DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT

NO. 2273 **11 July 2022**

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998
(ACT NO. 107 OF 1998)

PROPOSED REGULATIONS PERTAINING TO THE EXPLORATION AND PRODUCTION OF ONSHORE OIL AND GAS REQUIRING HYDRAULIC FRACTURING

I, Barbara Dallas Creecy Minister of Forestry, Fisheries and the Environment, hereby consult on the intention to make regulations pertaining to the exploration and production of onshore oil and gas requiring hydraulic fracturing under sections 44(1)(a) and (1)(aA), read with sections 24(5)(b)(x) and 24(5)(h) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) in the Schedule hereto.

Members of the public are invited to submit written comments or input, within 45 days after the publication of this notice in the *Gazette*, to any of the following addresses:

By post to: Department of Forestry, Fisheries and the Environment
The Director-General
Attention: Dr Dee Fischer
Private Bag X447
PRETORIA
0001

By hand at: Reception, Environment House, 473 Steve Biko Road, Arcadia, Pretoria.

By e-mail: dfischer@dffe.gov.za

Any inquiries in connection with the notice can be directed to Dr Dee Fischer at dfischer@dffe.gov.za or (012)399 8843.

Comments or input received after the closing date may not be considered.

BARBARA DALLAS CREECY
MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT

SCHEDULE

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CHAPTER 1

DEFINITIONS, PURPOSE AND APPLICATION OF THESE REGULATIONS

Definitions

1. In these Regulations, any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned, and unless the context indicates otherwise—

"API standard" means the relevant American Petroleum Institute Standards;

"applicant" means a person who applies for an exploration right or a production right in terms of the Mineral and Petroleum Resources Development Act, 2002 which intends to utilise hydraulic fracturing technology;

"base line monitoring" means the monitoring of key indicators to establish reference conditions of the potentially affected environment prior to hydraulic fracturing to form the basis for determining a change over time;

"base line monitoring plan" means the plan identified in regulation 7(1)(b);

"care and maintenance" means a condition where a production well is taken out of service temporarily with the intention to reuse the well at a later date, but the well is managed to ensure it remains in a safe and stable condition and all legislative requirements are adhered to;

"closure certificate" means the certificate contemplated in section 43 of the Mineral and Petroleum Resources Development Act, 2002;

"decision making authorities" means the authorities responsible for considering applications for rights, permits, authorisations, approvals, consents and licences contemplated in regulation 6(h);

"decommissioning" means the planned shutdown of an exploration or production well with the plugging of wells, removal of well equipment, production tanks and associated installations, site rehabilitation and monitoring and where relevant the final decommissioning and closure of the exploration or production operation;

"designated agency" means the agency designated in terms of section 70 of the Mineral and Petroleum Resources Act, 2002 namely the Petroleum Agency South Africa;

"environmental authorisation" means the authorisation by a competent authority for a listed activity or specified activity required in terms of section 24 of the National Environmental Management Act, 1998 (Act No. 107 of 1998);

Environmental Impact Assessment Regulations" means the regulations published in terms of sections 24(5) and 44 of the Act;

"exploration right" means a right contemplated in section 80 of the Mineral and Petroleum Resources Development Act, 2002 and for which no closure certificate has been issued;

"flow back" means hydraulic fracturing fluid and other fluids that return to the surface after hydraulic fracturing has been completed and prior to the well being placed into production;

"Financial Provisioning Regulations" means the regulations pertaining to the rehabilitation and remediation of environmental damage caused by reconnaissance, prospecting, exploration, mining or production operations, promulgated under sections 44(1)(aE), (aF), (aG), (aH) read with sections 24(5)(b)(ix), 24(5)(d), 24N, 24P and 24R of the National Environmental Management Act, 1998 (Act No. 107 of 1998);

"heritage resources permit" means a permit issued in terms of section 48 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999);

"holder" means a person who holds an exploration or production right issued in terms of the Mineral and Petroleum Resources Development Act, 2002;

"hydraulic fracturing" means a well stimulation technique in which rock is fractured by a pressurized liquid or gas, which process involves the high-pressure injection of fracturing fluids or gas into a wellbore to create microfractures or fractures in the deep-rock formations through which natural gas, petroleum and brine will flow more freely;

"Karoo Central Astronomy Advantage Area" means the area declared in terms of the Astronomy Geographic Advantage Act; 2007 (Act No. 21 of 2007) published under Government Notice No. 198 in Government *Gazette* No. 37434 of 12 March 2014;

"latent environmental impacts" means impacts which are existing and defined, but not yet developed and will manifest post-closure;

"liquid waste" means water that has been contaminated with waste products from the hydraulic fracturing operation that can pass through a 0.45-micron filter at a pressure differential of 0,5MPa;

"Mineral and Petroleum Resources Development Act, 2002" means the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002);

"minimum information requirements" means the:

- minimum information requirements for the submission of applications for an authorisation, right, permit or licence for the onshore exploration of oil and gas intending to utilise hydraulic fracturing; and
- minimum information requirements for the submission of applications for an authorisation, right, permit or licence for the onshore exploration of oil and gas utilising hydraulic fracturing;

"Minister" means the Minister responsible for mineral resources;

"municipal wellfield" means a groundwater resource used by water services institutions to provide water supply services as defined in the Water Services Act, 1997 (Act No. 108 of 1997) and includes future potential identified water resources;

"National Water Act, 1998" means the National Water Act, 1998 (Act No. 36 of 1998);

"national web based environmental screening tool" means the online spatial application contemplated in the Environmental Impact Assessment Regulations available at https://screening.environment.gov.za/screeningtool;

"petroleum" has the meaning assigned to it in the Mineral and Petroleum Resources Development Act, 2002;

"process water" means all water related to exploration and production, including flow back, produced water and contaminated storm-water;

"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;

"production right" means a right contemplated in section 84 of the Mineral and Petroleum Resources Development Act, 2002 and for which no closure certificate has been issued;

"production well" means a well drilled for the purpose of producing petroleum;

"SANAS" means the South African National Accreditation System;

"spring" means a point where subsurface water emerges at surface, usually as a result of topographical, lithological or structural controls;

"stimulation" means artificial means such as hydraulic fracturing, re-fracturing, gasification, depressurisation, acidising, oxidising or other techniques, in an effort to increase the flow of oil and gas from a well;

"the Act" means the National Environmental Management Act, 1998 (Act No. 107 of 1998);

"waste" has the meaning assigned to it in the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and includes flow back, fluids, and process water as well as well drilling waste;

"watercourse" has the meaning assigned to it in the National Water Act, 1998;

"water use license" means a water use licence issued in terms of section 40 of the National Water Act, 1998 for the exploration or production of onshore oil or gas requiring hydraulic fracturing;

"well" means a drilled hole used for the purpose of exploration or production of petroleum resources; and

"well engineer" means an engineer in the field of mining or mechanical engineering involved in either the design, construction or maintenance of exploration or production wells, with a minimum of five years experience in the field/discipline in question, who has the appropriate accreditation from the relevant institution.

Purpose of these Regulations

2. The purpose of these Regulations is to—

(a) identify and prohibit certain activities related to the exercising of an exploration or production right for onshore oil and gas requiring hydraulic fracturing;
(b) identify geographical areas in which it is prohibited to exercise an exploration or production right for onshore oil and gas requiring hydraulic fracturing;
(c) set general and specific requirements, practises and standards for the identification, assessment, avoidance and management of environmental impacts associated with all phases of exploration and production of onshore oil and gas requiring hydraulic fracturing;

(d) provide for the preparation and implementation of base line monitoring prior to the commencement of hydraulic fracturing;
(e) set general and specific requirements for ongoing environmental monitoring of hydraulic fracturing and production operations; and
(f) give effect to the coordination between decision making authorities of—

(i) requirements for base line monitoring, environmental assessments, public participation and environmental monitoring for the heritage resources permit, water use licence, environmental authorisation, and exploration or production right, through minimum information requirements;
(ii) timeframes for the submission of applications for permits, licences, rights and authorisations contemplated in paragraph (i);
(iii) timeframes for the consideration of the applications contemplated in paragraph (i);
(iv) the decision making process related to applications contemplated in paragraph (i); and
(v) conditions of approval.

Application of these Regulations

3. These Regulations apply throughout the Republic of South Africa to all exploration and production operations of onshore oil and gas intending to or utilising hydraulic fracturing.

CHAPTER 2

PROHIBITIONS

Prohibited Activities

4. The following activities when undertaken in terms of an exploration or production right for onshore oil and gas intending to or utilising hydraulic fracturing are prohibited:

(a) The use of potable water for any purpose in the hydraulic fracturing operation other than for drinking or domestic use and the preparation of the slurry for cement mixtures on which tests will be conducted;
(b) Discharge of process water without re-use and recycling at iterations as approved in the environmental authorisation contemplated in regulation 6(h)(iv);
(c) Discharge or disposal of hydraulic fracturing fluids, process water or any other component of process water–

(i) into a surface watercourse;
(ii) to a government water treatment works; or
(iii) to underground, including the use of re-injection disposal wells;

(d) The disposal of sludge to landfill with a water content of >40% or that liberates moisture under pressure in landfill conditions and which has not been stabilised by treatment;
(e) The storage of process water for reuse or disposal in pits or pollution control dams;
(f) The storage of drill cuttings, sludge and waste other than in above ground tanks or leakproof skips;

(g) The care and maintenance of exploration wells beyond eighteen months after pressure testing has ceased;
(h) The use of monitoring boreholes for abstraction; and
(i) The abandonment of wells without decommissioning.

Prohibited areas

5. Hydraulic fracturing is prohibited within–

(a) heritage sites declared in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999);
(b) protected areas contemplated in section 9(a), (b), (c) and (d) of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003);
(c) the Karoo Central Astronomy Advantage Area;
(d) two kilometres of any government waterworks, including dams with a safety risk;
(e) two kilometres from the edge of an existing or proposed municipal wellfield, including its aquifer, water supply borehole and groundwater supply infrastructure;
(f) two kilometres from the edge of any strategic water source area as identified on the national web based environmental screening tool; and
(g) two kilometres from the edge of a thermal or cold spring, including seismically active springs.

CHAPTER 3

EXPLORATION OR PRODUCTION FOR ONSHORE OIL AND GAS

Environmental obligation of an applicant for or holder of an exploration or production right

6. Every applicant for or holder of an exploration or production right has an obligation to—

(a) identify, assess, avoid, mitigate, manage and monitor all possible environmental impacts that may arise from exercising an exploration or production right for onshore oil and gas anticipating or requiring hydraulic fracturing, to ensure that potential environmental impacts are avoided, where possible, or mitigated to ensure sustainability;
(b) determine the pre-hydraulic fracturing base line conditions through the preparation of a base line monitoring plan for approval by the competent authority submitted as part of the application for environmental authorisation;
(c) through assessment, determine the possible changes to the pre-hydraulic fracturing conditions and the severity of the changes, identify mitigation measures and report on the acceptability of the changes in the documentation submitted as part of the application for environmental authorisation;
(d) during the execution of the exploration or production right for onshore oil and gas anticipating or requiring hydraulic fracturing, monitor any changes to environmental attributes and determine and report on the associated risk through ongoing monitoring and reporting;
(e) ensure that all materials used and procedures adhere to international best practises and standards;

(f) decommission all exploration and production wells, rehabilitate the area used for exploration and production, monitor the continued integrity of the decommissioning and rehabilitation and report on the findings through auditing procedures;
(g) provide funding for the decommissioning, rehabilitation and closure of the exploration and production operations as prescribed in the Financial Provisioning Regulations;
(h) be in possession of the following relevant rights, permits, authorisations, approvals, consents and licences prior to the exercising of an exploration or production right:

(i) an exploration right issued in terms of the Mineral and Petroleum Resources Development Act, 2002;
(ii) a production right issued in terms of the Mineral and Petroleum Resources Development Act, 2002;
(iii) a heritage permit issued in terms of section 48 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999);
(iv) an environmental authorisation issued in terms of section 24 of the National Environmental Management Act, 1998 (Act No. 107 of 1998);
(v) a licence issued in terms of section 40 of the National Water Act, 1998;
(vi) approval from the Minister of the plans and the determination of financial provision as contemplated in the Financial Provisioning Regulations; and
(vii) the relevant municipal zoning consents; and

(i) meet the design, construction and testing standards identified in regulations 9, 10, 11 and 12 and Appendix 1.

Submission of applications and implementation of monitoring plans

7. (1) On acceptance of an application for an exploration right in terms of section 79 of the Mineral and Petroleum Resources Development Act, 2002, the applicant must submit to the relevant decision making authorities simultaneously—

(a) the applications contemplated in regulation 6(h)(iii), (iv) and (v);
(b) a consolidated environmental impact assessment report, an environmental management programme and an overall base line monitoring plan which comply with the *Minimum Information Requirements for the Submission of Applications for an Authorisation, Right, Permit or Licence for the Onshore Exploration of Oil and Gas Intending to Utilise Hydraulic Fracturing*; and
(c) the relevant plans, reports, templates and spreadsheets comtemplated in the Financial Provisioning Regulations.

(2) On commencement of the exploration operation contemplated in subregulation (1), the holder must commence with the implementation of the base line monitoring plan and continue the required monitoring for a period of no less than 24 months.

(3) Throughout the 24 months of base line monitoring contemplated in subregulation (2), the holder of the exploration right must provide the monitoring results in the form of a base line monitoring report, which complies with the monitoring requirements of the *Minimum Information Requirements for the Submission of Applications for an Authorisation, Right, Permit or Licence for the Onshore Exploration of Oil and Gas Intending to Utilise Hydraulic Fracturing* to the relevant decision making authorities at intervals as identified in the standard conditions contemplated in Appendix 3.

(4) On acknowledgment of an application for an environmental authorisation for hydraulic fracturing contemplated in activity 20A of the Environmental Impact Assessment Regulations Listing Notice 2 of 2014, the applicant must submit to the relevant decision making authorities simultaneously—

(a) the applications contemplated in regulation 6(h)(iii) and (v);
(b) a consolidated environmental impact assessment report considering the information from the base line monitoring report contemplated in subregulation (3);
(c) the environmental management programme, an operational environmental monitoring plan and waste management plan which complies with the *Minimum Information Requirements for the Submission of Applications for an Authorisation, Right, Permit or Licence for the Onshore Exploration and Production of Oil and Gas Utilising Hydraulic Fracturing*;
(d) an emergency and spill contingency plan; and
(e) the relevant templates, spreadsheets, plans and reports contemplated in the Financial Provisioning Regulations.

(5) On commencement of the hydraulic fracturing operation contemplated in subregulation (4), the holder must commence with the implementation of the operational environmental monitoring plan, the waste management plan contemplated in subregulation (4)(c) and the emergency and spill contingency plan contemplated in subregulation (4)(d).

(6) Throughout the hydraulic fracturing operation, the holder of the exploration right must provide operational environmental monitoring reports which comply with the monitoring requirements of the *Minimum Information Requirements for the Submission of Applications for an Authorisation, Right, Permit or Licence for the Onshore Exploration and Production of Oil and Gas Utilising Hydraulic Fracturing* to the relevant authorising authorities at intervals as identified in the standard authorising conditions contemplated in Appendix 3.

(7) On acceptance of the application for a production right in terms of section 83 of the Mineral and Petroleum Resources Development Act, 2002, the applicant must, submit to the relevant authorities simultaneously—

(a) the applications contemplated in regulation 6(h)(iii), (iv) and (v);
(b) a consolidated environmental impact assessment report which complies with the *Minimum Information Requirements for the Submission of Applications for an Authorisation, Right, Permit or Licence for the Onshore Exploration and Production of Oil and Gas Utilising Hydraulic Fracturing* considering the information from the base line monitoring report contemplated in subregulation (3) and the operational monitoring reports contemplated in subregulation (6);
(c) the environmental management programme, an operational environmental monitoring plan and waste management plan which complies with the *Minimum Information Requirements for the Submission of Applications for an Authorisation, Right, Permit or Licence for the Onshore Exploration and Production of Oil and Gas Utilising Hydraulic Fracturing*;
(d) an emergency and spill emergency plan; and
(e) the relevant templates, spreadsheets, plans and reports contemplated in the Financial Provisioning Regulations.

(8) On commencement of the exploration and production operation contemplated in this regulation the holder must commence with the implementation of the operational environmental monitoring plan, the

waste management plan contemplated in subregulation (7)(c) and the emergency and spill contingency plan contemplated in subregulation 7(d).

(9) Throughout the exploration or production operation, the holder of the exploration or production right must provide the monitoring results in the form of operational monitoring reports which comply with the monitoring requirements of the *Minimum Information Requirements for the Submission of Applications for an Authorisation, Right, Permit or Licence for the Onshore Exploration and Production of Oil and Gas Utilising Hydraulic Fracturing* to the relevant authorising authorities at intervals as identified in the standard authorising conditions contemplated in Appendix 3.

CHAPTER 4

HYDRAULIC FRACTURING FOR ONSHORE OIL AND GAS

Responsibility of the applicant or holder to meet standards

8. (1) An applicant or holder of an exploration or production right for onshore oil and gas intending to utilise hydraulic fracturing technology must meet the design, construction and testing standards identified in regulations 9, 10, 11, 12 and Appendix 1.

(2) Should the applicant or holder wish to deviate from a standard requirement identified in subregulation (1), the applicant or holder must submit for approval—

(a) a detailed design and explanation of the proposed alternative;
(b) a comparative technical assessment of the proposed alternative to that contemplated in Appendix 1; and
(c) an indication how the proposed alternative will provide a higher level of safety and environmental protection compared with those contemplated in Appendix 1.

(3) Should the applicant wish to deviate from the standard as contemplated in subregulation (1), the explanation and design contemplated in subregulation (2) must be submitted as part of the documentation required in regulation 7(4) and 7(7).

(4) Any deviation, motivation or comparative assessment contemplated in subregulation (2) must be prepared by a well engineer.

(5) Should a holder wish to deviate from the standard as contemplated in subregulation (1) after an environmental authorisation has been issued, an amendment of such environmental authorisation must be applied for in terms of Part 1 of Chapter 5 of the Environmental Impact Assessment Regulations, which application must include the explanation and design contemplated in subregulation (2) and which amendment must be approved prior to it being implemented.

Well design and construction

9. (1) All wells must be—

(a) designed by a certified well engineer and the certification of the well engineer must be displayed in the site office of the exploration or production operation; and

(b) designed, constructed and tested as contemplated in the standard for well design and construction contained in Appendix 1.

(2) The final well design, meeting the requirements of subregulation (1), must be included with the documents required as part of regulation 7(4) and (7).

(3) Centralisers must be designed and constructed in accordance with the standard contemplated in Appendix 1.

Cement requirements and compression tests

10. Standards contemplated in Appendix 1 apply to-

(a) all cement used in the operation; and
(b) compression tests.

Casing string tests

11. Casing string tests must be undertaken according to the standard as contemplated in Appendix 1.

Blowout prevention

12. (1) Blowout prevention equipment, which meet the standard as contemplated in Appendix 1, must be installed.

(2) An exemption from the need to install blowout prevention equipment as contemplated in subregulation (1) may be motivated if the applicant can demonstrate that—

(a) conditions under which the holder is operating does not require the installation of blow out prevention equipment as contemplated in subregulation (1); and
(b) the well control equipment to be installed to control kicks, prevent blowouts and ensure the safety of the well operations is sufficient not to require blowout prevention.

(3) Should a holder wish to be exempted from the need to install blowout prevention equipment as contemplated in subregulation (1) after the environmental authorisation has been issued, an amendment of such environmental authorisation must be applied for in terms of Part 1 of Chapter 5 of the Environmental Impact Assessment Regulations, which application must include the motivation as contemplated in subregulation (2) and which amendment must be approved before the exemption will be valid.

(4) When blowout prevention equipment is installed, tested, or in use, a well engineer must be present at the well site.

(5) Testing of blowout prevention equipment for a drilling or completion operation must take place prior to drilling below the last cemented casing seat.

(6) The holder must maintain a record of the pressure tests which contains the number and location of the well tested, the date of testing and the results signed off by the well engineer.

Well examination

13. (1) The results of the well examination tests must at all times demonstrate that the pressure boundary of the well is controlled throughout the life cycle of the well.

(2) A well file must be kept on site by the holder which identifies the—

a) coordinates of the well;
b) number of the well;
c) design of the well; and
d) pressure test results.

A holder's responsibility to gain the approval of designated agency

14. (1) Test data showing competency of a proposed cement mixture that meets the requirements of the current AI "API RP 10 B-2 Recommended Practises for Testing Well cements" must be submitted to the designated agency for approval 2 days prior to the commencement of the cementing operation.

(2) Prior to casting any well casings, the holder in collaboration with specialist contractors, must submit for approval a programme for cement placement operations.

(3) Prior to any hydraulic fracturing commencing, the holder is required to submit for approval by the designated agency-

(a) the results of casing string tests and the formation pressure integrity testing; and
(b) a well examination plan which includes-

(i) confirmation of groundwater and aquifer isolation;
(ii) measures to address fracture containment;
(iii) measures to manage seismicity risks;
(iv) details of hydraulic fracturing and process water management programme, including testing programmes and operations which expands on the plans contemplated in regulation 7;
(v) a programme for independent well examination; and
(vi) a programme for post-decommissioning monitoring which expands on the plans and reports contemplated in regulation 7(7)(e).

(4) The names of all drilling fluids must be submitted to the designated agency for approval prior to use.

A holder's responsibility to notify and provide information to the designated agency and the Minister responsible for water affairs

15. (1) Verification inspections are required for the following activities-

(a) setting a casing to facilitate a verification of the hydrostatic pressure and drift test;
(b) commencing with cementing of casings operations;
(c) undertaking casing string testing;
(d) formation pressure integrity testing;

(e) conducting a blowout prevention test; and
(f) mechanical integrity testing.

(2) In order to facilitate a designated agency verification inspection, a holder must notify the designated agency at least 5 days prior to undertaking an activity contemplated in subregulation (1).

(3) A copy of the well file which meets the requirements contemplated in regulation 13(2) must be submitted to the designated agency monthly for information purposes.

(4) The records and overall summary of the blowout prevention testing must be submitted to the designated agency for information within 5 days after the testing was undertaken.

(5) Records and overall summary of the mechanical integrity tests must be submitted to the designated agency for information within 5 days after the testing was undertaken.

(6) Records for mechanical integrity tests and monitoring must be submitted to the designated agency for information on a quarterly basis including-

(a) type and volumes of water sources for stimulation operations;
(b) volumes and rates of fracturing fluid pumped into the target zone; and
(c) volumes and release of flowback received during and after each stimulation.

(7) A holder must notify the designated agency and the Minister responsible for water affairs, in writing, at least fourteen days before commencing with hydraulic fracturing operations indicating the date of commencement.

(8) Within 30 days of fracturing a production well, the holder must submit to the designated agency and the Minister responsible for water affairs, a post hydraulic fracturing report which report must meet the requirements contemplated in Appendix 2.

CHAPTER 5

OPERATIONS AND MANAGEMENT

Management of operations

16. (1) A holder must appoint a well engineer to be responsible for the day-to-day management of the operation.

(2) Equipment used in hydraulic fracturing operations must be fit for purpose and must meet relevant standards as contemplated in Appendix 1.

(3) A holder may only commence with hydraulic fracturing operations after the designated agency has approved the requirements contemplated in regulation 14 and all the relevant rights, permits, authorisations, approvals, consents and licences contemplated in regulation 6(h) have been obtained.

(4) Hydraulic fracturing operations must be immediately suspended if an anomalous pressure or flow condition is occurring in a way that indicates that the mechanical integrity of the well has been compromised and that continued operations pose a risk to the environment.

(5) A holder must notify in writing, the designated agency and the Minister responsible for water affairs within one hour of suspending hydraulic fracturing as a result of circumstances contemplated in subregulation (4) relating to the mechanical integrity of the well or the risk to the environment.

(6) Remedial action must be undertaken immediately and the designated agency must be satisfied with the remedial actions prior to issuing a written consent for the recommencement of operations.

(7) The designated agency may only issue a written consent for recommencement of operations in the form of a recommencement letter as contemplated in subregulation (6) after consulting with the Minster responsible for water affairs.

Drilling fluids

17. (1) Drilling operations below shallow soils and local aquifers must be undertaken using air, water or water-based mud systems.

(2) Where it is unfeasible to use air, water or water-based mud systems for drilling below shallow soils and local aquifers, the proposed alternative drilling fluids, and the safety data sheets must be submitted to the designated agency for approval for their use before they may be used.

Powers and duties of the designated agency

18. (1) The designated agency must provide approvals or request additional information within 2 days of receiving information for approval.

(2) The designated agency may, where necessary, require—

(a) a specific cement mixture to be used in a well or an area if evidence of local conditions indicates that specific cement is necessary; or
(b) the installation of an additional cemented casing string or strings in the well.

(3) The designated agency may at the cost of the holder, appoint an independent and competent person to undertake well examination.

Disclosure of information

19. (1) All the assessment, monitoring and reporting information contemplated in regulation 7 must be uploaded to the website of the holder within 2 months of submission to the relevant authorities or within 1 month from approval and annually thereafter.

(2) Data collected through the reserve determination process, must be published on the website of the holder within 12 months of the issuing of the exploration or production right, except where it may be shown to directly relate to the availability of gas or petroleum's commercial value of the holder's acreage.

(3) A holder must upload on the website of the holder the following documentation regarding fracturing fluids as approved through the environmental authorisation as well as any additions or deviations as authorised by the designated authority during hydraulic fracturing operations:

(a) the hazard status of the substance;
(b) material safety data sheet information for substances;

(c) anticipated volumes of fracturing fluid, including proppant, base carrier fluid and each chemical additive to be used within the operation per year for a five year period;
(d) the trade name of each additive and its general purpose in the fracturing process;
(e) each chemical intentionally added to the base fluid, including the chemical abstracts service number, and if applicable the actual concentration to be used in percentage or by mass; and
(f) the possible risk of the chemicals and additives to the environment and water resources.

Well decommissioning and monitoring

20. (1) All exploration and production wells must be decommissioned within 60 days of final use.

(2) Wells must be decommissioned as contemplated in paragraph 11 of Appendix 1.

(3) The holder is required to prepare a final rehabilitation, decommissioning and closure plan for incorporation into the initial and ongoing reviews of the "final rehabilitation, decommissioning and closure plan" contemplated in the Financial Provisioning Regulations.

(4) Decommissioned wells must be monitored by the holder in compliance with the operational environmental monitoring plan which meets the requirements of regulation 7(4)(c) or 7(7)(c).

(5) The results of the monitoring must be submitted to the designated agency and the Minister responsible for water affairs on the first working day of each quarter, unless there are identified anomalies, spikes or exceedances of requirements, in which case such anomalies, spikes, or exceedances must be reported within 12 hours of identification.

Standard conditions of authorisation

21. (1) The standard conditions contemplated in Appendix 3, will apply to rights, permits, authorisations and licences identified in regulation 6(h)(i) to (v).

(2) Where the standard conditions must be augmented, relevant decision making authorities must coordinate the setting of additional authorisation conditions to avoid duplication and conflict between conditions.

CHAPTER 6

GENERAL

General

22. (1) Any water or air quality analysis must be undertaken by a third party using international or SANAS accredited facilities and according to national and international analytical methods.

(2) The results of the analysis must include as a minimum a detailed description of the sampling and testing conducted, including duplicate samples, the chain of custody of the sample and quality control of the testing.

(3) The holder must at any time, allow the Minister, the Department responsible for water resources or any government department or agency which administers any law relating to matters affecting the environment, access to the operation and any relevant documentation to conduct any activities associated with compliance monitoring and enforcement and independent verification.

(4) Raw data used for analysis must be tabulated, retained and made available at the request of any competent authority or stakeholder.

(5) The results of any pressure test or strength tests must be submitted to the designated agency within 7 days of the results being obtained;

(6) Where directed by the relevant decision making authority in the conditions of authorisation as contemplated in regulation 7 to do so, the holder must capture data generated into the relevant department's database.

(7) Waste containing radioactive materials must be managed in accordance with the National Radioactive Waste Disposal Institute Act, 2008 (Act No. 53 of 2008).

Offences

23. (1) An applicant commits an offence if that person contravenes or fails to comply with regulation 4, 5, 6, 7(1), 7(4), 7(7), 8, 9, 10, 11 and 12 of these Regulations.

(2) A holder commits an offence if that person contravenes or fails to comply with regulation 4, 5, 6, 7(2), 7(3), 7(5), 7(6), 7(8), 7(9), 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20 and 22 of these Regulations.

Penalties

24. A person convicted of an offence in terms of regulation 23 of these Regulations, is liable to a fine not exceeding R10 million or to imprisonment for a period not exceeding 10 years, or to both such fine or such imprisonment.

Short title and commencement

25. These Regulations are called the Onshore Hydraulic Fracturing Regulations, 2022, and come into operation on the date of publication in the Government *Gazette*.

APPENDIX 1

WELL CONSTRUCTION STANDARDS

1. General

(1) A holder must ensure that a well design is informed by a risk assessment, and is constructed, equipped, commissioned, operated, modified, maintained, suspended and decommissioned in a manner that provides for the control of the well at all times.

(2) The holder must plan for multi-well pads and horizontal drilling technologies in order to maximize the spacing between neighbouring wells and minimize cumulative surface impacts of the operation, where this is not possible the reasons must be documented in the documents supporting the application for environmental authorisation.

(3) Where an API standard is prescribed, the most current standard is to be used.

2. Objective of well design

The overall objective of a well design is to–

(a) isolate aquifer and permeable zones by employing environmentally protective well casings;
(b) protect potable groundwater and prevent the migration of polluted water into groundwater or the exploration or production well; and
(c) protect against casing deformation and cement degradation.

3. Well construction

(1) A well must be cased according to current industry standards published by the API"5CT Specification for Casing and Tubing" and the casing thread compound and the use must conform to the API RP 5A3.

(2) A 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 dripping, production hydraulic fracturing operations.

(3) Casings may not be–

(a) pitted, patched, bent, corroded, crimped;
(b) the threads may not be worn or damaged; and
(c) reconditioned.

(4) Casings must pass the approved hydrostatic pressure and drift test pursuant to API "5CT Specification for Testing and Tubing.

(5) Conductor casing must be set and cemented to a surface to-

(a) isolate shallow aquifers;
(b) stabilize unconsolidated sediments; and
(c) provide a base for equipment to divert shallow natural gas.

(6) Surface casings for exploration or production wells must be-

(a) set to a depth of 60m below the base of the deepest fresh water or at least 100m above the top of the expected petroleum bearing zone, whichever comes first;
(b) installed and be fully cemented to the surface where intermediate casings are not installed;
(c) centralised at the shoe, above and below a stage collar or diverting tool, and through fresh water zones;
(d) centralised in each segment of the wellbore to provide sufficient casing standoff and to foster effective circulation of cement to isolate aquifers, flow-zones, voids, lost circulation zones and hydrocarbon production zones; and
(e) cemented to a surface.

(7) Intermediate casings for exploration and production wells-

(a) must be set at least 30 m below the base of the unexpected deepest to protect unexpected fresh water found below the surface casing shoe;
(b) a production casing must be set and be fully cemented to 150m above the top of the perforated zone;
(c) where cementing to the surface is technically infeasible and may result in lost circulation or both, cement must be brought to a minimum of 180, above the shallowest fresh water zone encountered below the surface casing shoe;
(d) may not be used as a production string in the well in which it is installed;
(e) may not be perforated;
(f) the location and depths of petroleum bearing zones or fresh water zones that are open to the wellbore above the casing shoe, must be confirmed by coring, electric logs, testing or such data from an offset well on the same well pad.

(8) Casings must be centralised 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.

(9) In non-deviated holes, a pipe centraliser must be placed every fourth joint from the collar cement shoe to the ground surface or to the bottom of the collar.

(10) The designated agency may require additional centralisation where necessary in order to ensure the adequacy of the integrity of the well design.

(11) Centralisers must be designed in accordance with–

(a) API "10D, Specification for Bow-Spring Casing Centralisers and all rigid centralisers";
(b) API "10 TR 4 Considerations Regarding Selection of Centralisers for Primary Cementing Operations"; and
(c) API RP"10D-2, Recommended Practise for Centraliser Placement and Stop Collar Testing".

4. Cement requirements and compression testing

(1) Hydraulic fracturing operations must be isolated from freshwater and other permeable horizons by ensuring complete cement isolation in each casing annulus.

(2) Cementation of casings must be done by the pump and plug method with a minimum of 25% excess cement and appropriate loss circulation material.

(3) Cement placed in the well bore must meet the standards of API "10 A Specification for cements and materials for well cementing' or ASTM "C150/C150M Standard Specification for Portland Cement".

(4) Tests for cement mixtures for which published performance data is not available must be conducted on representative samples of the basic mixture of cement and additives used.

(5) Water used for preparing the slurry for the cement mixtures on which tests will be conducted as contemplated in paragraph (4) must be distilled water or potable tap water.

(6) Tests contemplated in paragraph (4) must be conducted using the equipment and procedures established in the API "RP 10 B-2 Recommended Practise for Testing Well Cements" and Foamed cement slurry must be prepared to minimise its free water content in accordance with API "RP 10B-4 Recommended Practise On Preparation and Testing of Foamed Cement Slurries at Atmospheric Pressure".

(7) The cement used for well construction must have a compressive strength of at least 8273.71kPa (1.200 psi) and the free water separation must be no more than 6 millilitres per 250 millilitres of cement, tested in accordance with the API TR 10TR3.

(8) Cement compressive strength tests must be performed on all cement that will be used in casing strings before its use to ensure that it meets the required strength as contemplated in paragraph (7) and where it does not comply with the standards, the tests must be redone.

(9) After the cement is placed behind the casing, time must be allowed for the cement to set until the cement achieves a calculated compressive strength of at least 3447.38 kPa (500psi) before the casing is disturbed in any way, including installation of a blow-out preventer.

(10) A holder must run a radial cement bond evaluation log and monitor the annular pressure 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.

(11) A copy of the cement job log for a cemented casing string in the well must be maintained in the well file as submitted as required in regulation 15(3).

5. Casing string tests

(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 1.512 kPa per 0.3048 meter (0.22 psi per foot) of casing string length or 1o 342.12 kPa (1,500 psi), whichever is greater, for a minimum of 30 minutes with less than a 5% pressure loss.

(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.

(3) The actual pressure must not exceed the test pressure at any time during hydraulic fracturing operations.

(4) A hydraulic fracturing string used in the operations must be either strung into a production liner or run with a packer set at least 30 m 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.

(5) The pressure test must be considered successful if the pressure applied has been held for a minimum of 30 minutes with no more than 5% pressure loss.

(6) The annulus between the hydraulic fracturing string and casing must be pressurised to a minimum of 1723.69 kPa (250 psi) and monitored.

6. Formation pressure integrity test

(1) A holder must, after a successful casing string test, conduct a formation pressure integrity test below the surface casing and below all intermediate casings.

(2) The actual hydraulic fracturing treatment pressure must not exceed the casing test pressure at any time during hydraulic fracturing operations.

7. Blowout prevention and pressure testing

(1) A holder must install blowout prevention equipment that meets the current API standard 53 for blowout equipment after setting the casing to shut-off a wellhead which must be supported and secured to prevent stresses on all connections unless an exemption as contemplated in regulation 12(2) and (3) has been obtained.

(2) Blowout prevention equipment installed at a well that may be subject to hydraulic fracturing must include a remote blowout prevention actuator that-

(a) is powered by a source other than rig hydraulics;
(b) is located as a minimum 20 meters from the well head; and
(c) has an appropriate related pressure equal to or greater than the induced hydraulic fracture pressure.

(3) Lines, valves and fittings between the blowout preventer and the remote actuator must be flame resistant and must have a working pressure rating higher than the maximum anticipated well heads surface pressure.

(4) Blowout prevention equipment must have 100% availability at all times;

(5) The blowout prevention equipment must be tested to 100% of related working pressure and the annular-type blowout preventer must be tested to 6894.76 kPa (1,000 psi) at the time of installation in accordance with current SPI standard 53 for blowout equipment.

(6) Blowout prevention equipment that has failed any pressure test must not be used until it is repaired and has passed the pressure test.

8. Mechanical integrity testing and monitoring

(1) The injection lines and manifold, associated valves, hydraulic fracturing head or tree and any other well head component or connection not previously tested must be tested with fresh water, mud or brine to at least the maximum anticipated treatment pressure for a minimum of 30 minutes with less than a 5% initial pressure loss.

(2) A record of the pressure test must be maintained.

(3) 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.

(4) A function-tested relief valve and diversion line must be installed and used to divert, flow from the hydraulic fracturing sting-casing annulus to an overhead tank in case of hydraulic fracturing string failure.

(5) 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.

(6) They hydraulic fracturing treatment pressure must not exceed the test pressure of any given component at any time during the hydraulic fracturing operations.

(7) During hydraulic fracturing, annulus pressure, injection pressure and the rate of injection must be continuously monitored and recorded.

(8) Micro-seismicity (in real time<5 minute delay) must be monitored by a long array of accelerometers located in an offset monitoring well, situated 100m or more away from the well at a comparable depth.

(9) Micro seismic sensors must be designed for temperatures between 175-200°C.

(10) Tiltmeter measurements must be taken with an array of tiltmeters either located in shallow offset wells (10m) at the site surface or in a more sensitive deep offset well comparable depth to fracturing depth and in the fracturing well which provides information on fracture orientation and direction.

(11) Downhole pressure sensors must be used to provide indirect measurements of fracture height, which are to be connected to the production casing as well as outer casings to monitor well integrity.

(12) Performing temperatures and flow logging along the length of the well must correlate with information on fracture growth.

(13) Proppants must be tagged with radioactive isotopes so that proppant can be analysed to locate where different stages of the proppant went and to locate fracture at depth.

(14) Chemical tracers must be added to hydraulic fracturing fluid to improve the understanding of fracture fluid loss and flowback.

(15) Temperatures in the well must be measured to trace fluids from shale formations that are at a higher temperature than shallow fluids using fibre-optic sensors to measure temperature, pressure and sound that provides real-time information on fracture locations in the well (fibre-optic sensors are especially valuable for use in downhole high pressure high T situations where electronic gauges fail).

9. Well suspension

A holder may only suspend a well-

(a) after obtaining the approval of the designated agency; and
(b) for a period determined by the designated agency, which period may not exceed eighteen months.

10. Suspended well integrity management

(1) A holder must ensure that management standards and procedures are in place for monitoring 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.

(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 the anomaly.

(3) The suspension of a well-

(a) must be effected in such a way that the well can be re-entered safely and secured using pressure control equipment, without compromising the barrier in place;
(b) may not jeopardise the future final decommissioning and abandonment of the well.

11. Well decommissioning or closure

(1) A well that is no longer active, or producing, or for which the approved suspension period determined in terms of paragraph 9(1)(b) has passed, must be plugged and decommissioned in accordance with a final rehabilitation, decommissioning and closure plan as contemplated in regulation 20(3) approved by the designated agency;

(2) The final rehabilitation, decommissioning and closure plan must take into account the following-

(a) current conditions and the design of the well;
(b) height of cement in annulus outside casing;
(c) permeable formations outside casing that must be covered by cement;
(d) cement casing overlaps;
(e) the need for abandonment plugs to cover the full diameter of the hole;
(f) the type of fluid in annuli above cement;
(g) the difficulties of injecting cement into the annulus;
(h) future monitoring of the integrity of the well plug;
(i) the depth below the surface at which the casing must be cut; and
(j) related seismic activity risks.

(3) The surface area of the decommissioned well must be clear of obstructions and equipment and the well bore must be cemented for the full length and diameter of the wellbore to surface.

APPENDIX 2

CONTENT OF A POST HYDRAULIC FRACTURING REPORT

(1) A holder must compile and submit, to the designated agency and the Minister responsible for water affairs, a detailed post hydraulic fracturing operation report for review and recommendations, which report must include as a minimum-

(a) the location of the well, position in co-ordinates and well number;
(b) the actual fluid compositions, concentrations and total volumes used;
(c) the actual surface and downhole treating pressure range;
(d) the maximum injection treating pressure;
(e) the actual or calculated fracture geometry;
(f) annuli and offset well pressure monitoring records;
(g) confirmation and wellbore integrity was maintained throughout the operation;
(h) the testing and flow-back results;
(i) the chemical composition of gases released from wells;
(j) an explanation of operational variations to the pre-job design;
(k) data and information concerning related seismic events, in internally accepted formats, that have been recorded including the steps taken as a result of such events;
(l) plans to continue micro-seismic monitoring; and
(m) the induced seismic events that have been recorded including the steps taken as a result of such events.

(2) A holder must compile an audit report of the detailed post hydraulic fracturing operations for the complete well pad and submit the report to the designated agency and the Minister responsible for water affairs.

APPENDIX 3

STANDARD CONDITIONS

(1) The following conditions are applicable to the issuing of a right as contemplated in regulation 7(1):

(a) On receipt of the exploration right the holder must submit copies of the consolidated environmental impact assessment report, the base line monitoring plan and the environmental management programme as contemplated in regulation 7(1)(b) to South African Heritage Resources Agency.

(b) The holder must notify the decision making authorities fourteen days before the commencement of the operations to facilitate compliance inspections.

(c) Prior to the commencement of the exploration operations, the holder must appoint:

(i) an independent environmental control officer who is required to be on site throughout the operational phase of the exploration operations and at intervals as agreed in the submission of the annual updates of the final rehabilitation, decommissioning and closure plan, once the decommissioning and closure operations are initiated; and

(ii) a heritage specialist who is required to fulfil certain tasks and be available to assess any excavations or archaeological or palaeontological finds that could be unearthed through the exploration operations in line with the environmental management programme "chance finds protocol".

(d) Once appointed, the holder is required to provide the names, contact details, expertise and experience of the persons identified in paragraph (1)(c) to the decision making authorities.

(e) The independent environmental control officer will have, amongst others, the following duties as a minimum:

(i) prepare and maintain a project file which contains the following information as a minimum;

(aa) copies of all rights, permits, authorisations, licenses, programmes, plans consents and financial guarantees associated with the operation;

(bb) the approved environmental management programme;

(cc) emergency response plan for health, environment and safety;

(dd) any correspondence including reports and audits sent to or received from any decision making authority or the designated agency;

(ii) maintain a site diary documenting the activities being undertaken on site daily;

(iii) maintain an incident register which includes the remedial measures implemented to deal with the incident as well as the preventative measures implemented to avoid the re-occurance of such an incident;

(iv) maintain a complaints register which includes the measures implemented to address the complaint;

(v) on a daily basis ensure that the monitoring is being undertaken in relation to the base line monitoring plan as required;

(vi) inspect the operations on a daily basis to ensure compliance with the environmental management programme;

(vii) maintain a daily photographic record of the activities being undertaken;

(viii) prepare and submit to competent authorities and the designated agency a close out report on finalisation of exploration activities and again on finalisation of the final rehabilitation, decommissioning and mine closure plan;

(ix) prepare a quarterly compliance audit report which must, as a minimum, include the following:
  (aa) the period of the audit;
  (bb) compliance with the environmental mangment programme outcomes and actions;
  (cc) compliance with the base line monitoring requirements of the base line monitoring plan;
  (dd) document any audit findings issued; and
  (ee) corrective measures for audit findings;
(x) submit the audit report to the decision making authorities and the designated agency; and
(xi) report any emergency or significant environmental incident to the decision making authorities witin 24 hours of occurrence including the measures being implemented to manage the emergency or incident.

(f) The audit cycle begins on commencement of operations and is required to be undertaken quarterly from the commencement date and submitted to the decision making authorities within three days of the end date of the audit.
(g) The heritage specialist will have, amongst others, the following duties as a minimum:
  (i) prepare and maintain a project file which contains copies of the base line monitoring plan as contemplated in regulation 7(1)(b) and the environmental management programme including the "change finds protocol";
  (ii) prepare a site map of all identified heritage or cultural resources required to be monitored including the agreed buffers in which no activities should be undertaken;
  (iii) on a monthly basis ensure that the base line monitoring is being undertaken as required;
  (iv) on a monthly basis inspect the operations to ensure compliance with the environmental managment programme and buffers with respect to the protection of archeological, palaeontological, cultural or heritage resouces; and
  (v) when contacted by the holder, inspect any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, aged ostrich eggshell fragments, charcoal and ash consentrations which could be associated with historic dwellings etc. and ensure that the procedures of the "change finds protocol" are adhered to in such instances.

(h) On commencement of the exploration operations, the requirements of the following programme and plans must be initiated and implemented:
  (i) the approved environmental management programme;
  (ii) the base line monitoring plan;
  (iii) the templates, spreadsheets, plans, reports and calculations required in terms of the Financial Provisioning Regulations; and
  (iv) the chance finds protocol for cultural heritage and palaeontological resources.

(2) The following conditions are applicable to the issuing of a right as contemplated in regulation 7(4) and (7):

(a) On receipt of the right, the holder must submit copies of the consolidated environmental impact assessment report, operational environmental monitoring plan, and the environmental management programme as contemplated in regulation 7(4)(b) or 7(7)(b) to South African Heritage Resouces Agency.

(b) The holder must notify the decision making authorities fourteen days before the commencement of the production operations or the continuation of exploration activities into production operations to facilitate compliance inspections.

(c) Prior to the commencement of the exploration or production operations the holder is required to make the following appointments:
   (i) the experts identified in paragraph (1)(c); and
   (ii) a well engineer who is required to be on site throughout the operational phase of the exploration or production operations and at intervals as agreed in the submission of the annual updates of the final rehabilitation, decommissioning and closure plan, once the decommissioning and closure operations are initiated.

(d) Once appointed the holder is required to provide the names, contact details, expertise and experience of the persons identified in paragraph 2(c) to the decision making authorities.

(e) The environmental control officer will have the duties identified in paragraph 1(e) above and the following additional duties as a minimum:
   (i) in the project file include as a minimum the following information and any updates to that information;
      (aa) copies of site plans indicating the well pads and wells to be constructed and drilled;
      (bb) a copy of the approved environmental management programme;
      (cc) a copy of the approved operational environmental monitoring plan;
      (dd) a copy of the approved waste management plan;
      (ee) a copy of the emergency and spill contingency plan;
      (ff) the approved well examination plan;
      (gg) the well design and testing critieria;
      (hh) details including the certification of the accredited laboratories to which samples are to be sent;
      (ii) details including the certification of the waste treatment and waste disposal facilities to which wastes are to be directed;
      (jj) copies of the engineering drawings for the construction of the well pads and wells including the material specifications and strength testing requirements; and
      (kk) technical specification for equipment (e.g., rigs, pumps etc.);

   (ii) inspect the operations on a daily basis to ensure compliance with the environmental management programme, the operational environmental monitoring plan, the waste management plan and the emergency and spill contingency plan; and
   (iii) prepare a weekly audit which conforms to the information identified in paragraph 1(e)(ix) above and submit the audit report including the supporting documentation to the decision making authorities three days after its preparation.

(f) The audit cycle begins on commencement of operations and is required to be undertaken quarterly from the commencement date and submitted to the decision making authorities within three days of the end date of the audit.

(g) The well engineer will have the following duties as a minimum:
   (i) design all wells;
   (ii) maintain a well file as contemplated in regulation 13(2) and submit the file to the designated agency for approval as contemplated in regulation 15(3);
   (iii) collate, maintain and archive all water quality monitoring results including the raw data;
   (iv) inspect the operations on a daily basis to ensure compliance with the well design requirements the pressure testing requiements and the emergency and spill contingency plan;

(v) sign off on all pressure test results;
(vi) submit the records for mechanical integrity tests and monitoring to the designated agency every quarterly;
(vii) be present when blowout prevention equipment is installed, tested, or in use;
(viii) prepare a technical report on a weekly basis for inclusion in the audit report prepared by the environmental control officer which report must as a minimum include the following:

(aa) the period covered by the technical report;
(bb) compliance with the construction requirements of the environmental management programme outcomes and actions;
(cc) compliance with the monitoring requirements of the operational environmental monitoring plan;
(dd) compliance with the waste management plan including both waste water and solid waste managment;
(ee) compliance with the emergency and spill contingency plan;
(ff) a collation of water quality results represented in a graphical form indicating trends and cumulative impacts;
(gg) hydraulic fracturing fluids and proppants used on site, including the type of chemicals and proppants, quantity used and location of use including well names and locations;
(hh) material data sheets for all hydraulic fracturing fuids, proppants and chemicals;
(ii) submit test results of water quality monitoring, including the relevant laboratory accredition and chain of custody and sample storage protocols to the relevant decision making authorities quarterly; and
(jj) report any incidents that have happened relating to the operations, or spikes and anomalies in testing, providing details and remedial measures;

(ix) liase with the environmental control officer weekly to provide input to the audit reports being prepared for the operation;
(x) identify and report any risks to the environmental control officer;
(xi) keep records of all pressure test and provide the information for monthly audits;
(xii) keep records (including the raw data) of cement strength and compression testing and provide the information for the monthly audit reports;
(xiii) request inspections from the designated agency as required; and
(xiv) maintain and archive all design and construction records, including topographical surveys and materials test results on all materials used, for access during the operations and after decommissioning and closure.

(h) The holder must compile and submit, to the designated agency and the Minister responsible for water affairs, a detailed post hydraulic fracturing operational report for review.
(i) The holder must ensure that all boreholes are capped to avoid tampering with groundwater quality from surface pollution or human interference to ensure that results provided are a true reflection of the boreholes.