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In the Dark: Seeking Information about South Africa's Nuclear Energy Programme

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Introduction

The nuclear industry is, by its nature, secretive and opaque, wherever it is found. The South African industry is no different. A major element of this climate is the secret proliferation of nuclear weapons during the apartheid period (see chapter 4). Other elements promoting secrecy include the need to safeguard fissile materials, the need to curb trafficking in equipment that may lead to proliferation, and the need to ensure the integrity and security of nuclear facilities. However, the climate of secrecy has also been used to mask the economics of the nuclear industry, its safety record, the health and safety history of its workers, and the good governance (or lack thereof) of its controlling and regulatory bodies.

With plans for the expansion of the nuclear energy industry currently under way, it is essential for the public to ensure that any departures from transparency are addressed.[1] Under apartheid, the state had no accountability to its citizens in this regard. However, with the new democratic state striving to extend and enhance the values of consultation, participation and openness, secrecy militates against public involvement in fair decision making. The expansion of nuclear plants and facilities threatens to return citizens to the era in which they faced an intransigent security state, one that had little regard for building democratic political culture or respecting the rights of all citizens.

The nuclear energy industry in contemporary South Africa cannot shake off the tendency to defy democracy and transparency. Implicated in this are a number of state institutions. These include the energy utility Eskom, the Nuclear Energy Corporation of South Africa (NECSA),[2] the Department of Minerals and Energy (DME), the Department of Public Enterprises, the National Nuclear Regulator (NNR),[3] and the National Electricity Regulator. Pebble Bed Modular Reactor (Pty) Ltd (hereafter PBMR Ltd), which is devel-

oping new-generation nuclear technology, is a company with a majority shareholding by state institutions (Eskom, the Industrial Development Corporation and the government). The documentation initiated by all these bodies should be available to inquirers and, like the documentation of other state bodies that are subject to the Promotion of Access to Information Act No. 2 of 2000 (PAIA),[4] should be in the public domain.

Why would the public want access to such documentation? The provision of electricity in South Africa is a highly politicised issue. Citizens require information to understand how the country's energy policy is being implemented, particularly in relation to choices of technology. A nuclear revival — at the expense of alternative technologies — is one that requires intensive public scrutiny. This is particularly the case when the state intends to support the nuclear revival with tens of billions of taxpayers' rands, and where the risks are a cause of public concern.

Citizens are also being faced with electricity outages, which were said by government to be the result of power shortages or even sabotage. While it is true that South Africa's electricity demand is rapidly approaching its supply, at the time of writing this had yet to happen. When the cuts affecting Cape Town during the summer of 2005/06 — related to problems mainly experienced at the Koeberg power station — were investigated by the National Electricity Regulator, they were instead attributed to inadequate maintenance, negligence and failure by Eskom to conform to operating procedures.[5] Nevertheless, power shortages have been offered as the reason for scaring consumers into accepting further nuclear power.

Nuclear energy has also been promoted as 'clean' and carbon friendly, despite the intractable problems of nuclear waste and the fact that the entire nuclear fuel cycle, a series of operations from uranium mining through to reactor decommissioning, makes a considerable contribution to carbon emissions.

There has yet to be a formal national debate interrogating the industry's claims and determining why, of all forms of electricity provision, nuclear has almost privileged access to government and decision makers. The potential of renewable forms of energy has yet to be unleashed in full. The comparative economics of each technology needs to be verified through full disclosure, enabling the public to have a greater ability to make informed choices.

The health of former nuclear industry workers has come under closer scrutiny in recent years. Around two thousand former Pelindaba workers are concerned that their deteriorating health may have occupational causes.[6] Many were subjected to radiation and harmful chemicals. In attempting to follow up, the individual workers have had to obtain their medical records from NECSA. This process has resulted in many delays, as NECSA claims not to have centralised medical files on its employees.

With each proposal for new developments in the industry, changes have been subject to public scrutiny in the form of environmental impact assessments (EIAs), which allow

for participation by interested and affected parties. Participation has not always been taken seriously by government, resulting in legal and other challenges to the EIA process. These challenges are indices of the highly controversial nature of the industry. Its claims are contested by a range of civil society organisations, which act as public watchdogs in securing rights to information and good governance in a climate in which 'energy security' is becoming increasingly politicised.

The story told here is one that analyses the history and politics of the nuclear energy industry. It attempts to give some understanding of the current revival of interest in the expansion of this industry. It then relates the difficulties faced by civil society in its insistence that there be full disclosure on a range of relevant issues like health and safety, economics, and corporate governance.

In pursuing these issues, civil society organisations such as the South African History Archive (SAHA), the Freedom of Expression Institute (FXI) and others have been at the forefront of pressing state institutions to reveal information to which the public should be entitled under the law. Their role as champions of the right to know is essential in the democratic process.

A history of nuclear energy in South Africa

Origins of the nuclear energy industry in South Africa

South Africa was drawn into the first phase of the development of the nuclear industry in the United States and Britain immediately after the Second World War. During the war, the Allies had secretly developed nuclear weapons at Los Alamos in New Mexico. Known as the Manhattan Project, the weapons research was initially aimed at beating Nazi Germany in the race to harness nuclear fission to a deliverable weapon.[7] It was believed that the first side to develop such weapons would have an overwhelming advantage in the outcome of the war. However, by the time that the Manhattan Project scientists had tested their weapons in the Nevada desert, the war in Europe was over. Instead, the weapons were deployed at Hiroshima and Nagasaki in August 1945.[8]

When the war came to an end, there was a short-lived debate about what should happen to these weapons. Many of the physicists who had worked on the bomb felt that they should be placed under the control of the newly formed United Nations Organisation. However, the onset of the Cold War, a result of the deterioration of relations between the emergent superpowers, the United States and the Soviet Union, put paid to any multilateralist sentiments. The burgeoning tensions created the opportunity for the United States and Britain to retain control of the weapons technology, which was never internationalised. As the Cold War intensified, so it became imperative for the Soviet Union under Stalin to obtain its own nuclear weapons. By 1949 this had become a reality, and

the nuclear arms race had begun.

The Manhattan Project struggled to source supplies of the fissile material. Of a number of options, uranium seemed to be the most suitable. The uranium for the bombs had been sourced from the then Belgian Congo (now the Democratic Republic of the Congo), but further supplies were limited.[9] The continued interest in developing weapons after the war required the acquisition of substantial and reliable sources. Local scientists were asked to comb the geological literature for any clues, and came up with a field report dating back to 1923 in which it was recorded that substantial amounts of uranium were present as a by-product of the Witwatersrand gold mines.[10] Since there had been no prior commercial value for this mineral, the ore was simply added to the mine dumps and slime dams characteristic of the region.

The US and British governments initiated a USD 46 million programme for uranium exploration. In May 1944, and again late in 1945, geologists were dispatched to South Africa's gold mines to verify the earlier reports. It was concluded that 'present evidence appears to indicate that the Rand may be one of the largest low-grade uranium fields in the world'.[11]

The prime minister at the time, Jan Christian Smuts, was elated with these findings and took a personal interest in following the progress of verifying the extensive presence of uranium. In February 1946 he drafted the relevant scientists and officials into a Uranium Research Committee, which set about monitoring the commercialisation of the mineral. Links were established with experts at various scientific institutions in the United States and Britain. Smuts encouraged the export of uranium samples to laboratories in these countries, and went on a personal mission to meet with General Groves, former head of the Manhattan Project, as well as metallurgists located at the prestigious Massachusetts Institute of Technology who were examining the samples.

The US and British governments were overwhelmed by the results of these investigations, which showed that there were enormous reserves of uranium in the South African gold mines. The recovery of uranium was not regarded as a difficult technology, and it became very easy to establish separation plants at the mines. The governments of the United States, Britain and South Africa entered into a secret agreement that allowed the weapons-owning states to import almost all of South Africa's uranium output. Two-thirds would be bought by the United States and one-third by Britain. A fixed price was agreed on that would take into account the costs faced by the mining industry in separating the uranium, the repayment of loans covering this work and the guaranteed margin of profit.[12]

The gold mining companies were extremely happy with this arrangement. The mining industry had been dislocated by the war, as the rail system had to prioritise the movement of war materiel, and there were bottlenecks in the steel industry. At the same time, the mining industry was keen to develop important new gold fields in the northern

Orange Free State. The windfall from the exploitation of uranium resources, which lasted for a period of a decade, made this more economically feasible.

Smuts was eager to capitalise further on the role of South Africa beyond being simply a supplier of uranium. The mandate of the Uranium Research Committee was to oversee the use of uranium for export, but Smuts conceptualised a broader institution charged with the country's nuclear research programme. Instead of placing it within the existing Council for Scientific and Industrial Research, which specialised in applied research, Smuts felt that the model used in countries like the United States, Britain and Canada of a separate entity should apply in South Africa. He piloted legislation through Parliament foreseeing the establishment of the Atomic Energy Board (AEB) on 1 January 1949.[13] Ironically, in the whites-only general elections in May 1948, Smuts lost his seat and his party lost its majority. The era of apartheid was ushered in under the premiership of D.F. Malan. The launching of the AEB thus coincided with the coming to power of the apartheid government.

Figure 1. Aerial photograph of the Nuclear Energy Corporation of South Africa (NECSA).
Source: supplied by NECSA.

The nuclear industry during the apartheid era

The offices and workshops of the AEB first occupied buildings in downtown Pretoria. The operations of the board were then relocated to a farm west of Pretoria called Pelindaba (a Zulu term meaning 'the discussion is over', signifying the industry's secretive nature). Pelindaba became the home of the first research reactor acquired by the AEB. This occurred as a result of the 'Atoms for Peace' programme initiated by US President Dwight

D. Eisenhower, whose efforts to spread nuclear research technology were aimed at distracting certain allies from proliferating nuclear weapons. The reactor became known as SAFARI-1, and has largely run on weapons-grade uranium (90 per cent enriched) since being commissioned in 1965.[14]

The industry received strong support from all apartheid prime ministers, especially H.F. Verwoerd and B.J. Vorster. It was Vorster who announced in Parliament in 1970 that South Africa planned to develop its own uranium enrichment capacity. This involved splitting the AEB into two corporations: one involved in broad research (the Atomic Energy Corporation—AEC), the other dedicated to the enrichment project (the Uranium Enrichment Corporation). The latter was established at Valindaba ('the talking has ceased'), a property neighbouring Pelindaba. This became the site of conversion, pilot enrichment and, ultimately, full-scale enrichment plants. Vorster stressed that the logic of the programme was to enable South Africa to create value through local beneficiation of the uranium, and that the programme would be dedicated to the peaceful use of nuclear energy.[15]

The training of South African scientists was conducted in countries like the United States, Britain, West Germany, France and Sweden, and there was considerable nuclear cooperation with Israel and Taiwan. Most of the accolades for collaboration on reactor research went to the United States. Dr A.J.A. 'Ampie' Roux, first AEB president, explained:

> We can ascribe our degree of advancement today in large measure to the training and assistance so willingly provided by the USA during the early years of our nuclear program. [South Africa's research reactor] is of American design, [and] much of the nuclear equipment installed at Pelindaba is of American origin, while even our nuclear philosophy, although unmistakeably our own, owes much to the thinking of [American] nuclear scientists.[16]

Yet much of the inspiration for the enrichment project was a result of extensive nuclear collaboration with West Germany, despite later denials by South African scientists, who claimed that the enrichment process that they used was entirely homegrown.[17]

On the surface, the state was putting into place a number of the key components of the nuclear fuel chain. It would not take long before the electricity utility, Eskom, bought coastal land within 28 km of the city of Cape Town in order to construct the country's first nuclear power station. Different European consortiums vied for the construction contract, but with increasing misgivings about apartheid, the Dutch-led consortium was forced to withdraw after an unfavourable parliamentary vote. The prize went to a French-led consortium instead, because parliamentarians in Paris had done nothing to disturb the progress of the project, and construction was initiated in 1977.[18]

Using a Westinghouse-based model, the French built two pressurised-water reactors on the Koeberg site, each with the capacity to generate 965 MWe. These came on stream

in 1983 and 1984, respectively, and to date represent Africa's only nuclear power station. The reactors have reached almost half their operating life, and should be decommissioned around 2030.

To accommodate the radioactive waste from the power station, a disposal site was identified at Vaalputs in the Northern Cape Province, over 450 km from Koeberg.[19] At Vaalputs, only the low- and intermediate-level wastes are stored in drums buried in pits close to the earth's surface. The highly radioactive waste — mostly consisting of spent fuel — is kept on site at Koeberg in storage ponds. Initially, this measure was an interim one, meant to last for 10–15 years in order to cool the spent fuel efficiently so that it could be stored in silos at Vaalputs. However, this has not happened. Instead, the holding racks in the storage ponds have continually been rearranged in order to accommodate further spent fuel rods. The national policy on radioactive waste management took a further twenty years to materialise, and remains agnostic about solutions for high-level radioactive waste. Vaalputs itself was forced to close for a period in 1996, when the regulator discovered over forty deviations from licensed procedures.[20] The AEC built a fuel fabrication plant at Pelindaba and also attempted to develop plans for what might have become a reprocessing facility at Gouriqua on the southern Cape coast. Reprocessing is the technology used for removing the plutonium and other radioactive elements from spent fuel used up in nuclear power stations. It was clear that South Africa was aiming to put in place all stages of the nuclear fuel chain.

There are two vulnerable moments in the fuel chain: the enrichment stage and the reprocessing stage. If these technologies are available, it may be possible to divert fissile material into weapons proliferation. With the completion of the enrichment facility at Valindaba, apartheid South Africa did precisely this, diverting enriched uranium into a systematic programme to manufacture nuclear weapons. This came at a time when the apartheid state was under increasing pressure both internally and externally. From the 1973 Durban strikes, which initiated the rebirth of a long-dormant trade union movement, to the June 1976 Soweto youth uprising, the capacity of the state to repress rebellion had begun to reach its limits. The growth of the black consciousness movement under the charismatic leadership of Steve Biko, the swelling of the membership of exiled liberation movements by an exodus of young activists and extensive student unrest added to the state's vulnerability. In 1974 the Portuguese dictatorship fell, and by the following year the neighbouring ex-colonies of Angola and Mozambique had won independence under the Marxist leadership of liberation movements. Wars of liberation were also under way in Namibia and Zimbabwe.

The apartheid state's response was not only greater internal and external militarisation, including murderous raids on neighbouring countries, but also the decision to build nuclear weapons: 'We'll have the bomb if we want', intoned cabinet minister Owen Horwood at an election meeting in 1977. The bravado masked the fact that the weapons were

crude and the air force lacked suitable means to deploy them. The question arose as to the identity of the potential victims — would the bomb be dropped on Luanda, Lusaka, or even Soweto? Any of these options would have been disastrous, given the ongoing Cold War and the potential for retaliation from the Soviet Union or China. Later, the bomb makers justified their manufacture as a deterrent. The plan was that if apartheid ended up under grave attack or threat, possession of the weapons could be demonstrated as a means to extend the power of white rule.

In the end, as Chandré Gould shows in chapter 4, some rationality prevailed and the weapons of mass destruction were dismantled at the turn of the 1990s. President F.W. de Klerk was still in power when he announced in March 1993 that the programme had been ended, the weapons decommissioned, the uranium returned to Pelindaba under safeguard and all the documentation destroyed. South Africa rejoined the International Atomic Energy Agency (IAEA), signed the Treaty on the Non-Proliferation of Nuclear Weapons, and allowed for the full international inspection of its nuclear facilities.

The nuclear policy of the ANC

On coming to power, the African National Congress (ANC) government generally upheld the stance assumed by its predecessor on non-proliferation. It drew on the kudos obtained from South Africa being the first state to renounce its nuclear weapons status. It resumed the Africa seat at IAEA in Vienna and went further in introducing domestic legislation safeguarding its non-proliferation policy. It also promoted the Treaty of Pelindaba, aimed at making the African continent a nuclear weapons-free zone. However, the state apparatus has, especially from 1998, actively promoted the expansion of the nuclear energy industry.

A few months before the first democratic elections, the ANC Science and Technology Desk in the Western Cape, together with a local NGO, the Environmental Monitoring Group, promoted a conference on the future of nuclear policy in South Africa. The conference was addressed by Trevor Manuel, then head of the ANC's Department of Economic Planning. Speakers included opponents and proponents of nuclear energy. Officially, the ANC took no policy position on the question, leaving it open to future debate. However, Manuel promised that 'we shall not tolerate circumstances in which policy on issues as critical as a nuclear programme be confined to experts in dark, smoke-filled rooms. The debate must be public and the actions transparent'.[21]

Two years later, DME hosted an Energy Summit, with wide attendance by a number of stakeholders, including civil society organisations. The Energy Summit was one of the steps taken in catalysing a White Paper on Energy, a document signalling the direction of policy and legislative intentions arising from this policy. By the time of the summit, the state nuclear research entity, the AEC, had significantly scaled down its operations and staffing. The future of the Koeberg nuclear energy complex was also somewhat un-

certain. In the final White Paper, published in July 1998, it was explicitly stated that any expansion of the industry would occur within 'the context of an integrated energy policy planning process with due consideration given to all relevant legislation, and … subject to structured participation and consultation with all stakeholders'.[22]

Other signalled intentions were that there would be restructuring of the nuclear industry 'necessary to ensure the environmental sustainability and cost-efficiency of South Africa's energy economy, while seeking maximum benefit from historical investment'.[23] It was also indicated that restructuring would be done in 'a participatory fashion', and that there would be a thorough investigation into Koeberg's technical and financial performance, which 'will be made available for public scrutiny and comment before a final decision is made on the future of Koeberg'.[24]

In practice, none of the promised consultation or participation has materialised, and the nuclear policy continues to be crafted in the 'dark smoke-filled rooms' that Manuel supposedly rejected. The drafting of the Nuclear Energy Act No. 46 of 1999 and the National Nuclear Regulator Act No. 47 of 1999 was designed in DME by officials whose primary consultation was with the Chamber of Mines. The period allotted for public comment on the National Radioactive Waste Management Policy and Strategy was so short that the minister was forced to extend it for an extra 90 days to accommodate public comment.[25] Very few of the concerns expressed by the public were reflected in the final policy document.

There has been no broad stakeholder consultation on the future of the nuclear industry; neither has this applied specifically to the future of Koeberg, as promised in the 1998 White Paper. Most of the decisions about nuclear development have occurred within DME and the Department of Public Enterprises, without wide consultation with other departments. Much of the decision making has been from the top down, without any stakeholder participation. What appears to be government policy has bypassed even the policy processes within the ruling ANC.[26]

This lack of transparency indicates how, in the space of the last decade, the executive branch of government has come to dominate national policymaking. Cabinet has become susceptible to the special pleading and some of the false claims of the industry, securing for it a highly subsidised place in the sun at the expense of more sustainable technologies, human health and the environment.

The revival of the nuclear industry in South Africa

In practice, the local renaissance has been led by those promoting the pebble bed modular reactor (PBMR). This is a high-temperature reactor using helium gas as a coolant. The fuel takes the form of small particles of 10 per cent enriched uranium encased in graphite spheres approximately the size of billiard balls. These 'pebbles' are introduced to the reactor and removed when spent. The reactors are designed to produce a small amount

of energy (165 MWe) and therefore in most cases would only be viable when more than one module are grouped together. Its promoters foresee them being built alongside a factory or in a residential area. The waste would be stored on site for the life of the reactor. Claims have been made by the developers that the reactor is 'inherently safe'. Similar reactors have operated in the United States and Germany, but in both cases research into this model was discontinued. The South African version has been based on the German prototype and royalties continue to be paid to German companies. Plans for a Chinese rival high-temperature reactor will provide the South African manufacturers with considerable competition.

Ironically, the idea for a PBMR was mooted by a group of researchers who had originally worked on the South African nuclear bomb. Their first task was to persuade Eskom to support the project. In 1998, the company PBMR Ltd was formed. Initially, this was a full subsidiary of Eskom, but gradually other investors were drawn in. These included the state Industrial Development Corporation; the US reactor operating company Exelon; and British Nuclear Fuels Ltd (BNFL), the almost bankrupt state-owned reactor company. Exelon subsequently decided to withdraw its investment, while BNFL sold its reactor-building operation (Westinghouse) to Toshiba, which currently acts as the only foreign partner.

As in most cases of nuclear development, the prototype has been subjected to numerous design changes, huge cost overruns and extensive delays. The industry's intention is to build a demonstration plant on the Koeberg site and a fuel-manufacturing plant within the Pelindaba complex. In 2005 PBMR Ltd announced that the costs of these two developments would amount to ZAR 14.9 billion (USD 2 billion), most of which would have to be public investment. This figure does not include any operational costs, nor does it cover decommissioning at the end of the reactor's life. The aim is to have the plant operating by 2008, with commercial replication starting in 2013.

By March 2007 the EIA was still far from complete, as was the licensing of the demonstration model by NNR. The EIA has had to be scrapped and restarted, partly because of challenges from civil society[27] and partly because the company had substantially altered the design. Despite being incomplete, PBMR Ltd awarded tenders for the construction, the provision of turbines, the delivery of graphite for the fuel and other functions.

One of the key institutions safeguarding good governance in the industry is NNR. Created as an independent statutory body, the functioning of the regulator depends on its impartiality. In 2005, when there was a vacancy for the position of the regulator's chief executive officer (CEO), the cabinet appointed Maurice Magugumela over the heads of the regulator's board. Magugumela had been the former safety and licensing manager of PBMR Ltd. The credibility and independence of the regulator are therefore now at issue.

Although Eskom has signed a letter of intent to purchase the first 24 production models of the PBMR, there has been disquiet about this within the Eskom board. The

letter of intent is qualified by a statement requiring Eskom to opt for the least-cost technology. It is doubtful whether the PBMRs will ever be the lowest cost option, yet the support of the cabinet for the technology may neutralise these provisos, forcing the utility to purchase these reactors. After the state has invested so heavily in the technology, it will be difficult to write it off for economic reasons.

Why has South Africa chosen to develop a technology already abandoned by more sophisticated nuclear industries in the North? Both the United States and Germany have desisted from this path. The South African programme seeks to take advantage of the so-called nuclear renaissance, whereby, after a long period following the accidents at Three Mile Island and Chernobyl, orders for nuclear reactors dried up completely. Nuclear energy programmes became unpopular in most of Europe, with referendums or laws reversing nuclear developments in countries like Germany, Austria, Sweden and Italy. No orders have been placed for new reactors in the United States. However, since the turn of the century, there have been new reactor orders in the Russian Federation, China, Japan, South Korea, India and Finland. The South African industry is confident that it can tap export markets in places like Turkey, Indonesia and the rest of the African continent. PBMR Ltd has also been linked to a venture aiming to produce PBMRs in the United States if approved by that country's regulator. President George W. Bush is busy implementing an energy strategy that will offer government subsidies to reactor builders. Without considerable state support, the economics of the pebble bed make little sense.

While South Africa is hoping to take advantage of any niche demand for small third-generation reactors, it is also bearing most of the development risk. This could backfire, something that Exelon realised in its decision to disinvest. If so, the experiment would have occurred without considerable financial burdens for the North.

Ultimately, even South Africa may become impatient with the PBMR's tardy delivery. Pressures already exist for the building of further pressurised water reactors, and the minister of public enterprises, Alec Erwin, a staunch advocate of the pebble bed, felt that future large-scale electricity needs can only be met through ordering a reactor that can deliver an output of around 1,000 MWe. Having teamed up with Westinghouse in the PBMR project, the government is considering the feasibility of ordering one of Westinghouse's new AP1000 reactors.[28]

Questioning the logic of the nuclear renaissance

The state has offered various arguments in support of the nuclear revival: (i) nuclear power is clean, green and carbon friendly; (ii) South Africa's electricity future needs cannot be met by renewables or energy saving; (iii) the nuclear industry is evidence of the country's technological advancement; and (iv) there is no risk of weapons proliferation. However, these points are all based on mythology rather than hard facts.

Nuclear power generates radioactive waste, whose most lethal component, pluto-

nium, has to be insulated from the environment for approximately 244,000 years, the time it would take for its radioactivity to be diminished to safe levels. When we consider that human beings (*homo sapiens)* only emerged 35,000 years ago, have only been engaged in agriculture for the past 10,000 years, and have only been urbanised for the past 5,000 years, questions arise as to how these long-lasting radioactive residues are to be managed over their hazardous lifetime. The problem of managing the highly radioactive waste has not been fully resolved anywhere in the world.

On the question of carbon emissions, it is true that the reactors themselves emit little carbon dioxide. However, if one considers the entire fuel chain, without which power cannot be generated, it turns out that nuclear energy makes a positive contribution to carbon emissions. This can easily be seen in the very energy-intensive uranium enrichment process, as well as emissions from the mining and milling, reactor construction and decommissioning, and reprocessing stages. It is worth noting that nuclear energy is not recognised as a technology that can earn carbon credits under the provisions of the Kyoto Protocol. This indicates that scientists and politicians linked to the UN climate change negotiations felt that, in order to protect the climate, we should not replace the use of coal, oil or gas with nuclear plants.

Renewables, unlike fossil fuels, are not depleted with use, and are therefore a much smarter long-term option than nuclear. Prices have fallen and many processes have been commercialised, making it possible for those generating renewable electricity domestically to sell surplus power back to the grid. However, in South Africa, state investment in renewables to date has been derisory, despite imminent breakthroughs in the affordability of solar energy (developed at the University of Johannesburg with German support). The new South African National Energy Research Institute has established tertiary training in renewable energy at Stellenbosch University. There is a small commitment on the part of the state to increase the share of renewables in South Africa's energy mix, but this may be a case of too little, too late. Countries like Germany, Spain and Denmark lead the way in terms of the extent to which renewable energy sources are part of their energy mix. German jobs in the renewable energy sector now far outnumber those in the nuclear industry.

While countries may bask in the status of having nuclear technology, we need to ask whether this is the most appropriate path for Africa's development. It certainly generates far fewer jobs than an equivalent investment in renewable energies. It employs a small number of very highly skilled operators and scientists, in comparison with lower-tech energy solutions that can be generated in a decentralised manner throughout every community and where fewer skills are required for maintenance, repair and installation.

The patriotic glee with which certain cabinet ministers have supported the extension of the nuclear power industry is an expression of a technological nationalism. While the current politicians have supported a non-proliferation stance, this same technologi-

cal nationalism could one day be extended to the reacquisition of nuclear weapons. In September 2006 the intelligence community received with some acclaim an academic presentation that argued for the option of holding nuclear weapons in reserve to face an increasingly dangerous and uncertain world.[29] South Africa's democracy is young and fragile, and there are no guarantees that our current constitutional values will be upheld indefinitely.

Finally, government proponents of the nuclear renaissance argue that this will be a quick fix for the power shortage likely to be experienced by the economy, based on current electricity capacity. Electricity cuts have been intermittent all over the country in the last few years, particularly in cities where the utility has been placed on a commercial footing, and too little has been spent on upgrading and maintaining old equipment. During 2005 a series of incidents, including a fire under a pylon, caused one of the two nuclear reactors at Koeberg to trip. When this happens, power to the grid is disrupted. More seriously, on Christmas Day 2005 it was discovered that the rotor of a generator linked to the second reactor had been damaged by the presence of a misplaced bolt. The plant had to be shut down for some time, pending the sourcing and shipment from France of a replacement rotor in April 2006. This led to more substantial power disruptions throughout the Western Cape, affecting households, industry, services and agriculture. The summer harvests of fruit and wine had to be destroyed. Electric pumps operating sewerage systems failed, and sewerage leaked into wetlands and freshwater bodies important to biodiversity, ravaging their ecosystems for at least the next decade. The growing tourism industry feared that its clients would select other destinations because of the unreliability of the electricity supply. The second unit at Koeberg had to be shut down for some weeks between March and July because its nuclear fuel needed routine replacement. While both plants were shut simultaneously, there were severe electricity cuts at the beginning of the local winter.

On the eve of municipal elections on 1 March 2006 the minister of public enterprises, Alec Erwin, held a press conference during which he stated that the damage at Koeberg had been the result of sabotage. During the same meeting, the minister of minerals and energy, Lindiwe Hendricks, alleged that the actions were an attempt to affect the outcome of the elections. The ministers announced their intention to have the matter investigated by the National Intelligence Agency. The media and trade union response was one of outrage. Minister Erwin went on to deny he had implied sabotage, despite repeated running of the television news clip in which his allegations were audible to all. The major trade union federations, the Congress of South African Trade Unions (COSATU) and Solidarity, sharply criticised Ministers Erwin and Hendricks. The regional secretary of COSATU in the Western Cape, Tony Ehrenreich, stated: 'The sabotage accusations were clearly absurd and incorrect. After the minister was heard on radio and television making the accusation, he further discredited himself by denying it'.[30] The elections in the metropolitan area of Cape Town were hung, and the opposition Democratic Alliance went on to form a

coalition administration without the ANC.

While police and intelligence operators are still to report on the bolt incident, the National Electricity Regulator of South Africa in August 2006 issued a damning report on the outages. Its findings accused Eskom of inadequate maintenance, breaches of licensing conditions, inappropriate risk assessment, negligence, failure to conform to operating procedure, inadequate implementation of corrective measures and complete failure to notify supervisors of abnormalities. It further declared that the six incidents resulting in shutdowns could have been avoided.[31]

All this points to the problems arising from gross mismanagement by Eskom, despite it being aware that electricity demand is rapidly reaching full capacity. Belated plans to add capacity to the system include recommissioning some coal-fired power stations that had been mothballed when supply exceeded demand, adding new coal-fired and gas-turbine power stations to the grid, and looking to the Democratic Republic of the Congo to supply hydro-electric power from the Inga Falls complex. Demand-side management and energy conservation measures have been stepped up. Instead of an increased reliance on centralised electricity generation, the lesson should have been learned that the answer is one of greater decentralisation and dissemination of multiple energy sources throughout the country.

Further, the new head of NECSA, Rob Adam, formerly director general of science and technology, is a great proponent of the idea that South Africa should enrich its own uranium. The country's enrichment capacity was closed down after its abandonment of the bomb programme. Bomb-grade uranium can be used inside the SAFARI-1 research reactor at Pelindaba, although there are plans to change to much lower levels of enrichment. Enrichment is expensive and highly energy intensive. It makes economic sense only if South Africa is to add a further ten Koeberg-sized or over fifty PBMRs to its existing energy plants. Conversion and enrichment would add 100 per cent value to that of the mined ore.[32] Will the drive to set up enrichment facilities spur on the expansion of the civilian nuclear programme in South Africa and the rest of the continent?

With enrichment facilities, proliferation of weapons of mass destruction would become an option. The discussions within the intelligence community, mentioned earlier, have broken through the earlier political taboo about using nuclear technology for peaceful purposes only. The genie is now out of the bottle.

Civil society takes on the nuclear industry

Over the years, a number of civil society organisations have been active in challenging the nuclear industry. During the apartheid years, the key organisation was the voluntary Cape Town-based Koeberg Alert. At one stage this campaign had six area committees in the Cape Peninsula and Atlantis. Koeberg Alert organised public meetings, monitored emergency tests, distributed information, researched the industry, held street theatre and

organised demonstrations. Active mostly in the 1980s, the organisation was hampered in its activities by apartheid legislation such as the Key Points Act, as well as state of emergency legislation.[33] Nevertheless, it had informal links with groups all over the country and was able to operate as the anti-nuclear conscience of the people of Cape Town.

By the 1990s anti-nuclear activism had been absorbed into broader environmental activism exemplified by another volunteer organisation, Earthlife Africa. Earthlife Africa was formed in 1989, and by 2006 had active branches in Johannesburg, Cape Town, Durban and Windhoek (Namibia). At times the organisation also had a presence in Pretoria, Pietermaritzburg and Kampala (Uganda). The organisation was governed by an annual inter-branch congress and a Statement of Beliefs. Between congresses, branches operated autonomously, but with extensive mutual consultation. By 2004 the active branches had formed campaigning structures called Nuclear Energy Costs the Earth Campaign (NECTEC), managed by full-time campaign coordinators engaging in training and advocacy work. The NECTEC campaigns have involved interventions in the media and lobbying parliamentarians, canvassing for alternatives to nuclear energy (such as renewables), contesting the EIA for the PBMR, and supporting former nuclear workers to obtain access to records on their health status with a view to securing compensation for damage caused. NECTEC has also worked with a range of community-based organisations, local municipalities, faith-based groups, representatives of trade unions and trade union federations, land claimants, and other activists. Earthlife Namibia has focused its efforts on questioning the rights given to mining companies to extract uranium inside national parks.

In Johannesburg, Earthlife Africa's NECTEC campaign formed an alliance with SAHA in 2004 to help it obtain official documents through the provisions of PAIA.

The struggle for information on worker health

During 2003 Earthlife Africa Johannesburg's NECTEC was approached by a number of former workers at Pelindaba. These workers complained that they were suffering from health problems, which could be related in some way to their exposure to radioactivity and dangerous chemicals while previously working for AEC/NECSA. The workers sought to have their medical status verified in order to obtain workers' compensation funds from the state.

One such worker, James Mcephe, now 69, suffers from painfully itchy skin and is prone to bleeding after the slightest impact. His eyes burn, making it difficult to see, and he complains of other bodily aches and pains. Mcephe maintains that he was healthy prior to working as a labourer for NECSA at Pelindaba:

> I was fine at the beginning [in 1986,] but we used to load chemicals onto tractors and do a lot of maintenance work on broken pipes that funnelled liquids around the complex. We were

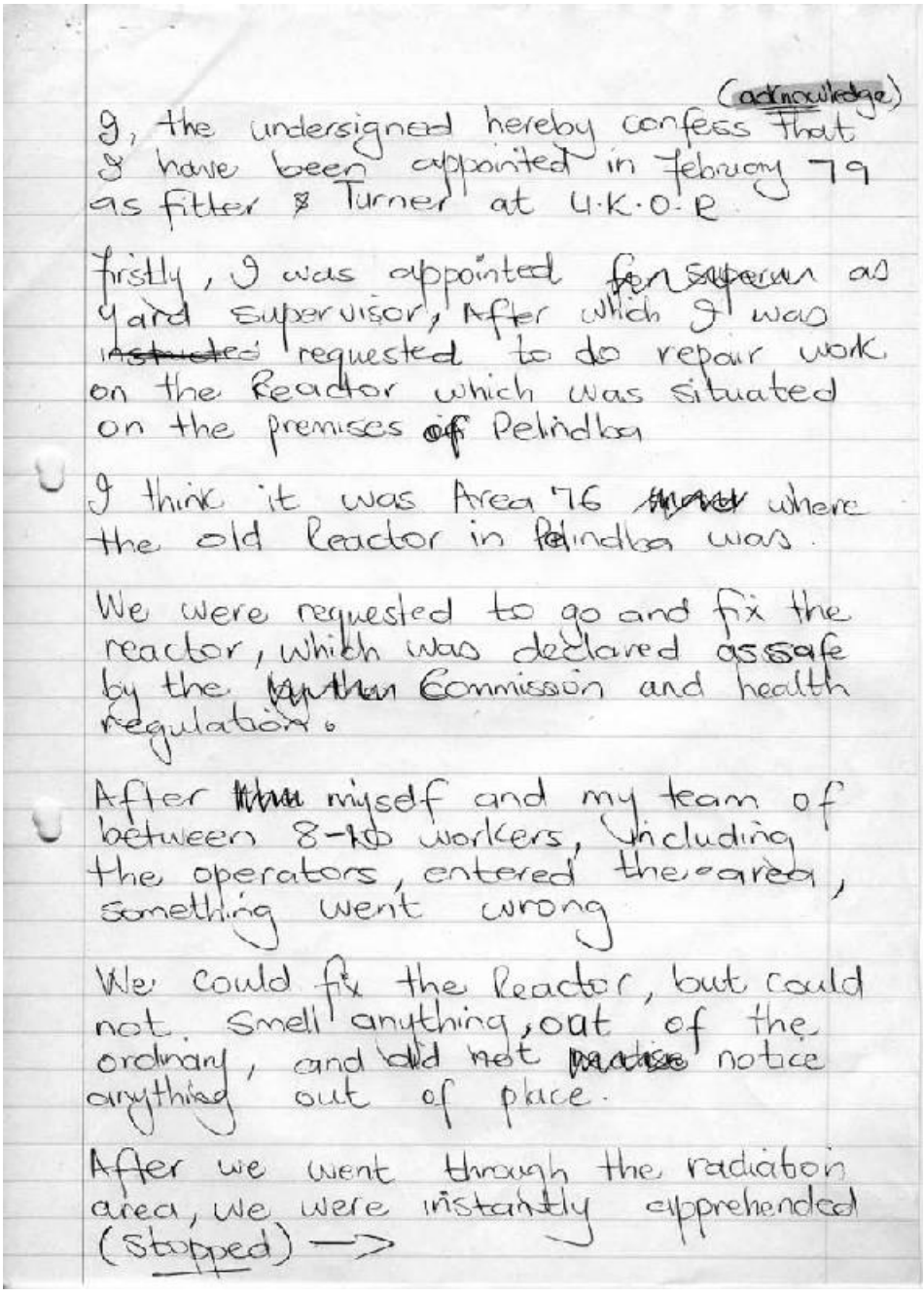
> never told about the risk of radiation contamination and there was never any safety training given to us — my protective clothing consisted of a pair of overalls. Now I am consumed by diseases. Things are bad, so bad I have to go to the clinic every month for treatment.

Retrenched in 1999, Mcephe's complaints to NECSA about his health status went unheeded.[34] He was one among many who ultimately approached Earthlife Africa to intercede.

Earthlife Africa engaged Dr Murray Coombs, a toxicologist with expertise on occupational diseases, to develop a report on the background and health status of the affected workers. Coombs was at this time operating as a private consultant with Health Gap Network, a Pretoria firm. In order to conduct the study, Coombs needed to examine the complete medical records of the former workers. Initially, NECSA was unprepared to grant access. Earthlife Africa therefore turned to SAHA to provide expertise in acquiring the official medical files on the affected workers. Initial requests for 23 personal records were submitted pursuant to PAIA in July 2004.[35]

Victor Motha's files were part of the original 23 requests. Victor was a Pelindaba worker, who joined NECSA soon after qualifying as a chemical engineer at Pretoria Technikon. While working in a fluorine plant in November 2001, Motha fell ill. His father, Clive, recalled that Victor said nothing about having inhaled fluorine: 'He ate his dinner as usual, and started vomiting. We rushed him to hospital, and there he died.' He was 21 years old. His death certificate, still in his father's possession, claimed that his death is under investigation. Shortly thereafter the family received correspondence from the then minister of minerals and energy, Phumzile Mlambo-Ngcuka (later the deputy president) promising the family that NECSA would investigate Motha's death: 'No stone would be left unturned in this investigation', she stated. Yet to date this is where the correspondence with the family ended. Later, DME officials claimed that the report on the investigation was available from the Department of Labour.[36] Immediately after the case was aired in the press, Clive Motha received a cheque for R6,000 from the Department of Labour, ostensibly to cover funeral costs (of four years previously). Clive Motha felt that this might have been issued to 'keep the family happy so that we don't talk to outsiders'.[37]

Figure 2. Victor Motha's father at home standing beneath a graduation photograph of his son.



(admowledge)

I, the undersigned hereby confess that I have been appointed in February 79 as fitter & Turner at U.K.O.E

Firstly, I was appointed ~~for~~ as yard supervisor, After which I was ~~instructed~~ requested to do repair work on the Reactor which was situated on the premises ~~of~~ Pelindba

I think it was Area 76 ~~where~~ where the old Reactor in Pelindba was.

We were requested to go and fix the reactor, which was declared ~~as~~ safe by the ~~Nuclear~~ Commission and health regulation.

After ~~them~~ myself and my team of between 8-10 workers, including the operators, entered the area, something went wrong

We could fix the Reactor, but could not smell anything, out of the ordinary, and did not ~~notice~~ notice anything out of place.

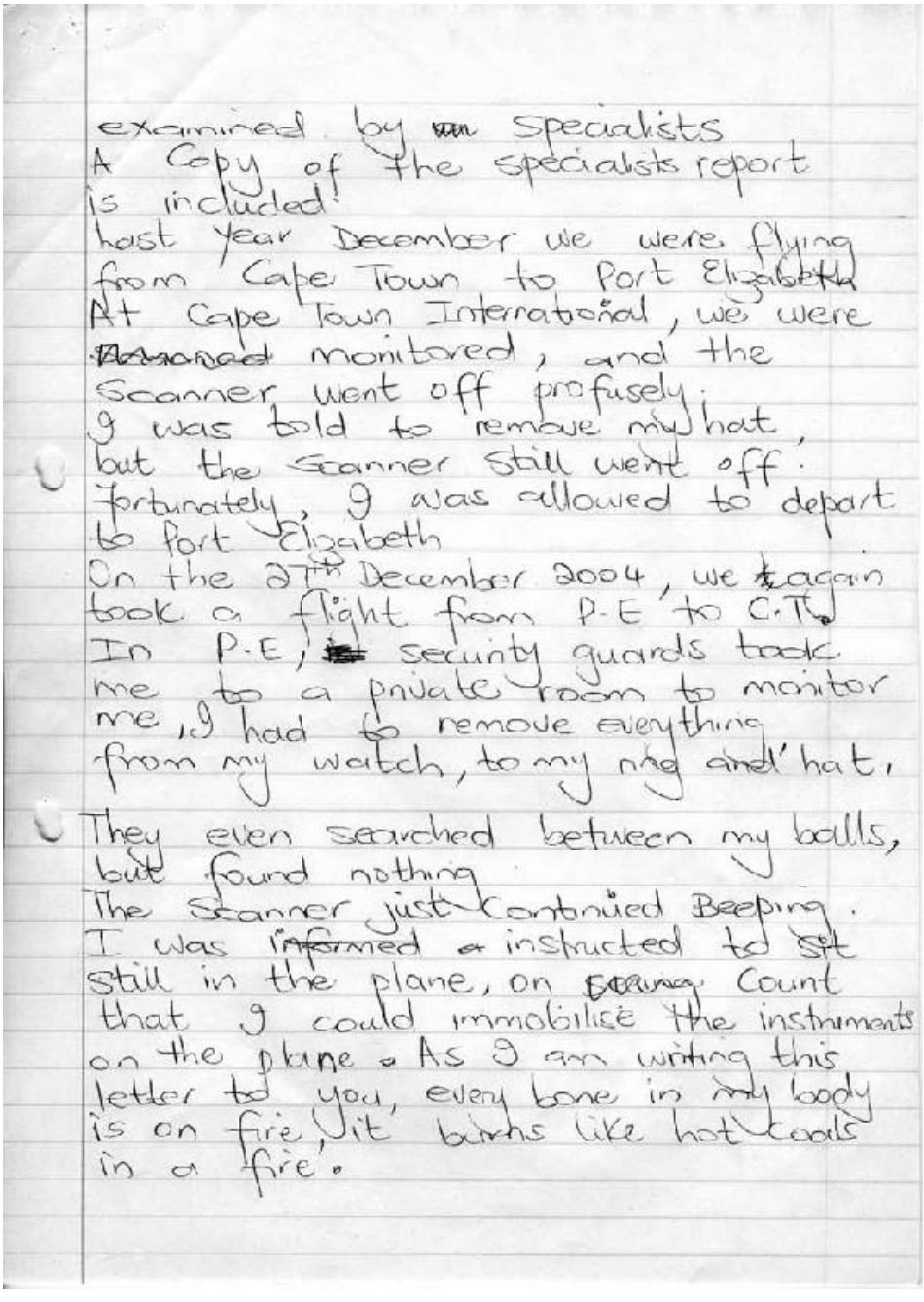
After we went through the radiation area, we were instantly apprehended (Stopped) →

Figure 3. (pp. 109 - 111) Statement submitted together with a request for medical records by former employee of Pelindaba contracted to work on nuclear reactor which is alleged to have leaked. The statement outlines the employees physical ailments after exposure.

Mr Vonk de Ridder, the official and health inspector, as well as other health inspectors, immediately started to monitor us, after which a blood Count was taken.
After which our clothes were taken away from us and burned.

We were given clean overalls on our way home.
We were about 4 workers who were instructed to report at Pelindaba the following day. After which the following 5 days we were required to be at Pelindaba for +- 35 mins. We had to lie in the leadbox to ensure that the radiation which we were exposed to, would leave our bodies.
After the instruction was signed and U.K.O.R handed us our packages, did we not realise what awaits us.

After all these years, I first experienced burn pains in my toes & thumbs. In 2003, I felt I could not be in the sun, and should not be in it, even though I am a nature lover. I then went to the Academic Hospital in Pretoria, where I was



examined by ~~xxx~~ Specialists
A Copy of the specialists report
is included!
last year December we were flying
from Cape Town to Port Elizabeth
At Cape Town International, we were
~~Advanced~~ monitored, and the
Scanner went off profusely.
I was told to remove my hat,
but the Scanner still went off.
Fortunately, I was allowed to depart
to Port Elizabeth
On the 27th December 2004, we ~~x~~again
took a flight from P.E to C.T.
In P.E, ~~x~~ security guards took
me to a private room to monitor
me, I had to remove everything
from my watch, to my ring and hat.
They even searched between my balls,
but found nothing
The Scanner just continued Beeping.
I was ~~informed~~ instructed to sit
still in the plane, on ~~x~~ Count
that I could immobilise the instruments
on the plane. As I am writing this
letter to you, every bone in my body
is on fire, it burns like hot coals
in a fire.

It took until mid-November 2004 for NECSA to respond with releases of records related to the formal request. By the time these files were released, four workers (one of whom had been Victor Motha) were already dead. Of the remaining 19, 13 workers presented themselves for medical examinations. Of these 13, Coombs revealed that ten ex-employees (77 per cent) 'have been exposed in the course of their employment to a hazardous substance which could cause adverse health effects'. The hazards referred to included radioactivity, chemical exposure and noise. Eight workers (62 per cent) needed immediate medical investigation and treatment. Four of these workers (31 per cent) had illnesses 'very likely to be occupationally related'.[38]

Coombs, in assessing the nature of the information released, reported that the records were incomplete in relation to statutory requirements governing nuclear worker health, as laid out in the National Nuclear Regulator Act No. 47 of 1999. Coombs suggested that the records be requested again, but with a more specific description of what was required. NECSA was now called upon to provide full medical and human resources files, the results of all tests conducted for radiation exposure, compensation claims records, death certificates and post-mortem records. This request for additional information was intended to close the gap in relation to the 23 original requests.

Between November 2004 and June 2005 SAHA put in a further 224 requests relating to NECSA's knowledge of the health status of individual workers. Under PAIA, government agencies are given 30 days to respond; NECSA failed to conform. It refused to respond to SAHA in writing, and gave no time lines suggesting when the documentation might be made available. Workers, some of whom were by now in a serious condition, were faced with continued stalling by the authorities. With no formal response, NECSA issued contradictory verbal assurances to SAHA and Earthlife. Eventually, NECSA's designated information officer claimed that she could 'not estimate the delay as she was not working directly with the employees responsible for copying the files'.[39] Nevertheless, in September NECSA provided SAHA with records relating to 30 requests. Fourteen of these related to request for additional information under the original 23 requests. In the face of the continued and unexplained delays in the provision of information, SAHA approached the public protector, the South African Human Rights Commission (SAHRC) and NNR for support.

Was NECSA deliberately being intransigent or simply incompetent? On a visit to NECSA on 6 October 2005, SAHA ascertained that there were a number of reasons for the corporation's extremely slow response:

- Records relating to individual employees were distributed across a number of internal NECSA departments.
- Record collections were catalogued in different ways. Injuries were listed by year, whereas human resources listed employees by their personnel numbers;

medical files were in order of the employee's identity number; and compensation claims were arranged by the employee's name.[40]

- For each collection, different requirements applied. For example, the human resources records had to be retained for seven years, whereas medical records had to be kept for 40 years. Some information requested had therefore been destroyed.

NECSA claimed that, faced with such challenges, it was in the process of regrouping and resorting records relating to all 25,000 past employees. It estimated that this process would take until the end of 2005, and had required the full attention of a team of eight; four extra officers would be appointed. NECSA estimated that the cost of reorganising the records would be ZAR 4.5 million. Priority would be given to the release of requested records, which would occur in batches.

NECSA also provided assurances that records would be released pursuant to the 210 outstanding requests by the end of 2005. The assurances were not tantamount to any kind of refusal of information, making it difficult for SAHA to argue a case for litigation in order to effect the rights of the requesting individuals under PAIA. The assurances also made it difficult to engage the public protector and the SAHRC in any intervention.

By the end of 2005 NECSA had released many of the requested medical records in batches; over the course of 2006 SAHA continued to pursue the remaining records, without much success. The first batch released in 2006 arrived in January 2006, without any explanation of the intended release of the remainder as requested. Some of the records continued to contain gaps. Nevertheless, having achieved broad access to the records of most of the concerned individuals, Earthlife agreed to take over SAHA's role in submitting further requests to NECSA for the records.

Despite NECSA's failure of to provide written advice as required by PAIA or to comply with its own guarantees on time lines for release, the public protector and the SAHRC failed to take any significant steps to intervene. The public protector requested an explanation from NECSA, which merely reiterated the conversation between itself and SAHA in October 2005,[41] and took no steps following SAHA's response setting out the multiple failures to comply with not only NECSA's own guarantees in relation to medical record requests, but with requests for non-medical records (dealt with below), some of which had been outstanding for over two years. Further, despite a meeting with he SAHRC in October 2005, it did not contact SAHA regarding the latter's complaint until January 2007, at which time it attached a letter from NECSA that misrepresented the 2005 agreement and stated that it (NECSA) had continuously provided access to records over the 2005/06 period. SAHA again responded that the 2005 agreement had not been complied with and that NECSA had failed to respond to the non-medical record requests, which had now been outstanding for almost three years. The SAHRC did not respond.

The initial Coombs report stimulated concern about the fact that a public body like NECSA, responsible under the law for the health and safety of workers to both the Department of Labour and to NNR, should have paid such belated attention to its poorly integrated record keeping. To offset reputation problems in an industry that should be scrupulous about its duty to protect its workers, NECSA decided in August 2005 to set up a team of five 'specialists' — all nominated by NECSA — to investigate Motha's death and the allegations of unsafe practices at NECSA resulting in the hazardous exposure of some workers. Efforts by Earthlife to propose representation of its own experts on the team were all rejected, leading to fears that the NECSA nominees would whitewash the institution.[42] Earthlife was offered a chance to make submissions to this committee, chaired by Mogwera Khoathane, a former NECSA radiation protection officer who now runs his own consultancy.[43]

The final Coombs report, published in September 2006, claimed that 72 members of the sampled group of 208 ex-workers (35 per cent) were suffering from occupation-related illnesses. 'If we even accept that 50 out of the 72 present problems of potential occupational diseases, it may indicate 5 100 employees with occupational diseases [in the historical pool of 30 000 NECSA employees since the 1960s]', Coombs wrote in his report. NECSA's response was to refer to its internal inquiry, which it claimed was due to report in January 2007.[44] It is interesting to note the defensiveness and delusion in the comments of NECSA's spokesperson, Chantel Janneker, in relation to the Coombs report:

> Dr Murray Coombs, in his report, makes assumptions that cannot stand interrogation and is misleading Earthlife Africa, and is supporting it in its drive to put any nuclear related matter into a negative light. Recent international opinion, prevalent even among environmental groups, is that, on balance, nuclear power is a more environmentally friendly option to produce energy than any other, and this is simply ignored by Earthlife Africa.[45]

Indeed, it will be interesting to see how NECSA's own team deals with the claims showing clear evidence of occupational illness, and how much this is attributed to lax health and safety standards at Pelindaba. Some might argue that NECSA's belated concern with these matters has entirely been a response to Earthlife Africa's use of PAIA.

Revealing radioactivity

In April 2004 Earthlife publicised the existence of an unfenced calibration unit in the vicinity of Pelindaba whose radioactivity was elevated above legally recognised dosages. The purpose of the unit when set up in 1979 was to assist with the calibration of instruments used by geologists. The existence of this unit had been made known by a group of former residents of the area. who are currently engaged in a formal claim to the land

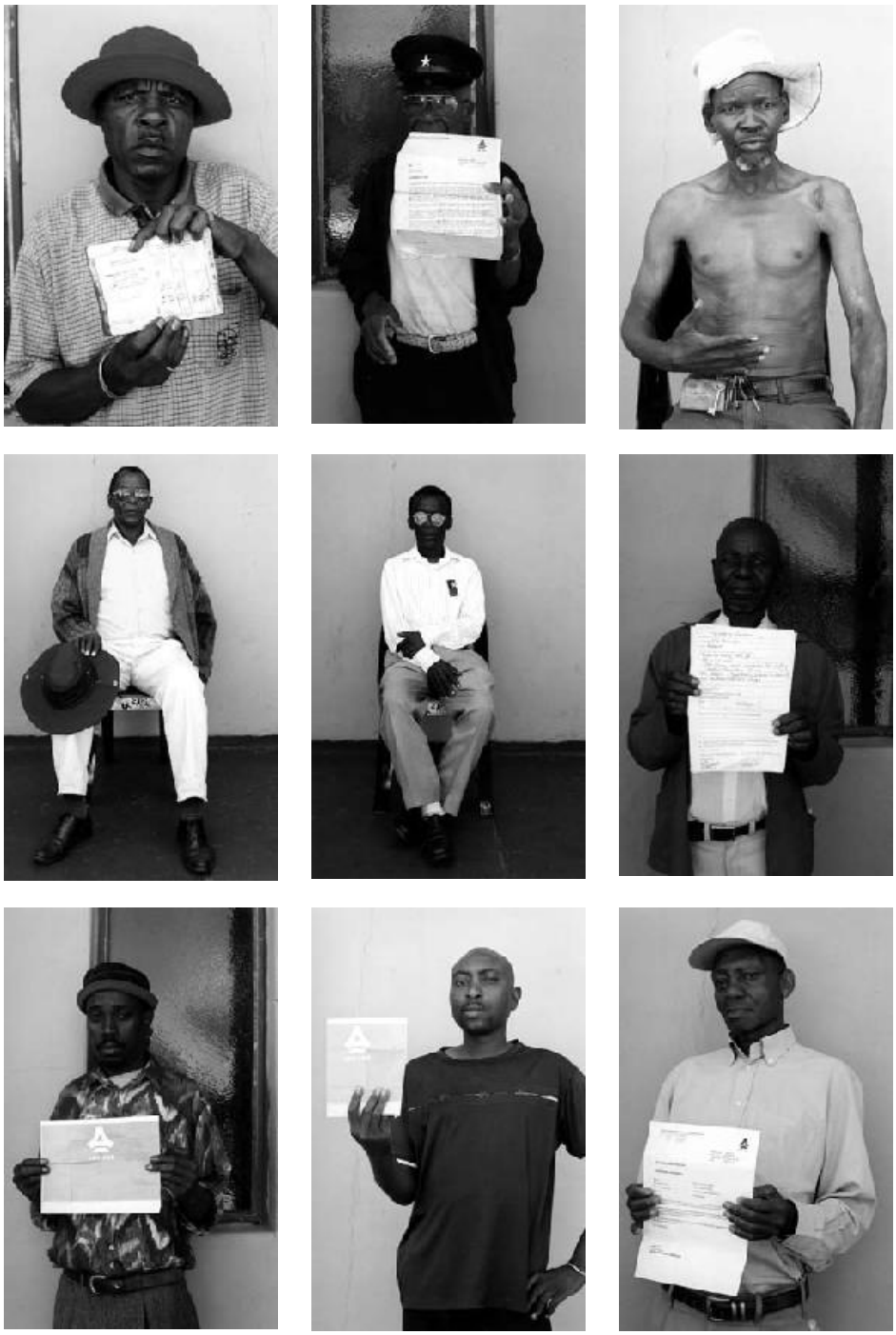


Figure 4. Former NECSA workers living in Attridgeville who together with Earthlife Africa submitted PAIA request for their medical records in order to claim compensation for occupational illnesses.

Figure 5. Award-winning cartoonist Zapiro's interpretation of Mlambo-Nguka's reaction to the fact that NNR had confirmed Earthlife Africa's readings of radiation levels of ten times the legal limit at an unfenced calibration centre located 20 metres from low-cost housing.

at Pelindaba. Claimants felt fearful that NECSA was taking no steps to safeguard the public from radioactive releases. The calibration centre was located 20 metres from a low-cost housing development. Earthlife's readings at the unit measured 20 to 30 microsieverts per hour, as opposed to the legal limit for ionising radiation measured outside a storage facility for radioactive materials that emissions should not exceed 2.5 microsieverts per hour.[46]

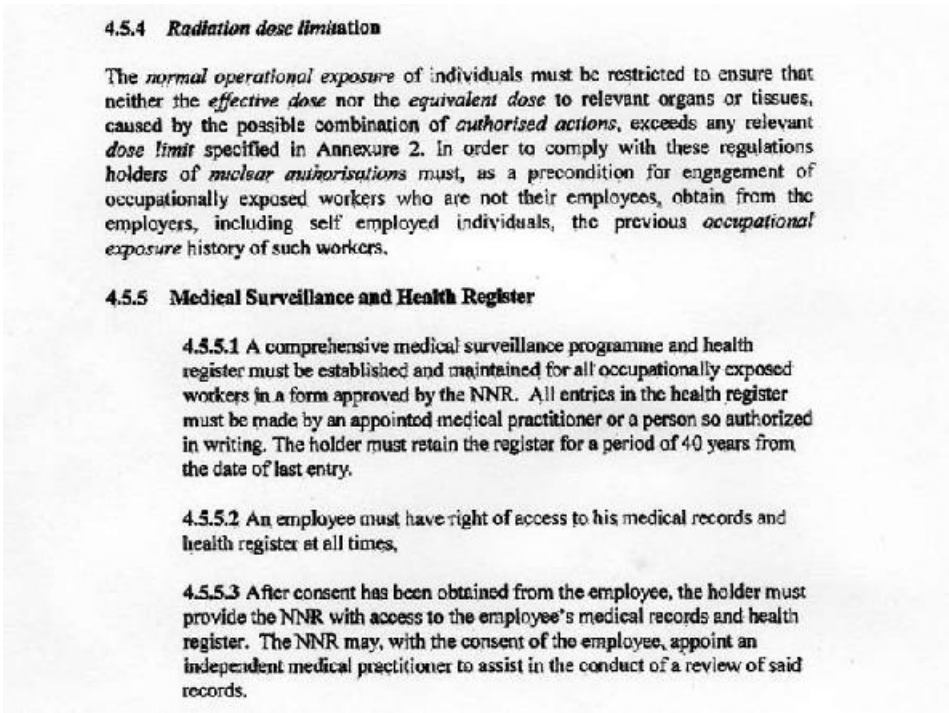
Earthlife's whistle-blowing, timed to coincide with the nineteenth anniversary of the Chernobyl accident, attracted the ire of the president and the minister of minerals and energy (then Phumzile Mlambo-Ngcuka): President Mbeki denounced the NGO for recklessness, untruth and 'scaremongering', while the minister announced that she would pursue the introduction of legislation to curb this kind of whistle-blowing. The matter was dropped after NNR confirmed that Earthlife's readings of the radioactivity levels were accurate. However, the incident revealed that the politicians were capable of knee-jerk reactions to complaints probably emanating from the industry about NGOs voicing legitimate concerns.

The Freedom of Expression Institute went on record as being deeply alarmed by government's statement of intent to introduce legislation to make individuals and organisations 'speak responsibly' on sensitive matters. Ironically, the minister had chosen World Press Freedom Day to make her remarks, which further incensed FXI:

> These threats place a blot on [South Africa's record of free media] on the very day when this freedom is being celebrated, and underlines the tenuous nature of this freedom. Earthlife has since been vindicated by the National Nuclear Regulator about the excessively high levels of radiation in the area. They have also clarified the fact that their initial statement never alleged the existence of a toxic site, but had termed it a calibration site. Therefore, if any institution can be accused of making baseless statements, then it is the government itself …. Earthlife should therefore be congratulated for its watchdog role, not attacked for it by the government.[47]

Not only do the threats fly in the face of national framework environmental legislation, which is sympathetic to whistle-blowers,[48] but they foreclose precious political space for

civil society to raise public interest issues. What was also noticeable was that the basis for the attack on Earthlife was a set of false statements attributed to the organisation and clearly drawn to the president's attention, presumably by the nuclear industry, without any attempt to verify them.



4.5.4 ***Radiation dose limitation***

The *normal operational exposure* of individuals must be restricted to ensure that neither the *effective dose* nor the *equivalent dose* to relevant organs or tissues, caused by the possible combination of *authorised actions*, exceeds any relevant *dose limit* specified in Annexure 2. In order to comply with these regulations holders of *nuclear authorisations* must, as a precondition for engagement of occupationally exposed workers who are not their employees, obtain from the employers, including self employed individuals, the previous *occupational exposure* history of such workers.

4.5.5 Medical Surveillance and Health Register

4.5.5.1 A comprehensive medical surveillance programme and health register must be established and maintained for all occupationally exposed workers in a form approved by the NNR. All entries in the health register must be made by an appointed medical practitioner or a person so authorized in writing. The holder must retain the register for a period of 40 years from the date of last entry.

4.5.5.2 An employee must have right of access to his medical records and health register at all times.

4.5.5.3 After consent has been obtained from the employee, the holder must provide the NNR with access to the employee's medical records and health register. The NNR may, with the consent of the employee, appoint an independent medical practitioner to assist in the conduct of a review of said records.

Figure 7. Government Gazette, 28 April 2006, Act passed by the National Nuclear Regulator stipulating the record keeping requirments for the Nuclear industry for all workers.

Casting the first pebble

SAHA assisted Earthlife Africa to request a number of key documents related to the nuclear energy industry, apart from health records of former NECSA workers. Many of these requests were to place documents in the public domain that dealt with different aspects of the industry, both historical and contemporary. A number of these documents had to do with the secrecy surrounding the development of the PBMR.

Earthlife Africa had long been aware of certain studies, especially on the economic feasibility of the PBMR project. It was widely known, for example, that in 2001, a macroeconomic study on the PBMR and the fuel plant had been conducted, but never placed in the public domain.[49] When approached under PAIA to reveal this document, Eskom claimed it was with PBMR Ltd rather than with Eskom. In turn, PBMR Ltd acknowledged that it had the document, but refused to release it on the grounds that, among

other factors, it would harm the company's commercial and financial interests.[50] SAHA launched an appeal on the grounds that some of the information in the report was already in the public domain.[51] Release of the information was not aimed at strangling competition, as commercially confidential sections could be masked should they be deemed to cause any harm. However, it is suspected that some of the information may reveal substantial departures from legal compliance, in which case disclosure in the public interest would outweigh the harm envisaged. The appeal was ignored.

In March 2000 consultancy firm PriceWaterhouse had issued a due diligence and business case report on the PBMR. When SAHA requested this document under PAIA,[52] Eskom gave an outright refusal, claiming that 'commercial' and 'research' information would be disclosed. Eskom did, however, release a report entitled Detailed Feasibility Report: Report on the Commercialisation of the PBMR, dated April 2002. On 8 September 2005 Eskom announced that the results of the internal appeal on the PriceWaterhouse document would be released 'subject to severance of the parts of the report that are considered not to fall within the disclosure provisions of PAIA and are exempted from disclosure'.[53] Detailed motivations for the masking followed, mostly citing commercial confidentiality. Kate Allan, who coordinates SAHA's Freedom of Information Programme, commented: 'Given the excessive severance of figures and recommendations in the report, it is difficult to ascertain exactly what the findings say.'[54] It is clear that this document, crucial in assessing the economic viability of the PBMR project, was not being permitted to inform public debate, implying that PBMR Ltd had something to hide.

Submissions of requests to DME have, by and large, proved fruitless, and are still pending. In February 2005 SAHA was referred to the Department of Labour[55] in the case of the request for documents relating to the investigation into the death of Victor Motha. This was despite a public assurance given by the minister to the Motha family that there would also be a 'high level investigation' at NECSA.[56] In November 2005 three outstanding internal appeals and the outcome of two requests to the DME were being awaited.

Who regulates the regulator?

NNR has also been the recipient of a number of requests under PAIA. NNR is the custodian of public health in relation to the nuclear industry and is involved in the licensing of nuclear facilities. It has a board representative from a number of stakeholders, including government, industry, the community and trade unions. The regulator emerged from a history of being part of the industry — the licensing branch of the AEC — to independence in 1988 in the form of the Council for Nuclear Safety. With new legislation, the council formally became NNR in 1999.[57] While it should regulate even-handedly, NNR has been hampered by a number of defects: insufficient resources for carrying out its mandate; political control by the very government department that promotes nuclear energy, DME; and a weighting of its board in the interests of the industry rather than the general public.

Nevertheless, the regulator monitors all nuclear facilities and both its information and its governance practices are of interest to a wide range of citizens.

NNR is also meant to collect and report annually on the number of breaches of safety at nuclear plants. It has a responsibility to guarantee that the operators of nuclear facilities are protecting the health of their workers, particularly where there have been operational problems and unplanned releases of chemicals and ionising radiation. More specifically, it is important that the licensing requirements of new facilities be placed in the public domain. Of special interest is the rationale used by NNR for terminating the licence held by the AEC to operate the Vaalputs radioactive waste site. After some time, this licence was reissued. If there are serious violations of the conditions of the licence, the public should have the right to know what went wrong.

On the question of governance, the allegedly irregular appointment of Maurice Magugumela, a former employee at PBMR Ltd, as CEO of NNR, was also of public interest. In particular, there was a suspicion that the NNR board had been sidelined — contrary to legal procedure — in the making of this appointment.

These issues informed the requests for documentation that Earthlife and SAHA submitted to NNR, which included:

- records relating to mining accidents and injuries, to violations of safety measures and safety regulations, and worker safety in relation to releases of cyanide and sulphuric acid;[58]
- records related to the licensing of the PBMR by NNR;[59]
- the report on the termination and renewal of the Vaalputs licence (violations of the licence led to temporary closure at Vaalputs of the national radioactive waste disposal facility);[60]
- records documenting exposures to dangerous substances of workers at Pelindaba, Koeberg and Vaalputs;[61]
- technical safety records issued by NECSA and Koeberg;[62]
- the report of the investigation into Ron Lockwood's complaints against Eskom (non-disclosure by the company of occupationally related illness);[63] and
- minutes of the NNR board and any other records during the period December 2004 – March 2005 regarding the appointment of Magugumela as CEO of NNR.[64]

Constant difficulties were experienced in getting NNR to respond to these requests. In February 2006 SAHA met with the CEO of NNR and was assured of cooperation. The list of outstanding requests was resubmitted. In a response in May, NNR claimed to have referred the matter of the CEO's appointment to the consideration of its own board. On the question of mine acids, the request was referred to NECSA, because 'NNR has no

jurisdiction in this area'. Other requests would, it was stated, be commented upon within one calendar month.[65]

After the NNR board met, it communicated to Mashile Phalane of Earthlife Africa Johannesburg that the board's minutes were confidential, but that 'if there are any specific items on which you require information on Board decisions, then this may be made available to you'.[66] Clearly, the board was being somewhat cavalier with the law and was prepared to reveal the circumstances around how the CEO was appointed over its members' heads.

After a further meeting with NNR in August 2006, a number of reports were released, including the licensing requirements for PBMR, safety regulations contained in the legislation and the report on the termination of the Vaalputs licence. The last of these had not previously been in the public domain. It outlines the results of an inspection visit to the Vaalputs nuclear waste disposal facility in September 1996.[67] The inspection recorded that there were 55 violations of compliance with the licence. The operators of the facility, the AEC (now NECSA), failed, among other things, to implement quality controls and training programmes, to develop emergency planning, to maintain records, to control radioactive effluent, to maintain personnel radiological protection, to check instrumentation and to audit safety procedures. Worst of all, the process of backfilling the trenches that house the nuclear waste drums was inadequate and there were no arrangements to store or retrieve records on the disposed radioactivity. The document noted that there was a 'general lack of management and supervision at all levels of the AEC organisation responsible for Vaalputs' and that there were no 'effective mechanism to ensure compliance with the undertakings in the Vaalputs licence'.[68] The Council for Nuclear Safety then halted further waste from being received at Vaalputs until there was proof of compliance with licence conditions.

This document took a decade to reach the public domain. By accessing NECSA's own website soon after its receipt, and coinciding with Vaalputs' twentieth anniversary, one could read the following:

> Happy is the land that has no history. And happy is the nuclear facility that makes no news. The Vaalputs nuclear waste depository, in sparsely populated and near-desert Namaqualand, has for fifteen uneventful years (against an annually negotiated fee) been receiving low and medium level nuclear waste from Eskom's Koeberg nuclear power plant near Cape Town.[69]

Clearly, NECSA was erasing entirely the historical memory of its poor nuclear safety management record. Without the use of PAIA to obtain the documents from NNR, no one could begin to question either its poor practices or its distortions of history.

Despite some reasonable successes, NNR's credibility remains battered in relation to the appointment of a PBMR Ltd official as its CEO. It is reluctant to deal openly with this matter, which further affects its need to have an open-handed reputation. Interest-

ingly, when the problems at Koeberg needed official investigation, this was given to the National Electricity Regulator to do, rather than NNR. It will be necessary for NNR to rebuild its reputation and public trust, but it can only do this by acting firmly to assert its independence from the special interests attached to the nuclear energy industry. Reform of NNR, particularly its need to be answerable to a department that does not promote the nuclear industry and its need for better community-driven oversight, is something that civil society organisations have been promoting.[70] Perhaps the work done by SAHA and Earthlife in getting NNR to take its public responsibilities seriously might help the institution to recognise its historic task. This is ever more essential to all citizens, who require protection against ionising radiation, especially if the industry is to expand in the near future.[71]

Conclusion

The use of PAIA has played an important role in getting the nuclear industry to respond to an array of public concerns about failures in corporate governance. For many years, the activities of the industry were shrouded in secrecy. This can no longer remain the case. However, this requires public vigilance and the valuable monitoring role of the relevant NGOs. In this case, the hero(in)es are SAHA's Freedom of Information Programme and the Nuclear Energy Costs the Earth Campaign of Earthlife Africa's Johannesburg branch.

Clearly, most of the relevant medical records are now with the former employees of NECSA, but the road to claiming compensation will be long and will remain fraught with bureaucratic obstacles. The high incidence of former workers whose health deteriorated for occupational reasons means that many others may step forward to claim their compensation. The in-house investigation into health and safety conditions at Pelindaba is unlikely to be too critical of past practice at NECSA. However, the results may trigger off an important dialogue with other health professionals who have a strong justice agenda.

There are still a number of outstanding documents that have defied efforts to effect their release. The process of encouraging release is of necessity a dogged one, sometimes bringing early results, but mostly requiring the exercise of great patience in prompting the institutions to realise their legal obligations to divulge.

Information is a tool, and greater information on the nuclear energy industry would, of necessity, be critical to decision making around South Africa's energy future. To date, the industry has — first under apartheid, and more recently under a democratic dispensation — gained privileged access to the state, as well as retaining control over much information that should have been in the public domain. The public is being asked to bankroll the industry, which has not sought to raise its own capital, to the tune of tens of billions of rands. The public needs to feel confident that the decision to expand the industry is justified by its viability and feasibility. The studies undertaken in this regard need to be

placed squarely in the public domain, instead of being kept under wraps, citing commercial confidentiality as a reason to suppress their findings.

Whistle-blowing is now recognised under South African law, and yet our decision makers are keen to limit civil society interventions. The sterling work of civil society groups in supporting whistle-blowers is a key contribution to the building and safeguarding of our rather fragile democracy. The important work of groups like Earthlife Africa is essential to our self-knowledge as a society faced with a series of risks that need to be understood, assessed and managed with rigour.

Box 3.1: A parallel case: The Coalition Against Water Privatisation and Johannesburg Water

A brief history of resistance to water privatisation

The ANC government's adoption of the International Monetary Fund- and World Bank-influenced neo-liberal macroeconomic policy (in its Growth, Employment and Redistribution policy — generally known as GEAR — of 1996) made water — and all basic needs/services — a market commodity, to be bought and sold on the basis of private ownership and the profit motive. Since then, South Africans have witnessed the gradual privatisation of water (in various forms).

As a result of the privatisation of water provision over the last several years, poor communities in and around Johannesburg have found themselves unable to access and/or afford water and have responded with active resistance. One of the new social movements that arose to lead such resistance is the Anti-Privatisation Forum (APF), an umbrella organisation for grassroots community groups mostly located in Gauteng Province (which includes Johannesburg and Pretoria). Formed in 2000, the APF's guiding principle has been that basic needs, such as water, are a fundamental human right, not a privilege to be enjoyed only by those who can afford it.

As a result of these struggles, the Coalition Against Water Privatisation (the Coalition) was formed in late 2003, bringing together a range of community organisations and progressive NGOs in a collective effort to turn the tide against water privatisation.

In 2004 the City of Johannesburg's corporatised water service provider, Johannesburg Water Pty Ltd (JW) initiated the roll-out of pre-paid water meters in Phiri, Soweto, as part of Operation Gcin'amanzi ('Operation Conserve Water'), which was its 'cost-recovery' programme to enforce payment and ensure continued profit margins. This was accompanied by a huge public relations campaign by JW in which it made repeated claims about widespread community consultation and choice over the introduction of pre-paid meters; argued that the poor would benefit by being able to 'own/manage' their water consumption; and declared that the free 'lifeline' provision

of 6,000 litres of water per month, per household (after which the meter automatically cuts off supply) is more than enough to meet the basic needs of a majority of poor households. JW also instigated an intense 'law and order' crackdown on community dissent/resistance to the pre-paid meters, which saw scores of Coalition activists and community members being arrested and imprisoned.

Accessing information in support of community struggles

In the heat of ongoing resistance to Operation Gcin'amanzi, the Coalition realised that there was a need to utilise PAIA to access crucial information from JW (and its legal owner, the City of Johannesburg) for a number of reasons, including:

- to access the results of JW's own community surveys, meetings and progress reports, in order to ascertain whether the results of these were consistent with JW's claims of widespread community acceptance of and support for the installation of pre-paid meters;
- to access JW directives and correspondences with individual households in Phiri, thus allowing the Coalition to test whether or not residents were being provided with freedom of choice around the pre-paid meters and the extent to which JW was using threats and intimidation;
- to access the management/business contracts between JW and the French water multinational Suez Lyonnaise des Eaux to see what in-built provisions there might be in direct relation to the installation of pre-paid meters in poor communities (and in other communities), as well as pricing structures for water delivery in such communities; and
- to access correspondence and minutes of meetings involving JW, the City of Johannesburg, the public prosecutor and the South African Police Service in order to determine the character and extent of JW's response to community protest/dissent.

With the assistance of SAHA and the Centre for Applied Legal Studies, the Coalition then submitted an extensive PAIA request to JW (and the City of Johannesburg) in late 2004. It was not until mid-2005 that the City of Johannesburg began to release the first trickle of documents to the Coalition. By the end of the year, and after numerous follow-ups and threats to take the matter to court, the City, and finally JW, released a substantial number of documents related to the initial PAIA request.

What was gained?

The Coalition's experience of utilising PAIA was, despite the long delay in the release of information, a positive one. SAHA proved to be of immeasurable value and

assistance, not only in formulating and submitting the initial request, but in ensuring that JW and the City of Johannesburg were constantly followed up on and hounded. The resultant relationship forged between the Coalition and SAHA is exemplary of the kind of partnerships that should be found between progressive NGOs and social movements/community organisations.

The information gained has gone a long way in helping the Coalition to counter JW's public claims and arguments around the character and content of Operation Gcin'amanzi and to expose the more general lack of transparency surrounding basic service delivery by public sector institutions and, more specifically, in relation to public–private partnerships. Additionally, the information has provided crucial facts and figures that have strengthened the Coalition's ongoing constitutional rights to legally challenge the use of pre-paid water meters, especially as regards illegal water cut-offs, the sufficiency of the allocated 'free water' amount and discrimination against poor households.

The Coalition was also able to use the information in strategising around its activities and campaigns. Subsequently, the Coalition embarked on its own research survey/project in Phiri, informed by the gaps/omissions in JW's surveys and the claims/arguments flowing from them. A more vigorous and focused media and information campaign against the organised repression faced by resisting residents was undertaken and the tactics adopted by community residents were shifted accordingly. Information gleaned from the management contracts and internal reports was used to launch a more concerted domestic and international campaign against the partnership between JW and Suez Lyonnaise des Eaux.

While it would be incorrect to argue that the accessing of information in this case has resulted in significant practical 'victories' for the Coalition, there can be no doubt that the information has been extremely useful in assisting the Coalition to take forward its activities/campaigns. Our experience has also highlighted the importance of using the PAIA as a tool to further inform and empower the struggles of poor communities around basic services, as well as to place more pressure on public authorities and elected officials to be accountable and transparent to those they work for and represent.

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