Offshore Petroleum and Minerals: Plugging Gaps in the Present Framework

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For twenty years, it has been realized that there is a gap in New Zealand's environmental law in that there is no general environmental legislation for the exclusive economic zone, and now for the extended continental shelf that includes areas more than 200 nautical miles offshore. The jurisdiction of regional councils under the Resource Management Act 1991 does not extend beyond the 12-mile limit, about 22 km offshore. (The jurisdiction of territorial authorities extends only to the mean low water mark.) That has meant that oil and gas operations beyond the 12-mile limit have not had proper environmental scrutiny. Public concern about such matters has sharpened in the light of petroleum exploration in the Raukumara Basin off the East Cape, although so far it has only reached the stage of seismic exploration. The Deepwater Horizon blowout on the Macondo prospect in the Gulf of Mexico in April 2010 also looms large in public debate. With a lower profile but with a similar potential to cause environmental harm is the possibility of seabed mining operations. A company is gearing up for deep seabed mining off New Britain in Papua New Guinea. Globally, the main targets are cobalt-rich crusts, polymetallic nodules (on the abyssal plain), and massive sulphide deposits (near hydrothermal vents). In New Zealand iron sands are also attractive. Other possible future uses of the offshore are carbon capture and storage and the extraction of gas hydrates. Existing operations such as fishing by bottom trawling present risks of environmental harm to the benthic environment, especially to features such as seamounts. The Minister for the Environment has now announced his intention to introduce a bill to plug this legal gap, at least in relation to petroleum development and seabed mining. Action on this is most welcome. It is desirable to consider the strengths and weaknesses of the proposal, and of the legal framework for oil and gas well drilling in general. Some surprising gaps remain even if the Minister's proposal is enacted.

The Environmental Gap

The existence of a gap in environmental regulation in the offshore is now well understood: Raewyn Peart, Kelsey Serjeant and Kate Mulcahy, *Governing Our Oceans: Environmental Reform for the Exclusive Economic Zone* (Environmental Defence Society, Auckland, 2011). A careful report has compared New Zealand's law with that of Australia, the United Kingdom, Ireland and Norway, and has made recommendations for improvements: Atkins Holm Joseph Majeury and ERM NZ Ltd, *Comparative Review of Health, Safety and Environmental Legislation for Offshore Petroleum Operations* (prepared for the Ministry of Economic Development 2010). A great deal of work was carried out in earlier efforts to formulate New Zealand policy for the oceans generally. The present situation leaves us reliant on the Maritime Transport Act 1994 and in particular the Marine Protection Rules Part 200, which require the operator of an offshore installation, to prepare a discharge management plan and obtain the approval of Maritime New Zealand for it. The applicant must identify all processes and activities that present a risk of pollution from an oil spill, the procedures to reduce the risk, and present an emergency spill response plan. It must identify potential environmental impacts. The Rules also require offshore installations to use water-based or synthetic-based drilling fluids (mud) unless specifically approved. In addition there are the

Resource Management (Marine Pollution) Regulations 1998 under the RMA which apply within the coastal marine area, out to the 12-mile limit.

The Minister's announcement is for an Exclusive Economic Zone and Extended Continental Shelf (Environmental Effects) Bill, to be introduced in Parliament in July 2011, to provide for:

- the new Environmental Protection Authority to be responsible for consenting, monitoring and enforcement
- activities to be classified as either permitted, discretionary (requiring a consent) or prohibited
- public notification and consultation required for all regulations and consents
- an environmental impact assessment on all consents
- a general duty to avoid, remedy or mitigate adverse environmental effects
- a joint application process where activities span the EEZ and territorial sea
- enforcement penalties aligned with the Maritime Transport and Resource Management Acts.

(Nick Smith, "Environmental Protection Law for Oceans Announced" 2 June 2011 press release and accompanying "Questions and Answers".)

It is intended that the new legislation will cover "some aspects" of petroleum exploration and extraction, seabed mining, and any activity that may cause environmental effects such as the redistribution of sediment, damage to seabed or damage to ecosystems. The legislation will allow regulations to be made through a public consultation process, in order to classify activities as permitted, discretionary (requiring consent) and prohibited. It is suggested, for example, that marine seismic surveying be a permitted activity if it complies with the regulations. A discretionary activity, such as drilling a well, would require a consent from the EPA. An environmental impact assessment would be required and there would be a public hearing. There would be a right of appeal from the EPA decision to the High Court on point of law only.

What can we make of these proposals? To begin with, we can give them a big welcome simply because they have arrived to fill an unacceptable gap in our law. We must applaud the fact that activities with the potential for major harm to the environment must now undergo scrutiny, and that more factors will be considered than the relatively narrow band involved in a discharge management plan. We can be pleased that a company's environmental impact assessment will be evaluated for its completeness, and that an open participatory process will strengthen decision-making on the more significant proposals. This will push New Zealand's environmental protection into the international mainstream. Indeed, a story circulates of one international oil company that had prepared its environmental impact assessment for work in New Zealand waters but was puzzled to learn that there was no agency that wanted it. It makes sense that the emerging Environmental Protection Authority be in charge; its expertise will be in environmental analysis and processes, to a greater degree than Maritime New Zealand or any of the other possibilities; and there is no need for a new agency. The EPA and MNZ will need to co-operate on the operation of shipping and marine installations, and on the New Zealand Oil Pollution Response Strategy that MNZ runs.

From the outline that is all we have at this stage, there seem to be three shortcomings in the proposal. The first is the important statement of environmental values, purposes, and principles that will guide decision-makers. We are informed that the legislation will provide, perhaps as a purpose statement, for the development of natural resources in the EEZ and ECS

while protecting the environment from any adverse effects, and that the principal considerations for decision-makers will include:

- the present and future economic wellbeing of New Zealand
- effects on the health and safety of people
- protecting existing uses, interests and values
- safeguarding the biological diversity and integrity of marine species and ecosystems and processes, protecting rare and vulnerable ecosystems as well as the habitat of depleted, threatened or endangered species
- managing the cumulative effects of all activities on the receiving environment
- the efficient use and development of natural and physical resources
- improving information and knowledge of the marine environment, including the effects of human activity on the marine environment.

Compared to Part 2 of the RMA, this offers less protection for the environment and more of a purpose of development and economic wellbeing. It is not that the RMA outlaws development and economic wellbeing – far from it – but it provides for environmental management and protection, and leaves it to market forces and economic pressure will foster and direct development.

The second shortcoming in the proposal is the apparent absence of any strategy or policy framework. If environmental management is not to descend into a series of ad hoc decisions in isolation, there must be some effort to understand the big picture. In the RMA, this is provided by policy statements and plans. In them, if all goes well, agencies and communities work out what are the important issues, they decide on the objectives that they wish to reach, and then the policies which they hope will allow them to do so. How bad is the water in this river? How much better do we want it to be in twenty years? What do we have to do to get it that much better? This guides decision-makers in deciding each consent application, and we need something similar for the offshore.

The third shortcoming is the lack of a right of appeal on the merits and to the Environment Court in particular, in relation to the EPA's decision to grant or refuse a consent, and the conditions put on a consent. This is a concern to applicants and the participating public alike. The EPA is a Crown entity, and the Minister's analogy to a board of inquiry under the RMA is not sound, because those boards are chaired by a present or former Judge of the Environment Court or High Court.

Why not then use the RMA? The Minister says that the RMA contains detailed planning and appeals processes, there is less competition for space in the EEZ and ECS and less effect on local communities, and probably only a handful of applications in any year, so that a separate and more streamlined piece of legislation is appropriate. But, firstly, the activities to be regulated will be big complex ones, carrying significant degrees of environmental risk; low probability but high impact. Secondly, the addition of a new system, however streamlined, will not reduce the overall complexity of our environmental laws. It will be much simpler and neater to add a short part to the RMA to extend it to the EEZ and ECS, stating:

- a modified application of the Act to activities (ie modifying Part 3),
- that the EPA exercises territorial and regional council jurisdiction,
- the duty of the EPA to prepare a plan akin to a regional plan, subject to necessary modifications (or leaving it to a national policy statement), and
- the other modifications to principle and procedure necessary to apply the RMA.

This will be less complicated and less fragmented than setting up a different offshore framework. It will allow those involved to draw on their existing knowledge of the law. It will provide a more integrated framework for projects that straddle the 12-mile limit. Let us not multiply entities unnecessarily.

To summarize thus far, environmental protection regulation for the offshore is welcome, the proposal needs to have added to it a suitable framework of principle and strategy, and the simplest form of the legislation is an adaptation of the RMA. This leaves for another day issues such as marine spatial planning, marine protection, and an overall marine management body. However there is one other shortcoming in our legal arrangements for health, safety and the environment in relation to oil and gas that must be rectified, both onshore and offshore.

Well Design and Plugging and Abandonment

There is no effective control by any agency in New Zealand of the way that an oil and gas well is drilled and the way that it is plugged and abandoned. There is oversight and review, but no legal power to approve, decline, or impose conditions. A well must be designed in a way that safely manages the pressure of fluids in the geological formations that will be encountered. Otherwise there is a risk of a leakage of oil, natural gas, or saline water to the surface, or into other formations such as potable water aquifers. A blowout or sudden uncontrolled release of pressure during drilling is rare, but it can be a disaster for life and limb and for the environment. A blowout onshore can take weeks to control, and offshore can take months. Sometimes a second well to relieve pressure is the only solution. Wells must therefore be carefully designed to control pressure at all stages. Blowout preventers, casing, cementing, and the management of drilling fluid are all part of the complex engineering entailed. What is required will vary with differences of geological conditions, depth, and the nature of the oil, gas and other fluids likely to be encountered.

Plugging and abandonment is a careful and sometimes expensive process of making sure that a well does not cause damage after the end of its useful life, especially damage from the movement of gas or liquid in the well. The main technique is to plug the well with suitable cement at the right places. It is important that the job is done well. The matter is one of public interest. For one thing, the responsible company may be long gone before any trouble is detected, leaving an "orphan" well that may cause environmental harm and loss of oil and gas, and will probably require public funds to deal with. Additionally, damage can affect the future use of an underground formation. It may affect the recovery of oil and gas and so cause a loss to the Crown and the public as owner of the resource. Also foreseeable are carbon capture and storage operations, which will put a premium on high-quality plugging and abandonment of wells drilled into formations suitable for carbon dioxide injection, along with a permanent public record of what was done. There is therefore a public interest in well design and plugging and abandonment that is grounded on several considerations: environmental protection, health and safety, national reputation, resource conservation, and integrity of subsurface formations.

What then is the state of New Zealand law for this purpose? There are some requirements in workplace health and safety regulation, but they are weak. The Health and Safety in Employment (Petroleum Exploration and Extraction) Regulations 1999 require an employer to give prior notification of certain operations including well-drilling, suspension, and the use of explosives; and to take all practicable steps to give the notification 20 days in advance. The employer must take all practicable steps to supply well-drilling records, to manage pressure

containment, to provide adequate blow-out preventers, and to provide sufficient casing. But no approval is required to ascertain whether the particular well engineering is suitable. As for plugging and abandonment, the Regulations require notification, but again no approval is required. They prescribe several specific requirements for the placing of cement plugs, for leaving casing where necessary, and for the removal of all equipment and debris at the surface or on the seabed.

The rest of our present law on the matter is under the Crown Minerals Act 1991, even though its main purpose is allocate rights to Crown-owned minerals like petroleum under prospecting, exploration and mining permits. The Minerals Programme for Petroleum 2005, made under it, states at 5.6.24 that petroleum mining permits will be subject to a general condition to undertake mining operations in accordance with "good exploration and mining practice (or good oilfield practice)" (which is likely to include plugging and abandonment) and a condition requiring "the proper decommissioning of production facilities and permanent abandonment of wells". The Crown Minerals (Petroleum) Regulations 2007 also require in regulation 36 that all well-drilling operations to be carried out in accordance with recognized good exploration and mining practice. The Programme says at 6.2.2 and 6.2.4 that good exploration and mining practice implies "that a permit holder will act in a technically competent manner and with the degree of diligence and prudence reasonably and ordinarily exercised by experienced operators engaged in similar activity under similar circumstances and conditions" but it recognizes that it cannot be defined. "Good oilfield practice" is in legal use internationally, but it is uncertain. (See for example Martin Hunter and Anthony Sinclair, "Aminoil Revisited: Reflections on a Story of Changing Circumstances" p 347 in Todd Weiler, ed, *International Investment Law and Arbitration: Leading Cases from the ICSID* (Cameron May, London, 2005).) There is a procedure in the Programme at 6.2.5 and 6.2.6 under which the Minister can address deficiencies and in theory revoke the company's permit. But overall the requirement of good exploration and mining practice is uncertain and difficult to enforce.

The Crown Minerals (Petroleum) Regulations 2007, regs 19(2) and 45-47, also make certain notification and reporting requirements; for a field development plan that includes a description of the proposed abandonment, a daily well-drilling report, a well completion report, notice of a plugging and abandonment, and a well abandonment report. But again no approvals are required.

The RMA, at least as presently administered, is not convincing as a source of authority for the control of well design and plugging and abandonment. It is not self-evident that a well is a taking, use, damming or diversion of water; or a use of land that affects water quality or the effect of hazardous substances. An oil spill or blowout would certainly contravene section 15 as a discharge of a contaminant without permission, and (out to the 12-mile limit) section 15B applies to the discharge of a contaminant from a ship or an offshore installation. But regional councils have not shown any intention to get involved in oil well engineering, or in geological structures beyond groundwater and natural hazards. Even in Taranaki, the *Regional Freshwater Plan* (2001) does not require a petroleum operator to obtain a resource consent for an oil or gas well as long as the hole is cased and sealed to prevent the potential for aquifer cross-contamination or leakage from the surface, as long as it is 50 m away from any effluent pond, septic tank, silage stack or silage pit, and 25 m away from any surface water, and as long as it produces less than 50 m^3 of groundwater per day or 1.5 litres per second.

Our present law for the design of wells and plugging and abandonment can therefore be described along the following lines. It is mainly in the health and safety legislation, so that it binds employers, whose obligations are mostly confined to taking all practicable steps. Its purpose is to reduce harm to employees, not the environment; indeed, if health and safety regulations were tightened up for environmental purposes, they would probably be ultra vires. Mostly it is confined to notification and reporting obligations, and does not require actual external scrutiny and approval. Crown Minerals Act requirements are phrased as obligations too general to enforce. Only the Maritime Protection Rules require approval, and pursue an environmental purpose.

Well design and plugging and abandonment are too serious to be so neglected, and should be subject to expert prior scrutiny and approval. A set of statutory procedures is required for application, approval and licensing, notification, monitoring and reporting. The requirements would apply onshore and offshore. The requirements would be administered by a body like a Well Safety Unit, the chief characteristic of which would be its expertise in this specialized field of engineering and risk management. It would not be large, and would need to keep its expertise refreshed by constant contact and exchange with agencies and consultants in other countries. It would be funded primarily by industry.

The objective of a Well Safety Unit, and the purpose of its governing legislation, would be to safeguard health and safety, the environment, and the other public interests identified above. This plurality of purposes is where the institutional design becomes a little more complicated. For example, if the empowering legislation is an amendment of the Health and Safety in Employment Act, it would be essential that it explicitly direct its administrators to pursue environmental and resource conservation purposes as well as health and safety. Formal means of providing input are probably required, so that, for example, the Environmental Protection Authority has the role of identifying the sensitivity of the receiving environment. The same goes for the institutional location of such a Unit, whether in the Department of Labour, the Environmental Protection Authority, or elsewhere. The Ministry of Economic Development's New Zealand Petroleum and Minerals (formerly Crown Minerals) has some appeal as an institutional location, because the common element is oil and gas operations, but one of the conclusions quickly drawn from the Deepwater Horizon disaster was the need to separate regulation from permitting and promotion. There would still need to be close liaison as to permit conditions and as to the permanent record of wells and other activities affecting the geological subsurface. There is no need to produce the "single window" or "one stop shop" institutional arrangements that may be attractive for individuals or small companies. Oil and gas companies are sophisticated, they know that their projects are big a complicated, and they are likely to be happy to deal direct with multiple regulators on different aspects of their projects. They are more likely to be concerned about the skills of regulators to tackle the substantive issues.

Such requirements and such agencies for well licensing are normal elsewhere. In the Australian offshore, the company must obtain the approval of the regulator for well operations management plans, well activities, and field development plans, under the Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011. This includes completion of a well, suspension of a well, and abandonment of a well. In Canada in the offshore and in the north, federal law requires an operator to have an operating licence from the National Energy Board: Canada Oil and Gas Operations Act RSC 1985, c O-7. Onshore, Alberta, the main petroleum province, requires an operator to have a well licence for every well (for both Crown and private minerals) from the Energy Resources

Conservation Board: Oil and Gas Conservation Act RSA 2000 c O-6. The New Zealand equivalent will be far smaller and will probably not be a stand-alone agency. As much as possible, new laws and new institutions should key in to existing ones.

Even with a system for well design and plugging and abandonment in place, and improved safety regulation, a well blowout is still not impossible. It is a low-probability high-impact event. There would be a high reputational impact in the news story, whatever the magnitude of the environmental impact might be. The New Zealand Oil Pollution Response Strategy 2006 strategy document does not refer to blowouts, and is mainly concerned with the higher-probability risk of shipping accidents. So some hard thinking is required about how New Zealand would deal with an offshore blowout. Sometimes the only effective way of tackling a blowout is with one or more relief wells. If the drilling ship or mobile offshore drilling unit has been damaged, another will be needed, maybe more than one. At this point we need to take into account the realities of geography. The Deepwater Horizon blowout was only a few hours' steaming from the world's biggest offshore oil and gas servicing ports; but New Zealand is weeks or months away from any such centre. Offshore drilling rigs are only occasional visitors. If a blowout ever happens in New Zealand waters, it will take a long time to deal with it. It may be possible to pre-position essential equipment in New Zealand, but a ship or drilling unit would be extremely expensive to have on standby. There seems all the more reason to make sure that our wells are drilled properly.

Safety

It is desirable to touch briefly on the safety regulation of petroleum operations. The existing regulation turns on the "safety case" which is a thorough analysis, supported by evidence, to show that a system is safe for a given application in a given operating environment. While it is quite right that the company should "own" the safety case rather than being allowed to think that it has shifted responsibility to a regulator, it is remarkable that the safety case does not need to be approved, but is simply sent to the Secretary of Labour: Health and Safety in Employment (Petroleum Exploration and Extraction) Regulations 1999 reg 22. This must change; it is not what happens in other countries such as the United Kingdom or Australia that use the safety case system. The obligation should be a general one rather than one qualified by a duty to take all practicable steps to ensure that a safety case is prepared. There is no loss of responsibility when a regulator is involved, any more than there is when an auditor verifies a company's accounts. There is a good deal of useful empirical evidence available now about what makes good a good regulatory systems for safety and other purposes; for example, Elizabeth Bluff, Neil Gunningham, Richard Johnstone, eds, *OHS Regulation for a Changing World of Work* (Federation Press, Annandale, 2004). Much of it is behavioural rather than strictly legal. We should draw on it to our benefit. A lot depends on bringing managers and employees, both individually and collectively, into a framework with agency regulators.

The under-resourcing of the safety inspectorate is shocking. New Zealand has but one inspector for all its offshore oil and gas installations and onshore installations, and is also responsible for all geothermal installations, which are growing quickly in number. This is a smaller proportion of inspectors to installations than in other countries. The under-resourcing is a concern not only for the workload but also for the difficulty that a small group faces in maintaining a high level of specialist expertise. Even the Environmental Defence Society and the Petroleum Exploration and Production Association of New Zealand find common ground on this.

Conclusion

My main points have been as follows. It is good news that there will finally be an environmental regime for the New Zealand offshore; it has been a long time coming. The Environmental Protection Authority is a suitable agency for the task, but there does not seem much justification for a new environmental statute when simple amendments to the RMA would produce the same result. Either way, the purpose and principles should be more aligned to environmental protection, and there should be provision for the strategic assessment of issues, objectives and policies. In addition, both onshore and offshore, there should be a proper legal regime, administered by a Well Safety Unit, to manage well design and plugging and abandonment, because of the substantial public interest in those specialist operations.