be contemplated.

It is recommended that greater attention is paid to all aspects of regulation of water disposal, management and monitoring of surface water and groundwater. The regulatory framework needs to be re-designed to include the specification of statutory monitoring points relevant to each operation, quality control measures and scientifically and environmentally acceptable disposal criteria. The water management system must be designed to ensure that appropriate actions, based on those scientific and environmental criteria, are taken in response to adverse results obtained from environmental monitoring.

1.2.5 Environment & Waste Management

Given the long-term health effects that can reasonably be attributed to radioactive wastes, it is inconceivable that a waste management program should encourage liability by apparently permitting deliberate passage of contaminated material into the environment.

Sections 3 (c) and (h) effectively authorise the routine release of nuclear substances and hazardous substances into the environment. There is no mention of limitations placed on the types and quantities of waste that could be disposed of in this fashion – conceivably it could cover a range from 1kg of highly radioactive material, to millions of litres of contaminated waste water from the Tailings Dam. Routine release of contaminated material is not a practice that is undertaken at Ranger Uranium Mine and should it occur, heavy penalties would result. Why should such releases be allowed in Malawi when such companies criminalized when they do it in Australia?

The practice of deliberate release of contaminated waste would contravene any definition of "best practicable technology", compromise the environment and people's health and it is therefore recommended that it should not be permitted by the regulations.

1.2.6 Export of Radioactive Materials & Concentrates

There is a need for greater clarity and purpose in this part of the regulations as they consider only the intent of the receiving state, and not other countries through which Malawi's product may pass. Part of the problem is that there is no definition in the regulations of what the framers of the regulation considers being the receiving state. Malawi is land-locked and unless a company intends to fly nuclear material out of Malawi (which has not been addressed in the regulations) it must be driven through Tanzania, Mozambique or Zambia. Any of these countries could be defined as or act as receiving states if they are active in the purchase and on-selling of product to a third party. Presumably in this event Malawi's concern ends at the border as under the regulations the product has been sold to a receiving state.

Alternatively, Tanzania, Mozambique or Zambia may represent only transitional locations where the product is moved through for export from a port. Under these circumstances, it is difficult to see how Malawi would be in a position to enforce its regulations or laws, should an incident occur outside of its territorial borders. This is a matter that would require diplomatic discussions with governments of the neighbouring countries to ensure that the IAEA's protocols and safeguards are met. Tanzania, Mozambique or Zambia have no legislation and regulations that deal with nuclear actions and there have been no evidence that such regulations have been introduced in Zambia as reported by Caritas Zambia and the Zambian Human Rights Commission.

We had therefore recommended that the government of Malawi and the framers of the uranium regulation being the Commonwealth Secretariat define what it meant in the regulations by "receiving state." We also recommended that the government should put an obligation on the mining companies to provide security and liability for anything which may

happen during transportation of yellow cake through neighboring countries to its ultimate destination as seen in the map below for a route taken by Paladin Energy Ltd from Malawi to Namibia.

1.2.7 Uranium Products

In section 11 (8), the document refers to yellowcake as U_3O_8. Yellowcake (also known as ammonium diuranate) is a bright yellow ammonium salt of uranium and has the chemical composition $(NH_4)_2U_2O_7$. Following calcination, a purple-brown uranium oxide product (U_3O_8) can be produced. Various other oxides of uranium (UO_3 and UO_4) may also be precipitated, depending on the process being used. The intent of Section 11 (8) is not fully clear and the Commonwealth Secretariat should consider rewriting it to define more accurately exactly what can and cannot be removed in approved containers.

1.2.8 Administration of Regulations

Administration of the regulations will be problematic in the absence of adequate and appropriate legislation (as described earlier). Regulations dealing with inspection (§ 27) should be expanded to include independent auditing and operations plans should be reviewed and resubmitted on an annual basis. The administration system should be designed to ensure that environmental data, health and safety information and incident reports can be made available to affected parts of the population and qualified third parties for review and analysis. This may require development of an associated system which may be better suited to the Mines and Minerals Act, rather than being specified in the regulations.

1.2.9 Warning Systems & Exposure

Section 18 requires the licensee to post warning signs at locations where radiation exceeds 25Sv/h and provide workers with direct reading dosimeters where they work in an area having a dose rate of radiation exceeding 100Sv/h. The origin of these two limits needs to be explained and reviewed because they appear to be too high by a factor between 2.5 and 10.

At Ranger Uranium Mine, annual γ radiation dose to employees is kept as low as reasonably achievable (the ALARA principle) and limited to 20mSv (equivalent to 10μSv/h for a 2000 h working year). For the public, the limit is 1mSv per annum. These limits are set by the ICRP and IAEA and affirmed by ARPANSA in Australia. As they are recognised internationally as dose constraints for radiation, there is no reason why they should not also be applied to Malawi.

Application of dose limits endorsed by ICRP and IAEA would reduce any potential liability that might be placed on the regulators and the company and reduce potential health impacts to workers. It is also recommended that where workers are required to perform their duties in

areas where γ radiation levels exceed 10μSv/h, then the time of their exposure should also be regulated to ensure that they do not receive more than the equivalent of the recommended annual radiation dose.

1.3 CONCLUSION

A system of regulation prepared for mining of uranium in Malawi appears to have been rushed to cater for Paladin's impending production of uranium because a license was issued first before regulations were introduced. We were therefore obliged to opine that the regulation developed was customized to meet the state of things. However, it is important to understand that the government has the constitutional mandate to review the current regulations re-developed to meet best practice for the safety of Malawian citizenly and not the industry. Regulations should be subject to on-going and periodic review and up-dated in line with receipt of new information and improved technology and practices. Consequently, regulations need to be reasonably general but intimately tied into a strong legislative framework as they will be applied in differing circumstances to many uranium mining companies which are running away from best practice in Australia and Canada.

Our critique on uranium regulation has identified a number of areas that a regulatory system of the standard sought must address. Of these, management and regulation of water is a key feature of operations that affects both profitability and environmental integrity. It is a matter that requires careful regulation backed up with strong legislation and effective penalties should those regulations be breached.

In Australia, Ranger Uranium Mine is regulated through an Authorisation (#0108-10) issued pursuant to the *Atomic Energy Act 1953*. Ranger Uranium Mine demonstrates that effective

systems of regulation can be developed under differing socio-economic and environmental circumstances and that they can be maintained to a high standard. Given the intricacies involved in developing high quality systems of regulation, there is a necessity for continued industry expert involvement in the process of developing a regulatory system for uranium mining in Malawi as desired by Government and not dictated or influenced by the industry. The uranium mining industry has the knack of laying its bloody hands on regulation to benefit them.

2. MINES AND MINERALS ACT

2.1 INTRODUCTION

Development of the Mining Industry within the Republic of Malawi will bring with it increased prosperity at community and national level. However, it is important to ensure that mining is undertaken in a socially and environmentally responsible manner, because if it is not, then the long-term costs associated with mining in general and especially with respect to radioactive minerals may ultimately outweigh the short-term benefits earned from the mine.

Over the years, Citizens for Justice has provided technical input on key matters relating to the nuclear related industry in Malawi including: the Environmental Impact Statement for the Kayelekera Uranium Mine, the Draft Uranium Mining Regulations and the Draft Atomic Energy Bill and Regulations for the Government of Malawi. The following section of the document, 2.0 Mines & Minerals Act, will offer comments regarding the Draft Mines and Minerals Act.

A critical part of social and environmental responsibility is the development of a strong legislation and regulation framework to control mining activities. Release of the Draft Mines and Minerals Act for selective public comment is an important step forward for the development of this framework. However, it is curious that radioactive minerals are discussed within the context of the broader Mines and Minerals Act, where the existence of Regulations specific to the mining of uranium suggests that separate legislation aimed at the mining or radioactive minerals could, or indeed should exist. This matter should be clarified, and if separate legislation is indeed planned, the relevance of addressing matters related to mining radioactive minerals as applied by the Mines and Minerals Act could be brought into question.

Citizens for Justice considers the draft copy of Malawi's Mines and Minerals Act to be a recommendable attempt in developing a comprehensive, well suited to the task and of a standard commensurate with similar Acts from other parts of the world, including Australia, where such acts exist.

Consequently, there are a number of comments which CFJ submitted to the government of Malawi in hopes that they could be considered in the final Mines and Minerals Act. Citizens for Justice trusts that these will be of some value for Malawi's pursuit of a sustainable future around the exploitation of its mineral resources for the benefit of Malawians and the investor.

2.2 OUR COMMENTS

2.2.1 DEFINITION: ENVIRONMENT

The definition of "Environment" in the current draft Mines and Minerals Act must maintain a level of consistency with Malawi's Environmental Management Act – where it is defined as: "the physical factors of the surroundings of the human being including land, water, atmosphere, climate, sound, odor, taste and the biological factors of fauna and flora and includes the cultural, social and economic aspects of human activity, the natural and the built environment".

The Mines and Minerals Act covers these issues and also refers to "good community relations between a Mine operator, the government and local communities, family life and structure, education and medical health and care of all citizens" as part of the environment. Although consistent with the Environmental Management Act, these are not terms usually directly associated with a definition of the environment. These are likely to be subjective measures that are difficult to assess, which may weaken the intentions of the Act.

However, as they are extremely important issues that are often overlooked by legislators, regulators and companies, they should remain in the definition and suitable means of assessing them should be developed.

2.2.2 DEFINITION: MINE & MINING

In most situations, the definitions of a "mine" or mining" are often expanded by the industry to include the act of processing or refining the mineral. This Act does not specify if these activities are to be considered part of mining. If they are, then they should be included in the Act and if not, then they must be dealt with under a different Act of Parliament. Measurable parameters for defining a mine and mining need to be developed or updated to ensure that all physical aspects of a mine and every stage in the process of mining are subject to regulation.

2.2.3 DEFINITION: MINERAL

The sub-definitions for water and soil provided are convoluted and greater clarity is required. It is assumed that the sub-definitions mean that water and soils are not classified as minerals unless minerals are to be extracted from them for commercial gain as this would make it at least consistent with the definition of "salt" provided later. However, if a different meaning is intended then this must be made clear.

2.2.4 DEFINITION: RADIOACTIVE MINERAL

With respect to the definition of "radioactive mineral", the Act's definition must contain a level of consistency with international definitions, laws and regulations. Radioactive minerals are

generally defined as mineral species that contain uranium or thorium as an essential part of the chemical composition. However, a minimum concentration of either, such as specified in Malawi's legislation is usually not provided.

The IAEA defines "radioactive material" or "radioactive substance" as a material or substance designated in national law or by a regulatory body as being subject to regulatory control because of its radioactivity, but does not appear to have its own formal definition for the term "radioactive mineral".

It does appear that States may choose to define "radioactive ores" or "radioactive minerals" on their own initiative provided the definition remains within the broader IAEA guidelines of risk dose assessments. For example, in the South Australian Mining Act (1971), the term "radioactive mineral" means uranium or any other prescribed radioactive mineral (but does not define a minimum concentration of any specific chemical element).

In this respect, the definition applied in the draft appears reasonable, although the rationale behind defining a radioactive mineral as a substance that "contains by weight at least one-twentieth of one per centum (0.05 per centum) of Uranium or Thorium or any combination thereof" is unknown. A description of this rationale might be inappropriate for placement in the Act, but should be communicated somewhere within Government policy or documents associated with the Act.

2.2.5 DEFINITION: SUSTAINABLE DEVELOPMENT

There are a wide variety of definitions of sustainable development available and these should be accessed to provide more alternatives for the Act's definition.

2.3 SECTION 19 APPLICATIONS: RECONNAISSANCE LICENCE

In Section 19 (g) (iv), an estimate of any significant effect on the environment or monuments and relics is required as part of the application for a reconnaissance license. Where a significant effect is anticipated, a description of how that effect will be rectified, remediated or rehabilitated must also be provided.

The same level of information should also be provided for any other application under this Act that might incur a significant effect on the environment such as for a Prospecting license (Section 33) or a Mining license (Section 53).

The legislation should also define principles necessary for public-private partnership agreements regarding concessions, specifying shareholding and equity benchmarks that safeguard against exploitative ventures.

2.4 SECTION 53: APPLICATIONS: MINING LICENCE

Section 53(e) requires the applicant for a mining license to describe plans and initiatives for sustained economic and social development within the region. It should be made clear in the Act that these plans and initiatives must also extend beyond the life of the mine and encourage both intra and intergenerational sustainability.

The legislation should also define principles necessary for public-private partnership agreements regarding exports, specifying shareholding and equity benchmarks that safeguard against exploitative ventures.

The legislation should also incorporate clear guidelines for Corporate Social Responsibilities for the sector to prevent corporate tokenism.

2.5 SECTION 70: NOTICE OF CHANGES IN PRODUCTION

Despite the links to sustainable development sought by the Act, there does not appear to be a provision made for dealing with the environmental and social aspects of closure of the mine. This is mentioned briefly in Section 54, as one requirement of the feasibility study; however, proposals for closure drawn up at this stage of the process will change dramatically as the mine develops. Funds and plans allocated at the early stages of mine development are likely to be outdated and fall short of actual requirements at time of closure.

In the event of closure of a mine, it is advisable to have in place a detailed closure plan funded by a rehabilitation bond. Policy, guidelines and a means of determining the quantum of the bond required for closure will need to be developed. If the Act aims at encouraging sustainability, then a means of returning land value is required and ongoing costs associated with land maintenance after mining should not be passed onto the Government or general public. All closure plans and initiatives must be designed such that they extend well beyond the life of the mine to encourage intergenerational sustainability.

As the Act does not appear to deal with mine closure, it is recommended that a separate section be written to address this issue. When developing this section of the Act, it should be noted that the long-term impacts of some mineral wastes (e.g. radioactive minerals) will be more significant that those of others (e.g. bauxite) and that the types and amount of information required will vary according to the commodity being mined.

IN conclusion the legislation and regulatory framework will need to have a comprehensive and detailed protocol for operations and closure of facility.

3. ATOMIC ENERGY BILL & REGULATIONS

3.1 INTRODUCTION

The continued development of a nuclear related industry in Malawi will be of continued concern to many people, so great care must be taken to ensure that open and transparent debates over all of the key issues is undertaken with all concerned parties. The development of sound legislation is only one aspect of this debate, as it must be underpinned by a focus on social and environmental impacts and strong systems that educate everyone with respect to the risks peculiar to this industry. In the absence of a well-developed educative and information sharing network, on-going public relations and social concerns will inevitably arise even though there are undoubted economic benefits to Malawi by embarking upon the nuclear path. The specialized nature of the nuclear industry means that any Government will leave itself open to criticism and on-going, long-term problems with public relations if the levels of knowledge, both within and without Government, are inadequate.

However, the release of the *Atomic Energy Draft Bill* and *Atomic Energy Regulations* is an obvious and important step forward for the development of nuclear legislation within Malawi. Equally important is the Government's initiative in releasing the draft documents for comment to the public. This is one key step towards ensuring that transparency is maintained throughout the process because with on-going public review, best practice is sustained. It is only hoped that equal weight will be placed upon the concerns of all parties making submissions and that the outcomes will reflect the needs of the citizens of Malawi over the needs of multinational corporations, as it is the citizens of Malawi who will need to live with the consequences of any failures.

Over the years, Citizens for Justice has endeavoured to provide technical input on key matters relating to the nuclear industry in Malawi including: the Environmental Impact Statement for the Kayelekera Uranium Mine and the Draft Uranium Mining Regulations for the Government of Malawi. Drawing upon research and expertise with uranium mining and regulation with respect to mines around the world, namely the Ranger Uranium Mine, Citizens for Justice-(CFJ) hereby provides opinions on both the Draft Atomic Energy Bill and the Regulations.

3.2 ATOMIC ENERGY DRAFT BILL

3.2.1 GENERAL COMMENTS

In line with the comment made in the introduction above, this draft bill assumes that the requisite knowledge of nuclear chemistry and radiation is held by those holding positions on the monitoring body's Secretariat and Board. This level of knowledge will take time to procure and it may take considerable time to convince the general population that those charged with administration of the Bill have the necessary and desired level of technical competence. At least at the start, a strong reliance on connections and networks with international bodies such as the IAEA will be essential to ensure success. It is gratifying to note that the Government considers establishment of such international networks as a cornerstone of its draft Bill. Evidently, the Malawi government has no expertise in the nuclear related field and there is need for it to build its capacity to be able to monitor the industry.

The scope of the Bill is sufficiently wide to encompass all facets of the nuclear industry including mining, medicine and waste management — all necessary parts of the growing nuclear industry of Malawi. However, a great deal of further work remains to ensure that adequate definitions and acceptable criteria against which regulatory aspects of the Bill can be measured are determined and enforced. It is hoped that Civil Service Organisations and other third parties

with appropriate technical expertise will have the opportunity to provide input to their development.

3.2.2 OUR COMMENTS AND CONCERNS

3.2.2.1 OBJECTIVES OF THE BILL

i. In the preface to the Bill, it is advised that the underlying purpose is to "provide for adequate protection of the people and environment in present and future generations against the harmful effects of ionizing radiation". While this is indeed the fundamental objective of the Bill, consideration should also be given to the chemical nature of the radionuclides concerned, as many of these have inherent biological toxicity.

ii. The radioactive decay sequence (refer Figure 1 & 2 attached hereto) for uranium (U) and thorium (Th) contain a number of daughter products particularly bismuth (Bi), polonium (Po), thallium (TI) and lead (Pb) that are environmentally and biologically harmful. These will vary over time, but inevitably lead to long-term environmental risk and consequence where mining and milling projects exist.

The objectives of the Bill and relevant sections of the Bill should therefore be modified to include provisions for protection of people and the environment from the toxicological effects of these and other radionuclide.

This matter is raised briefly in §51(e) with respect to radioactive waste management, but should also be specifically referred to within Part XII — Mining and Processing. Many of these chemical species will be rendered soluble and released into waterways during mining and processing, therefore regulatory mechanisms will be required to ensure that the risks to people and the environment are mitigated.

iii. The contents of the Atomic Energy Bill will need to be consistent with other legislation. To fully meet its objectives and ensure cross-legislative consistency, a public review of Malawi's Environmental Impact Assessment and Mining legislation should also be undertaken.

3.2.2.2 INTERPRETATIONS

i. The interpretation of the term "activity" presented on page 8 might lead to confusion as "activity" is also used as a measure of radiation. This is utilized in the interpretation of "radioactive material" (page 12) and "radioactive waste" (page 13), but does not appear to be used in this manner in the main text of the Bill. Clarity on this issue might be useful.

ii. While it is good practice to consider exemptions to the Bill as suggested on page 9, the basis on which an exemption may be sought or granted will require clear definition as most people consider that even low levels of ionizing radiation may be harmful. If the argument about what can be exempted has poorly defined and structured criteria, the Government and any company working with nuclear material is likely to suffer on-going problems with public relations. Any such definitions should therefore be prepared in conjunction with the input of the general population to maintain public confidence in transparency of the process.

iii. "Radioactive material," as defined on page 12, is radioactive and remains radioactive unless the activity or concentration is zero. As the effects of the radiation will diminish with decreasing activity and concentration, it would be more appropriate to regulate radioactive material according to cut-off activity levels or concentration rather than making exemptions from regulatory control. The use of radiation activity or

concentration based regulatory systems are world-wide standards that can be readily benchmarked against other countries.

iv. Section 7 (o) indicates that the Authority will be responsible for all matters related to radiological emergencies. An interpretation of what constitutes a "radiological emergency" should be included either in this Bill or through another legislative instrument.

3.2.2.3 SCOPE AND JURISDICTION

i. One of the more important aspects of this Bill that appears to require debate and clarification is the extent of jurisdiction over nuclear materials transported from Malawi and whether or not there is a moral obligation to receive wastes generated from that material. By necessity, this will open further debate of security and the need to construct a facility capable of handling high level waste in the future.

ii. In Part XIII — Security, §63 (1) page 67, regulations are to be developed for the import, export and transport of nuclear material within Malawi. Malawi is a landlocked country, so import and export may require transportation through other countries (e.g. Tanzania or Zambia) that may not currently have nuclear legislation or adequate security measures in place. This raises a number of important questions:

a. Will the Government of Malawi remain responsible for safety and security of this material as it passes through countries that are not members of the international nuclear community?
b. Will the Government of Malawi be responsible for any social or environmental impact that may occur due to an incident leading to loss of nuclear material in any of those countries?

c. Will a breach of any of the responsibilities above result in a liability to the citizens of Malawi?

iii. In Part IV — Notification and Licensing, §25 (1) (g), the Government has an expectation that all used radioactive sources (and therefore presumably wastes) will be returned to the exporting country. It is likely that with this comes the international community's expectation that Malawi will reciprocate and accept radioactive waste material that has been generated from its own uranium exports.

iv. In Part X — Radioactive Waste Management, §50, the Bill states that "radioactive waste generated outside the territory of Malawi shall not be imported into Malawi for any purpose". This has the potential to create an internal conflict within the Bill should the international community require Malawi to receive nuclear wastes generated from Malawi's own exports. This raises several questions:

a. Does the Government intend to accept radioactive waste generated from uranium exported from Malawi?
b. Will Malawi be compelled to or be placed under pressure to accept such waste materials?
c. Where will this waste be stored if it is returned?

2.2.4 ATOMIC ENERGY REGULATORY AUTHORITY

i. The role of education cannot be overstated, so it is welcome that the Bill requires the Chairperson of the Authority to have the highest level of competency from other Government Departments to be included as part of the Authority. To be effective, this competency must also extend into the fields of environmental science, uranium and thorium mining and processing and nuclear medicine. It would not seem practicable for

one person to maintain such an extensive knowledge base, making it essential that other members of the board have equivalent levels of competency in their specialist fields. This leads to the following questions:

a. Is the level of competency and understanding of the nuclear industry held by each Government Department sufficient to provide a meaningful level of protection as envisaged under the Objectives of this Bill?

b. What measures are or will be put in place to provide on-going training for potential members of the Board to ensure they can meet and maintain the desired levels of competency?

ii. On page 25 §9 (3) it stated that "the quorum of any meeting of the Board shall be a simple majority of the Board', while in §9 (7) it is stated that "a decision of the Board on any matter shall be made by at least half of the members present and voting at the meeting". This means that a binding decision could be made by as few as 3 of 10 Board members (assuming 5 were in attendance at the meeting and that 2 of the 5 present cast dissenting votes). This would constitute a minority decision. Questions must therefore be asked of the decision making process:

a. Should such minority decisions be made, will they be permitted to stand?

b. What safety mechanisms are in place to ensure that a robust decision is made by correctly qualified Board members? For example, could a decision on licencing of a mining venture be made in the absence of representatives from the Mining Department, Environmental Department and Health Department?

iii. Care will need to be taken to ensure that a conflict of interest does not occur should persons be co-opted under §9 (3) as many potential advisers may also be working within the nuclear industry. Similarly, advice on policy and procedure should be sought from independent sources in preference to any groups that might lobby for their industry's financial gain.

iv. On page 26 §10, it is indicated that members of the Board will be restricted to a maximum six years in the position. The nuclear industry is a specialized field that requires detailed and specialized knowledge. It may be of value to the Government to consider mechanisms to retain this expertise beyond the 6 year period envisaged. It may be advisable that the periods of office are increased or that a system of engaging retiring members as consultants is developed to ensure that expertise is not lost.

2.2.5 ENVIRONMENTAL SECURITY AND CRITERIA

i. On page 20 §7 (g), part of the license requires calculation of a financial security. During operations, mining securities in Australia's Northern Territory are typically around 100% of the total rehabilitation cost for the individual mine. For example at Ranger Uranium Mine it is greater than $150million AUD. Should Malawi's Government go down a similar path to reduce future liability, then processes will be required to ensure that these securities cannot be used for other purposes.

ii. The right of the Authority to undertake unannounced inspections, as envisaged on page 45 §35 (1), must remain and be applied to all activities as it is a useful monitoring tool and safeguard to maintain integrity within the system.

iii. In Part VII §43 (4), the Atomic Energy Regulatory Authority is charged with the responsibility of developing regulatory criteria for the purpose of determining what may be exempted from the requirements of the Bill as being of no regulatory concern.

   a. How will these criteria be developed and how will they be used to control the nuclear industry?

   b. Will these criteria be broad-based to include environmental, social, cultural and health aspects?

   c. Will these criteria be developed in line with industry expectations only or with the views of the International Atomic Energy Agency in mind?

   d. Will there be an opportunity for third party public input into any proposed regulatory criteria?

   e. Through what mechanisms will any criteria derived be enforced and will there be further sets of regulations to do this?

iv. In Part VII — Radiation Safety Principles, §42 (a), page 51, it is implied that a practice or activity may be licenced despite causing radiation harm as long as a beneficial offset can be provided to those persons or society exposed. This part of the Bill should be reworded to ensure that the above implication cannot become a reality.

v. Satisfactory calculation of an offset for environmental harm in the mining industry is notoriously difficult to establish. The longevity of radiation and environmental toxicity of some radionuclides means that offsets will be required well into the future and their

establishment may exceed whatever value is returned from the proposed nuclear activity.

2.2.6 FINANCIAL SECURITY

i. In Part III — Financial Provisions, §18 (2) (c), page 34, it is suggested that some funding for the Authority could be procured via loans. It is recommended that, while small loans might be suitable for some specific small projects, the use of loans should generally be avoided where possible. Corporate banking structures generally involve shareholdings in major mining companies and this may unintentionally create a conflict of interest or loss of Government control should a default position on the loan occur.

ii. Loans should not be procured for key processes such as rehabilitation following mine closure as the liabilities incurred may lead to a net negative profitability to Malawi. Instead, these types of processes should be funded by the industry either through a trust in perpetuity or via a system of securities.

2.2.7 LICENCING AND PRODUCT SECURITY

i. On page 39 §25 (2), there is a requirement for impact assessments to be performed with respect to environmental, social, economic, cultural and recreational attributes prior to a license being granted. Existing environmental impact assessment legislation should be opened to public review to ensure that the there is consistency between the requirements of the Atomic Energy Bill and that legislation.

ii. On page 40 §26 (3), it is stated that "a license shall not be transferred."

a. If a license is not transferable, what will happen should a company elect to sell its business to another?

b. Will a re-application for a license be required under this circumstance?

c. If required, will the re-application be subject to the same level of assessment as if it were a new license?

iii. On page 40 §27 (1), it is stated that "Authority may modify the conditions of a license on its own motion or on application by the licensee".

a. What safeguards will be in place to ensure that the strength of an existing license is not diluted through a series of applications by the licensee?

iv. On page 42 §29 (3), it is stated that where a license is suspended, the Authority may direct the storage of radiation sources under such conditions to prevent exposure of the public or workers to potential radiation hazards above prescribed limits.

a. How will this be dealt with in major industries such as mining, where large volumes of low-level waste might be produced?

b. Will the Government be considering the construction of a low-level (and high-level) waste storage facility to deal with large volumes of waste storage from other industries?

2.2.8 WASTE MANAGEMENT

i. The Bill provides to the Government an Authority via the courts to dispose of, seize and impound radioactive materials, but does not provide information about the mechanisms

for storage and disposal. This foreshadows the possibility of construction of a radioactive waste management facility. Several issues concerning what mechanisms are planned for storage and disposal of seized or spent radioactive materials should be asked, namely:

a. What if the origin cannot be sourced and therefore they cannot be returned to that point of origin?

b. What happens if they are not to be returned to the previous owner?

c. Who will be responsible for developing methods of disposal?

d. Will the public be involved in development of methods of disposal?

e. Will exploration drill cores recovered from uranium mining projects be dealt with in the same fashion as other radioactive wastes?

2.2.9 MATTERS SPECIFIC TO MINING

i. Uranium exploration and mining will be a significant component of the nuclear industry in Malawi for several decades and place a large impost on environmental systems for many thousands of years. It is therefore important that the Mining Act is reviewed to ensure that there are no conflicts between it and the Atomic Energy Bill as clauses specific to the mining of radioactive materials may be required in the Mining Act.

ii. On page 62, §59 (2), the Atomic Energy Authority is charged with the establishment of requirements for development of an exploration and mining project and on page 63,

§59 (3), systems for monitoring and auditing. These systems should be open for third party review to ensure the transparency and integrity of the systems that are proposed.

iii. On page 62, §60, the applicant for a license is responsible for the provision of information related to the mining project.

   a. Will this application process continue to be subject to a period of public review as was the case at Kayelekera and as occurs in other countries with a nuclear industry?

   b. Will applications to expand an existing plant or increase its output (as envisaged under §61 (3)) be subject to the same level of assessment, with public review?

iv. Mineral sands contain a radioactive component known as monazite.

   a. Is it the intent of the Government to apply this Bill to the mining and processing of mineral sands should a viable deposit be found in Malawi?

2.2.10 PENALTIES FOR NON-COMPLIANCE

i. On page 72, §70 (1), there is a drafting error in the statement "...commits an offence, and shall upon conviction be liable, to fourteen (15) years imprisonment" that needs to be corrected.

ii. Penalties suggested for non-compliance appear to be adequate, with one or two possible exceptions:

a. While a penalty of K2,000,000 suggested in §71 for offences may be sufficient for Malawian citizens, it appears to be too light for an international company that has access to large amounts of foreign capital, given the exchange rate that may be involved.

b. In §72, consideration should be given to a more structured or tiered range of penalties for offences related to records as the consequences will vary according to the nature of the information falsified or not kept.

c. In §74 (2), these offences should be considered as integral to terrorist activities which would be contrary to the purpose of the Bill. It may be appropriate for the court to determine the penalty up to a maximum term of life imprisonment, instead of 30 years.

3.0 DRAFT ATOMIC ENERGY REGULATIONS — 2010

3.1 GENERAL COMMENTS

The Draft Atomic Energy Regulations are to be read and applied in conjunction with the Atomic Energy Draft Bill reviewed in the previous section. They are consistent with the Atomic Energy Draft Bill so many of the comments and questions raised in the previous discussion will apply equally to the Regulations. For example, the general provisions of the Regulations will need to be expanded to include consideration of the chemical toxicity of radionuclides should the Bill be modified in that way.

In the nuclear industry, radioactive contamination of water is perhaps the most significant risk to the health of people and the environment. Although the Regulations have been written so that they can be broadly applied across the nuclear industry, it is disappointing that there

appears to be no specific regulatory mechanisms planned for dealing with contaminated water. It is recommended that greater attention is paid to all aspects of regulation of water disposal, management and monitoring of surface water and groundwater. The regulatory framework needs to be designed to include the specification of statutory monitoring points relevant to each activity or practice, quality control measures and scientifically and environmentally acceptable disposal criteria. The water management system must be designed to ensure that appropriate actions, based on those scientific and environmental criteria, are taken in response to adverse results obtained from environmental monitoring.

If it is considered inappropriate to include this level of detail within the Bill and its Regulations, then an appropriate mechanism external to these documents is required. As the information will be of interest to the public, then determination of regulatory mechanisms specific to water should be made available for public review. One possible location for this level of regulation may be via sets of Regulations specific to each facet of the nuclear industry (e.g mining). The other option, which allows for self-regulation by the nuclear industry, should be avoided as it may lead to a long-term and expensive liability for the people of Malawi through the possibility that contaminated water will be released in an under-reported and uncontrolled fashion that remains hidden from the affected public.

3.2 SPECIFIC COMMENTS AND QUESTIONS

3.2.1 INTERPRETATIONS

The Regulations speak of Category 1, 2 and 3 radioactive sources but do not provide a definition of these until the Fourth Schedule. A reference to the Fourth Schedule or a brief description in the Interpretations might be useful.

3.2.2 EXCLUSIONS

i. It may be inappropriate under some circumstances to include §7 (c) "unmodified concentrations of natural radionuclides in raw materials" in the categories for exclusion.

ii. While it is understood that a radioactive ore is in its natural state, the stockpiling of ores in a confined space may lead to a net overall concentration in radioactivity. This may increase the effective radiation dose rate to one well in excess of acceptable or safe levels.

iii. Concentrations of natural radionuclides in some ore bodies or pockets are so high that they will exceed safe levels without de *facto* concentration through.

iv. During the mining process, there will also be an increased concentration of 226Rn within open cut pits. These should be monitored for persons working in those areas and therefore not subject to exclusion.

3.2.3 DOSE LIMITS

i. Radionuclides vary in the type of radiation (a, 6, or y) they release. The Regulations speak of radiation dose rates but do not specify whether the levels of radiation to which they refer are total radiation, a, 6, or y radiation only. The nature of the radiation being considered should be fully described so that those working with the legislation and Regulations can develop and apply appropriate regulatory controls.

ii. In §16 (3) (b) (ii), the recommended annual dose of 10 pSv to the public appears to be high and inconsistent with the data (5 pSv) provided in Schedule 2 (page 104). By comparison, at Australia's Ranger Uranium Mine, an annual dose of 2 pSv is considered to be the standard for exposure to the general public.

iii. The dose limits provided for workers and the general public provided in the Second Schedule (page 103), also appears higher than the levels that could be reasonably achieved during the mining and milling process.

iv. The dose limits provided in the Second Schedule are not referenced, so their validity and application to the mining and milling industry cannot be verified by a third party review of the Regulations. The references should be provided.

v. Methods of calculating the proposed values are not provided in the Second Schedule, so the relationships between values presented (e.g. 500mSv exposure to the extremities compared to a 50 mSv effective dose) are not adequately explained and could not be determined during this review. The relevance of each of these values in comparison to each other and the overall risk to workers and the general public should be fully explained, if not in the Regulations then elsewhere in a publically available document.

3.2.4 HEALTH SURVEILLANCE

The effects of radiation exposure may not become evident until well after a worker has completed their period of employment. In addition to those specified in §42, health surveillance programmes should have a component that extends for a minimum 30 years following retirement for any person employed in the nuclear industry that may have been in a position where extended contact with radioactive substance or gases may have occurred. This timeframe is consistent with that proposed for record keeping in §43 (4) and a regulatory process for ongoing post-retirement monitoring of these people should be instituted.

3.2.5 RADIOACTIVE WASTE MANAGEMENT

i. The application of §77 (1) (b) and §78 (b) to wastes from mining and milling may create a situation where disposal of the material and therefore protection of the environment

from it, may not occur for a very long period of time. This does not constitute best practice.

ii. It is a common argument made by mining companies that tailings should be stored above ground as it may have a future value once appropriate technologies have been developed. It is more appropriate, given the long-term threat to the environment, that tailings from mines that process radioactive ores are interred within the pits from where the ore was extracted. To be successful, the pits will need to be sealed at the base and walls and covered at the top to ensure that radionuclides and contaminated groundwater does not escape. It may be appropriate to insert this requirement into the Regulations to specifically deal with tailings waste generated during the mining process.

Conclusion:

The government of Malawi has taken a political and economic decision to mine uranium which is a nuclear related substance. As Citizens for Justice-(CFJ) we believe that the government also needs to make a technical decision on the same. A technical decision for the government means putting in place stringent mining standards which will protect the environment, human rights and support the people of Malawi realize some revenue from the industry at a reduced cost. Up and above, the government also needs to develop a human capacity so that enough personnel are there to engage the industry. The government needs to put in place a high level technical and independent team to monitor the uranium industry.

Having reviewed the legal frameworks regulating the uranium mining industry in Malawi, we are of the view that Malawi risks sitting on a radioactive time bomb which will explode after all the uranium mining companies have packed and left the country. The time is now for the government to put in place such measures for the protection of the pristine rivers and lakes, fauna and soil but also for the benefit of its people. With the current state of things, the existing legal frameworks are a license for the uranium mining industry to loot and plunder.