

[REDACTED]
Director General
Department of Mines, Industry Regulation and
Safety
[REDACTED]

Dear [REDACTED]

Request for information on behalf of the Independent Scientific Panel Inquiry into Hydraulic Fracture Stimulation in Western Australia 2017

The Inquiry requires detailed information on onshore oil and gas wells in Western Australia, hydraulically stimulated between 2005 and 2015. We have previously been informed that this involves twelve wells.

For each of those, we request the following as per requirements under the Petroleum Environmental Regulations:

- The Approved Environmental Management Plan and any approved amendments
- The Approved Field Management Plan and any approved amendments
- The Approved Well Management Plan and any approved amendments
- The Approved Safety Management Plan and any approved amendments
- All reporting on monitoring of compliance and management of non-compliance
- All DMP/DMIRS compliance and enforcement records

In addition to the above, the Inquiry requests responses to the following questions:

1. What is DMIR's role in licensing and compliance with respect to petroleum operations?
 - Does DMIRS also *promote* onshore oil and gas development?
 - If so, how does DMIRS separate one function from the other?
 - Does DMIRS overtly address potential conflicts of interest as both the regulator and the monitor? How does DMIRS do that?

2. Recognising the ambition to move toward outcome-based conditions on developments, what are the outstanding *absolutely prescriptive conditions defined in regulation* (as opposed to “best practice”)?
 - For example, prescriptive requirements on numbers of well barriers and when these apply
 - The proscription of any chemicals (e.g., BTEX)
 - The declaration and public availability of every chemical used in the process of developing a well as well as fracturing it?
 - The requirement for Sustained Casing Pressure testing
 - The requirement for Reduced Emissions Completions
 - Minimum separation distances to sensitive receptors

3. To the degree that DMIRS relies on self-reporting by industry, is every report available to the public in full and if not why not?
 - What is the list of things that must be measured and reported as a well is developed and operated?
 - At what points and how often in the operation is the quality of air and water monitored and reported? Are all reports publicly available?
 - Do the analyses of water and air quality include the fullest range of potential analytes, or just a subset?
 - What is required with respect to the baseline measurements of formation and aquifer water quality, and local air quality, prior to development?
 - Has this data been collected at each well site and is it available?
 - How often does DMIRS verify the information provided in these completion and compliance reports?
 - Is there a schedule or protocol for such auditing / verification?
 - What have been the results of those checks to date?
 - Does DMIRS have the technical capacity and capability to independently examine and interpret all forms of information collected by the companies, including chemical, toxicological, seismic, mechanical, geological, hydrogeological information? If not, how does DMIRS obtain such advice?

4. Does DMIRS insist on industry best practice in the design and operation of onshore petroleum developments?
 - If so, why are not all operators using “green completions”?
 - If so, why do not all operators employ a “traffic light” monitoring and management system for potential seismic risks?
 - Is venting or flaring of gas still happening and does DMIRS consider that best practice?

5. Does DMIRS directly inspect the construction of each well and at what stage(s) of its development? Is such monitoring publicly reported?
6. What has been the actual inspection schedule for onshore, stimulated wells since 2005?
 - How often have staff visited wells/operations?
 - Can DMIRS provide these times and places?
 - What is measured or recorded on these inspections?
 - How many field staff does DMIRS dedicate to the licensing and inspection and compliance of the onshore petroleum industry?
 - What are their technical qualifications?
 - Where are they based (i.e. locations/regions)? Can they attend sites for inspections in a timely manner?
7. How many failures/breaches were identified by DMIRS, vs how many were reported by the companies?
 - Is there a process for the public to directly report breaches, problems or anomalies to the Department directly? Have you received any such reports from members of the public concerning well drilling, completions or maintenance operations, or the surrounding infrastructure (e.g. well or pipeline leaks, tailings pond issues, etc?).
8. When a breach/failure is identified, is every one investigated in the field?
 - Are reports on the breach available to public? In detail? When?
 - In the example of the recent, extraordinary rainfall events in parts of the Canning Basin, did DMIRS make any immediate assessment in the field of potential contaminations from overflowing ponds, local chemical stores etc?
 - What are the hazard response arrangements and capacities to deal with an incident in the Canning and Perth basins?
 - When there has been a breach or incident, is the site tested for exposures/contamination or is that just estimated/inferred?
 - Are these test results available?
 - Can DMIRS provide the records of these incident inspections?
 - Has any failure resulted in the contamination of land or water?
 - How is this determined?
 - What was done in the case where there has been contamination?
 - Has DMIRS ever fined or prosecuted an operator for any breaches or lack of compliance, and if so, what are the details?

9. Does DMIRS have a testing or research program into the long-term performance of plugged and abandoned wells?
- Is there a database of every decommissioned well in the State?
 - Are they monitored for integrity?
 - Is there evidence as to how they are holding up?
 - Is there a time limit of the monitoring of these wells?
 - Is there capacity for timely public reporting of monitoring?
 - Is there a program to monitor the long-term integrity of wells? What does that look like in detail?
 - Is there testing of soil and water when a company abandons a well?
 - What is the long-term liability for P&A wells and who holds that liability?
 - Does the State have the capacity to remediate any contamination of water resources in the event of the loss of containment in P&A wells?
 - Does DMIRS have any estimates of that liability and those costs for a single well or across the potential scale of the industry?
10. Does DMIRS require all companies to provide a detailed assessment of all chemicals used in drilling and hydraulic fracturing?
- What human health and ecotoxicological assessment is required?
 - Does DMIRS check that all chemicals proposed to be used are listed on the Australian Inventory of Chemical Substances (AICS)?
 - Are the chemical assessments publicly available? If so, where is this information provided? If not, why not?
 - Is there any checking/inspection that the chemicals listed by the company for use are the ones used in drilling or hydraulic fracturing?
11. How does DMIRS track corporate probity/responsibility through corporate mergers/on selling of entities?

The Panel looks forward to the Department's information on these wells and responses to our questions. Please note that both this request and any information forthcoming may become part of our Report and thus publicly available.

Yours sincerely



Tom Hatton
CHAIR

19 March 2017

Your ref Enter Your Ref (optional)

Our ref [REDACTED]

Enquiries [REDACTED]

[REDACTED]

Dr Tom Hatton
Chair
Scientific Panel Inquiry on Hydraulic Fracture Stimulation in WA

[REDACTED]

Attention: Dr Tom Hatton

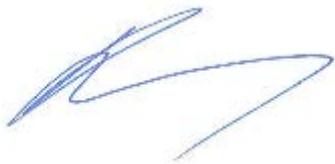
Dear Tom,

REQUEST FOR INFORMATION ON BEHALF OF THE SCIENTIFIC PANEL INQUIRY INTO HYDRAULIC FRACTURE STIMULATION IN WESTERN AUSTRALIA 2017

Further to your letter dated 19 March 2018, requesting detailed information from the Department of Mines, Industry Regulation and Safety (DMIRS) on hydraulically stimulated wells between 2005 and 2015. Attached is a detailed response in relation to this request.

As a part of your request, a large number of approval documents, reports and inspection reports in relation to the stimulated wells have been gathered by DMIRS and have been provided to you via media storage device.

Yours sincerely



[REDACTED]
Acting Deputy Director General
Resource and Environmental Regulation Group
15 June 2018

[REDACTED]

[REDACTED]

Request for Information on Behalf of the Independent Scientific Panel Inquiry into Hydraulic Fracture Stimulation in Western Australia

- **What is DMIRS' role in licensing and compliance with respect to petroleum operations?**

The Department of Mines, Industry Regulation and Safety (DMIRS) is the lead agency responsible for the regulation of petroleum activities in Western Australia. The key statutes, administered by DMIRS relating to petroleum, are the *Petroleum and Geothermal Energy Resources Act 1967*, the *Petroleum (Submerged Lands) Act 1982* and the *Petroleum Pipelines Act 1969* and associated regulations.

Administration of these Acts covers petroleum titles and applications, releasing areas for competitive bidding, exploration, administering resource management, environmental and health and safety provisions, as well as other compliance responsibilities. DMIRS maintains a publicly available Register of Titles on its website.

DMIRS evaluates all technical matters relating to drilling for petroleum, formation evaluation, resource management and production in accordance with industry best practice. A valid title must be granted under the relevant petroleum Acts before an application can be submitted to DMIRS for any petroleum activity over land or State waters. Before the activity commences, DMIRS must have approved the operational, safety and environment management plans for the project.

- **Does DMIRS also *promote* onshore oil and gas development?**

DMIRS has a clear role in protecting the environment. DMIRS also has a clear role in protecting the safety and wellbeing of the workforce and the community.

With this context, DMIRS also has a role in supporting sustainable growth in the Western Australian economy, and this includes the sustainable development of the mineral and energy resources sector.

As with all government departments, DMIRS operates within a whole of Western Australian Government context, and therefore has a role in supporting the objectives of the Government.

The Western Australian Government has a number of objectives, such as the protection of the environment, supporting the health and wellbeing of the community, and supporting a growing and diverse economy. While DMIRS has a regulatory role in some of these areas, it also has a responsibility to support these (and other) whole of Government outcomes. This is the same obligation upon all Government departments.

The department publishes information on the regulatory and approval processes for new exploration and development activities, thereby ensuring that investors have a

clear understanding of the processes, timing and scrutiny applied by the Western Australian Government in considering new applications.

One of the ways that DMIRS supports this objective is to provide information publicly that de-risks the decisions of exploration and mining investors. This includes geological and commodity information including reports, maps and databases documenting the geology, mineral and petroleum resources of Western Australia. Much of this is done by precompetitive geoscience information released by the Geological Survey of Western Australia, but this information also includes geoscientific results from previous exploration by the petroleum and minerals industry. This data is freely available to view or download from online systems and databases on the department's website.

The combination of those factors is a powerful method of aiding exploration efficiency and reducing the technical and financial risks involved in exploration.

Additionally, the department manages the Perth Core Library in Carlisle and the Joe Lord Core Library in Kalgoorlie, which archive representative drill core from mineral deposits and petroleum fields. This includes core and cuttings from offshore areas administered by the Commonwealth Government, with that formalised through a National Collaboration Framework project agreement. The physical assets contained within the core libraries provide valuable research material for mineral and petroleum explorers, assisting them with developing and testing theories on petroleum system and with target generation.

In addition to these services, DMIRS undertakes several programs also aimed to facilitate upstream petroleum investment in the State. These programs include:

- Petroleum acreage releases; and
- the Exploration Incentive Scheme's (EIS) co-funded drilling program.

Stakeholder engagement is an important focus of work for DMIRS. This includes people in the resources sector, people in the communities that host the industries, and the broader WA community whose lives are affected in many ways by the industries regulated by DMIRS. The department strives to build community confidence in its work, in particular, how it protects the people and the environment while also achieving the best possible economic benefit for the State.

- **If so, how does DMIRS separate one function from the other?**

The new DMIRS (formed on 1 July 2017) adopted a new structure from 22 January 2018 (**Attachment 1**). Many of the activities of the former DMP now reside within the Resource and Environmental Regulation Group of the department. The new structure is more strictly aligned along 'function' and, as a result, the Petroleum Division and Mineral Titles Division were abolished. All matters related to grant of title (minerals and petroleum) are now dealt with by the Resources Tenure Division.

All compliance matters (minerals and petroleum) are now dealt with by the Resource and Environmental Compliance Division. The third division within the RER Group is the

Geoscience and Resource Strategy Division, which consists of the former Geological Survey as well as policy officers dealing with the resources industry and legislation.

- **Does DMIRS overtly address potential conflicts of interest as both the regulator and the monitor? How does DMIRS do that?**

DMIRS adheres to the principles as provided by the Western Australian Public Sector Commission (PSC) on good governance. Specifically, DMIRS utilises strategic and operational plans at various levels within the department, outlining key strategic goals, outcomes and outputs. At an operational level, plans are in place that define critical success factors and how key goals and outcomes will be accomplished. DMIRS undertakes regular performance evaluations to ensure that staff performance and conduct is aligned with strategic and operational plans.

DMIRS abides by the WA Code of Ethics that defines standards of official conduct and professional behaviour expected by all of its employees. DMIRS staff undertaking regulatory oversight and monitoring must be suitably qualified and experienced in their fields of expertise. Professional conduct and performance is monitored and reported regularly.

- **Recognising the ambition to move toward outcome-based conditions on developments, what are the outstanding absolutely prescriptive conditions defined in regulation (as opposed to “best practice”)?**

The objectives-based regulatory regime is supported by a number of regulations supported by the PGERA 67, as follows:

- Petroleum and Geothermal Energy Resources (Environment) Regulations 2012
- Petroleum and Geothermal Energy Resources (Management of Safety) Regulations 2010
- Petroleum and Geothermal Energy Resources (Occupational Health and Safety) Regulations 2010
- Petroleum and Geothermal Energy Resources (Environment) Regulations 2012
- Petroleum and Geothermal Energy Resources (Resource Management and Administration) Regulations 2012
- Petroleum and Geothermal Energy Resources Resource Regulations 1987

Other sets of regulations also apply under the *Petroleum Pipelines Act 1969* and the *Petroleum Submerged Lands Act 1982*. These regulations were developed in collaboration with the Commonwealth Government of Australia and to mirror the requirements in the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009. Each regulation provides for a number of prescriptive requirements, for example, the contents of an Environment Plan.

The Petroleum and Geothermal Energy Resources (Resource Management and Administration) Regulations 2012 and the Petroleum and Geothermal Energy Resources (Occupational Health and Safety) Regulations 2010 contain seventeen and two prescriptive schedules respectively.

For example, prescriptive requirements on numbers of well barriers and when these apply.

The Petroleum and Geothermal Energy Resources (Resource Management and Administration) Regulations 2015 (RMAR 2015) is an objective-based set of regulations within a framework of managing risk for the exploration for, and recovery of, petroleum and geothermal energy resources within onshore and coastal water areas of Western Australia. This regulatory regime determines that the responsibility for achieving objectives and managing risk in conducting petroleum activities, through the use of industry 'best practice', lies with the holder(s) of the petroleum title. Best practice is based on internationally recognised standards such as the American Petroleum Institute (API) recommended practice and Norsok 10. These standards are kept up to date as technology continues to advance.

The basic premise is that the well design and the equipment used (such as casing of a particular grade) is fit for purpose. If it is not, for example if the casing was not rated as capable of withstanding pressures far exceeding those occurring during Hydraulic Fracture Stimulation (HFS), the well management plan would not be approved.

The number of well barriers is not prescribed in regulations. There is, however, still some necessary prescription in the regulations, particularly with data submission and reporting (contained within Schedules 1 to 17 in the RMAR 2015). Schedule 1 of the Petroleum and Geothermal Energy Resources (Resource Management and Administration) Regulations 2015 provides for the mandatory requirements of a Well Management Plan (WMP). An applicant is required, amongst other things, to provide an explanation of the philosophy of and criteria for, the design, construction, operational activity and management of the well. This Schedule also requires a list of the principal Australian and international standards that apply in relation to each well activity and plant used in connection with each well activity. A common standard used in WA and around the world includes the API standards.

The Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines provides a good summary of the application of API standards as applied to HFS operations. As follows:

The ultimate goal of the well design is to ensure the environmentally sound, safe production of hydrocarbons by containing them inside the well, protecting groundwater resources, isolating the productive formations from other formations, and by proper execution of hydraulic fractures and other stimulation operations. The well design and construction must ensure no leaks occur through or between any casing strings. The fluids produced from the well (oil, water, and gas) must travel directly from the producing zone to the surface inside the well conduit.

To meet this objective, DMIRS requires operators to design and complete wells with multiple casing and mechanical barriers. This design can, and usually does, include up to three or more barriers to surrounding superficial aquifers, see diagram below. Well design selection will be informed by the planned activity of the well (depth, maximum pressures, temperatures, fluid/gas compositions etc.) and the surrounding environment (presence of aquifers, surrounding rock properties, etc.).

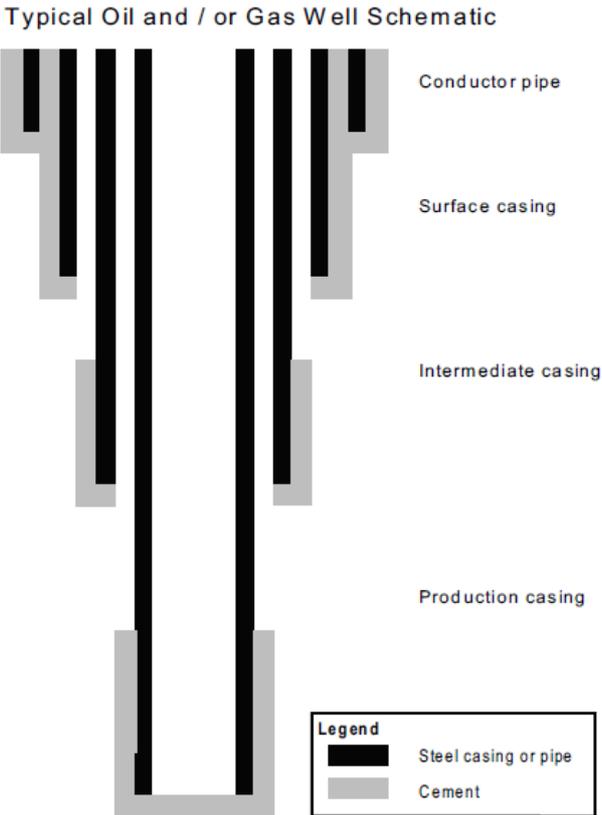


Figure1. Typical well schematic¹

¹ API Guidance Document HF1, First Edition, October 2009
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By way of background, regulators have moved away from prescribing specific procedures, such as those provided for in the 'Schedule of Onshore Petroleum Exploration and Production Requirements – 1991 (Amended 21 May 2010)' and 'Schedule of Geothermal Exploration and Production Requirements 2009'. The emphasis today is on the achievement of the objectives of the legislation. Industry is required to use appropriate standards to demonstrate to the regulator how objectives are to be achieved within an acceptable risk profile.

There have been two main drivers for having an objective-based regulatory regime:

- 1) In industries that are subject to rapid technological change, prescriptive regulations are likely to become outdated quickly and, consequently, become counterproductive in their intended role to improve safety and achieve greater efficiencies.
- 2) Particularly in the area of occupational safety and health (OSH), there has been acceptance that where governments attempt to specify (through prescriptive legislation) appropriate measures to minimise risk, the government effectively assumes the role of risk management and minimisation. Australian governments see the responsibility for risk management and minimisation to be the responsibility of the title holder carrying out the petroleum activity.

- **The prescription of any chemicals (e.g., BTEX).**

DMIRS does not prescribe which chemicals and fluid systems petroleum operators can use. Many cementing, drilling, HFS, well workover systems and fluids require specific mixtures of chemicals to achieve the necessary physical, chemical and biological properties to ensure that:

- the well remains integral; and
- that chemical use is appropriate to the specific petro-geological conditions.

DMIRS' risk-based approach requires the chemicals to be considered in the operators risk assessment which will also factor in risk to surrounding environments and receptors on a case-by-case basis. Where a proposal has identified that potential chemical hazards may exist in vicinity of sensitive receptors, then a more detailed risk assessment may be requested. The process for assessing and managing environmental risks arising from chemicals associated with onshore petroleum activities should follow the framework defined in the AS/NZS ISO 31000 (Standards Australia Limited and Standards New Zealand, 2009). DMIRS may refuse to approve a chemical for use if the assessed risk to the environment is unacceptable or if the unique chemical identifier (Chemical Abstract Services, CAS number) can't be publicly disclosed due to intellectual property provisions. Further information is available in the DMIRS [Environmental Risk Assessment of Chemicals used in WA Petroleum Activities Guideline](#).

Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX) chemicals are risk assessed in a similar way to other hazardous chemicals commonly used in the petroleum industry (eg. acids, oxidising agents, biocides, etc). BTEX chemicals are also naturally present in condensate and hydrocarbons from producing wells and present in trace quantities in many products. It would be difficult to apply a strict ban on BTEX, when it can be present in groundwater, chemical products and produced water. BTEX chemicals can also be found in common adhesives / bonding agents used in contemporary water bore construction.

- **The declaration and public availability of every chemical used in the process of developing a well as well as fracturing it?**

DMIRS has implemented a full public chemical disclosure requirement of all chemicals being used downhole in petroleum operations, including (but not limited to) drilling, cementing and HFS activities. The Chemical Disclosure Guideline (2013) outlines the chemical disclosure requirements for products, chemicals and other substances used 'down-hole' in petroleum activities regulated under 15(9) of the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012 and the Petroleum (Submerged Lands)(Environment) Regulations 2012.

The chemical disclosure guideline advocates the use of 'systems based' disclosure for fluid systems being used downhole. A 'system' refers to a fluid (comprised of multiple products and chemicals) designed specifically for each stage of well construction and the treatment being applied. The chemical disclosure requires Section B to disclose information about the product (including toxicity information, Safety Data Sheets and percent content in the fluid system) and Section C to disclose information about the chemicals found in the fluid (including Chemical Abstract Service numbers and relative percent in the fluid).

Since the implementation for the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012, any chemical that does not have its Chemical Abstract Services (CAS) number disclosed will not be approved for use downhole. This captures all proprietary chemicals.

Chemical disclosure information is provided to:

- DMIRS for assessment via the Environment Plan (assessed document); and
- the community via a public disclosure document (condensed version for public release via DMIRS website), found at:

<https://ace.dmp.wa.gov.au/ACE/Public/PetroleumProposals>

- **The requirement for Sustained Casing Pressure testing.**

Item 7 of Schedule 1 of the Petroleum and Geothermal Energy Resources (Resource Management and Administration) Regulations 2015 (RMAR 2015) requires an explanation of how the title holder will identify, monitor, mitigate and otherwise deal with a well integrity hazard and a significant increase in an existing risk for a petroleum well.

That is, the requirements for checks to well integrity. Item 6 of Schedule 1 in RMAR 2015 covers the performance of each well activity and the measurement criteria that define those performance objectives. The performance objectives are nominated by the title holder in their WMP, measured by them and reported to DMIRS. Performance objectives can include sustained casing pressure testing. In addition to item 7, item 14 requires a list of the relevant standards that are to be used (i.e. API, ISO, etc.) in managing well integrity risks.

The pressure testing of barriers (casing, blow out protector, tubing, packer etc.) can occur during well construction and at any time deemed appropriate during well production, suspension or care and maintenance. Pressure testing information is captured in the daily activity report and IADC (International Association of Drilling Contractors) report which is sent to DMIRS the next day (prior to noon) during well construction. If pressure testing is conducted after a well management plan has been approved, Schedule 1 items 12 (c) and (d) regarding notifications, reports and information on increases of existing risks (c) and of other matters relevant to the conduct of the well (d) are applicable.

DMIRS inspectors can verify the evidence of the pressure test (data/chart) during an onsite inspection. The title holder is required to store all records of pressure tests (data/chart). DMIRS inspectors can conduct a desktop audit to review such information if considered necessary.

- **The requirement for Reduced Emissions Completions.**

As the Petroleum Environment Regulations are not prescriptive in terms of particular technologies or methods, and do not set emission limits for a given type of petroleum operation, there is currently no prescribed requirement for operators to implement Reduced Emissions Completions. DMIRS risk assesses emissions, the controls proposed to manage that risk and whether the risks and impacts of emissions are reduced to “as low as reasonably practicable” (ALARP) and acceptable levels.

‘Reduced emissions’ follows the same principle of ALARP – to reduce the project emissions to a practical level. In many parts of WA, the cost (time, money and resources) associated with capture and transportation of emissions to a processing facility for subsequent sale means that there has been no opportunity for reduced emissions completions in onshore WA.

- **Minimum separation distances to sensitive receptors.**

By way of background, the State’s regulatory framework has largely departed from prescriptive frameworks to outcomes and risk-based approaches, that is, risks must be considered specific to the activity and the local environment. As such, there is little prescriptive legislation and regulation administered by DMIRS that provides for prescriptive set-back distances from petroleum activities to residential properties.

The location of petroleum activities in proximity to residential properties is largely regulated under the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012 under the outcomes and risk-based framework, however, referral to other agencies, principally the Environmental Protection Authority, Department of Water and Environment Regulation (DWER), Biodiversity Conservation and Attractions (DBCA), Planning, Lands and Heritage (DPLH) and Department of Health (DoH) can be undertaken. The roles of these agencies with regards to onshore oil and gas operations is detailed in the *Guide to the Regulatory Framework for Shale and Tight Gas in Western Australia* (2016), from page 21.

Petroleum and Geothermal Energy Resources Act 1967 (PGERA)

Access to a PGERA title holder can be denied where the land is: private land less than 2000 m² (one fifth of a hectare) in extent; land used as a cemetery or burial place; or land within 150 m laterally from such cemetery, burial place, reservoir or any substantial improvement. The owner or trustee of the land described above can agree or not agree to entry onto that land for the purposes of the PGERA operations.

These provisions are contained in Section 16 of the PGERA, which also defines a reservoir as including any natural storage or accumulation of water, spring, dam, bore or artesian well.

Section 15A of PGERA provides Ministers with vested lands, the right to determine access conditions and place such conditions of access to land within a PGERA title area.

It may also occur that a condition has been placed on a PGERA title that prohibits the holder from entering specified land within the title area (Section 91B PGERA), as follows:

91B. Conditions prohibiting entry on certain land

1) *In this section —*

holder means the holder of the permit, drilling reservation, lease or licence.

2) *The conditions subject to which a permit, drilling reservation, lease or licence is granted may include a condition prohibiting the holder from entering specified land within the permit area, drilling reservation, lease area or licence area.*

3) *The Minister may, at any time, by instrument in writing served on the holder, vary or revoke a condition referred to in subsection (2).*

The Petroleum and Geothermal Energy Resources (Environment) Regulations 2012.

Petroleum operators are required to submit for approval an Environment Plan subject to the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012. Regulation 14 (2) requires Environment Plans to:

- detail the socio-economic environment including local towns, population centres, and land uses in the vicinity of the proposed activity, including industrial activities/facilities in the vicinity of the proposed activity (eg. nearby seismic survey, drilling, facilities or industries, etc.).
- describe the existing environment including any natural (biological/physical) values and sensitivities, heritage areas and socio-economic features that may be affected by the activity. The description of the environment should therefore include any features of the environment that may be affected if the worst-case scenario (incident) occurred (eg. groundwater contamination, well blowout, major oil spill, fire).

The above information is required to ensure that all environmental impacts and risks of the activity have been adequately identified and that the management to be implemented by the operator is appropriate to the environment in which the activity is being undertaken. Where relevant, the spatial relationship between the proposed activity and the identified environmental features should be identified on a map.

Consultation with relevant authorities, interested persons and organisations must be undertaken and any issues reported must show evidence of being addressed/resolved (Regulations 11, 15 and 17). DMIRS has found this is important where activities are occurring closer to communities, to ensure companies are proactive and working with communities and resolving concerns prior to an activity being undertaken. Under DMIRS' Guideline for the Development of a Petroleum and Geothermal Environment Plans in Western Australia, DMIRS provides for five key principles for stakeholder engagement. They are as follows:

Communication – Communication must be open, accessible, clearly defined, two-way and appropriate.

Transparency – The process and outcomes of community and stakeholder engagement should, wherever possible, be made open and transparent, agreed upon and documented.

Collaboration – A co-operative and collaborative approach to seek mutually beneficial outcomes is considered key to effective engagement.

Inclusiveness – Inclusiveness involves identifying and involving communities and stakeholders early and throughout the process, in an appropriate manner.

Integrity – Community and stakeholder engagement should establish and foster mutual trust and respect.

Environmental Protection Act 1986

The *Environmental Protection Act 1986* (EP Act) provides for a range of mechanisms for controlling the location and operation of petroleum activities and facilities through Part IV and Part V of the EP Act.

- **To the degree that DMIRS relies on self-reporting by industry, is every report available to the public in full and if not why not?**

A number of reports are currently not routinely made publicly available. Section 150B of the PGERA 1967 restricts what the Minister (and DMIRS) may do with documentary information. Access to these reports may, however, be sought under freedom of information (FOI) legislation.

Reporting methods relating to safety compliance where dangerous occurrences and accidents have occurred, are currently not available to the general public. However, the statistics around the incidents and accidents are provided in a consolidated report. Additionally, all reports not subject to an active investigation, are accessible via FOI request.

The Resource Management and Administration Regulations 2015 requires daily activity reports to be submitted during drilling or post drilling well activities. A Well Completion Report is required one year after the end of drilling. Final activity reports are required six months after the end of a post drilling activity. These are to be released two years after the end of the activity to which the reports relate.

Annual Environmental Reports (AER) must be submitted to DMIRS no less than annually under the Petroleum Environment suite of regulations. It must contain the following information:

- A detailed summary of the activities undertaken during the reporting period.
- Details of any clearing and/or rehabilitation undertaken during the reporting period.
- A statement of compliance for each objective and standard in the EP including justification based on the measurement criteria.
- A summary of audits undertaken, including the findings and corrective action.
- A summary of any incidents that occurred (recordable and reportable) and lessons learned.
- A summary of all emissions and discharges, and any trends or anomalies.
- Details of methodology and results of any biological or environmental monitoring undertaken, and a discussion of any trends or anomalies identified.
- Details of any new or increased environmental impacts or risks identified during the reporting period.

- Details of all training and exercises undertaken.
- Details of all stakeholder engagement and consultation undertaken through the period.

AERs must also consider compliance with approval conditions and all other commitments in the environmental plan (including mitigation measures). The reports are not made publicly available, but may be requested through Freedom of Information. Further information about AERs can be found in the *Guidelines for the Development of Petroleum and Geothermal Environment Plans in Western Australia (2016)*.

Reportable and recordable environmental incident reports, emissions and discharge reports, rehabilitation reports may also be submitted to DMIRS and requested through FOI. This information is otherwise available to the public through summarised statistics and information in the Department’s annual reports.

- **What is the list of things that must be measured and reported as a well is developed and operated?**

The tables below outline the requirements for well activity reports and data that is required to be submitted to DMIRS as per regulation 72 and 73 (r. 72 and r. 73) of the Petroleum and Geothermal Energy Resources Act (Resource and Administration) Regulations 2015.

Report/Data/Samples	Format/Media	Submission Date	Remarks
Daily well activity report [r. 72]	PDF	Midday on the day after the day to which the report relates	This is the equivalent of the daily drilling report Refer to Schedule 5 for information required in this report
Well completion report [r. 74]	PDF	12 months after the rig release date	Refer to Schedule 9 for information required in this report Daily activity (drilling) reports are to be included in the well completion report Image files and logs included in report must be submitted as separate files See notes on petrophysical, geochemical or other sample analyses in this table Hard copies are not to be submitted

Well Completion Data			Schedule 8 (r.74(1))
Raw data, edited field data and processed data for all wireline	DLIS or LAS CD-ROM/DVD or portable hard drive	12 months after the rig release date	Include a verification listing of the data supplied. The data shall include full header information Includes raw well data for all tests conducted
Wireline Log Display	PDF, TIFF CD-ROM/DVD or portable hard drive	12 months after the rig release date	Continuous page at a readable scale
Edited field data and processed data for all MWD or LWD log holes	DLIS or LAS CD-ROM, DVD or portable hard drive	12 months after the rig release date	Include a verification listing of the data supplied. The data shall include full header information Includes raw well data for all tests conducted
MWD or LWD Log Display	PDF, TIFF CD-ROM, DVD or portable hard drive	12 months after the rig release date	Continuous page at a readable scale
Mudlogging data	ASCII or LAS CD-ROM, DVD or portable hard drive	12 months after the rig release date	Include a header giving field names, curve names and units of measure
Mudlog display	TIFF or PDF CD-ROM, DVD or portable hard drive	12 months after the rig release date	Continuous page at a readable scale
If generated, data from velocity surveys including: <ul style="list-style-type: none">• raw data;• processed data; and• checkshot and time/depth analysis	DLIS or SEG-Y for raw data and processed data DLIS, SEG-Y or ASCII for checkshot data CD-ROM, DVD or portable hard drive	12 months after the rig release date	To include verification header file
Velocity survey displays	TIFF, JPEG or PDF CD-ROM, DVD or portable hard drive	12 months after the rig release date [r. 74(2)(b)]	
Petrophysical, geochemical or other sample analyses	ASCII or XLS CD-ROM, DVD or portable hard drive	12 months after the rig release date [r. 74(2)(b)]	As a tab delimited ASCII file with metadata included

Report/Data/Samples	Format/Media	Submission Date	Remarks
Composite well log	TIFF, JPEG or PDF CD-ROM, DVD or portable hard drive	12 months after the rig release date [r. 74(2)(b)]	As part of the well completion report
Photography of the core and sidewall core, in both natural and UV light	JPEG or TIFF CD-ROM, DVD or portable hard drive	12 months after the rig release date [r. 74(2)(b)]	UV light photography to be done and submitted in fluorescent sections only Provide minimum 300 dpi image in 24-bit colour. High-resolution images able to be magnified (zoom in) without pixilation. If not in specified format, a reader program to be provided These are requested separately to images included in other reports so that original quality can be preserved Where possible, raw imagery to also be provided when submitting core samples
Monthly production report [r. 79]	Excel template Email	15 days after the day of production starting on the last day of the month to which the report relates	Refer to Schedule 17 for information required in this report

With regards to safety, the things that must be measured and reported are listed in the Petroleum and Geothermal Energy Resources (Management of Safety) Regulations 2010) All reportable matters relate to the OH&S incidents of the operator.

The operator must measure and report annually on environmental performance, through AERs. If any environmental incidents occur as a well is developed and operated, the operator must submit reportable and recordable incident reports to DMIRS in accordance with regulatory requirements and incident reporting timeframes. Emissions, discharges and waste are recorded and reported quarterly to DMIRS. Further information about reporting is contained in the *Guidelines for the Development of Petroleum and Geothermal Environment Plans in Western Australia* (2016). For licensed premises, there may also be monitoring and reporting requirements under Part V *Environmental Protection Act 1986* licence conditions.

At what points and how often in the operation is the quality of air and water monitored and reported? Are all reports publicly available?

Air monitoring

Licensed premises may be subject to licence conditions under Part V of the *Environmental Protection Act 1986*. This is administered by DWER.

The need for offsite air quality monitoring will be risk assessed by the operator on a case-by-case basis (it is not required for every petroleum activity). DMIRS has not prescribed air quality monitoring as a condition of approval and has not specifically requested it for any HFS activities. Some operators set up passive monitors for volatile organic compounds around their retention ponds during HFS activities as part of monitoring against their risk management systems (eg. at Woodada Deep-01). HFS Environment Plans risk assess impacts associated with emissions and are not approved unless the operator can demonstrate impacts will be ALARP.

The need for expert advice from consultants or academics is generally identified by the operator, such as where the environmental risk assessment process identifies specific concerns as to the effect on air quality (however it should be noted this has not been identified as credible risk in HFS Environment Plans assessed by DMIRS to date).

Further information is available in the *Environmental Risk Assessment of Chemicals used in WA Petroleum Activities Guideline (2013)*. In assessing the Environment Plan, DMIRS may also request additional expert advice from other Government agencies, such as DWER and DoH.

Water monitoring

The need for water monitoring will be risk assessed by the operator on a case-by-case basis. While it is not a specific regulatory requirement for every petroleum activity, petroleum companies have generally recognised community concern regarding protection of groundwater resources and propose undertaking groundwater monitoring programs (whether in exploration or production) as 'best practice' within their applications to DMIRS.

The *Guideline for Groundwater Monitoring in the Onshore Petroleum and Geothermal Industry (2016)* was developed in collaboration with the former Department of Water and provides further information on when groundwater monitoring is considered appropriate. An intensive groundwater monitoring program is likely to be required for petroleum activities in areas:

- In proximity to potable water supplies such as a Public Drinking Water Source Area (PDWSA), PDWSA water bore, or an Aboriginal community drinking water bore.

- In proximity to environmental sensitivities such as conservation category wetlands, groundwater dependent ecosystems, waterways, or areas protected by statutory mechanisms such as State forest, national parks, nature reserves, etc.
- With certain geology having potential to rapidly mobilise groundwater contaminants such as faults and karst geology.
- With important groundwater values and beneficial uses (current and future) where the groundwater resource has important social or economic values (such as local water supply, stock water, irrigation water, or is used to support nearby wetlands or recreational areas).
- In proximity to populated areas, culturally significant areas and/or there is significant public concern or perceived risks.
- Where there is a known risk of groundwater contamination.
- With higher operational risks, or where the proposed petroleum activity has a high level of complexity, uncertainty or risk.

A less intensive groundwater monitoring program may be appropriate for petroleum activities that pose lower risks to groundwater, or where there are no sensitive or water-dependent environments or water users in the vicinity of the proposed activity.

Where specific concerns or risks remain, the operator may decide to seek expert advice from consultants or academics who will often prepare a technical hydrogeological report and recommendations. DMIRS will review any subsequent reports and the environmental risk assessment to determine whether the proposal is acceptable, whether additional information is required, or whether additional controls and/or monitoring is required. In assessing the proposal, DMIRS may also request additional expert advice from other Government agencies, such as DWER, and water service providers.

Daily well reports as stipulated in the Petroleum and Geothermal Energy Resources (Resource Management and Administration) Regulations 2012 require operators to report the discovery of ground water, depth of the water and quantity produced during well operations.

DMIRS currently does not publicly report water monitoring data. However, information can be accessed through the provisions of the Freedom of Information Act. DMIRS is striving to improve public reporting, through its ongoing transparency initiatives and the Petroleum 2020 legislative reform project.

- **Do the analysis of water and air quality include the fullest range of potential analytes, or just a subset?**

As the Petroleum Environment Regulations are not prescriptive in terms of particular technologies or methods, there is no prescribed requirement for water and air quality monitoring for petroleum activities, including specific chemical parameters. The determination of necessary analytes is relevant to the nature of the proposal, proximity to sensitive receptors and sensitive environments, potential for community concern, etc.

DMIRS has not prescribed as a default monitoring of specific chemical parameters as standard conditions of approval, however where DMIRS is not satisfied with the parameters proposed for water monitoring (based upon the risks assessment), DMIRS requests operators include additional parameters in their water monitoring program. This is usually done through the Environment Plan assessment process rather than by conditions. Guidance on the parameters DMIRS expects to be monitored is included in the [Guideline for Groundwater Monitoring in the Onshore Petroleum and Geothermal Industry - August 2016](#).

Contaminated site investigations will require the full range of analytes and be subject to the requirements of the *Contaminated Sites Act 2003*.

DMIRS advocates a broad chemical parameter suite in undertaking baseline groundwater monitoring (see Groundwater Guidelines), with a more detailed chemistry suite follow up if necessary. Ongoing surveillance monitoring may be decided by either the operator or DMIRS as necessary. DMIRS observation in recent years is that a majority of petroleum operators are including within their proposal to undertake groundwater monitoring to demonstrate a commitment to protection of groundwater and industry best practice.

- **What is required with respect to the baseline measurements of formation and aquifer water quality, and local air quality, prior to development?**

As part of a field management plan, Schedule 3(8) of the Petroleum and Geothermal Energy Resources (Resource Management and Administration) Regulations 2012 requires the inclusion of details of the following:

- (a) any aquifers that could be affected by the development of the field; and
- (b) the applicant's proposals for the management of such aquifers including proposals for baseline monitoring.

The Guideline for Groundwater Monitoring in the Onshore Petroleum and Geothermal Industry - August 2016 outlines the department's expectations as to groundwater monitoring and provides guidance on undertaking baseline water monitoring. Some operators, particularly those proposing to undertake hydraulic fracture stimulation activities, have implemented a baseline monitoring program in accordance with this guidance (e.g. Buru Energy's TGS 15 Program).

Petroleum operators will monitor hydrocarbons and other chemistry parameters upon encountering formation water or target reservoirs containing hydrocarbons. This information may be regarded as commercially sensitive.

- **Has this data been collected at each well site and is it available?**

Where environmental baseline data has been collected (whether flora, fauna, waste, emissions, groundwater, etc.) it will normally be included in the Environment Plan. Subsequent surveillance monitoring results are typically reported in AERs. Some operators (e.g. Buru) may decide to make this information available on their website.

Some other agencies may also collect information in relation to administering their legislation, such as water abstraction volumes (DWER) licensed under the *Rights in Water and Irrigation Act 1914* and controlled waste collected and disposed of in accordance with Environmental Protection (Controlled Waste) Regulations 2004.

- **How often does DMIRS verify the information provided in these completion and compliance reports?**

DMIRS assesses the information provided by petroleum operators in environment plans and employs officers with the relevant tertiary qualifications and experience to assess petroleum, geothermal and pipeline projects. Those officers also assess AERs.

Petroleum operators often employ consultants and third parties to collect and analyse data in accordance with standards (e.g. NATA accredited labs, biological, chemical or hydrogeological consultants), which is then reported in AERs.

DMIRS does not collect samples for verification purposes. If a compliance investigation requires sample collection and analysis, DMIRS will require (or direct as appropriate) the operator to employ a suitably qualified consultant to undertake specific sampling, analysis and monitoring as required. DMIRS will be provided with a report, including the data or results from the suitably qualified consultant.

There are other Government agencies (namely DWER and DoH) that also have the legislative powers to investigate suspected contamination or pollution incidents and prosecute where validated. Daily activity reports are reviewed on a daily basis. Well completion reports and final activity reports are reviewed upon receipt.

- **Is there a schedule or protocol for such auditing / verification?**

DMIRS undertakes site inspections according to an annual inspection plan that is developed using a risk based approach. Site inspections may also include an audit of documents associated with the approved Environment Plan. The schedule of site inspections is risk based and broadly influenced by the type of activity being undertaken, company compliance history, and the risk to the surrounding environment. As part of the inspection and audit process, DMIRS inspectors will check for onsite compliance with the approved Environment Plan. This may include inspecting the chemicals being stored onsite and comparing them to that contained in the chemical disclosure.

- **What have been the results of these checks to date?**

The title holders are contacted if questions arise from review of daily activity reports. In most cases these ask for clarification of operational steps. In one instance a title holder continued activity even though a Blow Out Preventer (BOP) test was due. The title holder was informed that to continue without doing the test would be a breach of regulations. The title holder immediately ceased activity until the test was completed.

With regards to environment, the vast majority of reports received satisfy the requirements of the regulations. For the minority that do not, these are addressed through assessment, compliance and enforcement processes.

- **Does DMIRS have the technical capacity and capability to independently examine and interpret all forms of information collected by the companies, including chemical, toxicological, seismic, mechanical, geological, hydrological information? If not, how does DMIRS obtain such services?**

As previously noted, independent third parties usually collect the data, undertake the analysis and then submit reports interpreting the results. DMIRS has a variety of expertise within the department including chemists, hydrogeologists, engineers, geologists, etc. If additional expertise is required then DMIRS has the option of contacting relevant agencies with relevant expertise for advice.

- **Does DMIRS insist on industry best practice in the design and operation of onshore petroleum developments?**

Safety: Safety requires that onshore petroleum operators demonstrate that their risks are as low as reasonably practicable (ALARP) in both the design of their above ground equipment and facilities as well as their above ground operations.

Petroleum Compliance: As per the Safety note above, the requirement is for a fit for purpose design to demonstrate that risks are ALARP. Petroleum wells may have very different purposes and the requirements for a design to be fit for purpose in one instance may be more stringent than the requirements for a fit for purpose design in another instance for a different purpose.

Environment: Industry best practice is not a concept recognised by the Petroleum Environment Regulations and therefore is not insisted on. Contemporary regulatory regimes, i.e. those which are objective and outcomes focussed and risk-based, acknowledge that different circumstances demand different solutions. In a risk-based framework, if “standard practices” can reduce risks and impacts to acceptable levels, it would not be reasonably justified to insist on “best practices” to be implemented.

For this reason, DMIRS strongly encourages the application of industry best practice in design and operation, where the need for those practices is identified to reduce the risks and impacts of the activity to ALARP, or acceptable levels.

- **If so, why are not all operators using “green completions”**

Operators in WA are required to seek approvals from WA government regulators before venting or flaring operations in association with well testing and completions can be undertaken. For DMIRS, the two principal regulatory instruments that apply to venting and flaring are the Petroleum and Geothermal Energy Resources (Environment) Regulations 2012 and the RMAR 2015. There are also a number of safety provisions applied through an approved Safety Case and Safety Management System with regards to flaring and venting as they relate to worker and public safety. To respond to the query implicitly, there are no current regulatory or legislative requirements in WA for operators to undertake green completions.

On a practical level, the capacity for operators in the onshore of WA to complete green completions for exploration and some appraisal wells is somewhat limited and explains why this practice has not otherwise been adopted in the State to date. This is largely due to almost all exploration and appraisal operations, where flaring and venting may be undertaken, occurring in rural and remote regions with little or no adjacent gas pipeline infrastructure. Due to the transient nature of well testing to date and typical short timeframes, extending gas pipeline networks to testing sites would not be viable in consideration of the volumes of gas that may be flared. That said, there is some work currently underway within DMIRS regarding the participation of the WA Government in the World Bank’s [Zero Routine Flaring by 2030](#) initiative.

Petroleum and Geothermal Energy Resources (Environment) Regulations 2012

Petroleum operators are required to provide a description of all construction and operational aspects of a proposed activity, including details of specific operations which includes venting and flaring (Page 13. [Guideline for the Development of Petroleum and Geothermal Environment Plans in Western Australia](#)). Operators are required to monitor emissions and discharges from their activities and submit quarterly emissions and discharges reports to DMIRS in accordance with the requirements of regulation 34 of the Petroleum Environment Regulations. The annual environmental report that operators submit under regulation 16 of these regulations needs to include a year-by-year comparative analysis of emissions and discharges for ongoing activities.

Operators are also required to keep stakeholders up to date on activities, specifically notifying landholders prior to any flaring activities that may take place.

Resource Management and Administration Regulations 2015 (RMAR 2015)

Under the RMAR 2015 flaring may be part of a well test which requires regulatory approval before the activity can occur.

Field management plans under the RMAR 2015 require that arrangements for any disposal, venting or flaring of petroleum during production operations be presented in detail.

- **If so, why do not all operators employ a “traffic light” monitoring and management system for potential seismic risks?**

Most well activities including drilling do not pose a potential seismic risk. The micro seismic monitoring conducted during HFS is aimed at determining where fracturing has occurred. The analysis required for such determinations is time consuming and not available in real time. The control for determination for whether a HFS job should continue or not comes from monitoring pressures during a stimulation. In this situation there is certainly “traffic light” monitoring but it is not primarily for potential seismic risks.

- **Is venting and flaring of gas still happening and does DMIRS consider that best practice?**

Yes, venting and flaring occurs in WA. The appropriateness of venting and flaring is assessed by DMIRS on a case-by-case basis. Flaring is required in most instances to burn the hydrocarbons, reduce the thermogenic potential of emissions, and to prevent build-up of explosive gases (i.e. safety issue). In some cases, a proportion of petroleum gases may not meet required specifications for sale or use due to its chemical composition. In some cases, the improvement of gas to sales quality may be too energy intensive to be of net benefit (time, resources, money, environment). Flaring of such gases is an appropriate practice.

Cold venting of gas may be considered where flaring is not safe or reasonably practicable. DMIRS considers that cold venting is a last resort, i.e. where flaring is objectionable on safety or environmental grounds, such as where clearing of vegetation may be required for fire safety buffers around a flare.

- **Does DMIRS directly inspect the construction of each well and at what stage(s) of its development? Is such monitoring publicly reported?**

Safety inspections are undertaken on the above ground activities associated with petroleum operations, not the integrity or design of the well itself. Consequently, Safety Inspectors may not necessarily inspect each well, however, each operator is inspected regularly. DMIRS does not publicly report the results of these safety inspections.

DMIRS does undertake assessment of the design of every well proposed to be drilled. Every activity covered in a well management plan is assessed to ensure that it is ALARP. This includes proposals for HFS. Where possible inspectors go on site during activities to determine if the activity is being conducted in accordance with the approved well management plan. It is not possible for inspectors to attend every activity and selection of inspection targets is based on the risks presented by the activity.

Environmental Inspectors inspects most new exploration wells. The environment inspection program is risk-based and takes into account a range of factors, including the type of operations being undertaken, historic and recent compliance issues, and the presence of environmental sensitivities or receptors. DMIRS ensures that its resources target “high” risk activities. There are some sites that, due to the presence of environmental sensitivities or complex operations, are certain to be inspected at multiple stages of the activity. HFS is regarded as a complex operation.

The DMIRS environment inspection program is not publicly available. DMIRS inspection compliance reports are presently not made available to the public. However, inspection reports can be accessed through the provisions of the Freedom of Information Act. DMIRS is striving to improve public reporting, through its ongoing transparency initiatives and the Petroleum 2020 legislative reform project.

- **What has been the actual inspection schedule for onshore, stimulated wells since 2005?**

Stimulation is considered to be an activity that has sub-surface risks, even if the risks are reduced to ALARP. In this regard every well that has been stimulated since 2012 has been inspected during the stimulation to ensure compliance with approved plans.

For its safety inspections, DMIRS makes no distinction with regards to stimulated or not stimulated wells as this does not affect OHS risks. The safety inspection schedule is based on an overall assessment for the safety risks associated with the operation. Stimulation does not impact on this. The safety inspection schedule is based on the operator’s licence and the safety case (not on individual wells).

The Environmental Compliance, Safety and Petroleum Compliance Branches have inspected all of the onshore wells stimulated since 2005 and had officers present during HFS events since August 2012. The table in **Attachment 2** summarises official DMIRS inspections and visits of well sites stimulated since 2005.

- **How often have staff visited wells/operations?**

Staff visited activities on wells whenever possible. Some activities are sufficiently minor to not warrant inspection. Particularly as daily activity reports are received and reviewed when activity is occurring. Staff also witness well integrity checks whenever possible. All wells stimulated since 2005 have been visited at least once. The table in **Attachment 2** provides a summary of DMIRS inspections and officer visits for well sites that have been stimulated since 2005.

- **Can DMIRS provide these times and places?**

Please refer to the table in **Attachment 2**.

- **What is measured or recorded on these inspections?**

Safety Compliance: The scope for all inspections is compliance with the in-force safety case and the regulations. In general, only non-compliances are reported.

Petroleum Compliance: The scope is for compliance with approved well management plans since the RMAR 2015 came into force. Prior to that the scope was in compliance with approved activity programs, the Schedule of Onshore Petroleum Exploration and Production Requirements – 1991 and good oilfield practice. Reports on activity inspections will state if the activity is compliant or if there are non-compliances. Witnessing of well integrity checks will conclude with observations of pressures and any anomalies being entered into Petroleum and Geothermal Register.

Environmental Compliance: The scope for all inspections is compliance with the approved Environment Plan, approval conditions and the associated regulations. In general, non-compliances and opportunities for improved environmental performance are detailed in an inspection report.

- **How many field staff does DMIRS dedicate to the licensing and inspection and compliance of the onshore petroleum industry?**

Safety Compliance: ten inspectors.

Petroleum Compliance: five inspectors.

Environmental Compliance: six environmental inspectors under petroleum legislation.

- **What are their technical qualifications?**

Safety Compliance: In general, they are qualified engineers with a variety of industry and regulatory experience.

Petroleum Compliance: Various formal qualifications in geology, petroleum engineering or drilling engineering as well Cert IV in Government Investigations.

Environmental Compliance: All inspectors must have a Bachelor of Science degree in Environmental Science, Natural Resource Management or equivalent.

- **Where are they based (ie. Locations/regions)? Can they attend sites for inspection in a timely manner?**

All DMIRS petroleum inspectors are Perth based, there has not been any issues to date regarding inspectors getting to site in a timely manner when needed.

How many failures, / breaches were identified by DMIRS, vs how many were reported by the companies.

Safety Compliance: To date, there has not been any prosecution brought by the department on an onshore petroleum operation for any safety matter. Outcome based legislation means that the non-compliances found are addressed as risk management issues rather than legislative breaches.

Petroleum Compliance: There have been no prosecutions under the RMAR 2015.

Environmental Compliance: To date, there has not been any prosecution brought by the department on an onshore petroleum operation for any environmental related matters.

The Inquiry Panel has been provided with a list of all reportable and recordable spill incidents for onshore petroleum activities since August 2012. DMIRS reviews all self-reported incidents and will initiate further action, compliance and enforcement actions as appropriate. DMIRS also investigates third party reporting of potential incidents. DMIRS inspectors may also identify non-compliances and opportunities for improvement during their compliance inspections.

- **Is there a process for the public to directly report breaches, problems or anomalies to the department directly? Have you received any such reports from members of the public concerning well drilling, completions or maintenance operations, or the surrounding infrastructure (e.g. well or pipeline leaks, tailings pond issues, etc?)**

Yes, via email, mail in or phone calls, and the information is available on the DMIRS website for public access. Public Interest Disclosure is also available for sensitive or confidentiality purposes. DMIRS also has a website notification for petroleum incidents - www.dmp.wa.gov.au/Environment-16573.aspx

- **When a breach/failure is identified, is every one investigated in the field?**

Safety Compliance: As the safety case deals with operating procedures and practices, depending on the nature of the breach or failure the investigation may not necessarily be in the field, but may be in head office. Each investigation is case-by-case.

Petroleum Compliance: As per Safety note. The majority of failures are not breach of regulations but matters where remediation based on risk is required. Many of these are picked up by review of daily reports, do not require investigation and resolved by communication with the title holder.

Environmental Compliance: No. In many cases, a breach/failure does not result in material environmental impact / harm. For most incidents, DMIRS will require the operator to investigate the cause of the incident and detail the corrective actions taken to fix it, and minimise the likelihood of reoccurrence. Environmental inspectors may decide to visit the site of an incident where there is concern as to material environmental harm or public interest, to make observations in relation to the incident and/or its remediation. Serious incidents may require referral to specialist investigators within DMIRS or DWER to undertake detailed investigations, with a view to prosecution.

DMIRS also receives 'recordable incident' reports on a monthly basis. These written reports must specify all material facts and circumstances known relating to the incidents that have occurred and the actions taken by the operator. Recordable incidents are incidents that breach an environmental performance objective or standard in an operator's Environment Plan. An operator may include an environmental performance objective in their Environment Plan to the effect of 'no unplanned release of hazardous substances within the operational area'. As in this example, DMIRS will receive reports of any spills of hazardous substances within the operational area on a monthly basis, including very small spills that occur within lined bunded areas that are cleaned up immediately and do not result in material environmental impact or harm. Where DMIRS has concerns that a more serious breach or failure, e.g. a reportable incident, may or has resulted in material environmental impact or harm, the department will request further information from the operator and, where necessary, considers appropriate enforcement measures in accordance with its [Enforcement Policy](#).

- **Are reports on the breach available to the public? In detail? When?**

Investigations remain confidential in situations where there is potential for prosecution. There are currently no provisions in the Act for public release of information regarding incidents. However, reports can be accessed through the provisions of the Freedom of Information Act. DMIRS is striving to improve public reporting, through its ongoing transparency initiatives and the Petroleum 2020 legislative reform project.

- **In the example of the recent, extraordinary rainfall events in parts of the Canning Basin, did DMIRS make any immediate assessment in the field of potential contaminations from overflowing ponds, local chemical stores etc?**

In relation to that rainfall event, DMIRS contacted operators in the area to determine the impact of floods to site infrastructure. Operators confirmed they had inspected their sites when it was safe to do so.

- **What are the hazard response arrangements and capacities to deal with an incident in the Canning and Perth Basins?**

Safety Compliance: The responsibility lies with the operator. Under safety requirement, operators are required to have an Emergency Response Management Plan for the OSH of the workers.

Petroleum Compliance: The title holder is required to have an Emergency Response Management Plan (as required above).

Environmental Compliance: Petroleum Environment Regulations require all operators to have an Oil Spill Contingency Plan (as part of an approved Environment Plan) that details emergency response arrangements and capabilities for oil and chemical spills. This includes arrangements for third party assistance (e.g. service companies and emergency response services) where greater capabilities are required.

- **When there has been a breach or incident, is the site tested for exposures / contamination or is that just estimated or inferred?**

Where petroleum incidents occur, the operator is expected to clean-up and then test for residual impacts prior to closing out the incident. Testing for residual contaminants is likely to involve third party consultants and accredited laboratories to verify that the impacted area has been remediated.

Are these test results available?

The test results are required to be provided to DMIRS as evidence that appropriate and effective corrective action has been taken. Test results are not made publicly available, however, may be requested through FOI.

- **Can DMIRS provide the records of these incident inspections?**

All recordable and reportable spill incidents have been provided to the Panel (since regulations came into effect in August 2012). As noted above, the incident investigations are expected to be undertaken by the operator. DMIRS will receive reports to close out the remediation. Serious incidents may require response under EP Act or by inspectors / investigators. A number of available inspections records and reports will be provided as part of the larger document request.

- **Has any failure resulted in the contamination of land or water?**

Yes. These sites have been referred to DWER Contaminated Sites as the responsible authority for managing long-term contamination issues associated with petroleum sites.

- **How is this determined?**

As part of the incident investigation, the operator submits an incident report detailing the failure. During the assessment of the incident (operator) or review of the incident details (DMIRS), judgements are made as to the potential for soil or groundwater contamination. These judgements take into account the size of the spill, the receiving environment, the time between spill occurrence and detection, environmental conditions etc. If DMIRS has reason to believe that contamination has occurred, it may direct the operator to undertake further investigations, with a view to subsequently reporting the site to DWER Contaminated Sites.

- **What was done in the case where there has been contamination?**

DMIRS and DWER work collaboratively to ensure the contamination issues are remediated by the operator in a timely manner and with scientific rigour consistent with the requirements of the *Contaminated Sites Act 2003* administered by DWER. Previous examples of such collaboration between departments for conventional petroleum operational sites have included:

- Varanus Island
 - Barrow Island
 - Airlie Island
 - Whicher Range
 - Red Gully
 - Rough Range
- **Has DMIRS ever fined or prosecuted an operator for any breaches or lack of compliance, and if so, what are the details?**

No.

- **Does DMIRS have a testing or research program into the long-term performance of plugged and abandoned wells?**

No.

- **Is there a database of every decommissioned well in the state?**

The Western Australian Petroleum Information Management System (WAPIMS) lists every State petroleum well and its status.

- **Are they monitored for integrity?**

Not by DMIRS.

- **Is there evidence as to how they are holding up?**

Where monitored – yes.

- **Is there a time limit of the monitoring of these wells?**

Not applicable.

- **Is there capacity for timely public reporting of monitoring?**

No.

- **Is there a program to monitor the long-term integrity of wells? What does that look like in detail?**

This issue is covered under well management plans and requirements are described in the Guidelines to Petroleum and Geothermal Energy Resources (Resource Management and Administration) Regulations 2015.

- **Is there testing of soil and water when a company abandons a well?**

Testing of soil and water is not prescribed. DMIRS will assess an environment plan where a well and/or site is being decommissioned. The risk assessment may identify risks or potential impacts to soil and water that make it practicable or necessary to establish current soil or water parameters.

Site remediation is required where a well is decommissioned and may include any associated infrastructure including sumps, flowlines, well pads, laydown areas, etc. Soil testing would be required where there is reasonable evidence of current or historic impacts (e.g. under sumps, oil separators). Results of soil testing, along with other details of site decommissioning, are provided to DMIRS.

- **What is the long-term liability for P&A wells and who holds that liability?**

Presently, there are no legislative or regulatory requirements holding an operator liable for damages from a petroleum well that has been decommissioned in an approved manner and the operator has surrendered the licenced area back to the State. Final liability may revert to the State, though there has been no instances in WA where this has occurred for a decommissioned petroleum well.

- **Does the State have the capacity to remediate any contamination of water resources in the event of the loss of containment in P&A wells?**

The requirements for decommissioning wells entails the isolation of any hydrocarbon zones with cement and the isolation of any aquifers zones in a similar fashion. A decommissioned well will normally contain inhibited brine in sections that are not filled with cement. Other than salt, and small amounts of oxygen scavenging chemicals, no other sources of contamination would be expected to be present in appreciable amounts.

- **Does DMIRS have any estimates of that liability and those costs for a single well or across the potential scale of the industry?**

No.

- **Does DMIRS require all companies to provide a detailed assessment of all chemicals used in drilling and hydraulic fracturing?**

Please refer to the Chemical Risk Assessment Guidelines (2013). Not all operators will require a detailed environmental risk assessment of chemicals. The environmental risk assessment in the Environment Plan will suffice in most instances.

- **What human health and ecotoxicological assessment is required?**

Refer to the Chemical Risk Assessment Guidelines (2013) for a detailed description of requirements.

- **Does DMIRS check that all chemicals proposed to be used are listed on the Australian Inventory of Chemical Substances (AICS)?**

No.

- **Are the chemical assessments publicly available? If so, where is this information provided? If not, why not?**

Chemical disclosure information is provided on DMIRS website – in public disclosure documents (pdfs) of the Environment Plans. Available here:

<https://ace.dmp.wa.gov.au/ACE/Public/PetroleumProposals>

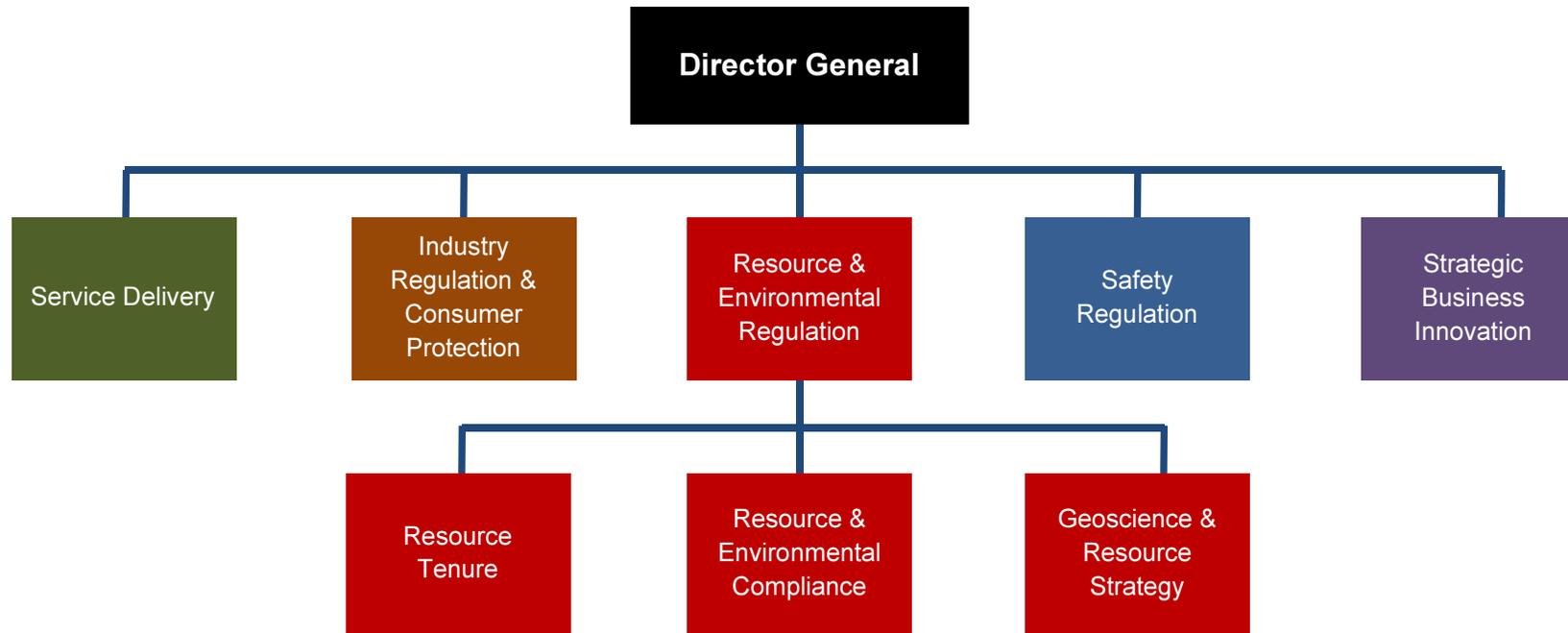
- **Is there any checking / inspection that the chemicals listed by the company for use are the ones used in drilling of hydraulic fracturing?**

Yes. DMIRS assesses chemicals used in drilling and HFS, which are reported in daily drilling reports. Inspectors may verify chemicals being stored on site compared to those listed in chemical disclosure.

- **How does DMIRS track corporate probity / responsibility through corporate mergers / on selling of entities?**

Details of the registered holders of a petroleum title or licenced area are required to be correct and up to date at all times. Any changes to registered holders interests on titles and licenced areas must be made available to DMIRS and approved by the Minister or his delegate. Presently, DMIRS does not have legislative powers that would limit or prohibit transactions of corporate entities as enabled through Commonwealth Corporations Law.

DMIRS High Level Organisation Chart



Pre-Grant, grant and dealings:

- Administers the granting of tenure, maintaining registers and land access
- Development and enhancement of business systems and processes

Post-Grant, administration enforcement:

- Manages the compliance and monitoring functions mineral and petroleum activities, including environmental approvals, inspections and audits

Promotion and strategy:

- Geological products and services
- Co-funded exploration initiative
- Operational policy

HFS Wells Inspections

Operator	Well	Year Stimulated	DMIRS Officials Inspections/Visits
Amity Oil	Whicher Range 5	2004	Environment: <ul style="list-style-type: none"> • 1 x drilling (6/11/2003) • 1 x HFS (26/7/2004) • 4 x rehabilitation (6/4/2005, 10/8/2005, 28/11/2006, 27/2/2007) • 1 x post relinquishment (17/2/2016)
AWE	Corybas 1	2009	Environment: <ul style="list-style-type: none"> • 2 x care and maintenance (2/11/2011, 2/2/2017)
	Senecio 2	2012	Environment: <ul style="list-style-type: none"> • 1 x HFS (17/8/2012) • 1 x care and maintenance (14/10/2014) Resources: <ul style="list-style-type: none"> • 1 x present for HFS
	Woodada Deep 1	2012	Environment: <ul style="list-style-type: none"> • 1 x post-drilling (21/9/2011) • 1 x post HFS (22/8/2012) Resources: <ul style="list-style-type: none"> • 1 x pre HFS (3/08/2012) • 1 x HFS (6/08/2012) Safety: <ul style="list-style-type: none"> • 1 x OSH inspection in relation to HFS (02-03/08/2012)
Buru Energy	Asgard 1	2015	Environment: <ul style="list-style-type: none"> • 1 x immediately post HFS (8/9/2015) Safety: <ul style="list-style-type: none"> • 1 x OSH inspection in relation to HFS (14-16/09/2015) Resources: <ul style="list-style-type: none"> • 1 x HFS (22/08/2015)
	Valhalla North 1	2015	Environment: <ul style="list-style-type: none"> • 1 x HFS (8/9/2015) Resources: <ul style="list-style-type: none"> • 1 x HFS (4/9/2015)
	Yulleroo 2	2009	Environment: <ul style="list-style-type: none"> • 1 x care and maintenance (13/4/2016)

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Latent Petroleum	Warro 3	2009	Environment: <ul style="list-style-type: none"> 1 x post-HFS (22/9/2011) 1 x care and maintenance (23/6/2015) Safety: <ul style="list-style-type: none"> 1 x OSH inspection in relation to HFS (19-20/02/2009) Resources: <ul style="list-style-type: none"> 1 x site inspection (10.7/2015)
	Warro 4	2011	Environment: <ul style="list-style-type: none"> 1 x post-HFS (22/9/2011) 1 x care and maintenance (23/6/2015) Safety: <ul style="list-style-type: none"> 1 x OSH inspection in relation to HFS (08-10/12/2015)
	Warro 5 (ST)	2015	Environment: <ul style="list-style-type: none"> 1 x pre-drilling (23/6/2015) 1 x pre-HFS (27/8/2015) 1 x HFS (9/12/2015) Safety: <ul style="list-style-type: none"> 1 x OSH inspection in relation to HFS (08-10/12/2015) Resources: <ul style="list-style-type: none"> 1 x drilling (21/09/2015) 1 x HFS (7/12/2015) 1 x well test (10/02/2016)
	Warro 6	2015	Environment: <ul style="list-style-type: none"> 2 x pre-drilling (23/6/2015, 27/8/2015) 1 x immediately pre-HFS (9/12/2015) Resources: <ul style="list-style-type: none"> 1 x drilling (29/10/2015) 1 x HFS (14/12/2015)
Norwest Energy	Arrowsmith 2	2012	Environment: <ul style="list-style-type: none"> 1 x pre-HFS (21/9/2011) 1 x HFS 12/8/2012 1 x post-HFS (18-19/9/2013) 1 x care and maintenance (1/2/2017) Safety: <ul style="list-style-type: none"> 1 x OSH inspection in relation to HFS (26-27/07/2012) Resources: <ul style="list-style-type: none"> 1 x HFS (27/07/2012)