



CER Comments on the Proposed Technical Regulations for Petroleum Exploration and Exploitation published by the Minister of Mineral Resources under s.107 of the Mineral and Petroleum Resources Development Act, 2002 on 15 October 2013

2 December 2013

General comments

1. These comments must be read together with the Centre for Environmental Rights' document entitled **Minimum Regulatory Requirements for Hydraulic Fracturing in South Africa** (the "CER Minimum Requirements"), which we submit with these comments. The CER Minimum Requirements was prepared with input from various local and international experts as a contribution to the process of developing appropriate and effective legal and governance systems to ensure that hydraulic fracturing ("fracking") does not infringe the fundamental right in section 24.
2. Any regulatory framework must accord with the Constitution of the Republic of South Africa, 1996, and give effect to the rights enshrined in the Constitution's Bill of Rights. Section 24 of the Constitution establishes the right to an environment that is not harmful to one's health and well-being and imposes a positive obligation on the state to protect the environment for both present and future generations "through reasonable legislative and other measures that—prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."
3. This means that mining activity¹ including fracking must only be permitted to the extent that it can be undertaken in a manner that is fully consistent with section 24 of the Constitution, and that any regulation of fracking must constitute "reasonable legislative measures" that comply with the requirements of section 24(b) of the Constitution.
4. Other constitutional rights of particular relevance to the relationship between fracking and the environment include the right to property (s. 25), the right of access to sufficient food and water (s. 27(1)(b)), the right of access to information (s. 32), and the right to just administrative action (s. 33).
5. Any legislation governing fracking must give effect to the principles detailed in section 2 of the National Environmental Management Act 107 of 1998 ("NEMA") which bind "the actions of all organs of state that may detrimentally affect the environment". These principles apply the constitutional rights in a practical environmental context, serve as the framework within which environmental management and implementation plans are to be formulated, and serve as guidelines for any state organ exercising any function concerning the

¹ Mining activity is understood to include all reclamation, reconnaissance, prospecting, mining, exploration and production activities under the MPRDA and mining rights are understood in a similar manner.

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protection of the environment (NEMA ss. 2(1)(b) and (c)). Section 37(1) read with section 69(2) of the MPRDA directly applies the NEMA principles to fracking operations.

Current Law Reform Processes

6. The proposed regulations do not recognise the current state of flux of the environmental management of mining activity which is set to be transferred from the MPRDA to fall under NEMA from 7 December 2014. Included in this reform process is the Mineral and Petroleum Resources Development Amendment Act, 2008 (“MPRDAA 2008”), which commenced on 7 June 2013, the effect of which raises questions as to whether the Minister of Mineral Resources (the “Minister”) now retains the competence to regulate the environmental impacts of mining activity at all.
7. We commend the efforts of the Department of Mineral Resources (“DMR”) to regulate the specific issues that arise from petroleum exploration and exploitation. However it appears that, by promulgating the proposed regulations under the MPRDA, the DMR is intending to regulate the environmental effects of fracking even though the environmental management of mining activity under the MPRDA is soon to expire (and, indeed, would have expired absent the application of the Interpretation Act to “sustain” the environmental management provisions of the MPRDA following repeal by the MPRDAA 2008). This is concerning for reasons including that the underlying rationale for the transfer of the environmental management of mining activity so as to fall under NEMA is so that the environmental effects of all industries are managed consistently under the appropriate mandate and that the MPRDA in its current or proposed form does not appear suited to the regulation of the nascent natural gas industry: it is only in the definition of “petroleum” that the MPRDA makes any specific reference to natural gas. Moreover, the environmental regulation of fracking under the MPRDA may be defunct following the (ultimate) repeal of the MPRDA’s environmental management provisions on 7 December 2014.
8. Promulgation of the proposed regulations under the current transient framework is particularly problematic in respect of the new and unknown implications of the invasive fracking technique. Fracking is likely to be applied even in the exploration phases of well development. However, under the current MPRDA regulations, exploration (as with prospecting) requires only the submission of an environmental management plan which entails no scoping procedure or environmental impact assessment (MPRDA regulations 48 to 50). Under NEMA’s Environmental Impact Assessment Regulations, 2010 (“EIA Regulations 2010”), activities which require an exploration right would require full scoping and environmental impact assessment.² Furthermore, as activities associated with fracking might trigger environmental assessments as listed activities under NEMA, the inclusion of fracking within the NEMA regime will assist the integration and alignment of the necessary authorisations. We are also concerned by the sequence of environmental authorisation in relation to the grant of mining rights under the MPRDA. Under the MPRDA, the approval of an environmental authorisation is not a pre-requisite to the approval of a production right (s. 84 MPRDA).
9. Other aspects of concern that are not covered by the outgoing MPRDA framework include those relating to public participation, access to information and independent environmental assessment.
10. We suggest that any regulations that pertain to the environmental effects of fracking are promulgated under the MPRDA, NEMA, the National Environmental Management: Waste, 2008 (“NEMWA”), National Water Act, 1998 (“NWA”), and the National Environmental Management: Air Quality Act, 2004 (“NEMAQA”), with express reference to the empowering provisions in each statute for the promulgation of regulations. Fracking must be dealt with on the same basis as any other activity that creates environmental risks. This means it must comply with all existing environmental laws and if fracking-specific regulations are required then they must be made under the relevant act. This allows for the staggered application of the appropriate acts to the environmental management of mining activity and promotes integrated environmental management and coherent regulation.

² GNR. 545 of 18 June 2010.

11. Alternatively, we suggest that the promulgation of fracking-specific regulations is delayed until the commencement of the environmental management of mining activity under NEMA to allow for the smooth and comprehensive transition of this process, the integration of any outstanding aspects (for example, provisions in relation to the management of environmental rehabilitation funds under NEMA, and the appeal and coordinated licensing processes for environmental authorisations of mining activity) and the regulation of fracking under the appropriate framework.

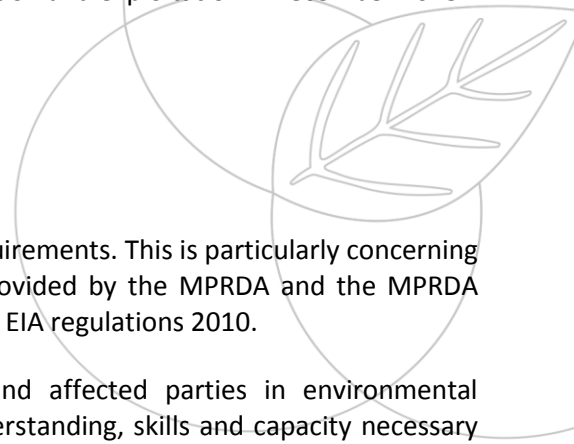
Lack of binding obligations

12. The proposed regulations are more akin to a guideline for norms and standards: they create no enforceable obligations as they make no provision for the creation of an offence following deviant behaviour. Additionally, no prescribed periods or methods are provided for concepts such as “regular sampling”.
13. The effective operation of any monitoring and enforcement agency is contingent on the creation of enforceable and meaningful sanctions within the relevant legislative framework. It is imperative that binding requirements are promulgated before the Minister makes any decision regarding shale gas exploration (and production) so that those regulations can control the potentially pervasive impacts of fracking in a real and effective manner. The sanctions imposed must present a reasonable deterrent to non-compliance.

Insufficiency of environmental impact assessment

14. A comprehensive environmental impact assessment must have due regard for cumulative environmental impacts and assessment and the comparison of feasible alternatives and must look at the proposed developments on both a project level and well-by-well basis. The proposed regulations do not ensure that the significance of all impacts and risks and the likely trade-offs are set out for decision makers. Sustainable development requires the balancing of competing needs in order to achieve the “best practicable environmental option” which “provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term” (under NEMA sections 1 and 2(4)(b)) whilst applying a risk averse and cautious approach, and under what conditions this should be approved. This means NEMA requires the costs and benefits of a proposed activity to be assessed in accordance with the constitutional obligation that reasonable legislative (and other) measures are passed to protect the environment “for the benefit of present and future generations” (Constitution s. 24(b)).
15. Notwithstanding isolated reference to health effects (for example, in the context of fracking fluids) and noise impacts, the environmental impact assessment outlined by the proposed regulations does not extend beyond biophysical impacts to include the impacts of the proposed activity on the human environment. Comprehensive assessment of environmental, social and economic impacts is necessary to allow for the proper assessment of competing needs and feasible alternatives and to ensure that the equitable distribution of costs and benefits associated with the proposed fracking is properly considered. An assessment of social impacts must include the consideration of impacts on and risks to: stakeholders’ sustainable livelihoods; health and socioeconomic wellbeing (including a sense of place); and access to infrastructure and services (including changes in access to, efficiency of use of and substitutions for affected resources).
16. Due to the pervasive and potentially large-scale effects of fracking, a strategic environmental assessment should be conducted³ so as to assess the relevance and impacts of fracking at a strategic level prior to the undertaking of any individual environmental impact assessment, including the comparative use of the shale gas resource instead of alternative energy sources on a holistic basis.

³ We understand that the Departments of Environmental Affairs and Water Affairs are planning a collaborative strategic environmental assessment for the Karoo.



Public participation

17. The proposed regulations make no provision for public participation requirements. This is particularly concerning in light of the rather amorphous provisions for public participation provided by the MPRDA and the MPRDA regulations in contrast with the more robust provisions of NEMA and the EIA regulations 2010.
18. The NEMA principles promote the participation of all interested and affected parties in environmental governance with all people given “the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation” and with participation by vulnerable and disadvantaged people ensured (NEMA s. 2(4)(f)). Meaningful public participation is a pre-requisite to the realisation of NEMA principle s. 2(4)(g) which requires decisions to account for “the interests, needs and values of all interested and affected parties”.
19. Due to the potentially extreme and far-reaching detrimental impacts associated with fracking, it is important that all stakeholders have the opportunity to participate in each significant stage in the shale gas process including that relating to water use and well abandonment and closure. Compliance with a defined stakeholder management plan will ensure such participation, and also contribute to decisions that comply with the requirements of just administrative action. In contrast with the EIA Regulations 2010, the MPRDA Regulations make very limited provision for public participation. Accordingly, absent regulation as a listed activity under NEMA, the proposed fracking regulations must include specific and detailed provision for transparent, informed and meaningful public participation.

Access to information

20. The proposed regulations make little provision for access to information. The only reference to the public disclosure of information is in relation to data that the designated agency may collect unless it directly relates to the “prospectivity of the holder’s acreage” (see regulation 5(7)). The public’s access to clear, comprehensive and accessible information from an unbiased source is vital to ensure that public participation is meaningful, and any consent (or lack thereof) is informed. The NEMA principles require decision-making in an open and transparent manner with access to information provided in accordance with the law (NEMA s. 2(4)(k)).
21. In order to ensure proper access to information and environmental assessment it is essential to disclose key environmental indicators for which base line measurements have been established. These key indicators include: groundwater quality supply and characteristics; surface water quality, supply and characteristics; seismic characteristics; air quality and emissions (including radioactivity and radio frequency levels); and noise quality. The indicators should cover levels of carcinogens, mutagens, teratogens and neurotoxins as these are often associated with the chemicals used for fracking. Baselines need to be collated over a two to five year period in advance of new drilling activity to ensure accuracy and must account for seasonal variations. An essential component of this process is the provision of clear environmental standards and thresholds against which outcomes are to be measured. These measures cannot be variable subject to the “agreement” between the applicant of the respective rights and the authorities.
22. We note that a previous version of the proposed regulations contained a chapter 6 comprising regulations on information disclosure and transparency. We are concerned that such regulations have now been excluded.

Application of API Standards

23. As fracking has not yet been practised in South Africa, the precautionary and preventive principles require that we look to best international practice and best international regulatory practice. The proposed fracking regulations refer to the standards of the American Petroleum Industry (the “API Standards”). Whilst we

commend the application of international practice, we note that the API Standards are intended to address problems of a general nature with local, state, and federal laws and regulations to address particular circumstances. Furthermore, the API standards cannot purport to be an impartial benchmark, as they are prepared by a national trade association comprised of petroleum industry representatives. The API's dedication to make "continuous efforts to improve the compatibility of their operations with the environment" falls short of ensuring the protection of environmental rights.⁴

24. It is imperative that there is also consideration of approaches such as those outlined in at least the following key reports and guidelines by international agencies and regulators:

- the International Energy Agency's 2012 report "Golden Rules for a Golden Age of Gas: World Energy Outlook Special Report on Unconventional Gas";⁵
- the European Commission's 2012 Report on Potential Risks from Fracking entitled "Support to the identification of potential risks for the environment and human health arising from hydrocarbons operations involving hydraulic fracturing in Europe";⁶
- the current and developing standards of the United States of America's federal Environmental Protection Agency ("EPA") such as the April 2012 Oil and Natural Gas Air Pollution Standards;⁷ and
- the United Kingdom's Department of Energy and Climate Change's July 2013 "Guidance about shale gas and hydraulic fracturing (fracking)".⁸

⁴ <http://www.api.org/environment-health-and-safety/environmental-principles> as accessed on 6 November 2013.

⁵ http://www.iea.org/publications/freepublications/publication/WEO2012_GoldenRulesReport.pdf

⁶ <http://ec.europa.eu/environment/integration/energy/pdf/fracking%20study.pdf>

⁷ <http://www.epa.gov/airquality/oilandgas/actions.html>

⁸ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/225826/About_Shale_gas_and_hydraulic_fracking.pdf

Proposed Regulations	CER Comments (not in bold)
NOTICE	
<p>I, Ms Susan Shabangu, MP, Minister of Mineral Resources, hereby give notice of my intention to make Technical Regulations for Petroleum Exploration and Exploitation under section 107(1) of the Mineral and Petroleum Resources Development Act, 2002 (Act No.28 of 2002), as set out in the Schedule hereto.</p>	<p>The promulgation of the proposed regulations in terms of section 107(1) illustrates the problems arising from the current legislative reform.</p> <p>Section 107(1)(a), which empowers the Minister to make regulations regarding the conservation of the environment and the management of environmental impact from mining operations, has been repealed with immediate effect by the commencement of the MPRDAA 2008.</p> <p>Under sections 107(1)(b)(k) and (l), the Minister is empowered to make regulations of general application regarding: “the exploitation, processing, utilization or use of or the disposal of any mineral” with a “mineral” defined so as to exclude petroleum (s. 107(1)(b)); “any matter which may or must be prescribed for in terms of this Act” (s. 107(k)); and “any other matter the regulation of which may be necessary or expedient in order to achieve the objects of this Act” (s. 107(l)).</p> <p>Notwithstanding these “general empowering provisions”, the repeal of the Minister’s authority to make regulations regarding environmental management indicates that the Minister’s authority in this sphere is specifically excluded. Following the commencement of MPRDAA 2008, the regulation of environmental management is no longer prescribed under or necessary to achieve the objects of the MPRDA.</p>

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Proposed Regulations	CER Comments (not in bold)
	<p>Despite the title of the proposed regulations, the proposed regulations in effect are concerned with natural gas and not petroleum. Consequently, and as the MPRDA only makes specific reference to natural gas in the definition of “petroleum”, it is questionable whether the regulation of natural gas is a “matter which may or must be prescribed in terms of [the MPRDA]” or a matter “necessary or expedient in order to achieve the objects of [the MPRDA]”.</p>
<p>The purpose of the proposed regulations is to augment gaps identified in the current regulatory framework governing exploration and exploitation of petroleum resources, particularly in relation to Hydraulic Fracturing and prescribe good international petroleum industry practices and standards that will enhance safe exploration and production of petroleum.</p>	<p>The regulations read as a guideline and not binding provisions-contravention is not an offence. As such, although we commend the efforts of the DMR to specifically address issues arising from the exploration and exploitation of petroleum resources, the formulation of these practices and standards as regulations is misleading.</p> <p>The use of the word “augment” is curious, this typically meaning to “increase” or “enhance”. Even assuming this to be an incorrect reference, the “regulations” do little to address the need for regulation following the gaps created by the specific and novel aspects of natural gas exploration and exploitation, and fracking (and its associated activities) in particular.</p>
CHAPTER 1	
GENERAL PROVISIONS	
<p>Short Title These Regulations shall be called Technical Regulations for Petroleum Exploration and Exploitation.</p>	<p>The description of the “proposed regulations” as “Technical Regulations” implies their confinement to technical aspects. We recommend that, if these regulations are to be promulgated under the MPRDA, they should indeed be confined to technical aspects and should not over-reach to address environmental management which is more appropriately regulated under NEMA. In their current form, the proposed regulations do little to ensure the responsible and comprehensive environmental management of</p>

Proposed Regulations	CER Comments (not in bold)
	petroleum activity in general, and fracking (and its associated activities) in particular. We are concerned by the recent indications of the Director General: Mineral Resources that the proposed fracking regulations are to be the only regulatory measures introduced prior to the making of the Minister's decision regarding the applications for shale gas exploration in the Karoo. ⁹
<p>Purpose To augment the Mineral and Petroleum Resources Development Regulations so as to prescribe standards and practices that will ensure safe exploration and exploitation of petroleum.</p>	<p>Whilst the notice refers to the enhancement of safe measures, the purpose of the proposed regulations is to “ensure” this safety. The proposed regulations, due to their non-binding and vague nature, do little to “ensure” the safety of natural gas exploration and exploitation.</p>
<p>1. Definitions In this schedule any word or expression to which a meaning has been assigned in the Act shall have that meaning and, unless the context indicates otherwise -</p>	
<p>"API" means American Petroleum Institute;</p>	
<p>"aquifer" means an aquifer as defined in the National Water Act, 1998 (Act No.36 of 1998);</p>	
<p>"base fluid" means the continuous phase fluid type, including, but not limited to water used in hydraulic fracturing operations;</p>	
<p>"casing" means piping positioned in a wellbore and cemented in place to prevent soil or rock from caving and isolate fluids from the surrounding geological formations;</p>	
<p>"chemical" means any element, chemical compound, or mixture of elements or compounds that has its own specific name or identity;</p>	<p>Companies may be reluctant to disclose the chemicals they apply, for example in fracking fluid, for commercial reasons. Whilst these commercial concerns are significantly outweighed by the risk of the violation of fundamental constitutional rights presented by the application of such chemicals, a middle ground might entail the public disclosure of “chemical</p>

⁹ Paul Vecchiato ‘Fracking proposed regulations released’ *Business Day Live* 17 October 2013 <http://www.bdlive.co.za/business/energy/2013/10/17/fracking-draft-regulations-released>

Proposed Regulations	CER Comments (not in bold)
	<p>families” and not the precise chemical composition.</p> <p>As such, the term “chemical family” should be defined in the proposed regulations.</p>
<p>"competent persons" means competent persons as defined in the Mineral and Petroleum Resources Regulations published in Government Notice No.R.527 dated 23 April 2004;</p>	<p>In order to be a “competent person”, a person must <i>inter alia</i> be familiar with the MPRDA and “other related legislation”. If the proposed regulations are to extend to environmental requirements, this familiarity must specifically extend to NEMA.</p> <p>Natural gas exploration in general is undeveloped in South Africa, whilst fracking is an entirely new technique. The proposed regulations make no provision for the training of such “competent persons” so as to equip them with the skills necessary to assess blowout equipment (reg 21(5)), examine wells (reg 23(2)), manage operations (reg 24) or audit fracking operations (reg 35(3)(d)).</p> <p>As recommended under the general commentary section above, we suggest that in light of the specialised and novel nature of fracking activity, and the government’s repeated commitment to the more integrated regulation of the environmental impacts of mining activities, the environmental authorisation of fracking related activity and the compliance and enforcement of environmental provisions in relation to fracking are exercised by a specialised, inter-departmental unit under the Minister of Water and Environmental Affairs. This specialised unit should comprise sufficient numbers of suitably qualified, experienced, incentivised and resourced and authorised officials:</p> <p>(1) to administer, consider and make recommendations on applications for environmental authorisations for mining;</p>

Proposed Regulations	CER Comments (not in bold)
	(2) to monitor compliance with environmental authorisations, and with general obligations for responsible environmental management; and (3) to take both administrative and criminal enforcement action where violations are detected.
"days" means calendar days;	This is inconsistent with the amendment to “days” introduced to the MPRDA by MPRDAA 2008 which defines “days” as calendar days excluding Saturdays, Sundays or public holidays.
"designated agency" means designated agency as defined in the Mineral and Petroleum Resources Regulations published in Government Notice No.R.527dated 23 April 2004;	<p>The reference to a “designated agency” in respect of petroleum activity is done away with by the Mineral and Petroleum Resources Development Amendment Bill, 2013 (“MPRDA Bill”). As such the “designated agency” will soon be an outdated reference.</p> <p>The inherent conflict between the DMR’s obligations to promote mining and its environmental obligations is illustrated by the MPRDA Bill’s proposed designation of the regional manager as authority for functions relating to petroleum activity (including fracking activity) despite the administrative practice that the regional manager, as delegated authority, is tasked with the evaluation and often the approval of applications for environmental authorisation under the MPRDA.</p>
"flare" means a thermal oxidation system using an open, enclosed, or semi- enclosed flame;	
"fresh water" means surface and subsurface water in its natural state that is suitable for human consumption, domestic livestock, irrigation, industrial, municipal and recreational purposes and is capable of supporting aquatic life in line with South African water quality guidelines;	
"gas" means all natural gas, including casinghead gas, coal bed methane and shale gas;	

Proposed Regulations	CER Comments (not in bold)
<p>"groundwater" means any water below the land surface that is within the saturated zone or geologic materials where the fluid pressure in the pore space is equal to or greater than atmospheric pressure;</p>	
<p>"holder" means a holder of an exploration or production right granted in terms of sections 80 or 84 of the Act or an applicant for such a right;</p>	<p>The definition of “holder” as both “holder” of and “applicant” for an exploration or production right blurs the lines between the application and licensing stages in respect of these rights. As such, the timing of the requirements outlined in the regulations is often unclear.</p>
<p>"horizontal well" means a well with a wellbore drilled laterally at an angle of at least 80 degrees to the vertical and with a horizontal projection exceeding 30 meters, measured from the initial point of penetration into the productive formation through the terminus of the lateral in the same common source of hydrocarbon supply;</p>	
<p>"hydraulic fracturing" means injecting fracturing fluids into the target formation at a force exceeding the parting pressure of the rock to induce fractures through which petroleum can flow to the wellbore;</p>	
<p>"hydraulic fracturing additive" means any chemical substance or combination of substances, including, but not limited to any chemical and proppant that is added to a base fluid for the purposes of preparing hydraulic fracturing fluid;</p>	
<p>"hydraulic fracturing flowback" means all hydraulic fracturing fluid and other fluids that return to the surface after hydraulic fracturing operations have been completed and prior to the well being placed in production;</p>	<p>The definition of “hydraulic fracturing flowback” should extend to all fluids that return after the completion of hydraulic fracturing operations and not only those return “to the surface”. A significant volume of fluids do not return to the surface, both because of leakage and because they become trapped in the interstitial layers.</p>
<p>"hydraulic fracturing fluid" means the mixture of the base fluid and all the hydraulic fracturing additives used to perform hydraulic fracturing;</p>	
<p>"hydraulic fracturing string" means any pipe or casing string used for the transport of hydraulic fracturing fluids;</p>	

Proposed Regulations	CER Comments (not in bold)
"micro-seismic monitoring" means the monitoring of seismic activity less than or equal to magnitude 3 using a network of calibrated seismological equipment in order to produce readings on magnitude, depth, location, error and time of each seismic event;	The monitoring of seismic activity greater than a magnitude 3, which may cause significant damage, must also be regulated.
"naturally occurring radioactive material" means a low-level, radioactive material that naturally exists in natural materials;	
"oil" means natural crude oil or petroleum and other hydrocarbons, regardless of gravity, which are produced at the well in liquid form which are not the result of condensation of gas after it leaves the underground reservoir;	
"perennial stream" means a stream that has continuous flow in its stream bed during all of the calendar year;	
"petroleum" means petroleum as defined in the Act;	
"produced water" means water, regardless of chloride and total dissolved solids content, that is produced in conjunction with oil or natural gas production or natural gas storage operations, but does not include hydraulic fracturing flowback;	
"proppant" means sand or any natural or man-made material that is used during hydraulic fracturing operations to prop open the artificially created or enhanced fractures;	
"release" means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment;	
"surface water" means all water that is open to the atmosphere and subject to surface runoff;	
"the Act" means the Mineral and Petroleum Resources Development Act, 2002(Act No.28 of 2002)	
"pollution" means pollution as defined in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998);	
"water resources" means water resource as defined in the National Water Act 1998 (Act No. 36 of 1998);	

Proposed Regulations	CER Comments (not in bold)
<p>"well" means any drilled hole used for the purpose of exploration and production of petroleum resources;</p>	
<p>"well site" means surface area, including a well, occupied by all equipment or facilities necessary for or incidental to drilling, hydraulic fracturing, production, or plugging a well.</p>	<p>This definition should explicitly include the road network and any storage facilities.</p>
<p>2. Application of Regulations</p> <p>(1) These Regulations apply to all onshore, and, to the extent applicable, offshore exploration and production operations and must be read with the Act, the Regulations thereto and any other relevant legislation.</p>	<p>This provision is misleading, not only because the proposed regulations operate as non-binding guidelines, but also because the proposed regulations are effectively concerned with natural gas and not petroleum.</p>
<p>CHAPTER 2</p>	
<p>SITE ASSESSMENT, SELECTION AND PREPARATION</p>	
<p>The proposed regulations fall far short of ensuring adequate environmental impact assessment. This is particularly concerning because, as fracking is necessary even at the exploration stage, fracking during this stage requires more extensive environmental assessment than that necessitated by prospecting under the MPRDA regulations. Instead, these aspects are adequately regulated under the NEMA EIA Regulations, and the use of different EIA terminology in this chapter of the proposed regulations will only cause further confusion.</p> <p>The proposed regulations focus on “impact prediction” although are confusing in the apparently interchangeable use of the terms “impact prediction” study (regs 3(2), 3(3)), “impact prediction assessment” (reg 3(2)(k)), “impact assessment report” (reg 3(2)(l)) and “impact assessment study” (reg 3(3)) amongst others. “Impact prediction” is only one component of environmental impact assessment. What decision makers need to know is whether or not the proposed activities could and would support ecologically sustainable development that is economically and socially justified. In order to achieve the most sustainable solution, whilst applying a risk averse and cautious approach, it is essential that the significance of all impacts and risks and the likely trade-offs are set out for decision makers.</p> <p>Section B.5.d of the CER Minimum Requirements sets out the components of adequate impact assessment, many of which are included in the proposed regulations. <i>Inter alia</i> regulation 3 fails:</p> <p>(1) to explain the basis on which decisions are to be made because it assumes that, provided certain steps are performed and information is obtained, fracking can and will proceed;</p>	

Proposed Regulations	CER Comments (not in bold)
<p>(2) to enforce binding obligations; (3) to manage the impact of ancillary activities; (4) to specify the application of the preventive and precautionary principles; (5) to extend beyond an assessment of biophysical impacts to ensure the proper consideration of social and economic impacts; (6) to ensure environmental assessments are undertaken at each developmental stage of the project; (7) to ensure that cumulative impact and risks at landscape scale are assessed ; (8) to provide for an emergency /upset preparedness plan and response clearly linked to the likely significance of impacts and risks; and (9) to ensure the health and safety of people impacted by any such activity.</p> <p>Despite the reference to “site selection” in the heading, the chapter contains no provision for site selection. This selection must be undertaken in accordance with section B.5.c of the CER Minimum Requirements.</p>	
<p>3. Environmental Impact Assessment</p> <p>(1) Wherever exploration or production activities are being planned that could have an impact on natural resources, or sensitive areas, appropriate studies must be undertaken to assess the potential impacts of such activities on the environment over the full life cycle of the operations.</p> <p>(2) An appropriate impact prediction study must contain the following elements-</p> <p>(a) correct formulation of the key questions that need to be answered by the impact prediction study and agreement with the relevant authorities that these are the correct key questions; (b) characterization and knowledge of the sources on the operations that give rise to the impact; (c) characterization and knowledge of the environmental pathways along which the impact could migrate; (d) characterization and knowledge of the receptors that experience the impacts and what constitutes an acceptable impact; (e) an assessment of the capabilities and limitations of the various approaches and tools</p>	<p>This section should relate to both socio-economic and environmental assessment. An environmental impact assessment must extend beyond biophysical impacts and include the impacts of the proposed activity on the human environment to allow for the proper assessment of competing needs and feasible alternatives and to ensure that the equitable distribution of costs and benefits associated with the proposed fracking is properly considered.</p> <p>Reg 3(1): The obligation to perform impact studies is vague and unenforceable as it allows an applicant unfettered discretion to determine when activities “could” have an impact on natural resources or sensitive areas. This determination is difficult absent an environmental impact assessment. Such discretion is particularly concerning because of the inadequate regulation of the environmental impacts of fracking under the MPRDA Regulations, particularly during the exploration phase. Additionally, the impacts to be considered are limited to biophysical resources and do not extend to socio-economic systems.</p>

Proposed Regulations	CER Comments (not in bold)
<p>that can be used to make impact predictions and answer the key questions that have been agreed upon;</p> <p>(f) understanding of the issues of risk and uncertainty inherent in the tools and the assessment procedure and how these combine to affect the confidence that can be placed in the impact prediction that is made;</p> <p>(g) development of a conceptual model that describes the interactions between sources, pathways and receptors, describes and motivates assumptions that will be made and describes and motivates which prediction tools will be used to undertake the impact prediction;</p> <p>(h) appointment of suitably qualified persons that have access to the various tools and that have proper training and experience in selecting the appropriate tools for the assessment being undertaken and in using the selected tools;</p> <p>(i) adequate and appropriate independent review of the prediction methodology and results;</p> <p>(j) design and implementation of an appropriate post-prediction monitoring programme, to support the validation and calibration of the predictions;</p> <p>(k) a conclusion and recommendation on the most appropriate management action to be implemented for the activity for which the impact prediction assessment was undertaken; and</p> <p>(l) compilation of all the above into an impact assessment report.</p> <p>(3) In undertaking an impact assessment study, the applicant must interact with the authorities at appropriate points in the impact assessment study and reach agreement with them on the following points-</p> <p>(a) the key questions that need to be answered by the impact prediction;</p> <p>(b) the identity of the critical receptors;</p> <p>(c) the initial conceptual model and its underlying assumptions;</p> <p>(d) the final conceptual model and its underlying assumptions and the tools to be used to undertake the impact prediction; and</p> <p>(e) that identified alternative management options to manage any unacceptable impacts are appropriate.</p>	<p>Reg 3(2):</p> <p>Reg 3(2)(a): As with reg 3(3), this refers to agreement to be reached between the applicant and the relevant authorities on the “key questions” to be answered in the impact prediction. These key questions must be clearly set out and not be the variable subject of agreement between the applicant and the relevant authorities. The regulated requirements of the environmental impact assessment must be formulated in light of these key questions so as to provide assurance that these questions are to be satisfactorily answered by the applicant.</p> <p>Reg 3(2)(b): does not make sense.</p> <p>Reg 3(2)(h): does not specify the manner of qualification. This is particularly important in light of the novel nature of natural gas activities, in particular fracking, in South Africa. As outlined under the general commentary section above and at sections B.4.b and B.5.h of the CER Minimum Requirements, we suggest the appointment of a specialised, inter-departmental unit under the Minister of Water and Environmental Affairs.</p> <p>Reg 3(2)(i): is vague and unenforceable in that it does not stipulate the manner “adequate and appropriate independent review” is to be determined. Whilst the MPRDA makes no provision for independent environmental evaluation, the provisions under section 24I of NEMA read with the EIA Regulations 2010 provide for the appointment of an independent expert panel to review and advise competent authorities on all scoping and environmental impact reports. In line with the above and the CER Minimum Requirements, we suggest that this independent expert panel is appointed by a specialised, inter-departmental unit and that there is civil society oversight to enhance transparency and accountability.</p> <p>Regs 3(2)(j) and (k): It is important that an emergency /upset preparedness plan and response clearly linked to the likely significance of all impacts and risks, with appropriate indicators and schedule for monitoring, is prepared as part of environmental impact assessment. As such, the vague reference</p>

Proposed Regulations	CER Comments (not in bold)
<p>(4) The final impact assessment report together with the independent review report must be submitted to the designated agency and/ or relevant Departments as part of the application process for an exploration or production right as prescribed by relevant legislation.</p>	<p>to monitoring in these provisions is inadequate. This plan/ programme must provide assurance that there will be an appropriate response to a well-designed monitoring programme with appropriate indicators (ie. not merely for the “validation and calibration of the predictions”). It must give assurance that there are planned measures to manage impacts (especially in the event of accidents, emergencies, pollution or situations where there is clear indication through monitoring of non-compliance with the standards or thresholds of the predictions) and that these measures will adequately remedy hazards to ecological/ human health and wellbeing in a timeous manner. Moreover, it must give assurance of adequate capacity to implement monitoring, evaluation of monitoring results, and adaptive management based on monitoring.</p> <p>Reg 3(3)(e): The reference to “appropriate” management options is vague and provides no accountable standard, particularly as this is determined by the applicant and the mining authorities. There need to be explicit criteria and thresholds for the evaluation of the predictable outcomes of these management options.</p> <p>Reg 3(4): fails to provide for public participation and access to information as required by the constitutional and NEMA principles and as set out at sections B.5.a and B.5.b of the CER Minimum Requirements.</p>
<p>4. Assessment of Conditions Below Ground</p> <p>A holder must assess the geology and geohydrology of the affected area prior to well design using available data and submit a geological overview report at the designated agency which may include the following -</p> <p>(a) geological map of the area (that can encompass several hydraulic fracturing sites) at relevant scale and with details that will allow understanding of the potential structural problems;</p> <p>(b) geophysical profiling (20 or 30) to the depth of the target area and below;</p>	<p>Regulation 4 is non-binding in that a geological overview report “may include” the listed specifications. Regulations 4(d) and (e) are vague in that they do not specify the nature and duration of the borehole analysis or assessment of physical and chemical properties. Section B.5.b of the CER Minimum Requirements outlines the requirements for the establishment of baselines and the disclosure of key environmental indicators.</p>

Proposed Regulations	CER Comments (not in bold)
<p>(c) stratigraphic boreholes (could be the hydraulic fracturing hole or any other complementary hole) to understand the regional stratigraphy and possible structural complexity. Proposed depth(s) to the top and the bottom of the formation into which well fracturing fluids are to be injected;</p> <p>(d) borehole analysis: core logging, downhole geophysics, camera, water strikes, water quality, injection tests in fractures or formations;</p> <p>(e) physical and chemical properties of the stratigraphic formations such as porosity, permeability, fracturing, total organic carbon, clay and mineralogy;</p> <p>(f) cross sections of the study area based on surface geology, exploration borehole and geophysical profiling showing the stratigraphy, including the presence and morphology of dolerite and kimberlite and tectonic structures;</p> <p>(g) a hydrogeological investigation report at depth of drilling and fracturing;</p> <p>(h) model of fluid migration in the geological formation; and</p> <p>(i) geohazards associated with geological formations and structures and the solutions to overcome them.</p>	
<p>5. Water Resource Assessment</p> <p>(1) A holder must appoint an independent specialist(s) to conduct a hydrocensus as well as identify priority water source areas and domestic aquifer supplies indicated on relevant geohydrological maps• for consideration in the impact assessment.</p> <p>(2) A holder must, prior to conducting hydraulic fracturing operations, appoint an independent specialist approved by the designated agency to conduct baseline water quality assessment of all water resources within 1 kilometre of the vertical projection of the planned wellbore to surface.</p> <p>(3) Water samples collected as part of the baseline quality assessment contemplated in sub-regulation (2) must be analysed by an accredited laboratory and the holder must submit the results to the designated agency and the Department of Water Affairs within 7 days after receipt</p>	<p>Reg 5(1): Impacts on water resources have pervasive and significant social implications. Consequently there must be full stakeholder engagement in this assessment process. This engagement must be regulated in detail in respect of the natural gas process, and fracking in particular, to enable certain and enforceable obligations.</p> <p>Regs 5(2) to 5(5): Baseline assessments must also include that of water quantity. As set out at section B.5.b.iii of the CER Minimum Requirements, baselines must be collated over a two to five year period in advance of new drilling activity to ensure accuracy and must account for seasonal variations. The periods at which sampling is to occur must be specified.</p> <p>Reg 5(6): Such collections must be upon reasonable notice to the owner or occupant of the land.</p>

Proposed Regulations	CER Comments (not in bold)
<p>thereof.</p> <p>(4) The results must, at a minimum, include a detailed description of the sampling and testing conducted, including duplicate samples, the chain of custody of the samples and quality control of the testing.</p> <p>(5) After baseline water quality assessment is conducted, a holder must-</p> <p>(a) as directed by the designated agency, have all water resources subjected to regular sampling, analysis and interpretation of water quality and changes in water levels by an independent specialist approved by the designated agency; and</p> <p>(b) submit the results of the analysis and interpretation to the designated agency and other relevant Departments within 7 days of the receipt of the analysis and interpretation.</p> <p>(6) The designated agency, Council for Geoscience or the Department of Water Affairs, may collect samples of any fluids encountered in the exploration or production area (water or hydrocarbons , at depth or at the surface) for their own analysis and interpretation.</p> <p>(7) Data collected as contemplated in this regulation may be published with the exception of where it may be shown to directly relate to the prospectivity of the holder's acreage.</p>	<p>Reg 5(7): It is not acceptable that public access to information is restricted by the possibility that data may “directly relate to the prospectivity of the holder's acreage.” In light of the potentially extensive effects of fracking on water quality and quantity, and the associated environmental and social impacts, access to information cannot be restricted by the potential financial situation of the licence holder.</p>
<p>6. Assessment of Related Seismicity</p> <p>(1) A holder must, prior to conducting hydraulic fracturing, assess the risk of any potential hydraulic fracturing related seismicity and submit a risk assessment report and mitigation measures to the designated agency for approval and recommendation by the Council for Geoscience.</p> <p>(2) A holder must carry out site-specific surveys prior to hydraulic fracturing to characterize local stresses and identify nearby faults and such site characterizations must include-</p> <p>(a) desktop studies of existing geological maps;</p>	<p>General: The requirements under regulation 6 are vague and impractical: Reg 6(1) does not provide for the period over which the risk assessment is to be conducted or the baselines to be used; reg 6(3) does not specify which “other techniques” are to be implemented; reg 6(6) does not specify the manner in which fracking is to be modified; reg 6(7) does not provide any direction as to what comprises a reasonable time period and reg 6(8) does not indicate what “conservative” entails and at what levels impacts are deemed acceptable.</p> <p>Reg 6(5): It is concerning that fracturing fluids (presumably intended to</p>

Proposed Regulations	CER Comments (not in bold)
<p>(b) seismic reflection data;</p> <p>(c) all available background seismicity data; and</p> <p>(d) stress data from nearby boreholes where available.</p> <p>(3) A holder must make use of other techniques to detect potential presence of faults given the limits of remote sensing techniques.</p> <p>(4) The assessment of the orientation and slip tendency of faults and bedding planes can be done once faults have been identified and geological stresses characterized.</p> <p>(5) Risks of fault movement must be mitigated by the identification of stressed faults and where practicable, by preventing fracturing fluids from entering stressed faults.</p> <p>(6) Fracture behaviour of a targeted formation in a given well must be tested using small pre-fracturing injection tests with micro-seismic monitoring and subsequent hydraulic fracturing operations must then be modified.</p> <p>(7) A reasonable period of time must be allowed to elapse following a pre- fracturing injection test to ensure that no seismic activity occurs as the injected fluid diffuses away from the well and pressure changes in surrounding rock formations are redistributed.</p> <p>(8) A holder must adopt conservative assessments and controls at the exploration and production phase.</p> <p>(9) Micro-seismic monitoring should continue after hydraulic fracturing at the site has ceased for a period of at least 3 years</p> <p>(10) Micro-seismic monitoring must occur at the waste sites should the disposal include similar procedures as hydraulic fracturing.</p>	<p>entail the defined “hydraulic fracturing fluids”) entering stressed faults is only prevented “where practicable”. The seismic implications of the hydraulic fracturing fluids entering stressed faults, particularly when assessed in light of the preventive and precautionary principles, must be strictly prohibited. This strict prohibition must extend to all fluid applied under pressure, and not only to hydraulic fracturing fluid.</p> <p>Regs 6(9) and 6(10): Micro-seismic monitoring, in line with the “cradle to grave approach” must continue throughout the life cycle of the operations for a significant period (of at least 50 years) after the issuing of a mine closure certificate so as to ensure proper rehabilitation for which the polluter is accountable.</p>

Proposed Regulations	CER Comments (not in bold)
<p>7. Site Preparation</p> <p>All topsoil stripped to facilitate the construction of the well pad and access roads must be stockpiled, stabilized and remain on site for use in either partial or final rehabilitation.</p>	<p>This regulation makes no provision for public participation, in particular that with the landowner who is likely to be fundamentally affected by such a stockpile of topsoil. Importantly, the regulation implies that “partial” rehabilitation may be acceptable. Partial rehabilitation might only be acceptable as an interim measure or in exceptional circumstances- to ensure the constitutional protection of the environmental right, full rehabilitation must be the benchmark.</p>
<p>8. Site Containment</p> <p>(1) A holder must at all times, prevent the contamination of the environment by providing a suitably designed impermeable site underlay system and site drainage arrangements.</p> <p>(2) Sites must be designed and constructed to prevent spills to the ground surface and containment measures must be-</p> <p>(a) instituted on the well-site during both drilling and hydraulic fracturing operations;</p> <p>(b) sufficiently impervious and able to contain spilled material or waste until it can be removed or treated; and</p> <p>(c) compatible with the waste material or waste stored or used within the containment.</p> <p>(3) A holder must submit a plan to the designated agency describing the containment practices, including equipment to be utilised on site.</p> <p>(4) Containment systems must be used wherever drilling mud, hydraulic oil, diesel fuel, drilling mud additives, hydraulic fracturing additives and flowback substances are stored.</p>	<p>Regulations 8(1) and (3) are vague and impractical: reg 8(1) provides no specification as to what “suitably designed impermeable site underlay system and site drainage arrangements” entail; reg 8(3) does not specify the nature of the plan to be submitted.</p> <p>Containment systems must also be used for produced water (which is not specifically included in reg 8(4)).</p> <p>Industry best practice provides for the use of “green completions” for the separation of flowback water from natural gas and other compounds to prevent the venting of toxic gas and facilitate gas capturing.</p> <p>Waste containers must have waste management licenses under NEMWA and accord with the requirements for the storage of waste specified in the national norms and standards for Class A landfills (hazardous lagoons) as published in GN R63 (National Norms and Standards for Disposal of Waste to Landfill or the “Landfill Regulations”) under NEMWA.</p> <p>In accordance with GNR 704 (Regulations on use of water for mining and</p>

Proposed Regulations	CER Comments (not in bold)
	<p>related activities aimed at the protection of water resources or the “Water Use for Mining Regulations”): no mining related activities may take place within the 1:50 year floodline or within a horizontal distance of 100m from a water resource; and no water or waste storage facilities may be located within the 1:100 year flood-line, within a horizontal distance of 100 metres from a water resource (excluding holes drilled specifically to monitor the pollution of groundwater), on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked.</p>
Protection of Astronomy Activities	
<p>9. Radio Astronomy</p> <p>(1) A holder must comply with all declarations and regulations, promulgated in terms of the Astronomy Geographic Advantage Act, 2007 (Act. No. 21 of 2007) for the protection of astronomy advantage areas declared for radio astronomy purposes.</p> <p>(2) The Minister of Mineral Resources must, prior to issuing an exploration or production right within a distance to be determined as contemplated in sub- regulation (3) of any Square Kilometre Array station in the Northern Cape Province, consult with the Minister of Science and Technology .</p> <p>(3) A distance contemplated in sub-regulation (2) will be determined by the Ministers of Science and Technology and Mineral Resources and published in the Gazette.</p> <p>(4) A holder must, for purposes of enabling effective consultation between the Ministers of Mineral Resources and Science and Technology as contemplated in sub-regulation (2), submit the following information to the Minister of Mineral Resources -</p> <p>(a) inventory of electrical or electronic equipment and relevant technical reports describing</p>	<p>We commend the manner in which aspects in relation to radio astronomy are addressed. However, in order to be enforceable regulations, contravention of such provisions must be specified as a sanctioned offence which comprises a meaningful deterrent to non-compliance.</p>

Proposed Regulations	CER Comments (not in bold)
<p>the radiated electromagnetic emissions to be expected from each piece of equipment under normal operating conditions; and</p> <p>(b) relevant standard operating procedure for usage of the equipment as described in the inventory.</p> <p>(5) If the outcome of consultation between the Ministers of Science and Technology and Mineral Resources as contemplated in sub-regulation (2) identifies a requirement for the holder to take the necessary actions to mitigate the risk of radio frequency and electromagnetic interference to the Square Kilometre Array radio astronomy facility, such a requirement will form part of the terms and conditions of the exploration or production right.</p>	
<p>10. Optical Astronomy</p> <p>(1) A holder must comply with all declarations and regulations promulgated in terms of the Astronomy Geographic Advantage Act, 2007 (Act. No. 21 of 2007) for the protection of astronomy advantage areas declared for optical astronomy purposes.</p> <p>(2) The Minister of Mineral Resources must, prior to issuing an exploration or production right within a distance to be determined as contemplated in sub-regulation (3) from the South African Large Telescope near Sutherland, consult with the Minister of Science and Technology.</p> <p>(3) A distance contemplated in sub-regulation (2) will be determined by the Ministers of Science and Technology and Mineral Resources and published in the Gazette.</p> <p>(4) A holder must, for purposes of enabling effective consultation between the Ministers of Mineral Resources and Science and Technology as contemplated in sub-regulation (2), submit the following information to the Minister of Mineral Resources -</p> <p>(a) inventory of relevant lighting, and relevant technical reports that describe the lighting to be expected from each piece of equipment under normal operating conditions; and</p>	<p>We commend the manner in which aspects in relation to optical astronomy are addressed. However, in order to be enforceable regulations, contravention of such provisions must be specified as a sanctioned offence which comprises a meaningful deterrent to non-compliance.</p>

Proposed Regulations	CER Comments (not in bold)
<p>(b) relevant standard operating procedure for usage of the equipment as described in the inventory.</p> <p>(5) If the outcome of a consultation between the Ministers of Science and Technology and Mineral Resources as contemplated in sub-regulation (2) identifies a requirement for the holder to take the necessary actions to mitigate the risk of optical interference to the South African Large Telescope facility, such a requirement will form part of the terms and conditions of the exploration or production right.</p>	
CHAPTER 3	
WELL DESIGN AND CONSTRUCTION	
<p>General: The well design and construction standards should be as good as those codified in the United States EPA standards in relation to the installation of green completions for the containment of the volatile organic compound (“VOC”) emissions from natural gas operations in order to reduce emissions from both methane and air toxics. According to the EPA, green completions are expected to yield a nearly 95 percent reduction in VOCs emitted from fracked wells and to result in financial savings.</p> <p>This chapter fails to allow for access to information or public participation in a constitutional manner. Enforceability is significantly undermined because of: the often vague and unclear nature of the provisions; the failure to specify sanctioned offences; the failure to outline the timing of respective tests in relation to the submission of the environmental impact assessment and award of the licence.</p> <p>Examples of the lack of clarity include:</p> <p>(1) “In instances where intermediate casing is set solely to protect fresh water encountered below the surface casing shoe and cementing to the surface is technically infeasible, would result in lost circulation, or both, cement must be brought to a minimum of 180 meters above the shallowest fresh water zone encountered below the surface casing shoe.” (reg 15(4)); and</p> <p>(2) The reference to “cellar” cement at reg 17(3) which is presumably intended to refer to “collar cement”.</p> <p>Section B.5.f of the CER Minimum Requirements outlines the threshold provisions for isolating wells and preventing leaks.</p>	

Proposed Regulations	CER Comments (not in bold)
<p>11. Well Design</p> <p>(1) A holder must ensure that a well is designed such that it is constructed, equipped, commissioned, operated, modified, maintained, suspended and abandoned in a manner that will provide for control of the well at all times and prevent-</p> <p>(a) migration of petroleum and other fluids into any other formation except the targeted formation;</p> <p>(b) pollution of useable groundwater (water containing 10 000 mg/l Total Dissolved Solids); and</p> <p>(c) risks to health and safety of persons from it or anything in it, or in strata to which it is connected.</p> <p>(2) Final well abandonment design must be considered at the well planning stage and the following factors must be considered-</p> <p>(a) height of cement in annulus outside casing;</p> <p>(b) any permeable formations outside casing that must be covered by cement;</p> <p>(c) cementing casing overlaps;</p> <p>(d) the need for abandonment plugs to cover the full diameter of the hole, with only casing within the cement;</p> <p>(e) type of fluid in annuli above cement; and</p> <p>(f) difficulties of injecting cement into the annulus.</p> <p>(3) Where technically appropriate and environmentally safe, multi-well pads and horizontal drilling technologies must be considered to maximise the spacing between neighbouring wells and minimise the cumulative surface impact of operations.</p>	<p>Reg 11(1): It is unclear what “control of the well” entails.</p> <p>Reg 11 1(b): This appears to provide that the pollution of useable groundwater must not exceed 10 000 mg/l Total Dissolved Solids (it is unclear because of the omission of a measure relative to this baseline). This baseline is concerning and wholly inadequate in light of the South African Water Quality Guidelines, 1996, which provide that health effects related to total dissolved solids are minimal when water intended for domestic use has concentrations of below 2 000 - 3 000 mg/R Total Dissolved Solids. According to these guidelines, short term consumption of concentrations above 3 000 mg/R Total Dissolved Solids leads to disturbance of the body’s salt balance whilst high concentrations lead to noticeable short-term health effects. Operations relating to well design must be specifically regulated, in particular because harm to water resources is often irreparable.</p> <p>Reg 11(2): Well closure must be considered at the preliminary environmental impact assessment stage. In line with the “cradle to grave” and precautionary approaches, well closure must be considered prior to the authorisation of the fracking/gas activity with finances provided for rehabilitation up-front in line with section B.5.i of the CER Minimum Requirements. The reference to well “abandonment” is concerning as this implies that the holder can “abandon” responsibility for the well. Responsibility beyond well closure is carried through into the mine closure provisions of the MPRDA Regulations, 2004, whereby the right holder is required to ensure that latent and possible residual environmental impacts, which remain after the issuing of a mine closure certificate, are identified and quantified (MPRDA Regulation 56(d)). Further, the holder must comply with the Water Use for Mining Regulations so as to ensure the treatment of water resources following the temporary or permanent cessation of a mine or mining activity is in line with such regulations.</p>

Proposed Regulations	CER Comments (not in bold)
<p>12. Casing Standards</p> <p>(1) All wells must be cased according to current industry standards published by the API in "5CT Specification for Casing and Tubing" and the casing thread compound and its use must conform to the current API RP 5A3.</p> <p>(2) All casing installed must have a minimum yield pressure designed to withstand at least 1.2 times the maximum pressure to which the casing may be subjected during drilling, production or hydraulic fracturing operations and the minimum yield pressure shall be based upon engineering calculations as listed in the API "TR 5C-3 Technical Report on Equations and Calculations for Casings, Tubing and Line Pipe used as Casing and Tubing, and Performance Properties Tables for Casing and Tubing".</p> <p>(3) A holder must not use casing that is pitted, patched, bent, corroded, crimped, or if the threads are worn or damaged, or reconditioned casing that has not passed the approved hydrostatic pressure and drift test pursuant to API "5CT Specification for Testing and Tubing".</p> <p>(4) A holder must contact the designated agency at least 2 days prior to setting any casing to enable an authorized person to be present when the test is done.</p>	<p>Reg 12 (3): The reference is presumably intended to be the API "5CT Specification for Testing and Tubing". See the comment in paragraphs 23 and 24 above regarding the use of API standards as the sole point of reference for international best practice.</p>
<p>13. Conductor Casing</p> <p>When conductor casing is used, it must be set and cemented to surface to -</p> <p>(a) stabilize unconsolidated sediments;</p> <p>(b) isolate shallow aquifers that provide or are capable of providing groundwater for water wells and springs in the vicinity of the well; and</p> <p>(c) provide a base for equipment to divert shallow natural gas.</p>	

Proposed Regulations	CER Comments (not in bold)
<p>14. Surface Casing</p> <p>Surface casing must be set to a depth of 60m below the base of the deepest fresh water or to the top of any petroleum bearing zones, whichever comes first and cemented to surface.</p>	<p>Regardless of the depth of the petroleum bearing zone, surface casing should be set to a depth of 60 metres to protect proximate fresh water from the petroleum bearing zone.</p>
<p>15. Intermediate Casing</p> <p>(1) Intermediate casing must be set to protect unexpected fresh water found below the surface casing shoe.</p> <p>(2) Intermediate casing used to isolate fresh water must not be used as the production string in the well in which it is installed and must not be perforated for purposes of conducting a hydraulic fracture treatment through it.</p> <p>(3) When intermediate casing is installed to protect fresh water, it must be set at least 30 meters below the base of the unexpected deepest fresh water and must be cemented to the surface.</p> <p>(4) In instances where intermediate casing is set solely to protect fresh water encountered below the surface casing shoe and cementing to the surface is technically infeasible, would result in lost circulation, or both, cement must be brought to a minimum of 180 meters above the shallowest fresh water zone encountered below the surface casing shoe.</p> <p>(5) The location and depths of any petroleum-bearing zones or fresh water zones that are open to the wellbore above the casing shoe must be confirmed by coring, electric logs, or testing and must be reported to the designated agency.</p>	<p>Reg 15(1): This provision, read with regulation 16(1), implies that intermediate casing is only to be installed when fresh water is found below the surface casing shoe. Intermediate casing should always be installed as a precautionary measure due to the “unexpected” incidence of such fresh water.</p> <p>Reg 15(4): This provision is unclear.</p> <p>Reg 15(5): The effect of this provision is undermined because the nature and extent of such logs or testing are unspecified.</p>
<p>16. Production Casing</p>	

Proposed Regulations	CER Comments (not in bold)
<p>(1) In cases where intermediate casing is not installed, production casing must be run and fully cemented to the surface.</p> <p>(2) If intermediate casing is in place, production casing must be set and fully cemented to 150 meters above the top perforated zone.</p>	
<p>17. Centralisers</p> <p>(1) Casing must be centralized in each segment of the wellbore to provide sufficient casing standoff and foster effective circulation of cement to isolate critical zones including aquifers, flow-zones, voids, lost circulation zones and hydrocarbon production zones.</p> <p>(2) Surface casing must be centralized at the shoe, above and below a stage collar or diverting tool, and through usable-quality water zones.</p> <p>(3) In non-deviated holes, a pipe centralizer must be placed every fourth joint from the cellar cement shoe to the ground surface or to the bottom of the cellar.</p> <p>(4) All centralizers must be in accordance with the standards of -</p> <p>(a) API "10 D, Specification for Bow-Spring Casing Centralizers and all rigid centralizers";</p> <p>(b) API "10 TR 4 Considerations Regarding Selection of Centralizers for Primary Cementing Operations"; and</p> <p>(c) API RP 100-2, Recommended Practice for Centralizer Placement and Stop Collar Testing.</p> <p>(5) The designated agency may require additional centralization as necessary to ensure the integrity of the well design is adequate.</p>	<p>See the comment in paragraphs 23 and 24 above regarding the use of API standards as the sole point of reference for international best practice.</p>

Proposed Regulations	CER Comments (not in bold)
<p>18. Cement Requirements and Compressive Tests</p> <p>(1) A holder must notify the designated agency at least 2 days before commencing with casing cementing operations to enable an authorized person to be present during cementation of all casing.</p> <p>(2) Cementation of all casing must be done by the pump and plug method with a minimum of 25% excess cement and appropriate loss circulation material, unless another amount of excess cement is approved by the designated agency.</p> <p>(3) All cement placed into the well bore must be cement that is manufactured to meet the standards of API "10 A Specification for cements and material for well cementing" or ASTM "C150/C150M Standard Specification for Portland Cement" and the cement slurry must be prepared to minimize its free water content in accordance with the current API RP 108-4.</p> <p>(4) A holder must conduct tests for cement mixtures for which published performance data are not available on representative samples of the basic mixture of cement and additives used, using distilled water or potable tap water for preparing the slurry.</p> <p>(5) Tests contemplated in sub-regulation (4) must be conducted using the equipment and procedures established in the current API "RP 10 8-2 Recommended Practice for Testing Well Cements"</p> <p>(6) Test data showing competency of a proposed cement mixture to meet the requirements of the current API "API RP 10 8-2 Recommended Practice for Testing Well cements" must be submitted to the designated agency for approval prior to the cementing operation.</p> <p>(7) A holder must perform cement compressive strength tests on all casing strings and if it does not conform to standards it must be redone.</p>	<p>Regs 18(14) and (15): The quality of the cement has a direct effect on the possibility of leakage and environmental contamination. As such this data should be available to the public to ensure the constitutional protection of the rights of access to information and just administrative action.</p> <p>See the comment in paragraphs 23 and 24 above regarding the use of API standards as the sole point of reference for international best practice.</p>

Proposed Regulations	CER Comments (not in bold)
<p>(8) After the cement is placed behind the casing, a holder must wait for the cement to set until the cement achieves a calculated compressive strength of at least 500 psi (3447.38 kPa) and for a minimum of 8 hours before the casing is disturbed in any way including installation of a blow-out preventer.</p> <p>(9) The cement must have a 72-hour compressive strength of at least 1,200 psi (8273.71 kPa), and the free water separation must be no more than 6 millilitres per 250 millilitres of cement, tested in accordance with the current API TR 10TR3.</p> <p>(10) A holder must ensure that there is isolation of hydraulic fracturing operations from freshwater and other permeable horizons by ensuring complete cement isolation in each casing annulus.</p> <p>(11) A holder must, in co-operation with specialist contractors, prepare suitable programmes for cement placement operations, including monitoring of the effectiveness of placement as part of the operations planning, contingency plans and procedures to cover the possibility of a failure to meet the cementation design objectives.</p> <p>(12) The designated agency may, as necessary, require-</p> <p>(a) a specific cement mixture to be used in any well or any area if evidence. of local conditions indicates that specific cement is necessary; or</p> <p>(b) installation of an additional cemented casing string or strings in the well.</p> <p>(13) A holder must run a radial cement bond evaluation log to verify the cement bond on all casing strings and must carry out remedial cementing if the cement bond is not adequate for drilling ahead.</p> <p>(14) A copy of the cement job log for any cemented casing string in the well must be maintained in the well file and be submitted to the designated agency.</p>	

Proposed Regulations	CER Comments (not in bold)
<p>(15) Any proposed changes to the cementation programme must be reported to the designated agency for approval before such changes are implemented except in case of a need to prevent possible catastrophic consequence.</p>	
<p>19. Casing String Tests</p> <p>(1) After the setting and cementing of a casing string, except the conductor casing, and prior to further drilling, the casing string must be tested with fresh water, mud, or brine to at least the maximum anticipated treatment pressure but no less than 0.22 psi per foot (1.512 kPa per 0.3048 meter) of casing string length or 1,500 psi (10 342.12 kPa), whichever is greater, for at least 30 minutes with less than a 5% pressure loss.</p> <p>(2) The pressure test must not exceed 70% of the minimum internal yield and if the pressure declines more than 5% or if there are other indications of a leak, corrective action must be taken before conducting further drilling and hydraulic fracturing operations.</p> <p>(3) A holder must contact the designated agency at least 2 days prior to conducting a pressure test to enable an authorized person to be present when the test is done.</p> <p>(4) A record of the pressure test must be maintained by a holder and submitted to the designated agency prior to conducting hydraulic fracturing operations.</p> <p>(5) The actual pressure must not exceed the test pressure at any time during hydraulic fracturing operations.</p> <p>(6) Any hydraulic fracturing string used in the operations must be either strung into a production liner or run with a packer set at least 30 meters below the deepest cement top and must be tested to not less than the maximum anticipated treating pressure minus the annulus pressure applied between the fracturing string and the production or immediate casing.</p>	<p>Regs 19(1) and 19(7): Pressure will fluctuate depending on environmental conditions, including seasonal variations. In order to produce a valid and objective result, the pressure test must be conducted at least over a period of one year and across each season.</p> <p>Reg 19(4): There is no provision of the time, prior to the hydraulic fracturing operation, at which this data is to be submitted, nor for the approval of the hydraulic fracturing operations contingent on the results of the test data.</p> <p>Reg 19(5): This is unenforceable without any provision for the monitoring of the pressure or repercussions should the pressure exceed the test pressure.</p>

Proposed Regulations	CER Comments (not in bold)
<p>(7) The pressure test shall be considered successful if the pressure applied has been held for at least 30 minutes with no more than 5% pressure loss.</p> <p>(8) The annulus between the hydraulic fracturing string and casing must be pressurized to at least 250 psi (1723.69 kPa) and monitored.</p>	
<p>20. Formation Pressure Integrity Test</p> <p>(1) A holder must, after a successful casing string test contemplated in regulation 19, conduct a formation pressure integrity test below the surface casing and below all intermediate casing.</p> <p>(2) A holder must notify the designated agency at least 2 days prior to conducting a formation pressure integrity test to enable an authorised person to be present when the test is done.</p> <p>(3) A record of the pressure test must be maintained by the holder and submitted to the designated agency prior to conducting hydraulic fracturing operations.</p> <p>(4) The actual hydraulic fracturing treatment pressure must not exceed the test pressure at any time during hydraulic fracturing operations.</p>	<p>Reg 20(3): There is no provision of the time, prior to the hydraulic fracturing operation, at which this data is to be submitted, nor for the approval of the hydraulic fracturing operations contingent on the results of the test data.</p> <p>Reg 20(4): This is unenforceable without any provision for the monitoring of the pressure or repercussions should the pressure exceed the test pressure.</p>
<p>21. Blowout Prevention</p> <p>(1) A holder must install blowout prevention equipment that meets the current API Std 53 for blowout equipment after setting casing to shutoff a wellhead which must be supported and secured to prevent stresses on all connections.</p> <p>(2) Blowout prevention equipment installed at wells that will be subject to hydraulic fracturing must include a remote blowout prevention actuator-</p>	<p>General: Emergency response plans must be formulated and approved as part of the environmental impact assessment so as to guard against the risk of blowout, or of rapid and uncontrolled change of underground pressure, that can cause spills or fluid releases underground. Appropriate blowout procedures must be followed with any incidents reported promptly. Emergency response plans must be clearly linked to the likely significance of impacts and risks with appropriate indicators and monitoring. These plans must provide assurance “beyond a reasonable doubt” that planned</p>

Proposed Regulations	CER Comments (not in bold)
<p>(a) that is powered by a source other than rig hydraulics;</p> <p>(b) located at least 20 meters from the well head; and</p> <p>(c) that has an appropriate rated pressure equal to or greater than the induced hydraulic fracture pressure.</p> <p>(3) All lines, valves and fittings between the blowout preventer and the remote actuator must be flame resistant and have a working pressure rating higher than the maximum anticipated well heads surface pressure.</p> <p>(4) Blowout prevention equipment must be in good working condition at all times.</p> <p>(5) When blowout prevention equipment is installed, tested, or in use, a competent person as contemplated in regulation 25 must be present at the well site and that person must have a current well control certification from an accredited training program that is acceptable to the designated agency.</p> <p>(6) The certification referred to in sub-regulation 5 must be available at the well site and provided to the designated agency upon request.</p>	<p>measures in the event of accidents, emergencies and pollution will adequately remedy hazards to health and wellbeing in a timeous manner. The plans must provide for adequate capacity for implementation and monitoring and must detail how underground fluid releases are to be tracked, measured and safely resolved.</p> <p>A blowout can cause resource depletion (of potable water etc.) As part of the environmental impact assessment, the holder must prepare an early warning monitoring system in the event of depletion or pollution of specified resources beyond specified levels. The public must be made aware of warning signs so as to be able to implement any precautionary measures.</p> <p>Reg 21(4): This provision has little effect absent the definition of “good working condition”.</p> <p>Regs 21(5) and (6): We commend the specifications of the qualification of the competent person. In light of the novel nature of natural gas activities, in particular fracking, in South Africa, there must be some identification of the accredited training programmes and provision that other training programmes may be listed by the Minister from time to time in the government gazette.</p>

Proposed Regulations	CER Comments (not in bold)
<p>22. Pressure Testing of the Blowout Prevention Equipment</p> <p>(1) The blowout prevention equipment must be tested to 100% of rated working pressure and the annular-type blowout preventer must be tested to 1,000 psi (6894.76 kPa) at the time of installation in accordance with current API std 53 for blowout equipment.</p> <p>(2) Testing of blowout prevention equipment for any drilling or completion operation must take place prior to drilling below the last cemented casing seat and a record of the pressure tests must be maintained by a holder and submitted to the designated agency.</p> <p>(3) A holder must notify the designated agency at least 2 days prior to conducting a blowout integrity test to enable an authorised person to be present when the test is done.</p> <p>(4) Blowout prevention equipment that has failed any pressure test must not be used until it is repaired and passes the pressure test.</p>	<p>Reg 22(2): There is no provision of the time, prior to drilling, at which this data is to be submitted, or for the approval of the drilling operations contingent on the results of the test data.</p> <p>Reg 22(4): This is unenforceable without any provision for the monitoring of the pressure or repercussions should the pressure exceed the test pressure.</p> <p>See the comment in paragraphs 23 and 24 above regarding the use of API standards as the sole point of reference for international best practice.</p>
<p>23. Well Examination</p> <p>(1) A holder must include in their well examination scheme the following aspects of well design and operations, including abandonment and hydraulic fracturing operations-</p> <p>(a) groundwater and aquifer isolation;</p> <p>(b) fracture containment;</p> <p>(c) related seismicity risks;</p> <p>(d) fracturing and flow-back/testing programmes and operations ; and</p> <p>(e) Independent well examination.</p>	<p>The well examination scheme is an integral component of ensuring responsible natural gas exploration undertaken in accordance with the principles of sustainable development under preventive and precautionary approaches. The formulation of reg 23(1) is vague and unenforceable. The details of the well examination scheme must be specific and include provision for monitoring and the repercussions of non-compliance. In particular the scheme must include the examination of water quality and quantity and the tracking and tracing of underground flows in the surrounding areas.</p>

Proposed Regulations	CER Comments (not in bold)
<p>(2) The designated agency may, at the cost of the holder, appoint an independent and competent person to undertake well examination.</p>	<p>It is unclear when the well examination scheme is to be submitted- the scheme must form part of the environmental impact assessment and must be undertaken to specified standards prior to each stage of the natural gas activity, failing which the holder should not be allowed to proceed.</p> <p>An independent and competent person <u>must</u> be appointed to undertake well examination - this should not be left to the discretion of the designated agency. We have referred above and in the CER Minimum Requirements to the formulation of a specialised, inter-departmental unit to appoint independent person in accordance with NEMA read with the EIA Regulations 2010.</p>
<p>CHAPTER 4</p>	
<p>OPERATIONS AND MANAGEMENT</p>	
<p>General: This chapter infringes the constitutionally protected rights to access to information and just administrative action in that it does not provide for public access to the nature, handling or destination of drilling fluids, hydraulic fracturing fluids, flowback, water resources or waste. As outlined at sections B.2.b and B.5.a and B.5.b. of the CER Minimum Requirements, transparency is essential for effective and impartial monitoring and enforcement and to instil public confidence. Due to the basic constitutional rights associated with access to water, and the significant potential for fracking to infringe these rights, stakeholder engagement with regard to water (and other) resources is essential. A stakeholder management plan setting out such stakeholder engagement should form part of preliminary and strategic environmental impact assessments.</p> <p>Although companies are often reluctant to disclose the identity and types of chemicals used in hydraulic fracturing and drilling fluids for commercial reasons, these commercial concerns are outweighed by the risk of the violation of fundamental constitutional rights presented by the application of such chemicals. In the United States of America there is a move toward state- level regulations requiring wide public disclosure of the types and volumes of chemicals used, over and above the federal requirements that operators disclose certain hazardous substances, including fracking fluid, to officials and those responsible for emergency services. Information can be displayed on a public disclosure registry along the lines of the US based website, FracFocus (http://fracfocus.org) which is the product of nationally recognised organisations working with state governments and industry stakeholders to provide public transparency. Requiring the disclosure of fracking fluid chemicals should incentivise innovation of environmentally friendly alternatives. As the exact chemical mixture of the hydraulic fracturing and drilling fluids change depending on the depth, geology, and other characteristics of a given well, individual disclosure of the components of fluids used for each well is necessary. The requisite disclosure of chemicals should be linked to the environmental and social/health impacts associated with</p>	

Proposed Regulations	CER Comments (not in bold)
<p>these substances instead of the purpose for which the substance is used- disclosure requirements could for example extend to chemicals within the fuel used to generate electricity on the site.</p> <p>The chapter sets arbitrary parameters for groundwater protection in terms of distances pollutants could migrate. These parameters are simplistically expressed in distances with no scientific evidence to back them up. An appropriate minimum depth limitation prevents fracking above a certain depth and is based on local geology and the risk of communication with fresh water aquifers. In the Karoo such a limitation must account for the complex hydrogeology, including dolerite and other intrusions and fault lines, as well as the prior experience of groundwater travelling long distances. In this context, the limitations of the proposed regulations are insufficient.</p> <p>All operations must at least comply with the relevant regulations under NEMA, NEMWA, the MPRDA and the NWA including the Water Use for Mining Regulations and the Landfill Regulations.</p> <p>The chapter provides insufficient detail, in particular regarding the storage, transportation and management of the natural gas collected from the well.</p> <p>Section B.5.e of the CER Minimum Requirements sets out the basic standards for responsible water use, storage, treatment and disposal whilst section B.5.g of the CER Minimum Requirements pertains to standards for eliminating venting and minimising flaring and other emissions.</p>	
<p>24. Management of Operations</p> <p>A holder must appoint competent persons to be responsible for day to day management of the operations in accordance with relevant legislation.</p>	<p>As detailed above, the MPRDA makes little provision for natural gas operations. As such it is difficult to ascertain the nature of the competent person or guidance offered by the “relevant legislation”.</p>
<p>25. Drilling Fluids</p> <p>A holder must ensure that drilling operations through shallow soils and local aquifers are always undertaken using water or water-based mud systems the details of which must be declared to the designated agency prior to commencement of drilling operations.</p>	<p>The nature of a “water-based mud system”. As set out above, particularly in light of the potential for drilling to significantly pollute and undermine the integrity of local aquifers, there must be public access to information regarding drilling fluids. There is no provision for: the monitoring of drilling fluids; the time, prior to drilling, at which this data is to be submitted; or for the approval of the drilling operations contingent on the nature of the drilling fluids in the context of the operations.</p>

Proposed Regulations	CER Comments (not in bold)
<p>26. Management of Hydraulic Fracturing General</p> <p>A holder must not commence with hydraulic fracturing operations before obtaining all the necessary authorizations and permits for any activities associated with hydraulic fracturing which include but are not limited to a water use licence in terms of the National Water Act 1998 (Act No 36 of 1998) and must submit the following to the designated agency and the Department of Water Affairs-</p> <p>(a) a plan for the handling, storage, transportation, and disposal or reuse of hydraulic fracturing fluids and hydraulic fracturing flowback ;</p> <p>(b) waste management plan which must address the following-</p> <p>i. type of waste to be generated by a specific operation to be performed;</p> <p>ii. the proposed methods and locations of waste treatment, reuse, recovery or disposal; and</p> <p>iii. waste management requirements in terms of National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) and water use requirements in terms of the National Water Act, 1998 (Act No. 36 of 1998)</p> <p>(c) a well engineering design which must include but is not limited to the following-</p> <p>i. type of rig to be used;</p> <p>ii. method of drilling;</p> <p>iii. type and estimated amount of drilling fluids;</p> <p>iv. different stages of drilling and the size of drill bits;</p> <p>v. casing programme;</p> <p>vi. cementation programme; and</p> <p>vii. perforation design.</p> <p>(d) A hydraulic fracturing programme and procedures that must include-</p> <p>i. pre-fracturing simulation and modelling;</p> <p>ii. the proposed depth(s) to the top and the bottom of the formation into which well</p>	<p>We commend the recognition of necessary authorisations and permits under other legislation and the explicit prevention of hydraulic fracturing operation prior to obtaining such authorisations and permits. However, we point out that it is because various aspects of fracking fall within the ambit of a number of legislative frameworks that we have suggested, in the CER Minimum Requirements, that: (1) the environmental effects of fracking are promulgated under the MPRDA, NEMA, NEMWA, the NWA and NEMAQA; (2) the promulgation of fracking specific regulations is delayed until the commencement of the environmental management of mining activity under NEMA. Furthermore, such authorisations should be obtained prior to the award of the respective licences concerning the fracking activity.</p> <p>As specified above, it is essential that there is public access to information and stakeholder on an informed basis prior to the finalisation and approval of the hydraulic fracturing programme and procedures.</p> <p>A waste management plan must incorporate the requirements of the Water Use for Mining Regulations in terms of which no water or waste storage facilities may be located within the 1:100 year flood-line, within a horizontal distance of 100 metres from a water resource (excluding holes drilled specifically to monitor the pollution of groundwater), on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked. Clean and dirty areas must be separated, clean stormwater must be diverted away from any dirty area and no water from any dirty area allowed to spill into any clean area. Any facilities used for the storage of contaminated water or produced water must be able to capture a 1:50 year flood event and have a freeboard of at least 0.8 metre above full supply level. Additionally, waste management facilities must have the appropriate waste management licences under NEMWA and water use licences under the NWA.</p>

Proposed Regulations	CER Comments (not in bold)
<p>fracturing fluids are to be injected;</p> <ul style="list-style-type: none"> iii. authorised source and volume of water to be used iv. re-use and disposal of flowback; v. fracturing fluid compositions, concentrations and estimated total volume to be used; vi. anticipated surface and downhole treating pressure range; vii. maximum injection treating pressure; viii. annuli and offset well pressure monitoring programme to be performed; ix. testing and flowback plan; x. equipment rig up and testing, including testing of all high pressure equipment; xi. a design of the fracture geometry including fracturing target zones, sealing mechanisms and aquifers; xii. monitoring of pressure on the production string and well annuli during rig up and testing; and xiii. monitoring of any adjacent or offset wells for pressure on the production string and other well annuli as required. 	<p>Although unclear from reg 26, reg 35(1) provides that fracking may only proceed after the designated agency has approved the plans and requirements under reg 26. The programme and procedures must be submitted at a preliminary stage as a condition to the award of the licence. All requirements to be included in the programme and procedures must be detailed, including (but not limited) to the nature, timing and extent of the monitoring to be conducted.</p>

Proposed Regulations	CER Comments (not in bold)
<p>27. Hydraulic Fracturing Equipment</p> <p>(1) Equipment used in hydraulic fracturing operations must be fit for purpose and must meet relevant API standards as prescribed in these Regulations.</p> <p>(2) Water transfer systems must be designed to site-specific conditions and must be tested and monitored in accordance with a schedule approved by the designated agency.</p>	<p>See the comment in paragraphs 23 and 24 above regarding the use of API standards as the sole point of reference for international best practice.</p> <p>This is one of the few provisions in the proposed regulations that caters for or refers to “site-specific conditions” (the others being regs 6(2), 44(4) and (5) and 46(1)). The basic standards for site selection are covered in section B.5.c of the CER Minimum Requirements. In accordance with the CER Minimum Requirements, due consideration of appropriate site-selection elements, together with a comparative evaluation of feasible alternatives, can avoid or mitigate later problems. Site selection must account for the location of water resources and for the minimum distances to be retained from such resources as specified in Regulation 4 of the Water Use for Mining Regulations.</p> <p>Reg 27(2) is particularly vague and unenforceable in that it fails to specify the nature of the tests, monitoring or schedule required, or whether the approval of the schedule affects the award or operation of the licence.</p>
<p>28. Mechanical Integrity Tests and Monitoring</p> <p>(1) Before the commencement of hydraulic fracturing operations, all mechanical integrity tests required under these Regulations must be successfully completed.</p> <p>(2) Prior to commencing with hydraulic fracturing operations, the injection lines and manifold, associated valves, fracture head or tree and any other wellhead component or connection not previously tested must be tested with fresh water, mud, or brine to at least the maximum anticipated treatment pressure for at least 30 minutes with less than a 5% pressure loss.</p> <p>(3) A holder must notify the designated agency at least 2 days before commencing with</p>	<p>In accordance with the general commentary section above, these provisions undermine the constitutional protection of the rights to access to information and just administrative action. Due to the potentially catastrophic environmental effects of fracking, the public should be entitled to be present at the testing contemplated in reg 28(2) upon at least 5 days notice to ensure proper notification. Records of the pressure test and monitoring, as contemplated in regs 28(4) and 28(10), should be publicly available. The public must be notified when operations are suspended and when any consequent remedial action is taken (in accordance with regs 28(11), (12) and (13)) so as to ensure they can take all timeous precautionary and preventive measures to minimise environmental risk.</p>

Proposed Regulations	CER Comments (not in bold)
<p>tests contemplated in sub-regulation (2) to enable an authorized person to be present during testing operations.</p> <p>(4) A record of the pressure test must be maintained by a holder and made available to the designated agency.</p> <p>(5) The pressure exerted on treating equipment including valves, lines, manifolds, hydraulic fracturing head or tree, casing and hydraulic fracturing string, if used, must not exceed 95% of the working pressure rating of the weakest component.</p> <p>(6) A function-tested relief valve and diversion line must be installed and used to divert flow from the hydraulic fracturing string-casing annulus to a covered watertight steel tank in case of hydraulic fracturing string failure.</p> <p>(7) The relief valve must be set to limit the annular pressure to no more than 95% of the working pressure rating of the casings forming the annulus.</p> <p>(8) The hydraulic fracturing treatment pressure must not exceed the test pressure of any given component at any time during hydraulic fracturing operations.</p> <p>(9) During hydraulic fracturing operations, annulus pressure, injection pressure and the rate of injection must be continuously monitored and recorded.</p> <p>(10) The records of the monitoring must be maintained by a holder and must be provided to the designated agency at any time during the period up to and including 5 years after the well is permanently plugged or abandoned.</p> <p>(11) Hydraulic fracturing operations must be immediately suspended if any anomalous pressure or flow condition or any other anticipated pressure or flow condition is occurring in a way that indicates mechanical integrity of the well has been compromised and continued</p>	<p>Reg 28(2): Pressure will fluctuate depending on environmental conditions, including seasonal variations. In order to produce a valid and objective result, the pressure test must be conducted at least over a period of one year and across each season.</p> <p>Reg 28(9): Must specify the nature and extent of the monitoring and recordings to ensure enforceable obligations. This information should be publicly available upon request.</p> <p>Reg 28(10): The reference to well “abandonment” as opposed to closure is again concerning. It is further concerning that monitoring records are to be maintained only up to 5 years following well closure. This limited requirement avoids the “cradle to grave” and “polluter pays” principles in terms of which polluters are responsible even for latent and residual environmental impacts occurring many years after the issuing of a well closure certificate. In terms of section 43(6) of the MPRDA, following the issuing of a mine closure certificate, the Minister may retain any portion of the financial provision (as provided by the holder for potential environmental damage) for “latent and or residual environmental impact which may become known in the future”. As such the records of monitoring must be retained by the holder for a significant period, if not indefinitely.</p>

Proposed Regulations	CER Comments (not in bold)
<p>operations pose risk to the environment.</p> <p>(12) A holder must notify the designated agency and the Department of Water Affairs within 1 hour of suspending hydraulic fracturing operations as a result of any matters relating to the mechanical integrity of the well or risk to the environment.</p> <p>(13) Remedial action must be undertaken immediately and the designated agency must be satisfied with such remedial actions prior to issuing a written consent for the recommencement of operations.</p>	
<p>29. Hydraulic Fracturing Fluid Disclosure</p> <p>(1) A holder must, as part of the impact assessment, submit the following information to the designated agency-</p> <p>(a) fluids and their status as hazardous/non-hazardous substances;</p> <p>(b) material safety data sheet information;</p> <p>(c) volumes of fracturing fluid, including proppant, base carrier fluid and each chemical additive;</p> <p>(d) the trade name of each additive and its general purpose in the fracturing process;</p> <p>(e) each chemical intentionally added to the base fluid, including for each chemical, the Chemical Abstracts Service number, if applicable; and the actual concentration, in percent by mass;</p> <p>(f) possible risk of the above on the environment and water resources; and</p> <p>(g) remediation required if a pollution incident were to occur.</p>	<p>We commend the disclosure of the constituents of hydraulic fracturing fluid to the “designated agency”. However, in accordance with the public disclosure requirements detailed above and in the CER Minimum Requirements, this information must also be publicly available. This submission must be part of the environmental impact assessment required prior to the issuing of the relevant licence for fracking activity (it is unclear whether this is intended by the reference to “as part of the impact assessment”). Included in the assessment of the possible risk on environment and water resources (reg 29(1)(f)) must be an investigation into whether such potential harm may be irreparable. This is particularly important in light of the persistent nature of many of the proposed chemicals, and their associated impacts on human and planetary health.</p>
<p>30. Fracture and Fracturing Fluid Containment</p>	<p>This provision is vague and unenforceable: the content required for the control and mitigation measures (reg 30(1)) is not specified; there are no</p>

Proposed Regulations	CER Comments (not in bold)
<p>(1) A holder must conduct a risk assessment that describes the control and mitigation measures for fracture containment and submit the risk assessment report to the designated agency.</p> <p>(2) Performance standards must be documented to characterize the basis for the sealing mechanism and to demonstrate that adequate control measures will be implemented.</p> <p>(3) Faults and igneous intrusions that might impact the hydraulic fracturing seal mechanism must be researched and the assessment documented and referenced in the Hydraulic Fracturing Programme to demonstrate that fracturing fluids cannot migrate via faults and intrusions beyond the designated fracture zone(s).</p> <p>(4) Hydraulic fracturing operations must be monitored and recorded against the Hydraulic Fracturing Programme design performance standards as contemplated in regulation 26(d) to ensure that wellbore integrity during hydraulic fracturing operation is maintained.</p> <p>(5) Hydraulic fracturing fluid must be confined to the targeted zone and if the monitoring system indicates that hydraulic fracturing fluid or hydraulic fracturing flowback are migrating into the freshwater zone or to the surface from the well in question or from other wells, the holder must immediately notify the designated agency and suspend hydraulic fracturing operations until remedial action that prevents the fluid migration is completed.</p> <p>(6) A holder must obtain the approval of the designated agency prior to resuming hydraulic fracturing operations suspended as contemplated in sub- regulation (5).</p>	<p>baseline performance standards (reg 30(2)); the extent to and manner in which intrusions are to be researched and documented (reg 30(3)) is not specified; and the manner in which the operations are to be monitored and recorded (reg 30(4)) is not specified.</p> <p>This provision must be in accordance with the Water Use for Mining Regulations and the Landfill Regulations, in particular that no mining related activities may take place within the 1:50 year floodline or within a horizontal distance of 100m from a water resource. Following regulation 12 of the Water Use for Mining Regulations, the Minister of Water Affairs may, following consultation with the DMR and the DEA, arrange for a technical investigation or inspection in order to prevent pollution or damage to a water resource connected with or incidental to the mining related activity.</p> <p>As detailed above this information must be publicly available. The public must be notified when operations are suspended and when any consequent remedial action is taken (in accordance with regs 30(5) and (6)) so as to ensure they can take all timeous precautionary and preventive measures to minimise environmental risk. We assume that any remedial action is to be undertaken immediately in accordance with reg 28(13).</p> <p>The requirements of reg 30(3) presumably overlap with those of reg 6 in relation to an assessment of related seismicity. This cross-reference should be specific in reg 30(3) so as to avoid confusion. More-over, the provisions of reg 30(3) and reg 6(5) contradict: whereas reg 30(3) provides that it must be demonstrated that “fracturing fluids cannot migrate via faults and intrusions beyond the designated fracture zone(s)”, reg 6(5) undermines this requirement in its provision that fracturing fluids must be prevented from entering stressed faults “where practicable” (see comment in relation to reg 6(5) above).</p>

Proposed Regulations	CER Comments (not in bold)
	<p>The provision does not specify any sanctions in the event of non-compliance. The migration of hydraulic fracturing fluid or hydraulic fracturing flowback, if it does occur, must be a serious offence attracting significant sanctions due to the extreme and often irreparable associated environmental harm. The submission of a risk assessment, performance standards, monitoring and recording measures must be part of the environmental impact assessment and a condition to the award of the licence.</p> <p>The definition of “hydraulic fracturing flowback”, following the reference in re 30(5), must be amended so as to extend to fluids that do not return to the surface after fracking operations. Failing amendment of the definition, re30(5) will not regulate flowback that migrates into the freshwater zone below the surface.</p>
<p>31. Fracturing Fluids Management</p> <p>(1) A holder must minimize environmental, safety and health risks associated with fracturing fluids and additives, assess potential risks and develop a risk management plan for each well to be fractured addressing the following aspects-</p> <p>(a) identification of chemical ingredients and characteristics of each additive; (b) identification of volume and concentration of the substances in the fracturing fluid; (c) assessment of potential environmental and health risks of fracturing fluids and additives; and (d) definition of operational practices and controls for the identified risk.</p> <p>(2) A risk management plan as contemplated in sub-regulation (1) must be submitted to the designated agency before commencing with hydraulic fracturing operations.</p>	<p>In accordance with the CER Minimum Requirements, the holder and competent authority must adopt preventive and precautionary approaches when assessing these risks. The risk management plan must be submitted with the environmental impact assessment as a condition for the award of the licence. As above, the aspects of the risk management plan must be publicly disclosed.</p> <p>The promotion of environmentally friendly alternative at reg 31(3) is commended. However, such promotion has little effect failing the creation of sanctioned offences and incentives.</p>

Proposed Regulations	CER Comments (not in bold)
<p>(3) A holder must-</p> <p>(a) maximize the use of environmentally friendly additives and minimize the amount and number of additives; and</p> <p>(b) train and develop relevant employees on appropriate procedures in handling hydraulic fracturing chemicals.</p>	
<p>32. Management of Flowback and Produced Fluids</p> <p>A holder must disclose to the designated agency the following information regarding management and handling of flowback or produced fluids-</p> <p>(a) estimated and actual volume of fluids to be recovered during flow- back;</p> <p>(b) the expected rates, pressures and temperatures of fluids recovered and produced;</p> <p>(c) water compositional analysis;</p> <p>(d) any identified contamination issues;</p> <p>(e) any radioactive contaminated fluids;</p> <p>(f) proposed methods of handling recovered fluids, including but not limited to tank requirements, pipeline requirements, flaring, flow-back and storage periods, recycling and re-usage for other activities;</p> <p>(g) proposed disposal methods of the recovered fluids up to the end location; and</p> <p>(h) proposed volume of flow-back fluids to be recycled and re-used.</p>	<p>“Flowback” should be referenced as “hydraulic fracturing flowback” according to the definition in the proposed regulations.</p> <p>As above the required information must be publicly disclosed.</p> <p>The proposed disposal methods up to and including the end location (reg 32(g)) must be specified. Proper and controlled re-cycling or re-use of the hydraulic fracturing flowback and produced fluids must be required. Where this is not possible the competent authority should only allow fracking in defined circumstances.</p> <p>The timing of the required disclosure is unclear. The information should be provided as part of the environmental impact assessment as a condition for the award of a licence, with updated information submitted at specified stages including prior to each developmental stage of the natural gas operations.</p> <p>As specified above and in the CER Minimum Requirements, base line measurements are necessary for proper environmental assessment of key indicators such as water compositional analysis. The baselines must be collated over a two to five year period in advance of new drilling activity to ensure accuracy and must account for seasonal variations.</p>

Proposed Regulations	CER Comments (not in bold)
<p>33. Transportation of Fluids</p> <p>(1) A holder must ensure-</p> <p>(a) planning to minimize fluid transport movements and distances;</p> <p>(b) implementation of management procedures to address the risks associated with fluid transport;</p> <p>(c) natural gas is removed from fluids prior to fluids being transported and a system for checking and recording is implemented;</p> <p>(d) fluids are transported to and from the hydraulic fracturing treatment site in accordance with relevant legislation and national standards in a manner designed to prevent spillage; and</p> <p>(e) general workforce, including drivers, receive appropriate training and are equipped to respond to emergencies and to implement clean up measures.</p> <p>(2) Transportation of hazardous fluids or materials must be carried out in accordance with applicable South African National Standards and relevant legislation.</p> <p>(3) A quarterly report on the transportation of hydraulic fracturing fluids, produced water and hydraulic fracturing flowback must be submitted to the designated agency and the report must include-</p> <p>(a) the amount of fluids transported;</p> <p>(b) identification of the company that transported the fluids; and</p> <p>(c) the destination of the fluids.</p>	<p>We commend the extension of the regulatory scope to transportation of fluids as an ancillary activity associated with fracking. However, the regulations relating to ancillary activities must extend to all ancillary activities under the relevant laws (including the cumulative impacts on roads, traffic, local communities and their long-term sustainability) and must be enforceable (the provision that the holder “must ensure” in reg 33(1) is vague and affects no enforceable obligations whilst failure to submit a report in terms of reg 33(3) has no repercussions).</p> <p>In addition, the requirements of this provision are vague and impractical: the nature of the planning and management procedures in reg 33(1)(a) and (b) are not specified; the manner in which natural gas is to be removed from the fluids, a crucial component of the operations with potentially severe environmental consequences, is not detailed at all (reg 33(1)(c)); and there is no regulation of the hydraulic fracturing treatment facilities (re 33(1)(d)). Because of the novel nature of fracking, and the natural gas industry, in South Africa there is no “relevant legislation” that specifically addresses the transportation of fluids of this nature and volume.</p> <p>The “quarterly report” required under reg 33(3) must include a compositional analysis of the fluids transported (in accordance with reg 34(9)); the manner in which the natural gas is removed from these fluids ; and the manner in which these fluids are handled at the treatment site.</p>
<p>34. Fluids Storage</p> <p>(1) Areas where any additives, chemicals, oils, fuels are to be stored must have sufficient containment capacity to hold the volume of the largest container stored on site +110% to allow for precipitation, unless the container is equipped with individual secondary containment.</p>	<p>Fracking necessitates the use of extensive fluid volumes. Plans for fluid storage must form part of the environmental assessment procedure. Stakeholder engagement in such plans is vital, particularly because of the impact on the owner and/or occupants of the affected land.</p> <p>The provisions for fluids storage do not provide sufficient detail- the only</p>

Proposed Regulations	CER Comments (not in bold)
<p>(2) For the purposes of storage at the well site, hydraulic fracturing additives, hydraulic fracturing fluids, hydraulic fracturing flowback, and produced water must be stored in above-ground tanks during all phases of drilling, hydraulic fracturing and production operations until removed for proper disposal.</p> <p>(3) For the purposes of centralized storage off site for potential reuse prior to disposal, hydraulic fracturing additives, hydraulic fracturing fluids, hydraulic fracturing flowback, and produced water must be stored in above-ground tanks with bund walls.</p> <p>(4) The use of a reserve pit is only allowed for the temporary storage of hydraulic fracturing flowback and must be used only in the event of a lack of capacity of tank storage due to higher than expected volume or rate of hydraulic fracturing flowback, or other unanticipated flowback occurrence.</p> <p>(5) Any reserve pit must comply with the following construction standards and liner specifications-</p> <p>(a) the synthetic liner material must have a minimum thickness of 24 millimetres with high puncture and tear strength and be impervious and resistant to deterioration;</p> <p>(b) the pit lining system must be designed to have a capacity of at least equivalent to 110% of the maximum volume of hydraulic fracturing flowback anticipated to be recovered;</p> <p>(c) the lined pit must be constructed, installed, and maintained in accordance with the manufacturers' specifications and good engineering practices to prevent overflow during any use;</p> <p>(d) the liner must have sufficient elongation to cover the bottom and interior sides of the pit with the edges secured with at least a 30 centimetres deep anchor trench around the pit perimeter to prevent any slippage or destruction of the liner materials; and</p> <p>(e) the foundation for the liner must be free of rock and constructed with soil having a minimum thickness of 30 centimetres after compaction covering the entire bottom and interior sides of the pit.</p>	<p>regulation of the storage of chemicals, oils and fuels (as opposed to the waste and by-products of fracking) is in relation to the size of the tanks at reg 34(1).</p> <p>Other important details are lacking in that: the control of fugitive VOC emissions from tanks and reserve pits is not addressed; there is no requirement of bund walls for on-site tanks and reserve pits; reg 34(6) provides no management measures in the event that removal of the fluids within this time period is environmentally unsound; there is no provision for the proper base-line measurement of radioactivity or the required treatment should unacceptable radiation levels be detected at reg 34(10); the manner in which “flow-back fluid” is to be stored on site is not detailed at all (reg 34(12); and neither the manner of supervision and monitoring nor the eventual fate of such fluids is specified.</p> <p>The Water Use for Mining Regulations specifically provide for the capacity requirements for clean and dirty water systems and the protection of water resources in relation such systems, as do the Landfill Regulations with regard to the infrastructure requirements for hazardous lagoons (such as those for the storage of fluids). Under the Water Use for Mining Regulations (regulation 6(d)), a dirty water system must be designed and constructed so that it is not likely to spill into a clean water system more than once in 50 years- measures to be undertaken for fracking activity must be even more precautionary in light of the unknown and potentially pervasive risk associated with the contamination of the Karoo’s restricted water resources.</p> <p>Again, these provisions do not provide for enforceable obligations- there is little point in prohibiting discharge into surface water or a water drainage way (at reg 34(11) unless non-compliance is a sanctioned offence.</p>

Proposed Regulations	CER Comments (not in bold)
<p>(6) Hydraulic fracturing fluids and hydraulic fracturing flowback must be removed from the well site within 60 days after the completion of hydraulic fracturing operations, except for any excess hydraulic fracturing flowback captured for temporary storage in a reserve pit which must be removed from the well site within 7 days.</p> <p>(7) Tanks, piping, and conveyances, including valves of sufficient pressure rating, must be constructed and be able to resist corrosion and be maintained in a leak-free condition.</p> <p>(8) Fluids transfer operations from tanks to tanker trucks must be supervised at both ends and along interconnecting piping.</p> <p>(9) Hydraulic fracturing flowback must be tested for volatile organic chemicals, semi-volatile organic chemicals, inorganic chemicals, heavy metals, and naturally occurring radioactive material prior to removal from the site and the results must be submitted to the waste transportation and disposal operators and the designated agency.</p> <p>(10) The ground adjacent to the storage tanks and any hydraulic fracturing flowback reserve pit must be measured for radioactivity prior to site restoration.</p> <p>(11) Discharge of hydraulic fracturing fluids, hydraulic fracturing flowback, and produced water into any surface water or water drainage way is prohibited.</p> <p>(12) A holder must make use of tanks to store and treat flow-back fluids on site.</p> <p>(13) Storage tanks must comply with applicable corrosion control requirements in accordance with applicable South African National Standards.</p> <p>(14) Storage site locations must be secured at all times.</p>	

Proposed Regulations	CER Comments (not in bold)
<p>(15) The following information must be submitted to the designated agency-</p> <p>(a) tank maintenance records; and</p> <p>(b) tank cleaning records and off-take waste disposal records.</p>	
<p>35. Hydraulic Fracturing Operations</p> <p>(1) A holder may only proceed with hydraulic fracturing operations after the designated agency has approved the plans and well engineering design contemplated in regulation 26 and all other requirements prescribed by these Regulations have been fully satisfied.</p> <p>(2) A holder must notify the designated agency in writing at least 5 days prior to the commencement of hydraulic fracturing operations.</p> <p>(3) During all phases of hydraulic fracturing operations, a holder must-</p> <p>(a) comply with all terms and conditions of the exploration and production right; as well as any other authorisations ;</p> <p>(b) conduct operations in a manner that does not pose risk to public health, life, property and the environment;</p>	<p>As this provision cross refers to reg 26, many of the comments in relation to reg 26 apply.</p> <p>Again this provision creates no sanctioned offence in the event of non-compliance and does not provide for public notification of the commencement of hydraulic fracturing operations notwithstanding the fundamental rights that may be affected by such commencement.</p> <p>The provision is insufficiently detailed in that: necessary emergency measures are not specified (reg 35(3)(c)); reg 35(3)(d) provides no requirements for independence and competency (as recommended above, we suggest that an independent expert panel is appointed by the specialised, inter-departmental unit under section 24I of NEMA read with the EIA Regulations 2010); reg 35(3)(e) makes no provision for the nature of</p>

Proposed Regulations	CER Comments (not in bold)
<p>(c) ensure that arrangements to deal with emergencies are in place and are disclosed to the designated agency;</p> <p>(d) ensure that audits by independent and competent persons are made available to the designated agency;</p> <p>(e) ensure that a sufficient number of people who are adequately trained and experienced to operate fracturing/flow-back/testing equipment, emergency shut-down systems and any spill containment equipment are available; and</p> <p>(f) ensure that systems acceptable to the designated agency are in place to monitor the extent of the induced fracture network.</p> <p>(4) A holder must ensure that risk assessments to eliminate or reduce the risks from dangerous substances being released and their impact on the environment is carried out, recorded and the necessary control and mitigation measures are implemented.</p>	<p>training or any guidelines as to what a “sufficient” number of people entails; there is no specification of what monitoring systems for fractures will be acceptable to the designated agency (reg 35(3)(f)) or of the nature and extent of the control measures and the necessary controls and mitigations required under reg 35(4)).</p>
<p>36. Post Hydraulic Fracturing Report</p> <p>A holder must compile and submit to the designated agency for review and recommendations a detailed post hydraulic fracturing operation report, including but not limited to-</p> <p>(a) location of a well, position in co-ordinates and well number;</p> <p>(b) actual total volume of fluids used;</p> <p>(c) actual surface and downhole treating pressure range;</p> <p>(d) maximum injection treating pressure;</p> <p>(e) the actual or calculated fracture geometry;</p> <p>(f) annuli and offset well pressure monitoring results;</p> <p>(g) confirmation that wellbore integrity was maintained throughout the operation;</p> <p>(h) testing and flow-back results;</p> <p>(i) any operational variations to the pre-job design;</p> <p>(j) any data and information concerning any related seismic events, in internationally accepted formats, that have been recorded including any steps taken as a result of such events;</p> <p>(k) plans to continue micro-seismic monitoring; and</p>	<p>The submission of a detailed post hydraulic fracturing operation report is commended. This report must be understood in light of the “cradle to grave” and precautionary approaches whereby the holder may be liable for latent and residual environmental impacts, which manifest many years after the operations. As such, assessments of wellbore integrity should continue by holder for a significant period of at least 50 years following the hydraulic fracturing operations.</p> <p>Further detail is required in that <i>inter alia</i>: reg 36(j) does not specify what “internationally accepted formats” entail (specific examples should be provided); and reg 36(k) does not detail the nature of the plans required for continued micro-seismic monitoring.</p> <p>Again this provision creates no sanctioned offence in the event of non-compliance</p>

Proposed Regulations	CER Comments (not in bold)
<p>(I) induced seismic events that have been recorded including any steps taken as a result of such events.</p>	
<p>Management of Water</p>	
<p>37. Water Balances</p> <p>(1) A holder in control of any operations must compile a water balance that-</p> <p>(a) is based on data collected from installed flow measurement devices to measure the amount of water abstracted, received, consumed, transported and/or discharged as required in order to ensure that the flow of at least 90% of the total water in use is measured, with the remaining 10% or less being calculated;</p> <p>(b) incorporates accurate values determined from suitable measurement or modelling for rainfall, runoff, seepage and evaporation from all facilities where these components of the water balance may potentially come into play;</p> <p>(c) accounts for seasonal changes for all flow values affected by rainfall and/or evaporation;</p> <p>(d) is computerised in order that it can be updated at least monthly with measured and modelled data;</p> <p>(e) accounts for and reflects all possible interconnections between the operations and the surface and ground water resource and how these will be avoided, mitigated;</p> <p>(f) is used by the operations to generate water management reports to assist in the management of the impact of the operations on the water resource; and</p> <p>(g) is submitted to the authorities on a bi-annual basis together with the monitoring data, unless stipulated otherwise in a water use licence.</p> <p>(2) A holder in control of any operations must ensure that all measuring devices used to develop the water balance are easily accessible, property maintained and in good working order based on a verifiable programme of checking, calibration, and/or renewal of measuring devices.</p>	<p>The compilation of a water balance is commended as well as the project based approach reflected in reg 37(1)(e). In accordance with the CER Minimum Requirements, the requirements for this balance need to be extended so as to ensure the proper collation of baseline measures accounting for seasonal variations (in accordance with reg 37(1)(c)).</p> <p>Reg 37(1)(e) is concerning in that it allows for possible connections between the operations and surface and ground water resources (although wording appears to have been omitted, it appears to require that where such connections cannot be avoided they are mitigated). This is unacceptable in light of the severe and irreparable environmental harm that can result from such connections- if connections cannot be avoided an exploration right must not be granted.</p> <p>As above, we are concerned that these requirements are not enforceable- the water balance must be a condition for the award of the relevant licence. The details of the water balance need to be publicly accessible so as to ensure the constitutional protection of the rights of access to sufficient food and water, access to information, and just administrative action.</p> <p>The requirement in reg 37(2) that a programme is “verifiable” is vague and requires further detail for any effect.</p>
<p>38. Protection of Water Resources</p>	<p>The wording “take into cognizance” in reg 38(1) emphasises the failure of</p>

Proposed Regulations	CER Comments (not in bold)
<p>(1) A holder must take into cognizance the following, prior to and during all phases of hydraulic fracturing operations-</p> <p>(a) the operation must not pollute a water resource or reduce such a resource and where such an incident occurs, a holder must implement the necessary remedial measures;</p> <p>(b) the operation must not cause adverse impact to water quality in the water catchment area; and</p> <p>(c) designated and existing uses of water resources are protected and maintained.</p> <p>(2) No well site where hydraulic fracturing operations are proposed, planned, or occurring may be located-</p> <p>(a) within 1 kilometre measured horizontally from the surface location of any existing water well or developed water resource; and</p> <p>(b) within 1 kilometre measured horizontally from the centre of a perennial stream or within 1:100 year flood-line.</p> <p>(3) The edge of the disturbed site associated with a well must maintain a setback of 500 metres from the edge of any water resource or the 1:100 year flood line.</p> <p>(4) No well must be drilled within 1 kilometre of any wetland and the edge of the disturbed area of any well site must maintain a 500 metres setback from the boundary of the wetland.</p>	<p>these provisions to be enforceable.</p> <p>Reg 38(1): The holder must account for whether there is enough water or other potential water resources to support ecologically, socially and economically viable fracking and associated activities. Any evaluation must account for the maintenance of the water “reserve” (as required under the NWA) which entails the water quantity and quality required to: (1) satisfy basic human needs, both now and in the reasonable future; and (2) protect aquatic ecosystems so that ecologically sustainable development and use of the relevant water resource is secured.</p> <p>Reg 38(1)(a): where the operation might irreparably harm resources this must be strictly prohibited.</p> <p>As in the general commentary section above, restrictions on the location of the well site (regs 38(2), (3) and (4)) are arbitrary with no scientific substantiation. Appropriate limitations must be based on local geology and the risk of communication with fresh water aquifers. In the Karoo such a limitation must account for the complex hydrogeology, including dolerite and other intrusions and fault lines, as well as the prior experience of groundwater travelling long distances.</p> <p>These details need to be publicly accessible so as to ensure the constitutional protection of the rights of access to sufficient food and water, access to information, and just administrative action.</p>
<p>39. Storm Water Management and Control</p> <p>(1) A holder must implement measures to manage and control storm water runoff in order to prevent transportation of contaminants to water resources.</p>	<p>So as to be enforceable non-compliance must be a sanctioned offence and the “measures” in reg 39(1) need to be detailed.</p> <p>Reg 39(2): supports the need for the account of seasonal variations when taking baseline measurements.</p>

Proposed Regulations	CER Comments (not in bold)
<p>(2) Construction design must consider natural drainage patterns in order to eliminate possible transportation of contaminants to the water resources.</p>	
<p>40. Water Use</p> <p>(1) A holder must prepare an integrated water and waste management plan for approval with the following components-</p> <ul style="list-style-type: none"> (a) flowcharts and data derived from a dynamic, computerised water balance; (b) pollution prevention and impact minimisation plan; (c) stormwater management plan; (d) water conservation and demand management strategy; (e) post closure water management; and (f) water monitoring and reporting. <p>(2) A holder must, prior to commencement of hydraulic fracturing, obtain the necessary authorisation(s) for the water uses as required indicating the supply source and location for the base fluid for each stage of the operation and the water usage volume.</p> <p>(3) A holder must consider re-using hydraulic fracturing fluids and produced water to reduce competing with freshwater uses.</p>	<p>Reg 40(1): to be enforceable non-compliance must be a sanctioned offence and the management strategies and monitoring and reporting requirements detailed.</p> <p>Reg 40(2): compliance should be conditional to the award of the relevant licence and not merely the commencement of activities.</p> <p>Reg 40(3): Proper and controlled re-cycling or re-use of the hydraulic fracturing flowback and produced fluids must be required. Where this is not possible the competent authority should only allow fracking in defined circumstances.</p>
Management of Waste	
<p>41. Fluids Disposal</p> <p>(1) Fluids that are no longer required must always be disposed of at an approved waste disposal facility in accordance with relevant legislation and disposal to underground is not permitted.</p>	<p>Again enforceability is an issue.</p> <p>Due to the novel nature of fracking, requirements, existing legislation does not cater sufficiently for waste treatment and ultimate disposal of this nature (preferably to a standard that allows return to the environment and</p>

Proposed Regulations	CER Comments (not in bold)
<p>(2) The holder must maintain the following records-</p> <p>(a) volume of waste water fluids produced during hydraulic fracturing operations; and</p> <p>(b) name of contractor, disposal sites, disposal methods, and mandatory disposal certificates.</p>	<p>the water cycle)- “relevant legislation” such as NEMWA and NEMA must be addressed to cater for these requirements before the Minister makes any decisions regarding the award of licences.</p>
<p>42. Waste Management</p> <p>(1) A holder must adhere to the waste management plan contemplated in regulation 26(b) and any relevant legislation when managing waste generated from its operations.</p> <p>(2) Waste containing naturally occurring radioactive materials must be managed in accordance with National Radioactive Waste Disposal Act, 2008 (Act No. 53 of 2008).</p> <p>(3) Drill cuttings and waste mud must be temporarily stored in above ground tanks or pits as prescribed under regulation 34.</p> <p>(4) All waste generated during operations must be disposed at a licensed landfill site and annular disposal of drill cuttings or fluids is prohibited.</p> <p>(5) A holder must keep track of all waste stream generated, treated, recovered, reused, disposed of and submit a quarterly record to the designated agency.</p>	<p>Again enforceability is an issue.</p> <p>Following the cross-reference to reg 26(b), many of the comments in relation to that provision apply.</p> <p>Again, because of the novel nature of fracking, requirements, although these requirements must, for example, accord with the Landfill Regulations under NEMWA and the Water Use for Mining Regulations under the NWA, existing legislation does not cater specifically for waste disposal of this nature- regulations under NEMWA (and possibly NEMA) must be addressed to cater for these requirements before the Minister makes any decisions regarding the award of licences.</p> <p>These details need to be publicly accessible so as to ensure the constitutional protection of the rights of access to sufficient food and water, access to information and just administrative action.</p>
<p>Management of Pollution Incidents</p>	
<p>43. Management of Spillage</p> <p>(1) Any spillage of hydraulic fracturing fluids or hydraulic fracturing flowback in excess of 50 litres must be reported to the designated agency within 24 hours of occurrence.</p>	<p>Again, enforceability of this provision is an issue.</p> <p>In accordance with section B.5.f of the CER Minimum Requirements, stringent procedures, properly trained personnel and readily available spill</p>

Proposed Regulations	CER Comments (not in bold)
<p>(3) Any spillage of hydraulic fracturing fluids, hydraulic fracturing additives, or hydraulic fracturing flowback, used or generated during or after hydraulic fracturing operations must be cleaned up immediately.</p>	<p>equipment are essential to prevent and contain spills that do occur. Appropriate emergency plans, assessed as a component of the environmental impact assessment, are necessary to ensure the proper management of spillage.</p> <p>The obligation to report spillage must be associated, not only with the quantity spilled, but also with the nature of the harm or potential harm caused. For example, if even 5 ml of a dioxin is spilt, the associated harm can be extensive.</p> <p>In accordance with section B.5.b.vi of the CER Minimum Requirements, when spills and other damages occur this should be immediately and fully disclosed, not only to the appropriate regulators under the DEA and DMR, but also to the public. Public disclosure facilitates damage limitation and promotes public good faith. Information of incidents or damages associated with the applicant on other sites (whether locally or internationally) must also be made available to the regulators as part of the application process. This enables regulators to assess the historical performance of applicants and assess the substance behind promises for future performance</p>
<p>Management of Air Quality</p>	
<p>44. Fugitive Emissions (1) A holder must minimise the emissions associated with venting of hydrocarbon fluids and natural gas during hydraulic fracturing operations by- (a) routing the recovered fluids into storage vessels; and- i. routing the recovered gas into a gas gathering line, collection system, or to a generator for onsite energy generation subject to section 20 of the Act; or ii. using another method other than venting.</p>	<p>Again enforceability is a basic issue with this provision.</p> <p>The CER Minimum Requirements outline specifications for emissions under section B.5.g.</p> <p>It is not acceptable that, where it is “technically infeasible” to “minimise” fugitive emissions by methods including storage, these emissions must be flared. Because of the significantly detrimental environmental risks of</p>

Proposed Regulations	CER Comments (not in bold)
<p>(b) employing sand traps, surge vessels, separators and tanks as soon as practicable during cleanout operations to safely maximise resource recovery and minimise releases to the environment.</p> <p>(2) If a holder establishes that it is technically infeasible to minimise emissions associated with the venting of hydrocarbon fluids and natural gas during hydraulic fracturing operations using the methods specified in sub-regulation (1), the designated agency must require the holder to capture and direct any natural gas produced during the hydraulic fracturing operations phase to a flare, except in conditions that may result in fire hazards or explosion.</p> <p>(3) Any flare used as contemplated in sub-regulation (2), must be equipped with a reliable continuous ignition source over the duration of hydraulic fracturing operations and a holder must maintain and operate the flare in accordance with manufacturer's specifications.</p> <p>(4) In order to establish technical infeasibility as contemplated in sub-regulation (2), a holder must demonstrate, for each well site on an annual basis, that taking the actions listed in sub-regulation (1) are not feasible based on a site-specific analysis.</p> <p>(5) A holder that uses a flare during hydraulic fracturing operations, other than emergency conditions must file an updated site-specific analysis annually with the designated agency.</p> <p>(6) The analysis contemplated in sub-regulation (4) must have details about whether any changes have occurred that alter the technical infeasibility of a holder to reduce their emissions in accordance with sub-regulation (1).</p> <p>(7) A holder must record and report to the designated agency on a quarterly basis the amount of gas flared or vented from each hydraulic fracturing well.</p>	<p>flaring, there must be specific restrictions on flaring and venting, a specific standard to give content to the relative measure implied by the word “minimise” (in the event that avoidance is not possible), and specific requirements to install equipment that minimises emissions. This is even more so because of the potential infringement of the health and safety of workers on site that may result from such flaring. The provision that a holder may use “another method other than venting” (reg 44(1)(a)(ii) is open ended, implies a lack of control, and allows for the introduction of non-sustainable methods. “Green completions”, which separate flowback water from natural gas without gas flaring is industry best practice. These are widely accepted in the USA and are both economically and environmentally beneficial in that they enable the recovery and marketing of gas produced during the completion stage of the well.</p> <p>Regs 44(4) and (5) specify that “technical infeasibility” is established on the basis of a “site-specific analysis”. However, the factors accounted for in such an analysis are not detailed.</p> <p>The regulation of “fugitive emissions” must extend beyond the production stage to emissions resulting from associated activities such as those involved in transportation and distribution. There is no such regulation in the proposed regulations- reg 33 being insufficient in this regard. There must be strict controls requiring the capture of methane (or other VOC’s) and of air pollutants in general. Pollution from vehicles and equipment may be controlled by existing environmental and fuel efficiency standards but fracking-specific regulations must account for the scale of use necessitated by the wells.</p>

Proposed Regulations	CER Comments (not in bold)
<p>45. Fugitive Dust</p> <p>(1) A holder must employ practices for control of fugitive dust during hydraulic fracturing operations which must include, but are not limited to-</p> <p>(a) the use of speed restrictions; (b) regular road maintenance; and (c) restriction of construction activity during high-wind days.</p> <p>(2) Additional management practices such as road surfacing, wind breaks and barriers or automation of wells to reduce truck traffic may also be required by the relevant Department if technologically feasible to minimize fugitive dust emissions.</p>	<p>Again enforceability is a basic issue with this provision.</p> <p>The provision is vague. Before any decision is made in respect of the award of licences for fracking, it must be ensured that there are appropriate measures to address environmental concerns relating to ancillary activities associated with fracking including dust pollution. These provisions are likely to include measures for adequate road construction, surfacing and traffic regulations (to prevent noise, dust and general disturbance) as well as the rehabilitation of the impacts associated with such infrastructure following well closure.</p>
<p>46. Noise Control</p> <p>(1) Site selection for drilling and hydraulic fracturing operations, including identification of traffic routes, must consider the potential effect of noise pollution on the surrounding environment including sensitive receptors.</p> <p>(2) Necessary abatement measures must be considered as part of the planning process for hydraulic fracturing operations.</p> <p>(3) Adherence to local by-laws concerning noise control and limits is mandatory.</p>	<p>The comments in relation to reg 45 apply. Due to the scale of activity associated with fracking it is unlikely that existing by-laws adequately address the noise implications. The “(n)ecessary abatement measures” must form part of the environmental impact assessment prior to the award of the relevant licence.</p> <p>We commend the reference to site-selection measures. Site selection must be in accordance the principles outlined in B.5.c of the CER Minimum Requirements and must occur at a preliminary stage, prior to the award of the relevant licence.</p>
CHAPTER 5	
WELL SUSPENSION AND ABANDONMENT	
<p>47. Well Suspension A holder may only suspend a well-</p>	<p>Well suspension is a significant step and information in this regard must be made publicly available so that stakeholders are able to take any necessary</p>

Proposed Regulations	CER Comments (not in bold)
<p>(a) after obtaining the approval of the designated agency; and (b) for a period determined by the designated agency.</p>	<p>preventive or precautionary measures. Enforceability is again a basic issue.</p>
<p>48. Suspended Well Integrity Management</p> <p>(1) A holder must ensure that management standards and procedures are in place for monitoring all wells that are in suspension phase following drilling and hydraulic fracturing operations prior to development phase, including the status of the equipment and any annulus pressure.</p> <p>(2) Procedures must take account of the specific circumstances of the well and must include the reporting criteria for any anomaly and a risk assessment of such anomaly.</p>	<p>Enforceability is again a basic issue.</p> <p>The provision is vague- details are required in respect of management standards and procedures. Additionally, it is unclear what stage in the project is described as “following drilling and hydraulic fracturing operations” but prior to “development phase”.</p> <p>It must be clarified that suspension is a temporary measure and does not amount to well closure.</p>
<p>49. Well Abandonment/Closure</p> <p>(1) A well that is no longer active, suspended or producing must be plugged and abandoned in accordance with an abandonment plan approved by the designated agency.</p> <p>(2) The abandonment plan must take into account the following factors-</p> <p>(a) final condition and design of the well; (b) height of cement in annulus outside casing; (c) any permeable formations outside casing that must be covered by cement; (d) cementing casing overlaps; (e) the need for abandonment plugs to cover the full diameter of the hole; (f) type of fluid in annuli above cement; (g) difficulties of injecting cement into the annulus; (h) future monitoring of the integrity of the well plug; (i) the depth below surface at which casing must be cut; and</p>	<p>The lack of enforceability and vague nature of this provision is concerning.</p> <p>It is important the wells are not understood as “abandoned” but rather “closed”- in accordance with the “polluter pays” and cradle to grave” principles it must be possible to hold a holder liable for environmental impacts following well closure. The environmental implications of mines, post-closure, including latent and residual impacts, can be significantly detrimental. An example of this is acid mine drainage. It is important that requirements for well closure (referred to as the “abandonment plan”) are detailed and assessed prior to the award of the relevant licence.</p> <p>Requirements for mine closure are provided under MPRDA, although the interaction of these provisions with NEMA (following 7 December 2014) and the amendments proposed by the MPRDA Bill confuse the application of these provisions. Included in the requirements for closure must be the holder’s financial provision for any post-closure rehabilitation. The basic</p>

Proposed Regulations	CER Comments (not in bold)
<p>0) related seismic activity risks.</p> <p>(3) Any abandoned well must be clear of all obstructions and equipment and cemented for the full length and diameter of the wellbore to surface.</p>	<p>principles of the financial provision are at section B.5.i of the CER Minimum Requirements.</p> <p>To ensure proper well rehabilitation, there should be a reference to a specific state to which all sites should be rehabilitated at the environmental impact assessment stage. Ideally this state should be final, total and return the land in a given area to some degree of its former state with accompanying restored social and natural functions. There must be clear guidelines on the requirements for rehabilitation at a project level, particularly given the extensive nature of the road and pipeline infrastructure associated with unconventional shale gas mining.</p>