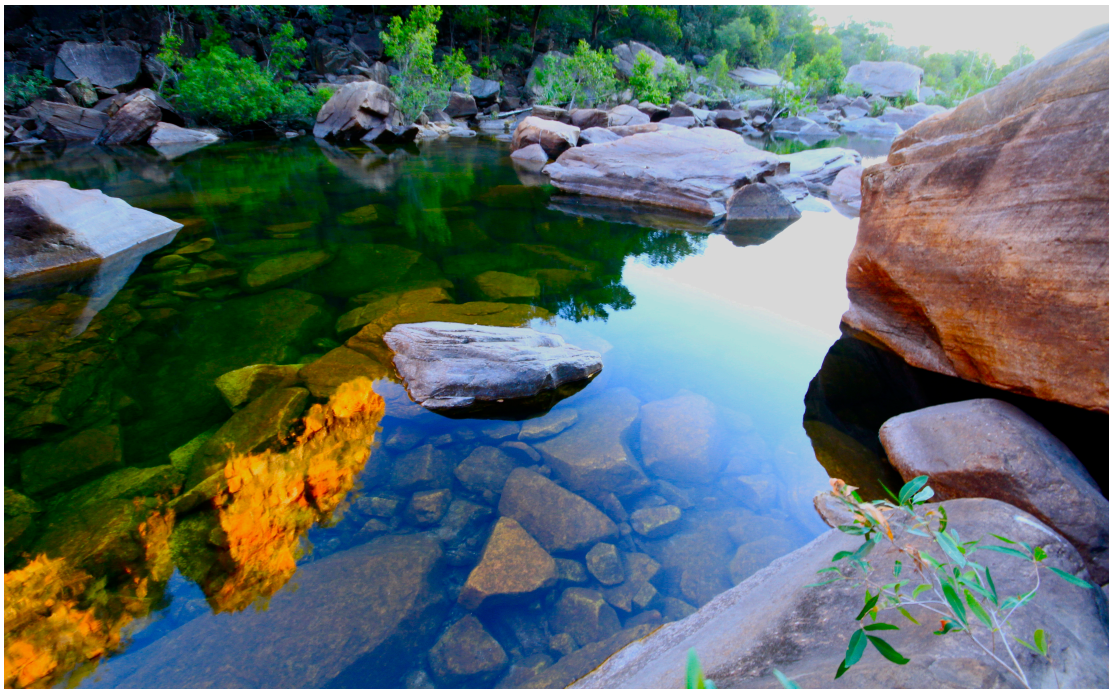
Northern Territory Government: Inquiry into Hydraulic Fracturing:



EDO Northern Territory Report

Best Practice Regulatory Frameworks for Hydraulic Fracturing Operations.

31 October 2014

ENVIRONMENTAL
DEFENDERS OFFICE (NT) INC.

Northern Territory Government: Inquiry into Hydraulic Fracturing:

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TABLE OF CONTENTS:

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Executive summary

Recently, the pros and cons of having an intensified natural gas industry in the Northern Territory (NT) have been widely debated throughout the community. Central to this debate has been the controversial process of hydraulic fracturing 'fracking'. Community division over the issue and concerns about the practices potential impacts on public health, the environment and water resources led the NT Minister for the Environment, The Hon Peter Chandler, to recommend an independent inquiry. In March 2014 the NT Hydraulic Fracturing Inquiry was established.

This report provides a comparative analysis of regulatory regimes for 'fracking' operations used throughout other jurisdictions in Australia and highlights some examples from the United States of America and Canada. This report does not indicate that the Environmental Defenders Office NT (EDONT) supports the use of 'fracking' in the NT. On the contrary, EDONT believes that the NT Government should be supporting renewable energy options wherever possible. Having said that, if 'fracking' operations are to occur in the NT they should be overseen by the strongest possible regulatory regime, learning from the experiences in other jurisdictions. It has become clear during the research and analysis presented in this report that any assertion that the NT has a 'best practice' or 'strong' regulatory regime cannot be maintained. The NT's regulatory regime is characterised by strong reliance on operator self-management, subjective regulator or Ministerial decisions and a lack of transparency. In EDONTs view, the NT's regulatory regime fails to establish international best practice in relation to permitting, well construction, water management and monitoring, chemical use and disclosure and public participation.

Overall conclusion

Having completed an extensive review of regulatory regimes, both in Australia and internationally, which apply to operations utilising hydraulic fracturing it is our overarching conclusion that the Northern Territory regulatory regime applying to petroleum requires a complete overhaul. The regime in the Northern Territory, as it currently stands, is apt to be flouted by any unscrupulous operators that are granted a permit.

Given the above, it is our strong recommendation that a moratorium on petroleum operations, utilising hydraulic fracturing, be put in place until such time as a new regulatory regime is put in place. In our view, the benefits of waiting until strong regulatory protections are put in place, far outweigh any economic benefits that may be derived from pushing ahead with the current weak regulatory regime.

The recommendations below, are recommended amendments to current legislation, however, they are equally applicable to any new legislation created as an overhaul of the regime for petroleum exploration and production in the Northern Territory.

Specific concerns:

- The *Petroleum Act*'s objects seek to place economic interests above environmental protection. Most jurisdictions in Australia now recognise that environmental protection should be an object of petroleum legislation. Additionally, there is no specific requirement for the Minister to consider the need to preserve and protect the environment.

- The absence of a mandated requirement in the NT for operators to undertake baseline testing and post operation testing. Best practice jurisdictions in the United States, like Colorado now mandate this kind of sampling, detail how sampling is to be undertaken and at what timeframes.

- The absence of a defined policy dealing with the protection of underwater water resources. In NSW the *Aquifer Interference Policy* (AIP) sets out objective factors to assess potential impacts on aquifers. For projects assessed under the NSW Gateway process, reports under the AIP are to be made public.

- The absence of a strategic planning assessment of areas of land in the NT which may be unsuitable for 'fracking' operations. This can be compared with the approach taken in NSW under the *Strategic Regional Land Use Policy.*

- The absence of mandated requirements for emissions and air quality from 'fracking operations in the NT. Best practice jurisdictions in the United States, like North Dakota and Colorado place explicit requirements on operators with relation to fugitive emissions, ambient air quality testing and flaring requirements. (see North Dakota 'Ail Pollution Control Rules).

- That operators in the NT are required to act in accordance with 'good oilfield practice', rather than mandated codes of practice or regulations.

- The absence of mandated requirements for chemical disclosure. EDONT notes that a chemical disclosure list is found on the Department of Mines and Energy website, however, this would appear to be a policy of the government, rather than a legislative requirement.

- The fact that application documents, technical programmes (or at least environmental management plans) are not publically available. This can be compared with the comprehensive requirements for public information in Western Australia, which requires public disclosure of all environmental management plans. In Illinois, all documents submitted as part of an application are viewable by the public.

- The fact there are no third party appeal rights in relation to any permits or licences granted under the *Petroleum Act*.

- That evaporation pits are able to used in the NT, despite the obvious challenges associated with large parts of the NT being subject to wet season high rainfall activity. We note that this practice has been banned in NSW and the STRONGER guidelines encourage a move away from this practice.

- The absence of mandated and specific technical requirements for the construction of any pit, tank or other facility designed to store produced or waste water. In most other jurisdictions, these requirements are detailed at great length. For example, see section 1-75 of the *Illinois Hydraulic Fracturing Regulatory Act*.

- The failure to take any steps in the NT to classify operators and activities by their level of risk. This can be compared with the procedure under the South Australian *Petroleum and Geothermal Energy Act* (2000) which regulates both operators and activities differently, according to their assessed level of risk.

- The fact that the NT regulatory regime does not appear to have specifically designed requirements to manage the impacts of the NT's unique climatic features on fracking operations. These conditions, if imposed, are done so via permit or licence conditions. This is at odds with the recommendations in the STRONGER guidelines.

- The fact the NT regulatory regime, particularly, the *Petroleum Act* does not require consideration of cultural matters. This can be compared with the NSW approach, at section 74, which requires the Minister to consider certain matters, including features of Aboriginal interest, before granting a permit.

Context and Recommendations

Definition of 'environment'

EDONT considers the definition or concept of '*environment'* to include:

a) ecosystems (whether marine or terrestrial) and their constituent parts, including people and communities;
b) the ecosystems existing within a bioregion or sub-bioregion[1];
c) natural and physical resources; and
d) the qualities and characteristics of locations, places and areas; and
e) heritage values of places; and
f) the social, economic and cultural aspects of a thing mentioned in (a)(b)(c)(d) and (e) above.[2]

EDONT notes the particular importance of taking a bioregional approach to assessments for activities involving hydraulic fracturing.

> *A bioregional assessment is a scientific analysis of a particular area including its ecology, hydrology, geology and hydrogeology, with explicit assessment of potential direct, indirect and cumulative impacts of coal seam gas and large coal mining development on water resources.*[3]

Recommendations

1. OBJECTS OF THE ACT

The Act's objectives be amended completely to shift the priority of the Act from economic development to environmental protection: This should be achieved by:

a. Making the primary object of the Act to provide for development of petroleum resources in the Territory in a way that ensures the Territory's unique environment is not adversely affected.

b. Requiring that the Minister and all agencies and persons involved in the administration of the Act must have to, and seek to further, the primary objective.

c. Explicitly requiring decision makers to take into account the principles of ecologically sustainable development.

d. Requring that decision makers take into account cumulative impacts, or potential cumulative impacts of petroleum operations.

2. INTEGRATED APPROVAL PROCESS

The Act should be amended to specifically reference the relevant provisions of the associated legislation with which approvals must comply.

3. AIR QUALITY

[1] httpf://www.environment.gov.au/topics/land/national-reserve-system/science-maps-and-data/australias-bioregions-ibra
[2] definition of environment adapted from the definition in s 528 of the *Environment Protection and Biodiversity Conservation Act* 1999 (Cth)
[3] *http://www.csiro.au/Organisation-Structure/Flagships/Water-for-a-Healthy-Country-Flagship/Water-Resource-Assessment/Bioregional-Assessments.aspx*

Regulations or a Code of Practice[4], with legislative force, must be incorporated into the regulatory regime and provide for permissible standards of air quality. The Code should set out standards of equipment required to be used and methods and requirements for monitoring and testing of air quality. The Code or Regulation should provide objective (enforceable) measures for:

a. fugitive emissions;

b. ambient air-quality; and

c. flaring.

4. PROTECTION OF GROUNDWATER

Regulations or a Code of Practice[5], with legislative force, must be incorporated into the regulatory regime and provide for greater protection of groundwater resources. The Code should:

a. set out objective factors in relation to groundwater that must be considered prior to the issue of a petroleum permit;

b. ban the use of open evaporation pits as a method of disposing of waste water;

c. set out permissible proximity of wells to underground water sources;

d. set out the type, frequency and location of baseline water sampling and its reporting and periodic monitoring requirements; and

e. mandate case-by-case assessment of the implications of proposed fracking on groundwater quality and quantity. This assessment should take into account hydrogeological conditions at a site and then specify the level of engineering and oversight required to manage, monitor and maintain well integrity and zonation throughout the life of the operation.

5. TECHNICAL SPECIFICATIONS

The technical specifications in the *NT Schedule of Onshore Petroleum Exploration and Production Requirements* should be updated, expanded and put into a code of practice or regulations with legislative force. Objective specifications should be set for:

a. well casings;

b. well monitoring and reporting;

c. pressure testing and reporting;

d. reporting of seismic activity;

e. tank specifications (and pond specifications for use in emergency only);

f. well abandonment specifications; and

g. well and operation area rehabilitation requirements.

6. WATER USE & WASTEWATER MANAGEMENT

[4] Regulations and Codes of Practice with specific requirements should replace the ambiguous and unenforceable requirement to act in accordance with 'good oilfield pratice.
[5] As above, at 4.

Petroleum activities should be more strictly regulated and transparent in terms of their water use, this should be achieved by:

a. amending the *Water Act* to remove Petroleum activities exemption from the requirement to obtain groundwater extraction licences;

b. mandatory requirements for all Petroleum applications to include a publicly available water management plan detailing:

    i. the expected quantity of water required;

    ii. location of the water source to be used;

    iii. details of the groundwater extraction licence held by the company;

    iv. details (prior to commencement of operation) of how waste water will be dealt with during and on completion of a well.

c. requiring public reporting on all completed activities, detailing the actual amount of water used, and the methods used to dispose of waste water.

7. STRATEGIC LAND-USE PLANNING

The regulatory regime should identify areas of high value land where petroleum operations should not be permitted, or are required to undergo additional / more stringent assessment. This should be achieved by:

a. Developing objective criteria for the assessment of high value reserved areas; this will avoid subjective Ministerial decision-making;

b. Permitting members of the public and other local councils to make applications for certain areas to be reserved from petroleum activities.

8. INDEPENDENT SCIENTIFIC EXPERTISE

Given the significant knowledge gaps that remain, relating to underground water resources, the impacts of climate change and the long term impacts of hydraulic fracturing operations, the Northern Territory government should have recourse to an independent scientific advisory body to ensure decisions are informed by the best available science. We recommend:

a. That an independent scientific body be established, similar to the *Independent Expert Scientific Committee on Coal Seam Gas and Large Mining Development,* to provide expert, independent scientific advice to decision makers on the impact of shale gas projects that may impact on the Northern Territory's water resources;[6] and

b. The establishment of an independent Northern Territory Petroleum Commission which, similar to the State Review of Oil and Gas Regulation, should be a multi stakeholder body which should assist the Northern Territory Government in the periodic review of the regulatory regime for petroleum in the Northern Territory. Its first task would clearly be to assist in the complete overhaul of the current regulatory regime for petroleum operations.

9. TRANSPARENCY

[6] The most sensible way to achieve this may be via an amendment to the Commonwealth *Environment Protection and Biodiversity Act* 1999 to expand the water trigger at s 24D to include shale gas projects.

Measures should be put in place to ensure that the regulation of petroleum operations in the Northern Territory is a transparent process. The EDONT recommends that:

a. the Act be amended to provide rights for third parties to seek merits review of decisions made under the Act at the Northern Territory Civil and Administrative Tribunal;

b. that the Act be amended to mandate that all environmental management plans, and all parts of technical programmes that are not commercial in confidence be made available to the public;

c. the the Act be amended to require the Department of Mines and Energy to keep a publicly available register of the security held for the rehabilitation of each well; and

d. that the Act be amended to provide for mandatory reporting of chemicals used and their quantities.

10. REGULATION AND ENVIRONMENTAL COMPLAINCE

The environmental compliance regime under the Act should be completely overhauled by:

a. amending the Act to give the Northern Territory Environmental Protection Authority (NTEPA) responsibility for:

    i. environmental assessments and approval of environmental management plans;

    ii. compliance actions in relation to breach of environmental obligations.

    The NTEPA should be given sufficient resources to effectively oversee these new powers and responsibilities.

b. providing for private prosecutions; and

c. by including a provision which provides that a petroleum operator bears the onus of proving that any water contamination/pollution within a certain proximity of its operations were not caused by it.

11. OPERATOR STANDARDS

The Act should provide stronger provisions for the assessment of operator suitability by:

a. requiring an assessment by the Minister of whether an applicant is a fit and proper person. The test should set objective criteria that must be assessed by the Minister in coming to his conclusion about whether an applicant is a fit and proper person; and

b. classifying operators as either low or high risk (with a corresponding level of regulatory oversight/scrutiny), depending on their experience and track record. EDONT notes that a provision of this kind will only be effective if the regulator is adequately resourced.

Shale gas extraction by way of hydraulic fracturing in the Northern Territory – A legislative review

Northern Territory: Overview

The regulatory framework for the shale gas industry in the Northern Territory can be easily broken down into a number of separate components:

1. In relation to obtaining tenure and permits for exploration and production:

    - Exploration and production of petroleum (shale oil/gas) by way of hydraulic fracturing ('fracking') operations are approved under the *Petroleum Act* (**the Act**) and the *Petroleum Regulations* (**Regulations**). The Minister for Mines and Energy is responsible for making decisions about whether or not to approve petroleum mining on land and inland waters in the Northern Territory.[7]

    - Where an application for a permit is over land in a declared Northern Territory park, reserve or wilderness zone, the Minister must comply with provisions in the Act, which require consultation between Department of Mines and Energy (**DME**) and the Minister administering the *Territory Parks and Wildlife Conservation Act*.[8]

2. In relation to environmental assessments:

    - Environmental Impact Assessment (**EIA**) of petroleum operations in the Northern Territory, whether exploration or production activities, is done under the *Environmental Assessment Act* (**EA Act**) and *Environment Assessment Administrative Procedures* (**EAAP**).

    - Despite EIA's being undertaken by the NTEPA under the EA Act, the Minister for Mines and Energy is ultimately responsible for approval of an exploration permit or production licence, and for imposing any conditions on that licence to fulfil any needs identified during the EIA process. The Act does not explicitly require the Minister to consider the outcomes of any environmental assessment under the Act. However, under s 8A of the EA Act, if the Minister decides to act contrary to an Environment Assessment Report under the EA Act, the Minister must give written reasons to the NTEPA and table a notice in the Legislative Assembly.

3. In relation to compliance and enforcement:

    - Petroleum activities, which cause environmental harm on a mine site, are regulated under the Northern Territory Act.[9] The Northern Territory Department of Mines and Energy (DME) is responsible for regulation and compliance on petroleum mine sites.

    - The *Waste Management Pollution Control Act* and the *Water Act*, administered by the NTEPA, regulate impacts from petroleum activities, which occur off a mine site.

The technical requirements of fracking operations are set out in the approved technical works programme submitted with the application for exploration or production. Operators are also required to employ good oilfield practices.[10] The technical requirements of a fracking operation are guided by the *NT Schedule of Onshore Petroleum Exploration and Production Requirements* and conditions imposed on an exploration permit or production licence.

Environmental protection elements of a fracking operation are submitted as part of an application for a production licence. The measures proposed are not made public. There is no requirement to submit a specific environmental management plan, but must include

[7] Petroleum Act, s 25, s 34 and s 47.
[8] Petroleum Act, s 15.
[9] Petroleum Act, Part V, Division 2.
[10] Petroleum Act, s 58(b)

"proposals for the protection of the environment, including proposed measures to be undertaken by the applicant for the rehabilitation of the licence area or other affected areas".[11]

Acts, Regulations and Codes

- *Petroleum Act* 1984 (NT)
    - *Petroleum Regulations* 1994 (NT)
        - *Petroleum Exploration Permit Guidelines;*
        - *NT Schedule of Onshore Petroleum Exploration and Production Requirements; and*
        - *NT Petroleum Exploration Reporting and Data Submission Guidelines*
- *Environmental Assessment Act* 1982 (NT)
    - *Environmental Assessment Administrative Procedures*
- *Aboriginal Land Rights (Northern Territory) Act* 1976 (Cth)
- *Native Title Act 1993 (Cth)*
- *Waste Management Pollution Control Act* 2007 (NT)
    - *Waste Management Pollution Control (Administration) Regulations*
- *Territory Parks and Wildlife Conservation Act* 1980 (NT)
- *Water Act* 1992 (NT)
    - *Water Regulations* 1992 (NT)

The Regulatory Framework – in more detail

1. *The Petroleum Act, subordinate legislation and 'fracking' operations in the Northern Territory*

The object of the Act is clearly intended to emphasis economic development above environmental protection and intergenerational equity. Under section 3 the object of the Act is *"to provide a legal framework within which persons are encouraged to undertake effective exploration for petroleum and to develop petroleum production so that the optimum value of the resource is returned to the territory*".[12] The Act does state that the legal framework provides for, among other things, "the reduction of risks, so far is reasonable and practicable of harm to the environment during activities associated with exploration or production of petroleum" (which includes fracking).[13]

Section 58 of the *Petroleum Act* sets out the general conditions of exploration permits and licences granted under the Act. In relation to ensuring protection of the environment, the following subsections are relevant:

- s58(b) requires operations to be undertaken with reasonable diligence, in accordance with good oilfield practice and the approved technical works programme;
- s58(c) carry out the technical works programme causing as little disturbance as practicable to the environment;
- s58(d) not allow escape of petroleum, without approval; and
- s58(f) comply with any lawful directions of the Minister in relation to protection of the environment.

We note that under section 5 of the Act, *good oilfield practice* is defined as 'in relation to the exploration for, or operations for the recovery of, petroleum, means all those practices and procedures that are generally accepted as good and safe in the carrying on of that exploration or those operations, as the case may be. This is an unacceptable standard. It is broad, vague, does not recognise the need for geographic specific requirements and, given the vast

[11] Petroleum Act s 45
[12] Petroleum Act s 3.
[13] Petroleum Act s 3(2)(f)

variation in oilfield practice around the world lacks any type of certainty.

The Regulations have no bearing on environmental protection.

2. *Guidelines and Codes of Practice in the Northern Territory.*

The Northern Territory has guidelines which influence 'fracking' operations. We note that these guidelines do not automatically have legislative force, and require the Minister to give notice to a permittee or licensee. Any codes or guidelines for petroleum activities in the Northern Territory should have legislative force and not require Ministerial actions to ensure they do.

There are three 'guideline' documents in the Northern Territory, namely:

- The *NT Schedule of Onshore Petroleum Exploration and Production Requirements (**the Onshore Schedule**).*

  The Onshore Schedule contains some of the requirements you would normally expect to find in regulations. The Onshore Schedule does not appear to be an issued 'guideline' in accordance with section 21E of the Act, and would therefore only have legislative force via the provisions of section 58, or as conditions imposed on a permit or licence. This is convoluted, nonsensical and confusing.

  Key sections to note:

  - **s 109 Protection of the Environment.**

    The holder of a title shall ensure that employees and contractors comply with an approved Code of Environmental Practice or with the Australian Petroleum Exploration Association Code of Environmental Practice 1983 [note – no requirement for a code to be as stringent as the APEA Code. Additionally, the APEA Code is not a public document].

    We note that the code that the Onshore Schedule may mean to refer to is the APPEA (Australian Petroleum Production and Exploration Association) Code of Environmental Practice.

  - **s 112 Containment of Petroleum and Waste Fluids**

    Petroleum recovered shall be confined to tanks, gasholders, pipes or other receptacles in accordance with good oil field practice and, except as a temporary measure during an emergency, petroleum shall not be placed or kept in an earthen pit. However, formation water or other waste fluids produced from a well shall be disposed of in a manner acceptable to the Director [no standard/consistent homogenized requirement, no detailed requirements in terms of lining, materials and depth], and in no case be allowed to risk public health or safety, or to contaminate water or land not specifically designated for waste disposal.

    All waste materials from work on a well or produced from a well (whether or not contaminated with oil) shall, unless otherwise removed from the well site to a satisfactory storage, be dumped or drained to a waste sump. Waste sump is to be adequately fenced and shall incorporate every reasonable precaution to prevent pollution of surface and underground water through seepage.

  - **s 289 Reporting escape or ignition of petroleum or other material**

    Operators are only required to report spills of over 300 liters in areas not in areas

of inland water. There is no definition of 'areas of inland waters'

Operators are only required to report any uncontrolled escape or ignition of petroleum or other flammable or combustible material in circumstances where that causes a potentially hazardous situation.

- **Part V 501 – Approval to Drill**

  Approval is required prior to drilling a new exploration, development or appraisal well. An application to drill must be made one month prior to commencement of operations or 3 months if the drilling is to occur in an environmentally sensitive area. The section requires a statement of proposed environmental protection and rehab measures, detail of the drilling program including particulars of the casing program (with designs for safety factors for burst, collapse and tension) complete casing cementation program, drilling fluid and formation evaluation procedures.

  Issues:

  There is no definition of an environmentally sensitive area, this provides a confusing problem for operators who have to, presumably, decide for themselves whether they are proposing to drill in an environmentally sensitive area

  There is no requirement to provide (a) an estimated amount of water to be used during drilling; (b) details in relation to plans for disposal of wastewater; (c) reports about the depth of freshwater subsurface sources.

- **s 506 casing**

  The maximum performance properties shall be those indicated as minimum performance properties in API Bull 5C2 "Bulletin on Performance Properties of Casing Tubing and Dill Pipe".

  Consideration (only) required to the setting of an intermediate casing string. Compared with other jurisdictions that require intermediate casing strings to be in place in certain situations. For example see Washington State Legislature WAC 332-17-110 *Casing Requirements* which requires intermediate casing whenever anomalous pressure zones, cave-ins, washouts, abnormal temperature zones, uncased fresh water aquifers, uncontrollable lost circulation zones, other drilling hazards are present or occur.[14]

- **s 507 Cementing in accordance with good oil field practice.**

  The section outlines some requirements for cementing of casing, including the requirement that all casing string cementations shall be carried out in accordance with good oil field practice and the details of cementing operations shall be recorded in the driller's log and the daily drilling report.

- **s 525 Protection of Aquifers**

  "All reasonable steps shall be taken during well or production operations to prevent communications between, leakage from or the pollution of aquifers that serve, or could serve, any useful purpose.

- **s 529 Abandonment of a well.**

  Sets out the requirements for cement plugs on abandoned wells.

[14] http://app.leg.wa.gov/wac/default.aspx?cite=332-17-110

- **s 531 Disposal of Produced Oil and Gas**

  The section states that any oil or gas that is circulated out of or produced during a drilling, testing or repair operation, and is not flowed through the well's flowline to a gathering facility, it shall be flowed through an appropriate manifold and properly staked temporary flow line to a storage tank or flare.

- **S 619 Approval to Vent or Flare**

  Venting and flaring must be approved as part of an operation or plan, unless in an emergency.

- The *Petroleum Exploration Permit Guidelines (***Exploration Guidelines***)*

  The Exploration Guidelines are issued under section 21E with a stated purpose of providing guidance to industry about their statutory obligations in the Northern Territory. The Exploration Guidelines state that the Department's "*over-arching objective is to manage the NT's petroleum resources and acreage in a manner consistent with the long-term viability of the industry and best return for the Territory*".

- The *Northern Territory Petroleum Exploration Reporting and Data Submission Guidelines* (**the Reporting Guidelines**).

  The Reporting Guidelines are not a tool to ensure that petroleum operations in the Northern Territory are undertaken in a way that ensures protection of the environment. The Reporting Guidelines are essentially a tool utilized to furnish the government with information about petroleum resources that may be located during operations.

3. Environmental Assessment of Petroleum Activities in the Northern Territory

The laws that control if, when and how an environmental assessment takes place are separate from the petroleum mining laws.

For petroleum exploration and mining activities on land or within three nautical miles of the Northern Territory coast, environmental impact assessment of a proposed petroleum mine only takes place if the Northern Territory Environment Protection Authority is of the opinion that the mining activities are likely to have a significant environmental impact.[15]

There is no explicit requirement for the Minister for Mines and Energy to consider the outcome of an environmental impact assessment when deciding whether or not to grant a petroleum approval. Having said that, if an environmental assessment has occurred the Minister is required to follow the recommendations of the assessment report, or table a notice in the legislative assembly.[16]

The only time when the Minister must consider the environment is when granting petroleum activities proposed to take place in a Territory park or reserve or a wilderness area.

If the exploration and mining of oil and gas is likely to have a significant impact on a matter of national environmental significance, the proposed exploration would require an approval under Australia's national environmental laws: the *Commonwealth Environment Protection and Biodiversity Conservation Act* 1999 (Cth)

[15] *Environment Assessment Act (NT)* s 4
[16] *Environment Assessment Act (NT)* s 8A

Petroleum activities on Aboriginal Land and Native Title land in the Northern Territory

See Appendix A and B to the Petroleum Exploration Permit Guidelines

Regulatory frameworks for hydraulic fracturing within Australia

Case Study A – New South Wales

Summary of the New South Wales regulatory framework for shale gas extraction (using hydraulic fracturing): Overview

The legal regime regulating 'fracking' activities in NSW can be described as a tripartite framework:

1. Coal Seam Gas (CSG) activity regulated under the *Petroleum (Onshore) Act* 1991 (**the Act**) and *Petroleum (Onshore) Regulation* 2007 and Codes of Practice made under the Act.
2. Impacts on the Environment, regulated under the *Environment Planning and Assessment Act* 1979 (**EP Act**).
3. Management of specific water issues under the *Water Management Act* 2000, specifically via the *Aquifer Interference Policy*.

Section 23 of the Act provides for conditions to be imposed on petroleum titles, either by the Minister or by the regulations. In NSW two codes of practice apply as conditions imposed on titles:

- NSW Code of Practice for Coal Seam Gas Fracture Stimulation Activities (**Stimulation Code**); and
- NSW Code of Practice for Coal Seam Gas Well Integrity (**Integrity Code**).

The Stimulation Code sets out measures to ensure that fracture stimulation activities are conducted in a safe manner that ensures protection of the environment, water resources and communities.[17] The Stimulation Code sets out mandatory requirements for Management Plans, Stakeholder Consultation, Fracture Stimulation Design, Risk Assessment, Safety, Use of Chemicals in Fracture Stimulation, Water Resource Protection, Management of Flowback water, Monitoring, Incident and Emergency Response, Completion Reports and Record Keeping.

The Integrity Code sets out specific design requirements for construction, production, maintenance and ultimate abandonment of CSG wells in NSW.[18] The Integrity Code provides minimum requirements for well design, casing, cementing, wellheads, drilling fluids, monitoring and maintenance and abandonment of wells.

The NSW regulatory regime also includes State Environmental Planning Policies made under the EP Act. The *SEPP (Mining, Petroleum Production and Extractive Industries) 2007* aims to provide for the proper management and development of mineral, petroleum and extractive mineral resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage sustainable development through the environmental assessment and sustainable management.

The *Strategic Regional Land Use Policy* provides a 'gateway assessment process'[19] for fracking developments in recognition of:

- The importance of agricultural resources;
- To ensure protection of strategic agricultural land and water resources;
- To ensure a balanced use of land by potentially competing industries; and
- To provide for the sustainable growth of mining, petroleum and agricultural industries.

[17] https://www.nsw.gov.au/sites/default/files/csg-fracturestimulation_sd_v01.pdf
[18] https://www.nsw.gov.au/sites/default/files/csg-wellintegrity_sd_v01.pdf
[19] http://www.planning.nsw.gov.au/en-us/planningyourregion/strategicregionallanduse/gatewayassessmentandsiteverification.aspx

Acts, Regulations, Policies and Codes

Principal components of the NSW regulatory regime applying to environmental protection from fracture stimulation activities are:

Acts and Regulations

- *Petroleum (Onshore) Act 1991* (NSW)
    - *Petroleum title conditions*
- *Petroleum (Onshore) Regulation 2007* (NSW)
    - *Schedule of Onshore Petroleum Exploration and Production Safety Requirements*
- *Environmental Planning and Assessment Act 1979* (NSW)
- *Water Management Act 2000* (NSW)
- *Protection of the Environment Operations Act 1997* (NSW)

Policy under the Environmental Planning and Assessment Act 1979

- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*
- *State Environmental Planning Policy (State and Regional Development) 2011*

Policy

- *Aquifer Interference Policy*
- *Strategic Regional Land Use Policy*

Codes of practice

- *NSW Code of Practice for Coal Seam Gas Fracture Stimulation Activities*
- *NSW Code of Practice for Coal Seam Gas Well Integrity*

Guidelines

- *ESG2: Environmental Impact Assessment Guidelines*
- *Part 5 REF Requirements for petroleum prospecting*

Key provisions

Petroleum (Onshore) Act 1991 (NSW)

- Policy under the Act that prohibits the use of BTEX compounds[20]

- Policy under the Act that bans the use of evaporation ponds for storing water used in the production process. [21]

- *Section 24A - Fit and proper person consideration in making certain decisions about petroleum titles.*

  Section 24A provides the NSW Minister with the discretion to consider numerous factors in relation to an applicant for a petroleum title.

[20] http://www.trade.nsw.gov.au/policy/TI-O-120
[21] http://www.resourcesandenergy.nsw.gov.au/landholders-and-community/coal-seam-gas/the-facts/protections-and-controls

- Section 42(2)(b) – Grant of a production lease

  Under the NSW regulatory regime, the Minister must not grant a production lease where to do so would contravene the *Environmental Planning and Assessment Act* 1979 (NSW).

- Requirement to obtain a development consent (under Part 3A or Part 5.1 of the EP & AA – Section 67

- Councils, Government Departments, Statutory authorities and the Director of Planning can object to the grant of a production licence.

- Section 74 – Specific requirement that the Minister must take into account the need to conserve and protect (a) the flora, fauna, fish, fisheries and scenic attractions; and (b) the features of Aboriginal, architectural, archaeological, historical or geological interest, in or on the land over which the petroleum title is sought.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

- The SEPP prohibits CSG development:

  - On or under land in and within 2km of a residential zone or future identified residential growth area; and
  - On or under land which is a critical industry cluster (CIC).

  The CIC's are concentrations of highly productive industries and contribute the identity of that region and provide significant employment opportunities.[22] Two CICs have been identified, namely, the Upper Hunter CIC and the Viticulture CIC. The Planning and Environment Department provides CIC maps which identify CSG exclusion zones.

- Development consent for exploration

  Under the SEPP, petroleum exploration is exempt from Development Consent, however, drilling or operating petroleum exploration wells requires Development Consent unless it is a set of 5 or fewer wells that are more than three km from any other petroleum well in the same title.

  CSG development is prohibited on land within a CSG exclusion zone and land within a buffer zone.

- Development standards for mining

  Sets non-discretionary development standards for mining. Of particularly implication for 'fracking' developments – the SEPP requires adherence to the *NSW Aquifer Interference Policy.*

Strategic Regional Land Use Policy

- All CSG proposals on land identified or verified as Strategic Agricultural Land will be considered under an independent Gateway assessment process. Key elements of the policy are the identification and mapping of Strategic Agricultural Land, the Aquifer Interference Policy to inform the Gateway Panel, the establishment of a new Land and Water Commissioner, the requirement for an Agricultural Impact Statement (for both exploration and production proposals).

[22] http://www.planning.nsw.gov.au/critical-industry-clusters-in-the-upper-hunter

Case study B – Queensland

Summary of the Queensland regulatory framework for shale gas extraction (using hydraulic fracturing): Overview

The *Petroleum Act* 1923, the *Petroleum and Gas (Production and Safety) Act* 2004 (**PGPS Act**) and the *Petroleum and Gas (Production and Safety) Regulations* (**PGPS Regulations**) form the core of the regulatory regime for petroleum exploration and production by way of hydraulic fracturing in Queensland.

The PGPS Act and PGPS Regulations provide a comprehensive list of requirements for operators of projects using hydraulic fracturing. These include requirements for the construction and abandonment of petroleum wells. The Queensland regulatory regime goes further, however, and imposes mandatory and preferred standards for operators. These standards are given legislative force under section 7, and schedule 1 of the PGPS Regulations.

> *Section 7 of the PGPS Regulations states:*
>
> *(1) A standard, code or other document listed in schedule 1, column 1 is prescribed as a safety requirement for the activity or thing stated opposite the document in column 2 of the schedule.*
>
> *(2) The document is a mandatory or preferred standard for the safety requirement as stated in column 3 of the schedule opposite the document.*
>
> *(3) If a document is a **mandatory standard** for a safety requirement, a person must comply with the document in order to comply with the safety requirement.*
>
> *(4) If a document is a **preferred standard** for a safety requirement –*
>
> *a. a person who complies with the document complies with the safety requirement; but*
>
> *b. a person may comply with the safety requirement without complying with the document if –*
>
> *i. the person gives the chief inspector a notice that the person is not complying with the document; and*
>
> *ii. the person has written evidence showing the level of risk for the activity or thing to which the safety requirement applies is equal or less than the level or risk that would be achieved by complying with the document.*
>
> *…*

The PGPS Regulations makes it mandatory for operators to comply with the:

- *Code of Practice for coal seam gas well head emissions detection and reporting;*
- *Code of Practice for construction and abandoning coal seam gas wells and associated bores in Queensland.*

The PGPS Regulations make it a preferred standard that operators comply with:

- *18 International Standards for Petroleum and Natural Gas, published by the International Organization for Standardization.*

Rights to use water in fracking operations in Queensland are regulated under the *Water Act* 2000 (**Water Act**).

In addition to the approvals required under the 'Petroleum legislation', outlined above, additional environmental specific approvals are required under the *Environmental Protection Act* 1994 (EP Act). The EP Act approvals regulate the environmental impacts of fracking operations, this includes management of wastewater.

The Coal Seam Gas Water Management Policy 2012 states, "in all but exceptional circumstances, evaporation dams have been banned as a management option for CSG water. Existing CSG operators are required to continue the decommissioning or conversion of any remaining evaporation damns".[23]

Acts, Regulations and Codes

- *Petroleum Act 1923*
- *Petroleum and Gas (Production and Safety) Act 2004*
    - *Petroleum and Gas (Production and Safety) Regulation 2004*
        - *Code of Practice – for construction and abandoning coal seam gas wells and associated bores in Queensland.*
        - *Code of Practice – for well head emissions*
        - *Land Access Code*
- *Water Act 2000*
- *Water Supply (Safety and Reliability) Act 2008*
- *Gasfields Commission Act 2013*
- *State Development and Public Works Organisation Act 1971*
- *Environment Protection Act 1994*
    - *Environmental Protection Regulation 2008*
        - *Coal Seam Gas Water Management Policy 2012*
- *Forestry Act 1959*

The Regulatory Framework:

1. Coordinated v non-Coordinated Projects

Fracking projects in Queensland are regulated via two different processes, depending on whether or not a project is a "Coordinated Project" as defined under the *State Development and Public Works Organisation Act* 1971 (Qld) (**The SDPWO Act**).[24] The two processes are summarised below:

1) *Coordinated Projects*

   A "Coordinated Project" under the SDPWO Act is directed by the Coordinator-General under the provisions of the SDPWO Act. Coordinated Projects tend to be large-scale projects with considerable amounts of infrastructure.

[23] *Coal Seam Gas Water Management Policy* 2012, pp v
[24] SDPWO Act, Schedule 2

Final approvals (such as tenure pursuant to the *Petroleum and Gas (Production and Safety) Act 2004* (P&G Act) and Environmental Authorities (EAs) pursuant to the *Environmental Protection Act 1994* (EP Act), or any other approval required from any other relevant Queensland Government department) will be sought from the relevant departments.[25] To inform their decisions, the Coordinator-General will provide to the relevant Departments a detailed "assessment report".[26] The project applicant is also required to make an application to the relevant individual government departments.[27]

The Coordinator-General can impose key operating conditions for the project, which cannot be changed by later approvals by those other departments. As an example, the Coordinator General has imposed conditions on Coal Seam Gas operations requiring operations to develop and implement a Social Impact Management Plan.

2) <u>*Non – Coordinated Projects*</u>

A non Coordinated Project is regulated completely by the Department of Natural Resources and Mines (**DNRM**) and the Department of Environment and Heritage Protection (**DEHP**) and the respective legislation, regulation and policies they administer.

Non-Coordinated Projects tend to be once off projects with no significant associated infrastructure or they might be expansion applications to existing projects (such as extra pipelines or wells).

2. Environmental Authority (EA) Regulatory Framework

<u>*Environmental Impact Assessment:*</u>

Prior to a decision being made as to whether or not to grant an EA, an EIS (prepared by the proponent of the project) *may* be required. The EIS processes involve public submissions and consultation. An EIS will be undertaken pursuant to one of two pieces of Queensland legislation:

a) State Development and Public Works Organisation Act 1971 (Qld):

If a resource activity is declared a Coordinated Project, the Coordinator-General will at the same time decide whether an EIS is required under the SDPWO Act per s 26(1).

If the Coordinator-General decides that an EIS under the SDPWO is not required, they must, pursuant to s 26(2)(a), ensure that an EIS will take place under another Act. In other words, a Coordinated Project will always have an EIS undertaken pursuant to one of the relevant Acts, contributing to the EA process.

An EIS under the SDPWO Act will be undertaken pursuant to Division 3 of the Act, after which the Coordinator-General will prepare a report evaluating the EIS (s 35) which will be made available to the various departments for approval consideration (such as an EA).

The Coordinator General's report may state/impose conditions for the undertaking of the project (s 47C(1), s 54B), and if it does, there is a statutory obligation to give a copy of the report to the minister administering the EP Act (s

[25] Department of Natural Resources and Mines (DNRM), Department of Environment and Heritage Protection (DEHP)
[26] *SDPWO* Act, s 54W
[27] ibid, s 54U

47C(2)). If there is an inconsistency between conditions imposed by the Coordinator General and DEHP in the EA, the condition imposed by the Coordinator General prevails to the extent of the inconsistency (s 54E).

The Coordinator General's EIS process has been recently reformed in order to streamline the process and the following documents have been produced:[28]

- Standardised outcome-focused conditions for resource projects;
- Generic draft terms of reference;
- Social Impact Assessment guidelines.

b) Environmental Protection Act 1994 (Qld):

Resource activities which are either ***not*** a Coordinated Project or ***is*** a Coordinated Project where the Coordinator-General determines that an EIS pursuant to SDPWO Act is not required, may undergo an EIS under Chapter 3 of the EP Act. DEHP have published a "trigger criteria" document, based on the EP Act, which helps specify the circumstances in which a project will be required to undergo an EIS under the Act.[29] Typically, it will be major projects that will need to undergo an EIS under the Act, however, a proponent may voluntarily prepare an EIS regardless of its status with the approval of DEHP (s 37(1)(d)).

Low and medium level projects generally do not undergo an EIS, as there are other procedures in place to assess the environmental considerations in respect of granting an EA for these types of projects. This includes published eligibility criteria for standard conditions (low risk projects only),[30] and the requirement of an environmental management plan.

Environmental Authority from Department of Environment and Heritage Protection

Whether the resource activity is a Coordinated-Project or not, it (any "environmentally relevant activity" (ERA)) will always require the grant of an EA from DEHP. EAs and the associated processes are described in Chapter 5 of the EP Act. Of note is that there is a prohibition on BTEX chemicals as a standard condition of all application types (s 206). There are three different types of application for an EA:

1. Standard Applications:

'When an applicant can meet the eligibility criteria and all the standard conditions associated with an ERA. This application type is only permitted for low risk activities and as such, there is no assessment by DEHP.'[31] Eligibility criteria and standard conditions exist for the following:

- Petroleum exploration;
- Petroleum survey;
- Petroleum pipeline;
- Geothermal exploration.

[28] Available at: Queensland Government, *Streamlining the EIS process* (02 July 2014) Department of State Development, Infrastructure and Planning <http://www.dsdip.qld.gov.au/streamlining-the-eis-process/coordinator-general-projects/assessments-and-approvals/streamlining-the-eis-process.html>.
[29] Available at: Lindsay Delzoppo, '*Triggers for environmental impact statements under the Environmental Protection Act 1994 for mining and petroleum activities* (10 February 2014) Department of Environment and Heritage Protection <http://www.ehp.qld.gov.au/management/impact-assessment/pdf/eis-guideline-trigger-criteria.pdf>.
[30] Available at: Queensland Government, '*Environmental Authorities*' (4 April 2014) Department of Environment and Heritage Protection <http://www.ehp.qld.gov.au/management/non-mining/environmental-authority.html>.
[31] Ibid.

2. Varied Applications:

'When an applicant can meet the eligibility criteria but needs to change one or more of the standard conditions for an ERA. The impacts from these changes are assessed by DEHP and standard conditions are varied'.[32] This assessment framework will be discussed below.

3. Site Specific Applications:

'When an applicant does not meet the eligibility criteria for the ERA or where there are no eligibility criteria in existence. These applications are subject to a whole-of-project assessment and include public notification. Standard conditions may be used in these approvals however it is likely that site-specific conditions will also be needed to protect environmental values'.[33] All Coordinated Projects are site specific. Site specific applications are generally higher risk projects. The assessment framework will be discussed below.

3. Assessment of Environmental Impacts and Conditions (Varied & Site Specific Applications)

DEHP assess the impacts a project will have on the environment against environmental objectives, performance standards and other criteria relating to impacts on the environment:

- *Environmental Protection Regulation 2008* Sch 5;
- *Environmental Protection (Air) Policy 2008*;
- *Environmental Protection (Noise) Policy 2008*;
- *Environmental Protection (Water) Policy 2009*.

The assessment will be based on the EIS or environmental management plan. In practice, there is a lot of communication and discussion between the project proponents and DEHP throughout the process. Essentially, the proponent proposes all the ways they will manage the environmental impacts of a project, and the DEHP, if satisfied that those proposals will meet the requirements of the policies and regulations – that the environmental outcomes are going to be met - an EA will be granted, with relevant conditions.

[32] Ibid.
[33] Ibid.

Examples of leading practices from other Australian states

National practices

The National Harmonised Regulatory Framework for Natural Gas from Coal Seams 2013. Standing Council on Energy and Resources.

- Focuses on four key areas of operation which cover the lifecycle of development: Well integrity, water management and monitoring, hydraulic fracturing and chemical use.
- The framework is designed to provide guidance to the states in developing regulatory regimes that ensure that development of the petroleum industry is managed sustainably.
- The framework established 18 leading practices.

Victoria

- The Victorian State Government endorsed the *National Harmonised Regulatory Framework for Natural Gas from Coal Seams* (**National Framework**) in early June, but is still in the process of deciding whether additional regulation is required at the State level.
- The *Resources Legislation Amendment (BTEX Prohibition and Other Matters) Bill* 2014 prohibits the use of BTEX chemicals in hydraulic fracturing.[34]

Western Australia

- The *Schedule of Onshore Exploration and Production Requirements* 1991 contains the types of provisions generally found in regulations, including requirements for well construction, drilling, regulation of production and reporting requirements.
- The Western Australian government commissioned Dr Tina Hunter to review its regulatory framework for unconventional gas in 2011 (as did the Northern Territory).[35] Her report recommended legislative amendment to provide for:
    - strengthened enforcement provisions;
    - full disclosure of all chemicals; and
    - public release of approved environmental management plans.
- The *Petroleum and Geothermal Energy Resources (Environment) Regulations 2012* (WA) requires all environmental management plans to be publicly disclosed. This includes a requirement to disclose all chemicals or other substances, which may be, used 'down-hole'.[36]
- Resource Management and Administration Regulations for Petroleum Activity were closed for public comment on 30 May 2014. These regulations "will provide a risk based management scheme for the exploration for, and production of petroleum and other geothermal energy resources.[37]

[34] *Resources Legislation Amendment (BTEX Prohibition and Other Matters) Bill* 2014 (Vic) s 25.
[35] http://www.corrs.com.au/publications/corrs-in-brief/the-regulation-of-unconventional-petroleum-exploration-and-production-in-western-australia/
[36] http://www.corrs.com.au/publications/corrs-in-brief/an-emerging-new-world-for-the-environmental-regulation-of-unconventional-gas-projects-in-western-australia/
[37] http://www.dmp.wa.gov.au/19487.aspx

- The Western Australia gas industry has a document entitled *Western Australian Onshore Gas Code of Practice for Hydraulic Fracturing.* This Code carries no legislative force.

South Australia

The primary regulatory tool in South Australia is the *Petroleum and Geothermal Energy Act (2000)* (SA) (**GEA**). A number of key provisions of the GEA are interesting to note:

- Section 10 of the GEA defines *regulated activities,* in relation to petroleum these include exploration and production.

- Section 74 – A licence must include mandatory conditions dividing the regulated activities to be carried out under the licence into:
    - activities requiring high level official surveillance; or
    - activities requiring low level official surveillance.

  Activities are to be classified as requiring high-level official surveillance unless the licensee satisfies the Minister that, in the view of the licensee's demonstrated competence to comply with the requirements of the GEA and the conditions of the licence the activities should be classified as requiring low level official surveillance.

  The implications of having activities classified as high surveillance are quite large. High surveillance activities require the prior written approval of the Minister and fees for low surveillance activities are reduced by half.

  The *Petroleum and Geothermal Energy Regulations* (2013) (**Regulations**) set out specific factors that the Minister must consider when classifying an operators activities as low or high surveillance activities.

- Section 95 – The Minister must, have regard to, and seek to further, the objects of the *Natural Resources Management Act* 2004 (SA)

- Section 97 – An environmental impacts report must be prepared for regulated activities in accordance with the Regulations. Importantly, an environmental report must take into account cultural, amenity and other values of Aboriginal and other Australians insofar as those values are relevant to the assessment.

- Section 98 requires the Minister to classify an activity as either low, medium or high impact. In making the classification, the Minister must consider the cumulative effects of the activities. The classification impacts on the level of environmental impact assessment required.

- The *Petroleum and Geothermal Energy Regulations* (2013) (**Regulations**) set out objective criteria for the assessment of the environmental impacts of regulated activities.

Regulatory frameworks for shale gas extraction (using hydraulic fracturing) within the United States of America

Case study A - North Dakota

North Dakota, United States of America: Overview

The North Dakota regulatory regime for hydraulic fracturing is overseen by the North Dakota Industrial Commission (NDIC), Oil and Gas Division. The control of oil and gas resource operations in the state are primarily regulated under chapters 38 of the *North Dakota Century Code* (**NDCC**) and Title 43 of the *North Dakota Administrative Code* (**NDAC**).

The NDCC contains the currently effective laws of North Dakota, chapter 38 relates to "Mining and Gas and Oil Production". The NDAC is a published codification of the rules of all state administrative agencies, including NDIC.

The North Dakota Department of Health (**Department**) has the responsibility to safeguard the quality of North Dakota's air, land and water resources. All discharge of wastes, on surface, are administered under Chapter 33 of the NDAC 'Standards of Quality for Waters of the State' (**Standard**). All air emissions from hydraulic fracturing operations are administered under the 'Air pollution Control Rules' (**Rules**) established by Chapters 33-15-07 and 33-15-20 of the NDAC. The rules set out requirements for tank emissions, and emissions from dehydration units, treater flares and pneumatic pumps.

The Rules include important provisions aimed at reducing fugitive emissions from fracking operations via flaring. Contrary to Colorado, the North Dakota regulations do not mandate testing regulations specific to shale/fracking operations.[38]

There is Federal legislation, which applies throughout the United States and forms part of the regulatory regime in North Dakota.

Acts, Regulations and Codes

Applicable Federal legislation:

- Clean Water Act (CWA)
- Clean Air Act (CAA)
- National Environmental Policy Act (NEPA)

Applicable State regulations:

- *NDIC Rules and Regulations (Contained in chapter 38 of the NDCC and Title 43 of the NDAC).*
- *Chapter 23-25 of the NDCC – Air Pollution Control*
- *Chapter 33-15 of the NDAC – Air Pollution*
- *Chapter 33-16 of the NDAC - Standards of Quality for Waters of the state*
- *Chapter 38 of the NDAC - North Dakota Air Pollution Control Rules*

North Dakota applies the American Petroleum Institute Standards.

Key provisions for environmental protection from hydraulic fracturing operations

1. The control of oil and gas resources

- Waste of oil and gas is prohibited (38-08-03)

[38] http://www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Capabilities/North-America-Capabilities/USA/Oil-and-Gasoline-Testing/Oil-and-Gas-Production-and-Midstream-Support/Fracking-Regulations-by-State

- The commission has the authority to enter into contracts for mitigating a problem if the well, equipment, pipeline or associated pipeline facility is likely to cause a serious threat of pollution or injury to the public health and safety (38-08-04.4)

- A drilling permit is required if the drilling of a well is for oil or gas. Unless waived by the owner, a permit will not be issued for an oil or gas well that will be located within 500 feet of an occupied dwelling. If a permit is issued within 1000 feet of an occupied dwelling, the commission may impose conditions on the permit (38-08-05)

- Hydraulic fracturing is designated as an acceptable recovery process. Hydraulic fracturing is a mechanical method of increasing the permeability of rock to increase the amount of oil and gas produced from the rock (38-08-25)

The damage compensation for oil and gas production is found in Chapter 38-11.1 and subsurface exploration damages is in Chapter 38-11.2

- If there is any damage to domestic, livestock, or irrigation water supply of any person who owns property within one mile of an oil or gas well site, that person is entitled to recover any costs (38-11.1-06)

- The well site is subject to inspections to ensure compliance with applicable environment protection laws (38-11.2-02)

- Any drilling operations must be notified (38-11.2-03)

- The owner of the well shall conduct an inventory of water wells within one mile of the site and conduct a certified water quality and quantity test within one year preceding the commencement of mineral production operations (38-11.2-07)

2. Air Pollution

- Chapter 33-15-20 of the NDAC – Control of Emissions from Oil and Gas Well Production Facilities

  Requires operators to submit reports to the Department within 90 days of the completion or recompletion of a well. The report must contain sufficient information to allow the Department to determine if the oil or gas well has complied with the Chapter.

  The Chapter sets limits on the amount of emissions (including, but not limited to, hydrogen sulfide and sulfur dioxide) from oil and gas wells and requires operators to provide information demonstrating that emissions from the facility do not significantly contribute to exceeding ambient air quality standards. The Chapter also places an obligation for operators to install equipment necessary to ensure that ambient air quality standards are met. The Chapter also provides specific requirements for flare stacks.

3. Water and waste management

- *Chapter 33-16-02 of the NDAC –*

  The section provides that no untreated industrial waste or other waste that may endanger public health or degrade the water quality of water shall be discharged into waters of the state.

- *Artilce 33-20 (Solid Waste Management and Land Protection)*

- *Article 33-24 (Hazardous Waste Management)*

- *Chapter 43-02-03-19.3 of the NDAC (Earthen pits and open receptacles)*

Except as otherwise provided in section 43-02-03-19, no saltwater, drilling mud, crude oil, waste oil or other waste shall be stored in earthen pits or open receptacles except in an emergency and upon approval by the director.

- *Chapter 43-02-03-53 of the NDAC – Saltwater handling facilities*

  Sets out the requirements for storage of water produced with oil and natural gas. Surface facilities, such as wastewater ponds/pits are able to be used in North Dakota, provided they are:

  - Devoid of leaks and are constructed of materials resistant to the effects of the wastewater stored in them. Dikes must be erected around any wastewater tank or other surface facility (wastewater ponds).

4. Casing and well requirements

- All wells shall be completed with strings of casing which are properly cemented at sufficient depths. Drilling of the surface hole shall be with freshwater-based drilling mud or other method approved by the director. The surface casing shall be set and cemented no less than 50 feet below the base and all strings of casing shall stand cemented under pressure for at least 12 hours (43-02-03-21)

- The director may prescribe pre-treatment casing pressure tests designed to protect wellhead and casing strings during treatment operations for fracturing wells and if fracturing results in irreparable damage, the commission may require the operator to plug the well (42-02-03-27)

- There are guidelines for a hydraulic fracture stimulation performed through a frac string run inside the intermediate casing string (43-02-03-27.1)
  - The frac string must be either in a liner or run with a packer at no less than 100 feet below the top of the cement
  - The frac string must be pressurised and monitored during operations, a tested pressure relief must be utilised on treatment lines with suitable valve checks and an adequately sized diversion line must be utilised to divert flow from the intermediate casing to a pit.

- The construction requires all injection wells to be cased and cemented to prevent movement of fluids into an unauthorised zone or into drinking water. For determining the casing and cement requirements, the estimated fracture pressure, the depth, fluid pressure and physical and chemical characteristics of the injection zone will be taken into account. Appropriate tests shall be conducted during the drilling and construction of injection wells (43-02-05-06)

5. Chemicals and reporting

- Within 60 days after hydraulic fracturing, the operator must post on the chemical disclosure registry, all elements used during operations. These are viewable by the public.

- There are reporting and monitoring requirements for injections wells in that monthly reports must be given to the commission. Upon completion of an injection well for formation fracturing, a report must be filed within 30 days outlining the reason for the work, dates, shots per foot, quantity of sand and chemicals, results of tests and any other information (43-02-05-12)

Case study B - Colorado

Colorado, United States of America: Overview

The primary piece of legislation governing oil and gas development in Colorado is the *Oil and Gas Conservation Act*. The Act's intentions are as follows: [39]

> *It is declared to be in the public interest to foster the responsible, balanced development, production, and utilisation of the natural resources of oil and gas in the state of Colorado in a manner consistent with protection of public health, safety, and welfare, including protection of the environment and wildlife resources.*
>
> *…*
>
> *plan and manage oil and gas operations in a manner that balances development with wildlife conservation in recognition of the state's obligation to protect wildlife resources and the hunting, fishing, and recreational traditions they support, which are important part of Colorado's economy and culture.*

Colorado Oil and Gas Conservation Commission (a division of the Colorado Department of Natural Resources) is the body responsible for regulation of the oil and gas industry in Colorado. The rules and regulations which regulate the manner and form of oil and gas developments within Colorado are the Commission's Complete Rules (100-1200 Series) (**the Rules**). Some of those rules are specific to hydraulic fracturing and are outlined below. The rules provide comprehensive requirements for operators using hydraulic fracturing including standard forms that cover many issues associated with fracking operations such as air emissions and water management.

Like North Dakota, the responsibility for ensuring that oil and gas operations do not impact on air and water quality is the responsibility of the Colorado Department of Public Health and Environment (Department).

The Department administers air, water and waste requirements that must be met by operators using hydraulic fracturing.

Colorado is widely recognised as the state in America with the toughest air quality regulations for fracking operators. Air quality is regulated by the Colorado Air Quality Control Commission (AQCC) Recently the AQCC adopted stronger requirements for emissions from fracking operations. Notably the new regulations set requirements and reporting obligations in relation to methane and required all wells to comply with America's strongest leak detection program.[40] Colorado has fully adopted the U.S EPA 'Standards of Performance for Crude Oil and Natural Gas Production, Transmissions and Distribution'.[41]

Operators are required to comply with emissions requirements[42] and use Department forms to report on air emissions from fracking operations. Operators are also required to comply with the Department's Water Quality Control Commission regulations.

Acts, Regulations and Codes

- Oil and Gas Conservation Act (Colorado).
    - Colorado Oil and Gas Conservation Commission Complete Rules (100-1200 Series)

[39] s34-60-102 Oil and Gas Conservation Act (Colorado)
[40] http://www.denverpost.com/environment/ci_25213661/colorado-adopts-tougher-air-rules-oil-gas-industry http://www.edf.org/blog/2013/11/25/colo-sets-national-precedent-air-quality-and-climate
[41] https://www.colorado.gov/pacific/cdphe/summary-oil-and-gas-emissions-requirements
[42] https://www.colorado.gov/pacific/cdphe/emissions-requirements-oil-and-gas-industry

- COGCC Groundwater Rulemaking 2012 – Statewide Groundwater Baseline Sampling and Monitoring.

- Colorado Habitat Stewardship Act 2007

- Colorado Air Quality Control Act

  - Colorado Air Quality Control Commission Regulations[43]

    - Regulation No. 3 – Stationary Source Permitting and Air Pollutant Emission Notice Requirements 5CCR 1001-5

    - Regulation No. 6 – Standards of Performance for New Stationary Sources 5 CCR 1001-8

    - Regulation No. 8 – Control of Hazardous Air Pollutants 5 CCR 1001-10 (incorporates the National Emission Standard for Equipment Leaks)

Key provisions of the Rules, which apply specifically to Hydraulic Fracturing:

- *Rule 205 – Inventory chemicals*

  Operators are directed to keep records of operations, which are available for inspection by the Commission for five years and in the case of chemicals for five years after cessation of the operation. Specifically from 1/5/2009 a chemical inventory must be kept of chemicals used in fracturing, including details of use of any amount exceeding 500 pounds of any chemical by well site.

- *Rule 205A – Disclosure*

  (1) Vendors and service providers must disclose the chemical composition of fracturing additives to operators unless protected by trade secrecy provisions in which case specific conditions apply. (2)Operators must register hydraulic fracturing treatment chemicals usage within 60 days of conclusion of operations or no later than 120 days after commencement and the registry information is available to public inspection on the Commission's website. Required details include volume of water used, volume of base fluid, depth of well, concentration of each chemical additive.

- *Rule 305.e.(1)A – Landowner Notice of Intent to Hydraulic Fracture*

  Directs the operator to notify surface land owner and supply Commission's Form 2A – Oil and gas location assessment, information sheet on fracturing where it is to be used, and to inform landowner that the full application may be viewed on the Commission's website and that they may provide comments to the Director of the Commission. The landowner must also be given the opportunity to consult the operator on surface use, where relevant, and notified of the expected date of commencement of operations.

- *Rule 316C 48-Hour Notice of Treatment to Local Government Designee*

  The operator must give 48 hours advance written notice of treatment at any well with the Commission then providing electronic notification to the local government designee.

- *Rule 317 Well casing and cementing; cement bond logs.*

  Details technical, safety and notification requirements for drilling
  - (a) Blow out prevention equipment (BOPE) Operator must supply details in its application of the working pressure of proposed BOPE, to exceed those of subsurface conditions. Director may specify condition specific requirements.

[43] https://www.colorado.gov/pacific/cdphe/aqcc-regs

- Drilling permit to prominently displayed at the site
- Casing requirements (d) to prevent oil, goes or water leakage to be approved prior; (e)(f) surface casing to protect all know and reasonably expected ground water; (g) to protect aquifers by stage commenting where required 50ft below and above or by other approved method; (h) technical specification of casing cement
- Flaring of gas (i) to be carried out at a safe distance and with notification to emergency services
- Disposal zones to be evaluated for hydrocarbon (n)
- Requirement for remedial cementing may be directed (p)

- *Rule 317B setbacks and precautions near surface waters and tributaries that are sources of public drinking water.*

  Controls operations in public water system surface water supply areas as shown in Commission's maps and details the application of appropriate buffer zones. Operations are not permitted within the internal buffer (300ft) without approval, where the criteria are:

  - demonstrated best management practice and equivalent demonstrated protection of drinking water;
  - that conducting operations outside the buffer would pose greater risks; or
  - that to conduct operations beyond the internal buffer would be impractical and prevent to exercise of mineral rights.

  Operations within the intermediate buffer zone (301-500 ft) must be conducted using pitless drilling and contained flowback and within the outer buffer (501-2460 ft) either pitless drilling or contained flowback. Baseline data on surface water composition to be supplied and an emergency response program must be in place.

- *Rule 341 Bradenhead monitoring during well stimulation operations*

  The rule requires all wells to be equipped with a Bradenhead. Bradenhead pressure is the pressure that builds between casing strings of a well (the annulus). The primary concern addressed by monitoring and recording bradenhead pressure is the existence of pressure in the annular space between the surface casing string and the intermediate or production casing string. The casing strings are designed and constructed to contain fluids under pressure while protecting water resources that have been penetrated by the wellbore. The monitoring requirements allow operators to monitor downhole conditions for the entire life of the well.

  Requires continuing monitoring and recording of bradenhead annulus pressure during well stimulation. Any increases of more than 200 psig are to be verbally reported to the Director as soon as practicable and no later than 24 hours after the event. Written notice is to be supplied with 15 days of corrective action. The pressure in the annulus between the intermediate casing and the production casing is also to be monitored and recorded where present. Records must be available for inspection for five years. The operator has the right to apply for variation of these conditions.

- *Rule 608 special requirements for CBM wells.*

  - *Assessment, monitoring and reporting on plugged and abandoned wells within ¼ mile of proposed CBM wells*
  - *Water well sampling of the two closest wells within ½ mile of proposed CBM including for cations, anions, total dissolved solids, minerals and methane*
  - *coal outcrop and coal mine monitoring for gas seepage.*

- *Rule 609 Statewide groundwater baseline sampling and monitoring*

  The rule sets out the requirements for operators to obtain baseline groundwater samples. The requirements are for initial sample to take place within 12 months prior to setting a conductor pipe in a Well or the first Well on a Multi-Well site. Subsequent monitoring is

required at the initial sampling location between 6 and 12 months and a second subsequent sampling event is to be undertaken between 60 and 72 months following completion of a Well.

- *Rule 903 pit permitting, lining, monitoring & secondary containment.*

  Approval must be granted for production pits, special purpose pits, drilling pits, multi-well pits; and within 30 day of construction for emergency response and flare pits.

- *Rule 904 lining monitoring and secondary containment*

  Sets out the requirements for lining of pits on federal land. These include requirements for:

  - Materials i.e. (must be impervious, have high puncture and tear strength, be resistant to ultraviolet light, weathering, hydrocarbons, aqueous acids, alkali, fungi or other substances in the produced water).
  - Thickness of lining
  - Foundation construction

  The rule also allows the Director to require a leak detection system for the pit. Other protective measures that can be required are increased record-keeping requirements, underlying gravel fill sumps and lateral systems. The Director must consider the surface and subsurface geology, the use and quality of the potentially affected groundwater, the quality of the produced water, the depth to groundwater and distance to surface water.

- *Rule 906*

  Details the requirements for notification, prevention and remediation and releases of E&P wastes and produced waters.[44]

- *Rule 907 Drilling Fluids, recycling and reuse, treatment and disposal and Oily wastes*

  Details the proper management of exploration and production wastes, including the storage, handling, transportation, treatment, and disposal of waste, including drilling fluids and produced water.[45]

- *Rule 908 Centralized E&P Waste Management Facilities*

- *Rule 910 Concentrations and Sampling for Soil and Ground Water*

[44] http://www.epa.gov/epawaste/nonhaz/industrial/special/oil/state_summaries_040114.pdf
[45] http://www.epa.gov/epawaste/nonhaz/industrial/special/oil/state_summaries_040114.pdf

Case study C – Illinois

Illinois, United States of America: Overview

In June 2013, the *Illinois Hydraulic Fracturing Regulator Act* (**IHFRA**) came into force. This piece of legislation forms the core of the regulatory regime for gas extraction by way of hydraulic fracturing (fracking) in Illinois.

The Act contains provisions, which are aimed at ensuring water quality, transparency and public involvement in the process of hydraulic fracturing. The IHFRA represents, in our view, one of the most comprehensive regulatory regimes for fracking in America.

Key provisions in the IHFRA include:

- A prohibition of open-air ponds for wastewater storage. This is an important provision and one that should be given serious consideration in the Northern Territory due to its tropical climate.
- A comprehensive set of water monitoring requirements, with baseline testing and post-fracking testing of surface water and groundwater sources near fracking wells required.
- Presumption of liability for water pollution. The IHFRA imposes on fracking operators the burden of proving that contaminated water near fracking wells was not caused by fracking. This reverse onus provision is a powerful measure that will have the effect of ensuring that only best practices are used.
- Best practice engineering requirements for well construction, casements and maintenance.
- Strong chemical disclosure provisions, including the ability for the public to challenge trade secret designations.
- A requirement that fracking operators have a water management plan that details the source and anticipated volume of water used in each well. Companies must also report to the Department of Natural Resources the total water used in fracking and locations from where water was drawn.
- The ability for "anyone adversely affected" to request a public hearings which allows evidence to be presented and cross-examination of witnesses.
- The ability for environmental groups to sue fracking companies for violations of the act and the Department of Natural Resources for failure to perform its duties under the Act.

Under section 1-99 of the IHFRA, a Task Force is required to be created to prepare a report to the General Assembly as to whether further legislation is needed to regulate hydraulic fracturing in Illinois.

Acts, Regulations and Codes

- *Illinois Hydraulic Fracturing Regulator Act* 2013
- *Illinois Oil and Gas Act*
    - *Illinois Administrative Code, Title 44-Part 610 and Title 62 – Parts 240 and 250.*
- *Illinois Environmental Protection Act*
    - *Groundwater rules*

Key provisions

- Section 1-20: The act applies retrospectively to all wells where high volume horizontal hydraulic fracturing operations (**fracking**) are planned, have occurred, or are occurring.

- Section 1-25: Setback provisions

  The general rule is that no well site may be located:

  (1) in the absence of express agreement in writing from the owner, within 500 feet from any residence or place of worship;
  (2) within 500 feet of any school, hospital or licenced nursing home facility;

  (3) in the absence of express agreement in writing from the owner, within 500 feet of any existing water well or developed spring used for human or domestic animal consumption;

  (4) within 300 feet from the centre of any perennial stream or the high water mark of any river, natural or artificial lake, pond or reservoir.

  (5) within 750 feet of a nature preserve or site on the Register of Land and Water Reserves; and

  (6) within 1500 feet of a surface water or groundwater intake of a public water supply.

- Section 1-30: individual permits are required for all wells.

- Section 1-35: permit applications must include detailed information about the proposed operations. These details include the:

  - approximate depth, angle and direction of the well, approximate depth at which the well deviates from vertical, the estimated depth of lowest potential fresh water along the length of the wellbore, anticipated pressures in the wellbore;

  - total volume of water to be used, each anticipated additive, each anticipated chemical to be used and its anticipated concentration;

  - requirement to provide a certificate of compliance with the *Water Use Act* 1983

  - requirement to provide a freshwater withdrawal and management plan;

  - requirement to provide a plan for the handling, storage, transportation and disposal or reuse of hydraulic fracturing fluids and hydraulic fracturing flowback. This plan must describe the capacity of the tanks to be used for the capture and storage of flowback and of the lined reserve pit to be used, if necessary, to temporarily store any flowback in excess of the capacity of the tanks;

  - requirement to provide a casing and cementing plan.

  Applications are signed by the applicant with an acknowledgement that they do so under the penalty of perjury.

- Section 1-40: The permit application and notice of its receipt are posted on the Department's website. Importantly, the public is able to view all of the information above, in stark contract to the non-transparent procedures currently applied in the Northern Territory. Public notice is to occur once each week for two weeks. Any person having an interest that is, or may be adversely affected can request a public hearing.

- Section 1-45: 30 day period for public comment

- Section 1-50: Request for public hearings should contain a short and plain statement identifying the person and stating the facts demonstrating that the person has an interest that is or may be adversely affected. The Department must hold a public hearing upon a request, unless it is determines that the application:

    - lacks an adequate factual statement showing that the person is adversely affected; or
    - is frivolous.

  The public hearing is conducted in compliance with the contested case requirements of the *Illinois Administrative Procedure Act.*

- Section 1-53: High volume horizontal hydraulic fracturing permit determination: Judicial Review

  This section sets out mandatory criteria that must be met before a permit is granted. This increases the accountability of decision makers and represents a move away from subjective discretionary decision-making powers of the Department.

- Section 1-70 Well preparation, construction and drilling

  The IHFRA sets out specific requirements for the preparation, construction and drilling of wells. These requirements have legislative force. Of particular significance:

    - Section 1-70(d) provides that well casings, casing thread compounds, centralizers, and cement must comply with the current industry standards published by the American Petroleum Institute (see section ## of this report).

    - Section 1-70(d) sets out requirements for casing to protect fresh water resources.

    - Section 1-70(d) sets out requirements for pressure tests on wells.

- Section 1-75 High volume horizontal hydraulic fracturing operations

  Subsections of particular note are:

    - Section 1-75(c) Fluid and waste management, which requires the storage, at the well site, of hydraulic fracturing additives, hydraulic fracturing fluid, hydraulic fracturing flowback and produced water to occur in above ground tanks during all phases of the operations until removed for proper disposal.[46] The section outlines the requirements for the tanks and any temporary storage pits.

    - Section 1-75(e) Emissions controls, details requirements for well emissions, flaring and reporting.

    - Section 1-75(f) which requires operators to file a completion report. The completion report includes requirements to report on the chemicals used during operations, the total water used and all recorded pressures. The completion reports are considered public information and are required to be published on the Department's website.

- Section 1-77 Chemical disclosure, trade secret protection.

  Operators must provide a master list of chemicals and additives used during fracking to the Department. The master list is to be available to the public and published on the Department's website. Operators are able to apply to have master list details redacted on

[46] Reserve pits, approved by the Department, may be used for the temporary storage of hydraulic fracturing flowback where tank capacity is exceeded.

the grounds they are trade secrets, however, they must meet a statutory test. Members of the public can review a decision of the Department to grant trade secret protection.

- Section 1-80 Water quality monitoring

  Subsections of particular note are:
  - Section 1-80(b) prior to fracking operations beginning, operators must retain an independent third party to conduct baseline water quality sampling of all water resources within 1,500 feet of a well site, where there are none within 1,500 feet baseline testing must be conducted from samples from the aquifer at the closest groundwater well. Samples obtained by the independent third party are required to be tested by an independent laboratory.

  - Section 1-80(c) following baseline testing, all water sources are required to be sampled and tested again in the same manner 6 months, 18 months and 30 months after fracking operations have been completed.

- Section 1-83 Order Authority

  Any person who has reason to believe they have incurred pollution or diminution of a water source as a result of fracking operations is entitled to request that the Department undertake an investigation. The Department is required to investigate claims.

- Section 1-85 Presumption of pollution

  The section established a rebuttable presumption for the purposes of evidence and liability under State law regarding claims of pollution or diminution of a water source within 1500 feet of a fracking well up until 30 months after the operations concluded.

- Section 1-87 Water quality investigation and enforcement

  Illinois Environmental Protection Agency is responsible for investigation and enforcement under this section.

- Section 1-95 Plugging and restoration

- Section 1-102 Other relief

  This section allows any person having an interest that is or may be adversely affected to commence civil action on his or her own behalf to compel compliance with the IHFRA.

- Section 1-105 Violations, complaints and notice website.

  The Department shall maintain a detailed database that is readily accessible to the public on the Department's website. The database is required to detail, in plain language, each violation found by the Department in relation to fracking operations – the description is to outline in plain language any risks to public health, life, property, aquatic life and wildlife resulting from the violation.

- Section 1-110 Public information website

  All information submitted to the Department under the IHFRA is considered public information, unless it is deemed to constitute a trade secret.

State Review of Oil and Natural Gas Environmental Regulations

Overview:

The State Review of Oil and Natural Gas Environmental Regulations (STRONGER) is a non profit, multi-stakeholder organisation that assists member states in the United States of America in documenting environmental regulations associated with the exploration, development and production of crude oil and natural gas. The stakeholders involved in STRONGER include representatives from industry, states and environmental groups.

The group was created collaboratively by the U.S EPA and the Interstate Oil and Gas Compact Commission (IOGCC).[47] Member states are able to volunteer to have their regulatory regime reviewed by STRONGER.

STRONGER publishes guidelines for the regulation of oil and gas exploration and production wastes for member states. The latest edition of the STRONGER Guidelines were published in 2014.[48]

The STRONGER Guidelines are set out in 10 Sections, which provide, relevantly, for:

- *Section 3 – General*

  Key points to note:

  - An effective state program should contain a clear statement of the program's goals and objectives. Such goal should include, at a minimum, protecting human health and the environment from the mismanagement of E&P activities while recognizing the need for an economically viable oil and gas industry. When establishing regulations and policies for E&P waste management, states should use the waste management hierarchy set forth in section 5.3 to encourage waste minimization and source reduction.[49]

  - Programs should be developed to take into account an area's unique characteristics in terms of climate, meteorological patters, air quality compliance status, hydrology and geology. [50]

- *Section 4 – Administrative Criteria (Permitting, monitoring and enforcement)*

  Key points to note:

  - Recommends that agency records should be available for review by the public, including waste disposal records, pit location records and any required analytical data. Trade secret material should be segregated.[51]

  - Performance measures to monitor program effectiveness and compliance should be quantitative, wherever possible. [52]

- *Section 5 – Technical Criteria*

[47] http://www.epa.gov/epawaste/nonhaz/industrial/special/oil/state_summaries_040114.pdf
[48] http://strongerinc.org/sites/all/themes/stronger02/downloads/2014%20STRONGER%20Guidelines.pdf
[49] STRONGER Guidelines 2014, Section 3.2
[50] STRONGER Guidelines 2014, Section 3.3
[51] STRONGER Guidelines 2014, Section 4.2.2
[52] STRONGER Guidelines 2014, Section 4.2.3.2

Key points to note:

- Facilities and sites used for the storage or disposal of wastes derived from oil and gas operations should be operated and managed at all times to prevent contamination of groundwater and surface water, soil and air, protect public health, safety and the environment, and prevent property damage.[53]

- Generally, the choice of waste management option should be based upon the waste management hierarchy. Programs should include requirements of policies that encourage source reduction and recycling.[54]

- The STRONGER Guidelines provide for specific quantitative guidelines for some waste management practices. The numbers cited are considered to be conservative values for protection of human health and the environment.[55]

- There should be requirements for fencing, netting or caging to protect the public, and wildlife.[56]

- Construction standards for pits should take into account historical precipitation patterns. The Depth of any pits should not penetrate or adversely impact groundwater or surface water.[57]

- The use of production pits is declining in America because of concerns about potential contamination of air, soils and groundwater. In many instances, equipment consolidation, process modifications, or tanks can be used in lieu of pits. The use of alternatives is generally encouraged.[58]

- *Section 6 – Abandoned Sites*

  Key point to note:

  - A state abandoned sites program should provide for public participation. At a minimum the public should have (1) access to information about the program; (2) the opportunity to participate in any rulemakings associated with the program; and (3) a statutory or regulatory mechanism to petition the state agency to change a site's status on the inventory and/or the level of remediation required on a site.[59]

- *Section 7 – Naturally Occurring Radioactive Materials*

  Key point to note:

  - Naturally occurring radioactive material (NORM) is present above background levels at some oil and gas exploration and production facilities. Because of this, states should adopt a regulatory program for NORM that addresses, identification, use, possession, transport, storage, transfer, decontamination and disposal in a way that protects human health and the environment.[60]
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- *Section 8 – Stormwater Management*

[53] STRONGER Guidelines, section 5.1(a)
[54] STRONGER Guidelines, section 5.3
[55] STRONGER Guidelines, section 5.4
[56] STRONGER Guidelines, section 5.5.2
[57] STRONGER Guidelines, section 5.5.3
[58] STRONGER Guidelines, section 5.5.3
[59] STRONGER Guidelines, section 6.7
[60] STRONGER Guidelines, section 7.2

Key points to note:

- Stormwater management requirements should be adapted to regional characteristics. These should include the variations in topography, rainfall (annual average, episodic and seasonal), major soil types, proximity to surface waters, floodplains, seasonal and permanent swamps, wetlands and marshes, and vegetation cover.[61]

- States should have stormwater management plans for oil and gas operations.[62]

- Construction of well sites, access roads, pipelines, stream crossings and crossings of wetlands, swamps and marshes can result in the contamination of stormwater and/or adjacent surface waters. State agencies should develop standards or management practices appropriate for these activities.[63]

- Standards and management practices should be appropriate for the region.[64]

- States should consider which practices they will require as stormwater controls.[65]

- *Section 9 – Hydraulic Fracturing*

  Key points to note:

  - States should have standards to prevent the contamination of groundwater and surface water from hydraulic fracturing.[66]

  - Programs should include standards for casing and cementing to meet anticipated pressures and protect resources and the environment.[67]

  - The program should require monitoring and recording of annular pressures during hydraulic fracturing operations.[68]

  - Programs should consider baseline groundwater monitoring protocols.[69]

  - Regulator agencies should require appropriate notification including the identification of materials used, aggregate volumes of fracturing fluids and proppant used and fracture pressures recorded.[70]

  - A state should evaluate and address, where necessary, the availability of water for hydraulic fracturing in the context of all competing uses and potential environmental impacts resulting from the volume of water used for hydraulic fracturing. The use of alternative water sources, including recycled water, acid mine draining and treated wastewater, should be encouraged.[71]

- Section 10 – Air Quality

[61] STRONGER Guidelines, section 8.1
[62] STRONGER Guidelines, section 8.2
[63] STRONGER Guidelines, section 8.3.1
[64] STRONGER Guidelines, section 8.3.2
[65] STRONGER Guidelines, section 8.3.2
[66] STRONGER Guidelines, section 9.2
[67] STRONGER Guidelines, section 9.2.1
[68] STRONGER Guidelines, section 9.2.1
[69] STRONGER Guidelines, section 9.2.1
[70] STRONGER Guidelines, section 9.2.2
[71] STRONGER Guidelines, Section 9.3

Key points to note:

- As a result of increased development of oil and natural gas from shale formation in recent years, concerns about air emissions have become more focused.[72]

- On August 16, 2012, the U.S EPA published 3 final rules for the Oil and Natural Gas Sector. (NSPS OOOO, for the control of VOC and SO2 emissions; and NESHAP HH/HHH, for the control of hazardous air pollutant emissions). These rules require companies to reduce flowback emissions from hydraulically fractured and re-fractured gas wells by employing reduced emissions completions, control emissions from storage vessels by 95%, use low or no bleed pneumatic controllers in the production segment, use no bleed controllers at gas plants, replace reciprocating compressor seals every 26,000 hours of operation or three years, reduce wet seal centrifugal compressor emissions by 95%, and implement more stringent leak detection and repair programs at gas plants. [73]

- States should have standards to prevent contamination of air.[74]

- States should adopt an air quality permitting program for emission sources in the oil and gas industry that is legally and practically enforceable and harmonises with federal requirements.[75]

- State programs should contain procedures for the receipt, evaluation, retention and investigation of all notices and reports required of permittees.[76]

- State programs should have inspection and monitoring procedures that are independent of the information supplied by regulated persons. The program should have the capability to conduct regular inspections.[77]

- Regulated persons should be required by law to: establish and maintain records; make reports; install, use and properly maintain monitoring equipment, and use audit procedures, or methods; sample emissions in accordance with prescribed measures; provide stack test protocols and test reports; perform parametric monitoring where direct emissions measurement is impracticable and submit compliance certifications and other information required to demonstrate compliance. [78]

- State agency should have effective enforcement tools to address violations.[79]

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[72] STRONGER Guidelines, Section 10.1
[73] STRONGER Guidelines, section 10.1
[74] STRONGER Guidelines, section 10.2
[75] STRONGER Guidelines, section 10.2.3
[76] STRONGER Guidelines, section 10.2.4
[77] STRONGER Guidelines, section 10.2.4
[78] STRONGER Guidelines, section 10.2.4
[79] STRONGER Guidelines, section 10.2.5

American Petroleum Institute – Standards

Overview:

The American Petroleum Institute (**API**) provides the most commonly cited guidelines for water management and well construction. These API guidelines are referred to in the Northern Territory Onshore Schedule.

Summary of main API documents relating to Hydraulic Fracturing

- *API HF1, Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines*

  This guideline provides recommended practices for constructing onshore oil and gas wells (the cased drill hole used to access the underground oil and gas bearing shale rock). The intention is to provide recommendations through all stages of operations (start to completion) for management and engineering solutions to maintain their structural integrity. The purpose of the guidance is to ensure shallow groundwater aquifers are protected from fracturing whilst enabling viable petroleum development.

  The guidelines purpose is achieved by isolating the internal conduit of the well from the surface and subsurface environment to protect the surrounding groundwater from contamination from produced fluids (e.g. hydraulic fracturing chemicals and resultant liberated oil, gas and other solutes from the fractured rocks) and the surrounding surface environment by maintaining pressure gradients within the well and containing the produced fluids so that they are not free to escape to the surface under pressure. The API Standard is 5CT and coupling threads should meet API Spec 5B, together with fully designed engineered cementing of the casing for the life of the well.

- *API HF2, Water Management Associated with Hydraulic Fracturing*

  This guideline provides an overview of practices recommended to manage water produced from the well during drilling and production. Hydraulic fracturing involves the injection of fluids into the well in order to fracture the oil / gas bearing shale and liberate the oil/gas. Substantial amounts of water are required for this process that must be accessed, transported and stored in accordance with local regulatory requirements. Substantial amounts of water are also produced (flow back water) in the development and stimulation of the well and must be disposed of appropriately to protect the surrounding environment. Note that this water will contain fracture and stimulation fluids as well as hydrocarbons and other solutes from the surrounding subsurface rocks and as such must be actively managed.

  Purpose of guideline is to identify best practice (to minimise environmental impacts) used in the management, treatment and disposal of water. This is achieved by specific scientific data and planning considerations for the management of operations during different phases of operations with a key focus on material selection, performance requirements and evaluation recommendation.

  Typical considerations include the geological formation, anticipated well spacing and selection of proppant material, formation temperature, pressure, length of productive interval to be fractured, reservoir depth and formation rock property. Recently developed shale-specific surfcants have improved the recovery and flow back of stimulation water in shale.

- *API HF3, Practices for Mitigating Surface Impacts Associated with Hydraulic Fracturing*

  Purpose of guidelines is to mitigate or minimise potential surface environmental impacts associated with fracturing. Operators must comply with all federal, state and local requirements which relate to surface water use, wastewater management, injections activities site construction, discharges and emissions to protect sensitive environments. This practice also calls for active stakeholder engagement and collaboration between industry, regulators and the public.

- *RP 51R, Environmental Protection for Onshore Oil and Gas Production Operation and Leases*

  This guideline addresses the considerations and planning processes that may require approval in the relevant jurisdiction when undertaking onshore oil and gas operations including exploration, production and completion. The guideline provides recommendations for environmentally sound practices. It extends to interactions with landowners and access consideration, road and access infrastructure considerations, design and construction, maintenance and rehabilitation. The focus of the document relates to environmental protection and compliance.

- *PI Std. 65-2, Isolating Potential Flow Zones During Well Construction*

  This guideline is designed to advise proponents of the requirements and potential practices that can be used in creating barriers and sealing different areas of a well conduit to control pressure, prevent unwanted mixing inside the conduit, or assist in regulating well production flow. It is also an important factor in ensuring the there is no loss of well control to protect the surrounding surface and subsurface environment. The guideline includes information on practices employed including management, maintenance and monitoring.

Summary of the regulatory framework for shale gas extraction (using hydraulic fracturing) in Alberta, Canada.

Alberta Canada: Overview

The *Responsible Energy Development Act 2013 (Alberta)* came into force in June 2013. The Act represented a major overhaul of the regulatory regime in Alberta and saw the creation of the independent Alberta Energy Regulator (AER).[80]

The regulatory framework for 'fracking' in Alberta

The Responsible Energy Development Act 2013 (REDA) forms the core of the regulatory framework underpinning Alberta's response to perceived concerns about 'fracking' operations within Alberta. The REDA creates the independent AER, which operates at arms length from the Government, and gives it the mandate to:[81]

- *provide for the efficient, safe, orderly and environmentally responsible development of energy resources in Alberta through the Regulator's regulatory activities; and*

- *in respect of energy resource activities, to regulate*

    - *the disposition and management of public lands*
    - *the protection of the environment; and*
    - *the conservation and management of water, including the wise allocation and use of water.*

The AER is the single regulator of energy development in Alberta, from application and exploration, to construction and development, to abandonment, reclamation and remediation.

The AER was created to "ensure that Alberta's resource policy development, public consultations, and regulation of energy development were efficient and competitive while effectively supporting public safety, environmental management, and resource conservation objectives – all while respecting the rights of landowners".[82]

Section 2(2) of the REDA sets out the powers, duties and functions of the AER which are variously to:

a) consider and decide applications and other matters under the energy resource enactments in respect of pipelines, wells, processing plants, mines and other facilities and operations for the recovery and processing of energy resources;

b) to consider and decide applications and other matters under the *Public Lands Act* for the use of land in respect of energy resource activities, including approving energy resource activities on public land;

c) to consider and decide applications and other matters under the *Environmental Protection and Enhancement Act* and *Water Act* in respect of energy resource activities;

d) to consider and decide applications under Part 8 of the *Mines and Minerals Act* in respect of the exploration for energy resources;

e) to monitor and enforce safe and efficient practices in the exploration for and the recovery, storing and processing and transportation of energy resources;

[80] *Responsible Energy Development Act* (Alberta), s 3(1)
[81] *Responsible Energy Development Act* (Alberta), s 2(1)
[82] www.aer.ca/about-aer/what-we-do

f) to oversee the abandonment and closure of pipelines, wells, processing plants, mines and other facilities and operations in respect of energy resource activities at the end of their life cycle in accordance with energy resource enactments;

g) to regulate the remediation and reclamation of pipelines, wells, processing plants, mines and other facilities and operations in respect of energy resource activities in accordance with the *Environmental Protection and Enhancement Act;*

h) to monitor energy resource activity site conditions and the effects of energy resource activities on the environment;

i) to monitor and enforce compliance with energy resource enactments and specified enactments in respect of energy resource activities.

Issues with the Alberta approach that the NT should not follow – As outlined by EcoJustice Canada:[83]

- The test for standing for appeals under the REDA is those persons "directly and adversely affected".[84] Standing should be given to persons with "relevant information and expertise". There should also be a public interest provision for standing "genuine interest" test. [85]

- Objective factors missing from the REDA which the AER should have regard to are:[86]

    - Considerations relevant to triggering an environmental impact assessment, as listed in section 44(3) of the EPEA;

    - Whether a project will contribute to cumulative impacts where thresholds for those impacts (as set out in the plans, policies and programs) have already been exceeded or can be reasonably be expected to be exceeded by projects under approval.

    - Whether scientific knowledge is missing and where the proposal's environmental impacts cannot be known, are uncertain or unclear.

- The right to seek Judicial Review of AER decisions is excluded under the REDA. This is unacceptable as procedural issues such as whether a party has the right to be heard, or whether a decision maker is biased are not decisions which should be made by the AER in relation to its own decisions. (See section 56).[87]

- Lack of transparency, no requirement to report annually either publically or to the legislature. S16 disclosure to the Minister on his/her request – no duty on Minister to make that information public. [88]

- There should be full disclosure of documentary information, submitted as part of applications and regulator should be required to reasons for decisions, including decision to not hold a hearing. S67 should be removed.[89]

- The REDA doesn't set out in detail how the AER must make its decisions. These details are left for internal processes or regulations. The previous Energy Resources Conservation Board (ERCB) was required to act in the public interest. There is now only

[83] http://www.ecojustice.ca/files/reda-backgrounder-may-2013/at_download/file
[84] See *Responsible Energy Development Act* (Alberta) s 32, s 34 and s 36
[85] *Legal Backgrounder – Bill 2: Responsible Energy Development Act*, EcoJustice Canada, May 2012.
[86] *Legal Backgrounder – Bill 2: Responsible Energy Development Act*, EcoJustice Canada, May 2012.
[87] *Legal Backgrounder – Bill 2: Responsible Energy Development Act*, EcoJustice Canada, May 2012.
[88] *Legal Backgrounder – Bill 2: Responsible Energy Development Act*, EcoJustice Canada, May 2012.
[89] *Legal Backgrounder – Bill 2: Responsible Energy Development Act*, EcoJustice Canada, May 2012.

the broad requirement to provide for the efficient, safe, orderly and environmentally responsible development of energy resources in Alberta.[90]

- The REDA makes allowances for people to submit 'Statements of concerns' (SOC), however, it doesn't state how these SOCs are required to be considered by the AER. The submission of a SOC does not have the effect of triggering the hearing provisions in the REDA.[91]

- EDONT notes the undesirability of having one body responsible for both authorisations and enforcements, as is the case under the REDA. This is similar to the current situation in the Northern Territory. The difference is that the AER, unlike the NT's Department of Mines and Energy, must consider the protection of the environment and its mission statement is not to facilitate the industry; this difference in emphasis is important.

[90] *Legal Backgrounder – Bill 2: Responsible Energy Development Act*, EcoJustice Canada, May 2012
[91] *Legal Backgrounder – Bill 2: Responsible Energy Development Act*, EcoJustice Canada, May 2012

Examples of regulatory frameworks, which utilise independent scientific panels.

Commonwealth

The Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) was established under the Commonwealth *Environment Protection and Biodiversity Act* 1999. The IESC provides expert, independent, scientific advice to decision makers on the impact coal seam gas projects may have on Australia's water resources.

The IESC was set up following the inclusion of a trigger under the EPBC Act for coal seam gas and large coal mining developments which may impact on water resources. Notably, the IESC does not provide advice on shale gas developments. As CSG actions do not occur in the NT, the Northern Territory is not a party to the *National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development* (**Partnership Agreement**). The Partnership Agreement allows government regulators in signatory states to seek the IESC's advice.[92]

Victorian regulators, for example, can use the IESC to provide information on projects impacts on ecosystems and water and chemicals used in hydraulic fracturing.

New South Wales

The NSW Chief Scientist and Engineer, Professor Mary O'Kane has recently completed an Independent Review of Coal Seam Gas Activities in New South Wales. During the 19 month review of CSG activities, the Chief Scientist publishes a number of documents, documents can be accessed on the Chief Scientists website.[93]

The final report of the Chief Scientist was released on 30 September 2014.[94]

[92] http://www.iesc.environment.gov.au
[93] http://www.chiefscientist.nsw.gov.au/coal-seam-gas-review
[94] NSW Government Chief Scientist and Engineer *"Final Report of the Independent Review of Coal Seam Gas Activities in NSW, September 2014.* http://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0005/56912/140930-CSG-Final-Report.pdf