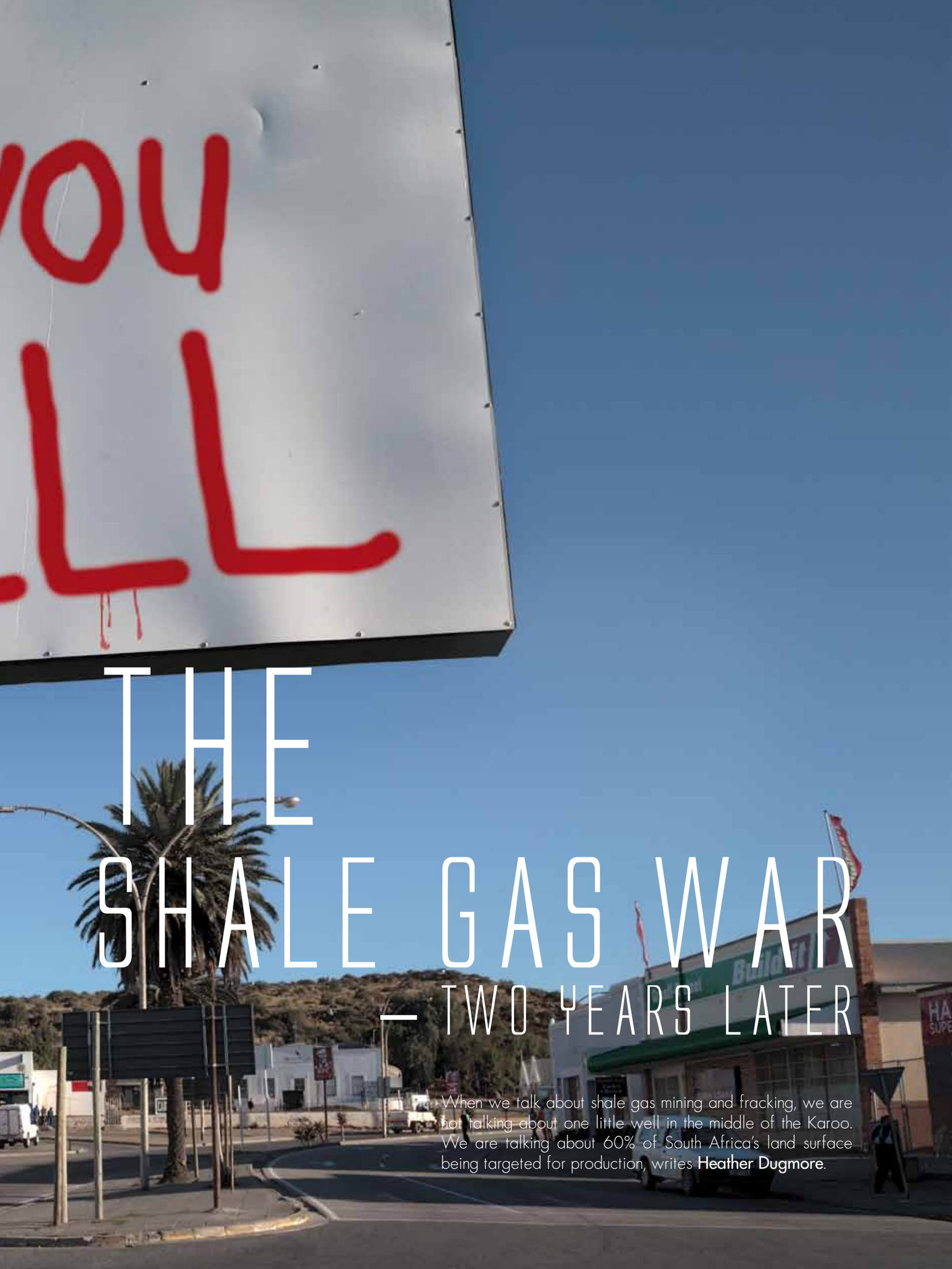
Photo: Obie Oberholzer



THE SHALE GAS WAR
– TWO YEARS LATER

When we talk about shale gas mining and fracking, we are not talking about one little well in the middle of the Karoo. We are talking about 60% of South Africa's land surface being targeted for production, writes **Heather Dugmore**.

It's been two long years since a group of farmers gathered at the bowling club in the Karoo town of Hofmeyr, where Shell held its first meeting to spell out its shale gas fracking plans. I was there.

Shell's team extolled the company's virtues, emphasizing that it was one of the good guys and what a clean environmental record it had. The team spoke as if the Niger Delta and all the other Shell-shocked fallout zones in the world didn't exist.

With hindsight, the farmers should have stopped the meeting right there and asked whether this was a declaration of war given that shale gas mining threatened to destroy their livelihoods and the agricultural economy of the Karoo.

But it was only the first meeting, and all the farmers wanted to know was:

- What chemicals do you use in the fracking process?
- This process requires millions upon millions of litres of water — where are you going to source it?
- Will it contaminate our water?

No one from Shell was prepared to respond to these basic concerns. Instead the team invited everyone for tea and sandwiches.

The Karoo farmers immediately felt uncomfortable; they felt the vastness of the shadow of threat passing over them, and they were not wrong. They have since learned that Shell and various other oil and gas companies are targeting 60% of South Africa's land surface, starting with the Karoo. Which is why global businessman Johann Rupert, who is from the Karoo, publicly warned Shell not to play Russian roulette with the region and not to treat the people of the Karoo like "hillbillies". Yet still it does.

Over two long years, farmers, landowners and community members of the Karoo — all shapes, sizes and colours — have been subjected to a string of oil and gas men telling them how shale gas mining is going to bring wealth and employment to the impoverished. To make sure everyone in South Africa gets to hear this, Shell's team has worked overtime, including sending a string of journalists on cushy trips to the United States. I have not been invited.

Two years later the people of the Karoo still don't have any answers to their questions. All they know is that Shell executives are well-schooled in double speak. "We won't compete with the farmers' water," Shell's Joburg-based upstream general manager, Jan Willem Eggink, repeatedly states. A smooth-talking Hollander, he has spent tellingly little time in the Karoo yet he talks about it on TV as if he knows and loves it well.

For Eggink or Shell to state that it will not compete with the farmers' water rings alarm bells from here to China — where Shell is already very busy drilling for shale gas and where it surely had a far easier time steamrolling the locals because active citizenry is not encouraged in that part of the world.

Why does it ring alarm bells? Because we all know there are deepwater aquifers in the Karoo, situated below the level of the boreholes where farmers get their water. But the system is interlinked and if Shell drills down to or fracks the deeper levels it could have a devastating leakage effect into the shallower levels, increasing the danger of ground and surface water contamination.

Drilling, like fracking, is not regulated in South Africa, and, with or without fracking, it remains a highly invasive process. It would need to penetrate four to 5.5km down and then horizontally approximately 2.5km to access the Karoo shale gas.

"This is massively deep drilling for which there is no experience in South Africa, where shale gas mining has never been done. Contamination can occur from the deep drilling process alone," explains attorney Derek Light, who is based in Graaff-Reinet and who is representing thousands of farmers and landowners within the 220 000km^2 (the report from the government's task team refers to an area of 125 000km^2) of the Karoo that Shell and other oil and gas companies are targeting.

Mandated by the people he is representing, including generous support from Rupert, Light is heading a team of independent specialists from South Africa and the United States, including advocates, economists, engineers, mining specialists, and environmental and water specialists, to get to the bottom of the implications of shale gas exploration and extraction in the Karoo and other parts of South Africa.

"There are so many questions we need to address," says Light. "If, for example, as the government's task team report on shale gas mining concludes, the resource will be depleted in 20 to 30 years ("This process would spread over a period of 20 to 30 years"), then what is the sense of going to the excessive expense of mining shale gas, which is another fossil fuel, when we have coal reserves for 200 to 300 years?"

It is also completely misleading to say that shale gas has a lighter carbon footprint than coal because the carbon footprint of the full production cycle of shale gas will invariably exceed that of coal.

"We also need to look at the current global oversupply of natural gas (including shale gas). The price is currently below US$2 per 1 000 cubic feet whereas it costs US$4.50 to produce this amount. How can this be economically viable, especially given the substantial challenges of exploiting South Africa's reserves, given the depth of the gas and the lack of existing infrastructure? Does it not make sense to rather buy into the massive finds off Mozambique and import the gas we need?" questions Light.

Ahee Coetsee

Brent Baxter

- Shell's Environmental Management Plan fails to comply with the requirements of the Mineral and Petroleum Resources Development Act (MPRDA). Yet Dr Brent Baxter (photo), senior scientist at Golder Associates, signed it off.

- "How can Shell/Golder declare a 'low risk' water rating in their Environmental Management Plan without explaining where they intend sourcing water from?" questions exploration geohydrologist, Ahee Coetsee.

Another critical area to assess is the impact on the Karoo's agricultural economy, given that the Eastern Cape region of the Karoo produces over 30% of the red meat in this country. Add the Western and Northern Cape regions of the Karoo and it goes up to approximately 50% of the country's red meat production. The percentage of natural fibre the Karoo produces, notably wool and mohair, is even higher. Yet the environmental management plan (EMP) that Shell submitted as part of its exploration application, describes the Karoo as an arid region with little agricultural merit. Regrettably the report produced by the minister's task team similarly reflects a complete lack of appreciation of the valuable contribution of agriculture in the Karoo, including its role as a substantial employment provider.

From start to finish, Shell's EMP, which was produced by environmental consultancy Golder Associates, reveals an alarming lack of detail and research, as Fritz Bekker, the environmental consultant commissioned by Light as part of the team that formally responded to Shell's EMP, attests:

"It is my opinion that Shell's EMP does not comply with any of the requirements of the Mineral and Petroleum Resources Development Act. In doing so, they've attempted to bypass legislation that exists to protect the people of South Africa, as enshrined in Chapter Two of our Constitution."

Yet a senior scientist at Golder Associates, Dr Brent Baxter, signed it off.

It is up to South Africa to make sure that oil and gas companies comply with our legislation and that the necessary amendments to the mining-related laws are put in place to prevent companies from thinking they can present EMPs that are simply not good enough. "For example, the law needs to ensure that substantial financial security is provided for a mining proposal of this kind, and the financial security needs to apply for a meaningful period of 100 years so that you don't have companies pushing off and burdening the South African taxpayer with cleaning up the mess years down the line," Light says.

"We also have to imagine what multi-well pads with 32 wells per pad, serviced by an average of 1 400 trucks per drilling activity per well would look like and what the impact would be, because this is what Shell is proposing."

Shell has stated that it would need one hectare per well pad because any area larger than a hectare automatically requires an environmental impact assessment (EIA). In reality, explains Light, each 32-well pad might well need three to four hectares per multi-well pad.

What is also far too unclear is how it would deal with the vast quantities of drilling mud, drilling cuttings, toxic fracking waste flowback and produced water containing heavy metals and a variety of impurities.

The South African government has, to its credit, acknowledged the concerns Light and his team have raised, many of which were in response to Shell's EMP. Concerns raised include the potential dangers of fracking as a production method, especially considering that it is not regulated in South Africa; potential water, air and dust pollution; possible effects of radioactive materials, socio-economic effects … the list goes on.

"Accordingly, we have written to the minister of mineral resources, Susan Shabangu, and recommended that she does not grant the five pending shale gas exploration applications on the grounds that there are far too many gaps and unknowns for it to be prudent. We advised that a strategic environmental assessment by the government be undertaken before any decisions are made.

This is crucial because as the law in South Africa currently stands, if the minister grants an exploration right she must grant the production right as well."

"We also have to imagine what multi-well pads with 32 wells per pad, serviced by an average of 1 400 trucks per drilling activity per well would look like and what the impact would be."

Shabangu has not responded. Regrettably, the government has also decided against a strategic environmental assessment.

"They have erred, in our view. The precautionary rule should apply with an exploration process of this magnitude. It will be extremely difficult to stop the process once it has started and at which stage the people of this country might well be led on a legal dance we cannot afford," explains Light, adding: "If the minister grants the exploration applications, and if the conditions are offensive to us, then we will challenge this. We have come too far with this process for South Africa not to insist on good governance."

Working against this are the rumours of big money changing hands, but irrespective of whether they are true or not, the shale gas battle is far from over.

"What we have on our side is good law. We are fortunate to have one of the best legal systems in the world," says Light. "If we can influence the improvement of our mineral laws, and make sure that changes are made in the law to benefit all the people in South Africa — from the Karoo to Mpumalanga — then we will have done something incredibly valuable for South Africa and the world."

Fritz Bekker

Ed Kingwill

• "It feels like the aardvark is aiding the jackal through the fence and we have more than enough jackals in our part of the world," farmer Ed Kingwill told Shell/Golder in January 2011.

SHELL IS QUESTIONED

A series of questions were put to Shell, and were answered by Shell South Africa's media manager, Janine Nel. Derek Light, the Graaff Reinet attorney who is representing thousands of people in the Karoo, responded to Shell's replies.

What percentage of Shell South Africa's profit is invested in green energy? Please name a few of these projects.

Shell: The world is shifting towards a new low-carbon energy future. It will be powered by a range of sources, from cleaner fossil fuels to renewables. Shell is already taking the first steps with partners to tackle the challenges that lie ahead. The energy transition will take time and fossil fuels will continue to provide the bulk of energy for many years to come. Natural gas could provide South Africa with a stable, sustainable alternative to coal for power generation that is 40% more energy efficient and emits only about half the CO_2.

Derek Light: Shell's response is not a response to the question as put. It does not reveal what percentage of the company's profit is invested in green energy and no projects are identified. Scientific research reveals that the production of tight gas from shale rock utilising deep and horizontal drilling as well as hydraulic fracturing is at least as (if not more) dirty than the production of coal in terms of the greenhouse gas emissions.

Given the known problems of groundwater contamination wherever fracking has been undertaken in the world, why do you believe that no contaminants will reach the Karoo underground water?

Shell: We recognise that concerns do exist, and we take them seriously. Shale gas development needs to be done responsibly. At Shell, we believe we can explore, develop and produce tight/shale gas safely and responsibly. Shell committed to set up an independent study of the Karoo groundwater resources, using third party experts to inform us and gather data of the Karoo's water supplies. The *Groundwater Atlas* (results of the study) draws on some of the country's top hydrogeologists and provides insight into the unique characteristics of Karoo groundwater, what is required to protect and preserve the region's fresh water resources, and where we could source the water we would need for our operations.

Derek Light: Our research (utilising a number of groundwater and other specialists) reveals that there is a real risk of contamination of groundwater and, more significantly, there is a number of significant unknowns relating to the hydrology and geohydrology of the Karoo and how this may impact on the risks associated with the proposed process. A great deal of research needs to be done to augment the limits of our knowledge and this should occur prior to the granting of any exploration rights which allow drilling and the utilisation of hydraulic fracturing. Shell's *Groundwater Atlas* in fact highlights and demands that further research be done given that much of the information contained therein is speculative. The work group of the government's task team has also recommended that a great deal of research needs to be done before the risks associated with the process can be appreciated and understood.

The amount of water required for drilling and fracking is substantial. Where would you source water for this given that the Karoo is a water-stressed region?

Shell: For the initial exploration wells we intend to import the water by truck or rail, until the team of groundwater specialists can confirm alternative sources of deeper, brackish, non-potable waters that could be used.

Derek Light: Shell has repeatedly failed to disclose the source of the water it will utilise despite the fact that South African law demands that it does so. No research has been done into the so-called "deeper, brackish, non-potable waters" that may occur in the underground structures in the Karoo or elsewhere. Furthermore, in the event that these water reserves should exist, there is the real risk of contamination of shallow fresh groundwater reserves by accessing deeper saline water, which probably occurs in very tight formations and may demand fracking to produce such water.

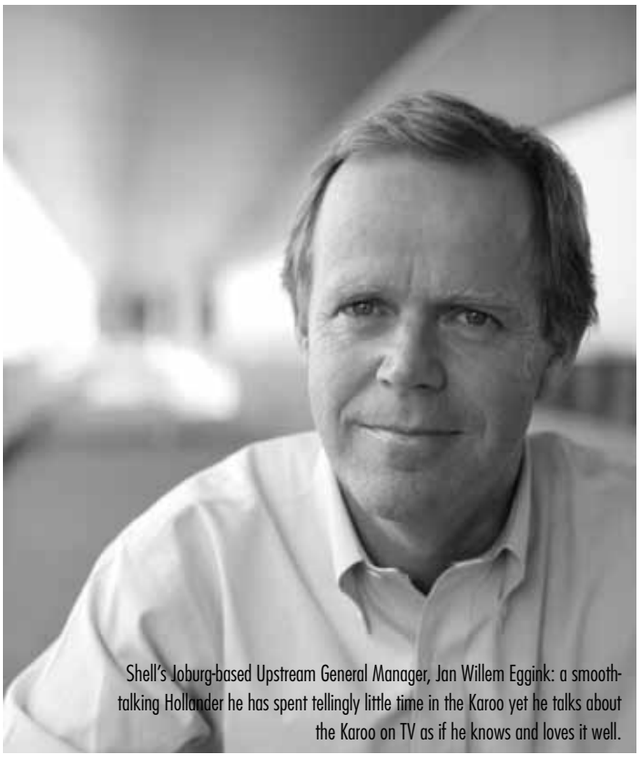
Will you make public and allow independent verification of all chemicals used in your fracking fluid?

Shell: In the Environmental Managements Plans for the Karoo project, Shell has committed to disclosing hydraulic fracturing chemicals. Shell also commits to undertake toxicity screening, the results of which will be publicly shared, prior to developing the final hydraulic fracture design for an exploration well.

Derek Light: Shell has failed to disclose the chemicals it will use in the fracking process in its Environmental Management Plan (EMP). Without this vital information no risk assessment can be performed, which is why it is dumbfounding that Shell saw fit to declare in its EMP that most of the environmental impacts of its activities in the Karoo, including the impact on water, will be "low".

The Karoo infrastructure, such as roads, fire-fighting capabilities, hospitals, chemical spill control, and emergency services, is completely unequipped to handle the kind of emergencies that have already occurred in the United States linked to shale/natural gas mining and fracking. We refer to explosions, gas leaks, burns, poisoning of your workers and residents, pipe bursts, overturned trucks with chemicals, and finally, massive earthquakes (5,7 on the Richter scale) caused by fracking as reported in *Nature* magazine. Do you believe that the Karoo infrastructure should first be upgraded?

Shell: At Shell, we make it standard practice to consult landowners and local communities before we begin drilling, to determine how best to mitigate the impact of our operations.



Shell's Joburg-based Upstream General Manager, Jan Willem Eggink: a smooth-talking Hollander he has spent tellingly little time in the Karoo yet he talks about the Karoo on TV as if he knows and loves it well.

Derek Light who is based in Graaff-Reinet and who is representing thousands of farmers and landowners within the 220 000 sq kms of the Karoo that Shell and other oil and gas companies are targeting.

Derek Light: Again, this question has not been answered by Shell. The infrastructure in the Karoo is currently wholly inadequate, and, as such it would come under enormous pressure with the increase in the scale of operations related to shale gas production.

As part of the fracking process, used, chemically contaminated water and petroleum residues are pumped into holding dams above ground. Will your company clean this up?

Shell: According to industry best practice, before being sent for recycling, flowback water is contained on-site within sealed tanks to ensure it cannot disperse into the environment. Flowback wastewater is disposed of at a certified waste facility, treated and reused or, in some cases, re-injected in deeper rock layers.

Derek Light: There is a paucity of detail on the disposal of solid waste and contaminated water in the Environmental Management Plan of Shell and others. This is unacceptable. Furthermore, there is inadequate regulation of the proposed activities and no exploration or production should be allowed until the regulatory framework has been revised as directed by the Cabinet in its acceptance of the work group's report. Furthermore, the current infrastructure is inadequate to cope with the volumes of waste that will be generated, some of which will be contaminated by naturally occurring radioactive material.

Will you negotiate compensation for possible disasters before you start operations as a gesture of your confidence and goodwill to the people of the Karoo?

Shell: We will continue to work closely with the people of the Karoo and South Africa to address concerns and ensure they benefit from the shale gas exploration. We will continue to listen to the views of Karoo residents and explain in detail what our plans entail. In the case of negative impact, we will provide in kind replacement or other appropriate recompense to any landowner with documented evidence of direct negative impact or loss on their land as a result of our activities.

Derek Light: The undertaking to compensate landowners where documented evidence of "direct negative impact or loss on their land" resulting from Shell's activities is meaningless. The consequences of contamination are not limited to direct damage to the land, but will include consequential loss or damage that may only become apparent decades after the event that occasioned the damage. The degree of proof required may be difficult to establish. The Association of Environmental Lawyers has recommended to the minister that proposed amendments to the Mineral and Petroleum Resources Development Act (MPRDA) should include the establishment of an industry-wide "superfund" to facilitate the internalisation of environmental costs by the industry, rather than by the South African public. In an already inadequate system, Shell has failed to comply with the provisions of the MPRDA relating to the identification of risks on a site-specific basis and consequently any provision made in terms of the MPRDA for financial security is inadequate.

What is the point of investing in a potentially high-risk process with such a small return on investment for a resource that will last only 20 years?

Shell: South Africa faces a huge energy challenge, and will soon need access to a full range of energy sources in order to secure the stable energy supply it needs to drive its growth and development. The energy demand is likely to double, or even triple, over the first half of this century. Shale gas will play an increasingly important role in the global energy mix.

Derek Light: We have recommended to the government that a Strategic Environmental Assessment be performed which will include an assessment of what the cost to this country of shale gas mining will be and whether the benefits of doing so substantially outweigh the negative impacts. It has been suggested by Shell and others that gas could somehow replace our dependency on coal. A resource that will be exhausted in 20 to 30 years cannot replace coal as a source of energy in this country.

This pristine landscape could be covered in gas wells if the oil companies have their way.

COURT CASES AGAINST SHELL

Shell, the company fighting the hardest to acquire the rights to exploit shale gas in the Karoo, promises "safe" concrete protection of underground pipes, to prevent leakage of chemicals and so on. But this is the same company that polluted the North Sea, is currently polluting Sakhalin Island, and here in Africa is still polluting the Niger Delta. The list of environmental disasters caused by Shell is very long. **DEKAT** located some; here are just two:

Violations in Nigeria

The first case is quoted from the website of the Center for Constitutional Rights (CCR), an American legal and educational non-profit organisation dedicated to advancing and protecting the rights guaranteed by that country's Constitution and the Universal Declaration of Human Rights http://ccrjustice.org/.

"Beginning in 1996, the Center for Constitutional Rights (CCR) in the USA, Earth Rights International (ERI) and other human rights attorneys brought a series of cases to hold Shell accountable for human rights violations in Nigeria, including summary execution, crimes against humanity, torture, inhuman treatment and arbitrary arrest and detention. The lawsuits were brought against Royal Dutch Shell, Shell Nigeria, and Brian Anderson, the head of its Nigerian operation.

"Over the course of 13 years, Shell made many attempts to have these cases thrown out of court, which the plaintiffs defeated. The United States District Court for the Southern District of New York set a trial date of March 27, 2009. On the eve of the trial, the lawsuits were settled for $15,5 million in what is being hailed as a milestone moment in the movement towards corporate accountability and human rights."

Shell ordered to pay compensation for oil spill

"The court in The Hague orders Shell to pay compensation for the oil spill in Nigeria," Sarah Shoraka wrote on 30 January 2013 in platformlondon.org:

"It's big news. For the first time, Shell has been found guilty in a court outside of the country in which it inflicted damage — in this case, in a court in The Hague for an oil spill in Nigeria. Shell will be forced to pay compensation to a farmer whose land and livelihood were ruined by the spill. This might seem a small step and a long time coming but it is very significant because it could open the floodgates to similar cases and bodes well for cases against Shell in the US Supreme Court and UK High Court for crimes committed in Nigeria.

"The cost to Shell is incalculable and should be enough to rattle investors and may even force change at the highest levels of the company. As Andy Rowell pointed out in his blog for Oil Change International: 'This is the first time a multinational has been held accountable for the actions of its subsidiaries in its home nation.'

"This is truly a David vs Goliath moment. Congratulations should go out to Environmental Rights Action and Friends of the Earth Netherlands that supported this case and to the farmers who had the courage to stand up to Shell. This win cannot right all the wrongs that Shell has done in the Delta and amidst the sense of victory it's important to remember that Shell is still operating in ways that seriously impact communities and ecosystems in the Niger Delta.

"Nigeria-based Environmental Rights Action pointed out the environmental racism inherent in companies like Shell operating to very different pollution standards in countries like the Netherlands vs Nigeria.

"While we commend the Dutch court ruling, it is now time Western countries pass laws compelling companies to enforce the same environmental responsibility standards abroad as at home. Shell's arguments in the face of incontrovertible evidence has again shown the double standards of the oil companies in treating spills incidents in Nigeria differently from their pollution in Europe or North America.

We are still optimistic that this landmark judgement will instigate more communities to seek justice."

SHELL AND THE ANC

Since the ANC government will be responsible for giving or denying Shell permission to carry out shale gas exploration and fracking in the Karoo, it is vital to look at the relationship between the company and the party. Will the government make a decision based on facts or loyalty to Shell? Is it pay back time?

On 22 September 2011, *Cape Business News* reported: "Shell literature boasts about its strong black empowerment credentials, but that empowerment looks as follows: Thebe Investment Corporation holds a 25% interest in Shell SA Marketing, which it acquired in 2002. It also has a 25% interest in Shell SA Refining, purchased in 2008.

"(Shell SA Marketing includes all Shell's retail and commercial marketing operations including fuels, lubricants, marine and aviation fuelling, bitumen, storage and handling. Shell SA Refining comprises Shell's refining business, in which Thebe is a 25% shareholder. Shell owns the remaining 75% of the company. Shell SA Refining has a 50% interest in the 180 000 barrels per day Durban refinery, Sapref.)

"At what monetary consideration were these deals struck? Shell spokesperson Kim Bye Bruun tells CBN 'the price and details of the financing structure are confidential'. One could easily speculate that it was effectively a gift, perhaps in exchange for some future favours.

"But here is the interesting thing: Thebe Investments was founded in 1992 by the Batho Batho Trust as an ANC investment company. This puts the Shell/Thebe (read ANC) debacle in perspective and the millions the ANC stands to make from the Karoo deal …

"Concerns and complaints about the environmental impact of 'fracking' continue, but the monetary gains to be made by the ANC, PetroSA and Shell are still over-riding."

PetroSA, or Petroleum Oil and Gas Corporation of South Africa, is the state-owned national oil company.

David Ross, the DA's shadow deputy minister of energy, said on 10 April 2012: "If the moratorium on fracking exploration in the Karoo is lifted, the ANC could earn a fortune. The Democratic Alliance (DA) calls for the ANC-linked Batho Batho Trust to divest its 51% stake in Thebe Investments (Shell South Africa's local empowerment partner). Through Thebe, the Batho Batho Trust effectively has a 12% stake in Shell SA Refining, and a 14% stake in Shell SA Marketing.

"Deputy President Kgalema Motlanthe recently indicated that Chancellor House, the ANC's investment arm, should divest its shares in companies that gain from government tenders. In the same spirit, the Batho Batho Trust should withdraw its investment from Thebe.

"The political relationship between Shell and Thebe Investments has already made a mockery of the due diligence process to be followed in ascertaining to whom the Petroleum Agency of South Africa should grant fracking exploration rights.

"The Batho Batho Trust was established 20 years ago by ANC members with a view to supporting socio-economic development in South Africa. But the trust now provides donations to the ANC. Trust chairman Kenny Fihla said that the trust's donations to the ANC were in line with its specific transformation agenda. This is convenient, but at odds with its initial mandate. "KwaZulu-Natal Health MEC Sibongiseni Mkhize happens to be on the board of trustees, for instance. A prominent ANC personality in Western Cape, Chris Nissen, emerged as the spokesperson for the Karoo Shale Gas Community Forum (strongly advocating that fracking be allowed). This effectively means that the government, tasked with regulatory oversight, is compromised in performing its job effectively. It is becoming both player and referee."

In his address on fracking at the Cape Town Press Club on 23 May 2012, Nissen agreed that the ANC had a financial interest in Shell, but added that he saw nothing wrong with this. Thus the ANC is both decision-maker — as to whether the practice of shale gas exploration and fracking should go ahead — and part owners of the company applying to do so. This makes it both the player and referee.

For other stakeholders in shale gas mining and fracking in the Karoo go to: http://www.moneyweb.co.za/moneyweb-special-investigations/karoo-series-shells-sa-stakeholders-uncovered.

Farmers Doug Stern and Lukie Strydom in Williamsport, Pennsylvania, during their fact-finding mission to the United States to investigate shale gas production.

Fracking victims

Fracking has already taken its toll in the United States, where many people have spoken about the effects on their health, land and livelihoods. We listen to a few first-hand accounts. **Photos:** Lukie Strydom

Sandra Folzer, Pennsylvania

"I have owned land in Tioga County, Pennsylvania since 1969. I was offered lots of money to lease my beautiful land to natural/shale gas drillers but I did not want to see it destroyed and my water ruined. Some of my neighbours in Bradford County signed and have lost their clean water and many are moving out. I understand why some folks signed leases, as they needed the money. The problem is that whatever my neighbours do has an impact on my life. Even if I don't have drilling on my property it can still lead to my wells being polluted, because the fracking fluid can migrate.

"I saw *Promised Land* and was disappointed that it didn't reveal more of the facts about the impact of drilling. The movie never showed an active well, the terrible noise it makes, like jet engines running constantly for days, or the irritating bright lights that shine through the night. It did not show how forests are being ruined by cement pads, which also affect the wildlife. It did not show how the increase in jobs is a myth. Most of the gas drillers come from Texas and Oklahoma. Only the poor-paying jobs, like driving trucks, are given to locals. And these are temporary jobs. In the meantime, many jobs are lost, such as in tourism, hunting, fishing and agriculture.

"The movie also did not talk about health issues. Unfortunately, it is difficult to have folks speak openly about their problems because of the gag rules which the gas companies insist upon if they pay for any health costs

Steve and Jacki Schilke, North Dakota ranchers

There are 32 oil and gas wells within five kilometres of Steve and Jacki's 65ha ranch. Jacki blames the wells for the loss of livestock well as the decline of her own health. Her symptoms began a few days after the wells were fracked, when a burning feeling in her lungs sent her to the emergency room. After that, whenever she went outside she became lightheaded, dizzy and had trouble breathing.

At times, the otherwise fit 53-year-old can't walk without a walking stick, drive or breathe easily. She warns landowners against making deals with frackers:

"They're here to rape this land, make as much money as they can and get the hell out of here. They could give a crap less what they are doing here. They will come on your property look you straight in the eye and lie to you."

Destroying precious land for gas

Sean Lennon, musician and son of John Lennon and Yoko Ono, wrote a piece that was published in The New York Times on 27 August 2012. This is an extract of his article: On the northern tip of Delaware County, New York, where the Catskill Mountains curl up into little kitten hills, and Ouleout Creek slithers north into the Susquehanna River, there is a farm my parents bought before I was born. My earliest memories there are of skipping stones with my father and drinking unpasteurised milk. There are bald eagles and majestic pines, honeybees and raspberries.

A few months ago I was asked by a neighbour near our farm to attend a town meeting at the local high school. Some gas companies at the meeting were trying very hard to sell us on a plan to tear through our wilderness and make room for a new pipeline for hydraulic fracturing, or fracking. Most of the residents at the meeting, many of them organic farmers, were openly defiant. The gas companies didn't seem to care. They gave us the feeling that whether we liked it or not, they were going to fracture our little town.

I felt I needed to do some research and looked into Pennsylvania. Here, hundreds of families have been left with ruined drinking water, toxic fumes in the air, industrialised landscapes, and a devastating and irreversible decline in property value.

Don't be fooled. Fracking for shale gas (or "natural gas") is dirty energy. It inevitably leaks toxic chemicals into the air and water. Industry studies show that 5% of wells can leak immediately, and 60% over 30 years. There is no such thing as pipes and concrete that won't eventually break down. It releases a cocktail of chemicals from a menu of more than 600 toxic substances, climate-changing methane, radium, and, of course, uranium.

Gas produced this way is not climate-friendly. Within the first 20 years, methane escaping from within and around the wells, pipelines and compressor stations is 105 times more powerful a greenhouse gas than carbon dioxide.

Few people are aware that America's Natural Gas Alliance has spent $80 million (R733m) in a publicity campaign that includes the services of Hill and Knowlton, the public relations firm that through most of the 1950s and '60s told America that tobacco had no verifiable links to cancer. Natural gas is clean, and cigarettes are healthy — talk about disinformation. To try to counteract this, my mother and I have started a group called Artists Against Fracking.

More than 100 entertainers, including Lady Gaga, Robert DeNiro, Flea, Gwyneth Paltrow, Hugh Jackman, Mark Ruffalo, The Strokes, Leonardo DiCaprio, Sir Paul McCartney and Matt Damon, have joined with actors and other celebrities in the Artists Against Fracking campaign.

• www.artistsagainstfracking.com

Nationwide Insurance says no to fracking

Nationwide is the first major American insurance company to announce that it will not cover damages related to natural gas fracking operations. It says: "From an underwriting standpoint, we do not have a comfort level with the unique risks associated with the fracking process to provide coverage at a reasonable price."

Wenonah Hauter, the executive director of Food & Water Watch, says: "When a company with the scope of Nationwide Insurance determines that property with fracking is too risky and too dangerous to insure, political leaders considering the practice would be wise to take heed."

She adds: "Nationwide isn't willing to risk its bottom line over fracking, and our elected leaders shouldn't be willing to risk the health and safety of those they serve."

Food & Water Watch is an American public interest organisation that works to ensure the food, water and fish people consume is safe, accessible and sustainably produced.

Water contamination health warning signs like these are seen throughout Pennsylvania in the United States.

"They're here to rape this land, make as much money as they can and get the hell out of here. They could give a crap less what they are doing here. They will come on your property look you straight in the eye and lie to you."

Trucks transporting chemicals to well sites in Pennsylvania. 200 000 litres of chemicals are used per frack in each well.