UNITIZED RECOVERY OF PETROLEUM DEPOSITS IN AUSTRALIA

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ABSTRACT: an investigation of the regime imposed upon Australian petroleum (oil and gas) producers to ensure efficient and maximised recovery. The Australian practice is founded upon North American experience although the Australian regulator is also the royalty recipient unlike the US and Canada where the fee simple land owner is the royalty recipient. The Australian regime is made up of three areas being on-shore, coastal waters, and off-shore and is administered by the Federal government and the seven regional (being the six states and the Northern Territory) governments.

KEYWORDS: petroleum – oil and gas – co-operative recovery – unit operation – unitization – pooling – unit development – enhanced recovery – maximised recovery – waste – conservation – efficiency – cost reduction – co-operative exploitation – quasi-unitization – voluntary unitization – good oil-field practice – compulsory unitization – coastal waters – off-shore – on-shore – minerals – adjacent deposits – adjacent producers – adjacent areas

It is impossible to say anything against unitization. It undoubtedly achieves better operating procedures, enhances recovery, and implements good conservation practices, all at reduced cost. It is not surprising, therefore to find that unitization is encouraged by public conservation bodies.

Ballem, JB, *The Oil and Gas Lease in Canada* (1973) 217

The evolution of the petroleum recovery industry has occurred only in the last 125 years.¹ In that time our knowledge of the physical properties has increased and that knowledge, coupled with an appreciation of the finite amount of reserves available to us,² has brought about developments in the industry rarely found outside it. Such concepts as **pooling** and **unit development** describe co-operative participation by a number of persons holding different and sometimes competitive interests. Australia, with a relatively young petroleum industry, has benefited by the experience gained in the industry from other countries particularly Canada and the United States. It is this experience coupled with the public ownership of minerals in Australia³ which has conferred a maturity acquired without the necessity of suffering growing pains. Thus early conservation methods and the consequences thereof are not necessarily relevant in Australia, examples being the concepts of **pooling** and **well spacing**.

First it is necessary to define or describe “unitization” and its rationale. Many texts, particularly earlier American ones, make no emphatic distinction between pooling and unitization⁴ because both relate to the consolidation of oil and gas or other mineral interests in a field or common source [page 2] of supply.⁵ To better understand the concepts the following distinctions can be made:⁶

Pooling is the bringing together of separately owned small tracts for the purpose of gaining a well permit under applicable spacing rules.⁷

Unitization or **Unit Operation** is an arrangement for the joint development of an entire deposit or a substantial part thereof.

Producers can benefit by co-operation among themselves in exploiting their discoveries where the most efficient exploitation is the result. An obvious example is the sharing of processing and transport facilities enabling economies of scale and the elimination of duplicated facilities where one producer can, by outright purchase from the others or by sub-contract, process the produce of all. Another example is the

creation of a processing entity jointly owned by all the producers for the purpose of processing all the produce.

The very nature of petroleum deposits lends itself to co-operation in exploiting discoveries. Because of the migratory (or fugacious) nature of the deposits they can be exploited in an inefficient and wasteful manner. Such waste can be physical where the product is brought to the earth's surface and allowed to escape by evaporation or is deliberately burnt as an unwanted product and is thus not captured.⁸ Physical waste includes the inefficient tapping of the deposit such that reservoir energy is dissipated leaving as irrecoverable [page 3] the major portions of the deposit which were potentially recoverable, ie, failure to recover a maximum quantity which theoretically could be produced. Similarly, uncontrolled production can result in "channelling" where recoverable oil is by-passed in a water-driven field because of an excessively high production rate⁹ rendering it impossible to recover the by-passed oil.

Economic waste is the result of over-production which in turn leads to unrealistically low prices such as were experienced in the East Texas field in the 1930s. Economic waste will not be further considered here although it is worth noting in passing that support in the US industry for conservation regulations was generated by the producers' fear of economic waste and their desire to curtail production and thus increase prices.¹⁰ Conservation as a desirable end in itself was initially brought about for the reason of the producers' self-interest in imposed production quotas through proration and Market Demand statutes.

Our knowledge of petroleum recovery is derived in the main from North American and particularly Texas oil-field practice. In these areas, because of private ownership of land including the minerals beneath the surface, there was fierce competition to produce because under the Rule of Capture,¹¹ until the migratory deposits of petroleum were produced it was open to other adjoining land holders to produce and thus capture the petroleum that may have underlain another's land. The rule of capture was reflected by the Offset Drilling Rule¹² which has been more robustly [page 4] described as "git there fustest with the mostest" wells¹³ with the result that in the Californian Sante Fe Springs field an area known as Hell's Half Acre was "drilled to such a density that the legs of the derricks interlocked".¹⁴

In order to better understand the concept of unitization it is instructive to follow the evolution of the industry in another jurisdiction such as Texas which is suggested to be characteristic of the industry learning and building upon its own experience.

Because of wasteful practices common throughout Texas the State sought to regulate the industry through the agency of a statutory body, the Railroad Commission of Texas.¹⁵ An early measure introduced was the regulation of well spacing on an arbitrary scale – set at 40 and 160 acres of land to support each well for oil and gas wells respectively.¹⁶ The imposition of production quotas and the prohibition against flaring or burning off unwanted gas by oil producers also reduced both economic waste and inefficient recovery techniques.

The effect of well spacing regulations could be overcome where a small interest holder whose holding was less than that required to support a well under the regulations was nonetheless allowed to drill one well on his holding and a production quota was imposed on that well such that the production to area ratio was equivalent to those wells drilled in compliance with the well spacing regulations.¹⁷ To deny the small tract owner his right to do so would be [page 5] confiscation of his property.¹⁸ Thus small tracts were available for production in limited cases as an exception to the well spacing regulations. Such exceptions bred further exceptions leading to the virtual abrogation of the regulation.¹⁹ Where such exceptions were not available there came co-operation between holders of production rights to small tracts, each of which by itself was of insufficient area to allow a well but once combined with other similar tracts the larger combined tract qualified for a well permit under the spacing regulations. The term applied to such co-operation where individual interest holders contributed their holding to a “pool” of sufficient size to qualify for a well permit was “pooling”. The concept has little relevance to Australia where permits and licences are granted by the Crown in blocks greater in area than that required to support a well. Additionally there are prohibitions against drilling near boundaries of the licence area.²⁰ The relevance of pooling to the Australian industry is limited to the part played by it in the chronological development of co-operation between interest holders that ultimately led to unitization. The description of pooling given fails to disclose the various interest holders in the North American context in that each tract usually had a

lessor being the fee simple owner and a lessee of the mineral interests, usually a producing company. Thus a pooling of two tracts required the agreement of four interest holders. The Crown's ownership of in-ground minerals makes for one common licensor although there may be various licensees.

Unitization is the logical development from pooling. Whereas the subject area of a pooled development need only be that area necessary to obtain the right to drill a [page 6] producing well, the subject area for a unitized development is the whole area overlaying the whole deposit so that the deposit can be exploited as a single whole rather than a number of individual producers seeking to exploit that part of the deposit available to them at the expense of adjoining interest holding producers. Such a field under unitized operation lends itself to maximised efficient exploitation with the application of enhanced recovery techniques such as cycling, pressure maintenance or primary recovery enhancement, secondary recovery enhancement and even tertiary recovery. Recovery enhancement techniques require a deposit to be exploited as one entity. An example is the sweeping of a deposit of its recoverable oil by driving that oil towards extraction wells by injecting fluids into other well. Such techniques require the consent and co-operation of the interest holder over that land from which oil will be swept away or which will be rendered non-productive by the encroaching injected driving fluid. Ballem describes unitization as involving the recovery of petroleum from a deposit which is a homogenous whole with the petroleum substance free to move within it without regard to any artificial distinctions created by ownership sub-divisions.²¹

Ideally, as defined above, "unitization" is the exploitation of a whole deposit but in practical terms, usually because the geographic limits are not known, a number of producers may enter into a unitization scheme for a discovery which later proves to be less than the whole deposit. It is only during the course of production that further information regarding the deposit is acquired and continually added to [page 7] that already known. It is in this area of less than whole deposit unitization that the distinction between pooling and unitization becomes blurred. Obviously a deposit that is only partly unitized cannot be exploited with optimum efficiency. A possible and desirable solution is for unitization arrangements to be suitably flexible to allow for later variations as more information regarding the deposit comes to hand.

Thus it is possible to further define co-operative arrangements described above as:

Pooling is the bringing together of individual small tracts, which tracts by themselves do not qualify for the granting of a well permit, so that the total area of the pooled tract is sufficient to justify the granting of a well permit under the applicable spacing regulations.

Unitization is the arrangement without regard to property boundaries for the joint development of an entire petroleum deposit entered into by those whose lands overlie the deposit.

Unit Operation is an arrangement without regard to property boundaries for the joint development of a common source of supply.

Thus it can be said that both “pooling” and “unitization” come within an overall term of unit operation. A further [page 8] definition could be included which, for want of a better expression, I shall describe as “quasi-Unitization” to cover the joint unitized development of several distinct deposits.

The Benefits of Unitization

Unitization, as described above, is a logical development from pooling which itself was devised to overcome restrictions imposed by the State to negate the undesirable consequences of the Rule of Capture. Thus it is ironical that unitization, by allocating equitable recovery rights to producers with differing interests, has gone a long way to repealing the Rule of Capture. The producers have by voluntary agreement accomplished that which the common law was unable to do and cried out for legislative assistance.²² Unitization requires the landholder to surrender his rights to produce the oil beneath his own land and also that from beneath his neighbour's land by drainage. In return the landholder acquires an interest in the oil underlying both tracts and is protected against his neighbours draining oil from underneath his land. This result in itself eliminates the haste and greed associated with the Rule of Capture is sufficient to justify unitization. There are however further benefits accruing to participants in a unitized arrangement.

Without the desperate need to produce oil while there still remains oil to be produced, production can be scheduled such that market demand will be produced without the imposition of quotas restraining production. As all producers have an interest in the entire deposit even those whose land covers [page 9] oil that will be captured last enjoy a constant cash flow. This is of importance to producers participating in “quasi-Unitization” where it is decided to produce in order from individual deposits in a series.²³ Thus unitization provides an economic benefit and assists in eliminating economic waste. Without the incentive for producing at excessive rates there is also an elimination of physical waste such as **channelling** and **fingering**.²⁴

Unitization also brings with it a saving on infrastructure capital expenditure where common facilities are shared by the producers without the need for individual processing plants. This saving on capital expenditure is an inducement to create quasi-Unitized arrangements such as the South Cooper Basin (Australia) deposits. Myers cites the savings associated with individual well costs and suggests that the Arkansas Schuler field which was unitized four years after discovery could have been exploited with 71 wells fewer than were actually drilled had unitization been undertaken from the time of discovery or shortly thereafter.²⁵

The benefits described above inure mainly for the producers of petroleum deposits. There are further benefits which result in greater quantity of production and so favour others beside the producers. In North America the lessor benefits from the greater and longer period of payment of royalties as the life of the field is extended and the Australia counterparts of the lessor is the licensor, ie the Crown. The consumer also benefits from the increased recoverable reserves brought about by optimum recovery efficiency.

[page 10] The real benefit provided by unitization is the exploitation of the whole deposit with maximum efficiency such that production can take place with the least dissipation of reservoir energy.²⁶ In the absence of whole deposit production as much as 85% of the oil in a reservoir is left unrecovered. Unitization allows programmes for pressure maintenance over the whole deposit which, coupled with secondary recovery techniques, can increase recovery from 15-25% to as high as 80%.²⁷ Although similar methods are used, pressure maintenance involves the injection of fluids into the

reservoir to maintain pressure early in the life of a recovery programme while secondary recovery uses similar injection when the reservoir is approaching or has reached the exhaustion of natural energy.²⁸ In addition to the 71 unnecessary wells drilled in the Schuler field already cited,²⁹ Myers further describes the advantages of unitization in that field:

[The] field was discovered in 1937 and unitized four years later. Had the field been unitized at the time of its discovery, or soon thereafter, the drilling of seventy-one wells could have been avoided. During the four years of primary operations billions of cubic feet of rich gas were vented to the air. Prior to unitization, the field produced a total of approximately 16½ million barrels of oil with a drop of reservoir pressure from 3548 to 1625, or a difference of 1923 pounds. Thus, during those four years 55 per cent of the vital reservoir pressure was expended in the production of 11 per cent of the total oil. During the first eight years of operation under unitization 30 million barrels of additional oil were produced with a pressure drop of only 185 ponds. Under primary operation the field would have long since been exhausted, whereas, by as late as 1954 it was producing well over 5,500 barrels per day. By January 1, 1953 it had produced over 71 million barrels of oil. The estimated recovery as a result of unit operation is approximately 100 million barrels of oil, or more than 100 per cent over competitive operations.³⁰

[page 11] Of further benefit is the systematic pattern for locating input and producing wells over the reservoir whereas in competitive operations secondary recovery was restricted to placing four input wells at the corners of the production tract with the producing well in the centre of the tract.³¹ Injection of waste salt water allowed the disposal of as much salt water as oil being produced and retained reservoir pressure in the East Texas oil field.³² For those wells of high gas-oil production ratios the re-injection of the gas or cycling of the gas after the condensate is removed serves to maintain reservoir pressure. Injection of fluids and cycling can require large capital expenditure on the plant required and this capital outlay is best borne by those who have an interest in maintaining the high efficiency of reservoir production – those whose lands overlie the deposit.

Thus, unitization, the operation of a field as an entity without regard to any artificial distinctions created by ownership or property boundaries makes good engineering and economic sense.³³ Indeed there may even be a right or duty on producers to use efficient methods of production.³⁴ Today unitization is considered a standard part of the procedure for enhanced recovery.³⁵ A recent Texas case³⁶ has held that the duties of a reasonably prudent operator include the seeking of voluntary unitization, the

court relying on an earlier decision³⁷ limiting the extent of the duty to that where an amount of oil can be recovered to equal the cost of administrative expenses, drilling or re-working and equipping a protection well, producing and marketing the oil and yielding to the lessee a reasonable expectation of profit.³⁸

[page 12] It is submitted that the passage of Ballem's quoted at the head of this paper is fully justified. Whether or not an Australian court would be prepared to hold that 'good oil-field practice'³⁹ includes unitization remains in doubt.

The North American Experience

Voluntary Unitization

The first pooled or unitized development was effected by a common lease whereby two lessors leased their separate tracts to a single lessee/producer. The lease form referred to both owners as the lessor and that royalties on production were to be paid to the lessor. Litigation arose⁴⁰ when the owner of the smaller tract from which no oil was being produced sought a share of the royalties on the oil being produced from the larger tract. The court upheld the right of the owner of the non-producing land to share in the royalties in the proportion that his land area bore to the total leased area. The court based its decision on the terms of the lease which provided for payment of royalties on production from any point on the lease to the lessor which included both owners. Further the entire lease was to continue during production and the lessee could thus perpetrate the lease indefinitely without the need to explore or produce from the smaller tract. The decision and that of other courts was to the effect that in the absence of an agreement by the owners not to share the royalties upon production, royalties will be shared notwithstanding the absence of an express agreement to share. The community lease came about through a single lessee whose [page13] lease reflected his intentions with only scant consideration for the legal effect as between the land owners. It was primarily a document setting out the legal effect between the lessee and the lessor (or lessors).⁴¹ For those reasons, including perhaps the unintended legal effect imposed by the courts, the community lease fell into disuse to be replaced by express pooling and unitization agreements or the inclusion of a specific clause empowering the lessee to pool the subject land. The imposition of regulatory well spacing orders by conservation authorities rendered the inclusion of a pooling clause in an ordinary lease as a necessity.

Whereas the inclusion of a pooling clause in an ordinary lease confers the power to pool should the lessee later desire to do so, an express unitization agreement is entered into for the sole purpose of unitization perhaps to co-operate in recovery enhancement techniques or to develop a new field most effectively.

Fitting somewhere between voluntary and compulsory pooling is what has come to be known as “equitable pooling”.⁴² Such equitable pooling arose through the imposition of well spacing regulations so that where a lessee of two separate tracts applied for and was granted a well permit for the combined area of the tracts, the owner of the non-producing tract was permitted to share in the production royalties by equitable principles.⁴³ It is by no means certain that the decision in the Mississippi cases are to be followed outside that state and their inclusion here is for the sake of completeness in describing the North American experience. Because of the [page 14] size of licence areas granted in Australia, their relevance to Australian petroleum law is limited.

Compulsory Unitization

In North America “compulsory” unitization need not necessarily force interest holders into unitization against their will. The experience there is that most interest holders enter into agreements voluntarily for their own benefit. The compulsion is against the reluctant hold-out where the majority of interest holders desire to pool or unitize voluntarily.

In the absence of statutes providing for compulsory pooling or unitization, a state cannot require the pooling of tracts nor can a field-wide unit be created. Nevertheless, such a state such as Texas, where the conservation agency (the Railroad Commission) is specifically prohibited from unitizing leases, has under the power to prevent waste effected unitization by calling all operators to show cause why the fields should not be closed down until wasteful practices ceased.⁴⁴

Where it is necessary to impose unitization there are requirements for notice to be served on the interested parties and hearings allowing representations to be made.

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Legal Theory

The community lease gave rise to litigation in the case of *Veal v Thomason*⁴⁵ where the plaintiff vendor Thomason sought to have set aside a sale of land to Veal. The land was subject to a multiple community lease. The defendant Veal took the procedural point that all the royalty owners in the unitized tracts were necessary parties to the action and since Thomason had declined to join as parties the royalty owners his action was dismissed at trial and the dismissal of the action upheld on appeal. In effect the community lease constituted a cross-assignment of royalty interests of each royalty owner to all the other owners.

In direct opposition to the theory of cross-assignment there is the contractual theory whereby the individual lessors agree to share the royalties payable and also expressly negative any intent to cross-assign their interests. That community leases have fallen into disuse does not render the distinction moot as it is expected that even today there will still be such community leases still on foot having been perpetuated by production. A recent Texas case⁴⁶ has applied the cross-assignment theory to a lease containing a pooling clause. The ultimate resolution of the two conflicting theories may lie in Ballem's⁴⁷ and Williams and Meyers's⁴⁸ suggestion that cross-assignments offend against the Rule against Perpetuities. Hoffman⁴⁹ expresses the opinion that these decisions upholding the cross-conveyancing theory were unfortunate and unnecessary as those cases could have been confined to the issue of necessary parties to a suit involving title.

[page 16] The inclusion of a pooling or unitization clause in a lease raises the question of a legal status of the parties. Has the lessor conferred a power of attorney on the lessee or has he merely appointed him as his agent. The answer, although not helpful, would appear to be that each lease including the pooling or unitization clause will be construed on its words and hence care must be exercised in drafting such a clause. Ballem⁵⁰ suggests that the most likely legal approach is to be that of Principal and Agent. This approach and indeed that of the implied Power of Attorney fails to take into account the cessation of the agency or the power upon the principal's (or the grantor's) death. A careful draftsman may be able to produce a modified and narrow agency relationship binding on the principal's heirs.

Provisions for Unitization in Australia

The industry in Australia is relatively young⁵¹ and reliance is placed on the technical expertise acquired in overseas oil fields. Thus the Australian industry benefits by previous overseas experience and it is not necessary for the local industry to grow and learn through its own experience. The industry here is less complex⁵² than overseas because of the public ownership of minerals including petroleum which are vested in the Crown.⁵³ There does not exist in Australia the diverse interests as in North America where at least one royalty owner, one producer, and the state as the conservation body have an interest in a production well. In Australia the royalty owner and the conservation body are merged into [page 17] one. Looking further at adjoining interests the royalty owner is still the Crown whereas with private ownership of minerals two adjoining tracts can give rise to two different royalty owners. The conflict in a North American pooling case is more likely to be between the adjoining royalty owners than involve the common producer/lessee of the adjoining tracts. The producer must pay the royalty. The question under Australian unitization provisions is the different interests of two different producers from adjoining licence areas. The Crown is the royalty owner or licensor of both tracts. Most complex of all is unitization under a jurisdiction where minerals are privately owned which can give rise to at least five parties – the state as the conservation body, two producers or lessees of each adjoining tract and the royalty owners or lessors of each tract. There are 21 different areas from which petroleum can be produced in and surrounding Australia. These areas are the on-shore, the coastal waters, and the adjacent off-shore areas of the six states and the Northern Territory. Because the states have enacted similar legislation for their coastal waters and the Commonwealth *Petroleum (Submerged Lands) Act* 1967 covers all of the seven different adjacent (off-shore) areas the effective number of different laws covering production of petroleum in and around Australia is reduced to nine; the seven on-shore enactments, one (effectively) coastal water enactment and the Commonwealth adjacent area enactment. The task of understanding the law of petroleum in Australia is further lightened by the similar legislation that has been passed by some states relating to [page 18] on-shore petroleum areas. Further, the coastal water statutes follow closely the Commonwealth adjacent area enactments.

In all jurisdictions⁵⁴ (with the possible exception of Tasmanian), on-shore petroleum recovery provide for unitized operations.⁵⁵ On-shore exploration and production in Tasmania is governed by the *Mining Act* 1929 and § 48 of that Act relates to the amalgamation of mining leases. It is not certain whether separate producers desiring to unitize voluntarily could do so or that the Minister for Mines could compel producers to unitize pursuant to § 48. The time does seem ripe for the Tasmanian Parliament to enact a separate Petroleum law similar to that state's off-shore petroleum legislation. The provisions of the Commonwealth and the separate states' off-shore legislation are substantially the same and it is only the variation between the states' on-shore legislation that presents a non-uniform approach. Section 59 of the Commonwealth off-shore legislation will be used as a standard for comparison in considering the various provisions for unitization in Australia. For the purposes of simplifying the description, a deposit contained wholly within two adjacent areas only will be considered. Of course, petroleum deposits which do not respect boundaries drawn by man can extend over any number of areas.

Off-shore legislation

“Unit development” is defined in sub-section (1) of § 59 to mean “the carrying on of operations for the recovery [page 19] of petroleum from that pool under co-operative arrangements between the persons entitled to carry on such operations in each of the areas.” Clause (a) of sub-section (1) confines the application of unit development to an instance where a petroleum pool is partly in a particular licence area and partly in either another licence area held by another licensee or in an area to which the legislation does not apply but in which another person is lawfully entitled to recover petroleum from the pool pursuant to other legislation. It would seem that the legislation does not extend to the case where one licensee holds both licence areas in which the petroleum pool is located or where the adjoining area is not subject to a licence.⁵⁶ Sub-section (6) does empower the Designated Authority to issue directions to a person who is the licensee in respect of two or more licence areas in each of which there is a part of a particular petroleum pool for the purpose of securing the more effective recovery of petroleum. Section 5, the definition section of the Act defines “petroleum pool” as a naturally occurring discrete accumulation of petroleum. This definition confines unit operation to the one petroleum pool and does not cover

the case where separate deposits of petroleum may be more effectively produced under a co-operative arrangement such as were described above as quasi-unitization.

Sub-section (2) empowers a licensee to enter into an agreement for the unit development of a pool and such agreement must be in writing and have been approved by the Designated Authority to have force and effect. The use of the words “force and effect” is of wider effect than similar provisions construed by the Western Australian Supreme [page 20] Court⁵⁷ and the Canadian Supreme Court⁵⁸ and I would submit that an agreement pursuant to sub-section (2) is unenforceable even as a matter of contract between the parties to the agreement unless the Designated Authority has approved the agreement. The purpose of this sub-section is permissive and allows producers to voluntarily enter into unitized production and obtain the benefits of unitization.

In the absence of voluntary unitization agreements the Designated Authority is empowered by sub-section (3) to direct a licensee to enter into an agreement for unitization within the time specified in the Designated Authority’s direction and the licensee is to lodge the agreement with the Designated Authority for registration pursuant to § 81. For the Designated Authority to issue a directive pursuant to this sub-section the Authority can do so either on his own motion or upon the application of a person who is entitled to produce from the particular pool. It should be noted that the power of the Designated Authority is discretionary in that while he may issue a direction, he cannot be compelled to do so. The purpose of this section is to allow the Authority to compel an agreement for unit operation in the face of reluctance to enter into such an agreement by one or more persons entitled to recover petroleum. The Authority has no powers of direction outside his own particular adjacent area and in the case of a reluctant licensee of an adjoining adjacent area it would seem that all the Authority can do is encourage the licensee of his adjacent area to make application to the relevant authority who has the responsibility for the adjoining area. The provision in this sub-section for [page 21] the registration of an agreement pursuant to § 81 emphasises the lack of such a provision for voluntary agreements entered into pursuant to sub-section (2). Attention is drawn to sub-section (10) which provides that an agreement under § 59 is an instrument to which § 81 applies.

Where the Designated Authority has issued a direction pursuant to sub-section (3) and the licensee fails to enter into such an agreement or fails to lodge such an agreement pursuant to § 81 or the lodged agreement is not approved pursuant to § 81 the Designated Authority may direct the licensee to provide a proposal for unit development of the pool within the time specified in this further direction: sub-section (4). This sub-section permits the Authority to issue a further direction to provide a proposed scheme. The Authority is not compelled to issue the direction.

Upon failure of the licensee to submit a proposed scheme in response to the Authority's direction pursuant to sub-section (4) within the time specified in that direction, the Authority is empowered to give directions to the licensee such as the Authority considers necessary to secure the more effective recovery of petroleum from the pool: sub-section (5). This provision allows the Authority to impose a unitized operation upon a licensee. Again, it is permissive and not mandatory on the authority.

Sub-section (6) described above empowers the Authority to direct unit recovery where a licensee holds more than one licence area in each of which there is part of a petroleum [page 22] pool. This provision covers the case where a single licensee holds all of the licence areas under which a pool lies. Sub-sections (3) to (6) inclusive empower the Authority to impose unitization upon a reluctant licensee or licensees. It is expected that licensees would voluntarily enter into unit agreements pursuant to sub-section (2) because of the benefits that flow from unitization. A further incentive to negotiate a voluntary agreement between licensees is their desired preference to negotiate their own agreement instead of being subject to such an arrangement imposed on the licensees by the Authority pursuant to sub-sections (3) to (6).

After unit operations have commenced pursuant to either an agreement or the Authority's direction, the Authority is empowered to issue further directions pursuant to sub-section (7) having regard to additional information. This sub-section provides for variations in the unit operations as, with development, more is learned of the physical characteristics of the petroleum pool. It is surprising that there is not a similar provision for the licensees to seek variations to the unit arrangement as more information becomes available. It may be that in a carefully drawn up unit agreement

the participants have included provision for varying the agreement but this may not always be the case.

Sub-section (8) prohibits the Authority from giving directions pursuant to sub-section (6) or (7) unless the affected licensee or licensees have been given the opportunity to confer with the Authority concerning the proposed direction. Because sub-sections (3) to (5) inclusive are procedural steps [page 23] such that the Authority is not empowered to issue a directive pursuant to sub-section (6) it is not necessary that the licensee be given the opportunity to confer with the Authority concerning directions pursuant to sub-sections (3) to (5). The sub-sections (6) and (7) however, empower the Authority to impose unitization upon the licensees and the licensees are given the opportunity to confer with the Authority prior to such an important direction being given by the Authority. Sub-section (8) is important in any administrative law action being brought against the Authority as a failure to allow a licensee to confer would allow a licensee to seek a remedy under the Commonwealth *Administrative Decisions (Judicial Review) Act* 1977 where pursuant to § 6 of that Act a review of a decision may be sought where there is a complaint regarding the conduct related to making a decision. Similarly in Victoria (and the Victorian legislation follows the Commonwealth legislation closely) the requirement of giving an opportunity to the licensee to confer would be sufficient to constitute the decision maker as a “tribunal” pursuant to § 2 of the Victorian *Administrative Law Act* 1978.

The Authority is empowered by sub-section (9) to give directions as to the rate of petroleum recovery when the Authority gives directions pursuant to sub-section (5), (6), or (7). This power would appear to be superfluous as § 58(3) empowers the Authority to do so when petroleum is being recovered in a licence area.

Unit agreements are required to be registered pursuant to § 81 of the Act: sub-section (10).

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Sub-section (11) which is mandatory requires the Designated Authority to consult with the relevant authority of another jurisdiction where the particular pool is believed to extend beyond the particular adjacent area over which the Designated Authority has authority into an adjoining area whether the adjoining area is also the adjacent area

(and thus covered by the Act) or the adjoining area is an area under state jurisdiction. This sub-section recognises the possibility of pools “straddling” man-made boundaries. Section 6A which was included in the Act in the 1980 amendments to the Act provides for a deemed allocation of recovery from such different areas to allow for the allocation of royalties between the various jurisdictions where a petroleum pool extends into two licence areas.

Where there is a pool extending beyond the adjacent area sub-section (12) prevents the Designated Authority from approving of an agreement or issuing directions unless the relevant authority of the area into which the pool extends also approves of the agreement or the proposed directions.

All states, with the exception of South Australia,^{*} have enacted their own *Petroleum (Submerged Lands) Acts* in almost identical terms as the Commonwealth Act. In the case of South Australia, the *Petroleum (Submerged Lands) Act* 1967-74 provides for unit development in § 59 of that Act which is substantially the same as § 59 of the Commonwealth *Petroleum (Submerged Lands) Act* 1967-73, ie, prior to the 1980 amendment of the Commonwealth Act. Thus the South Australian legislation has no provisions similar to those of sub-sections (11) and (12) [page 25] of the Commonwealth Act relating to petroleum pools extending beyond the area of jurisdiction into an adjoining state’s coastal waters or, in the case of South Australia, into the South Australian adjacent area which is within the jurisdiction of the Commonwealth. Similarly the South Australian legislation retains the omitted sub-section (1) which was replaced in the 1980 Commonwealth amendment. This definition of unit operations does not countenance a petroleum pool extending beyond the area of jurisdiction.

On-shore Legislation

The states of New South Wales⁵⁹, Western Australia⁶⁰, and Queensland⁶¹ have legislation that is similar to that of the Commonwealth *Petroleum (Submerged Lands) Act* 1967-73, ie, prior to the 1980 amending legislation although unlike that Act which was discussed above in relation to the South Australian off-shore legislation, the three

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^{*} But now see *Petroleum (Submerged Lands) Act* 1990 (SA) [added annotation].

state enactments do countenance a petroleum pool extending beyond the state. In New South Wales and Queensland the relevant term is “petroleum deposit” which is defined in § 3 of the respective Acts to have a similar meaning to “petroleum pool” as defined in the Commonwealth legislation.

The Victorian provision for “unit operations” is contained in § 63 of that state’s *Petroleum Act 1958*. That section provides that where the land in any lease forms part of a single geological petroleum structure or petroleum field extending beyond that land and it is desirable that the oilfield should be worked and developed as one unit, the [page 26] Minister is empowered to vary the conditions of the lease by including further land to which the oilfield extends and (where applicable) to require all lessees to jointly prepare a scheme for the unit development of the oilfield as one unit.⁶² The Minister is to serve notice on the lessees in writing and the notice shall specify the subject lands and the time within which the plan is to be provided to the Minister.⁶³ There is provision in sub-section (3) that if the plan is not provided within the specified time or the Minister does not approve the plan then the Minister shall cause a plan to be prepared.

The final sub-section (4) provides that any plan furnished to the Minister and approved by him (or in the case of a plan caused by the Minister to be prepared pursuant to sub-section (3)) shall become a condition of the lessee’s lease and the lessee shall perform and observe such condition accordingly.

It should be noted that sub-sections (3) and (4) are mandatory and not subject to the minister’s discretion. The section appears to be a blunt tool for encouraging or imposing unitization on producers and is imprecisely drawn. Whereas the Act defines a “petroleum deposit”, the provision for unit development is related to “a single geological petroleum structure or petroleum field.” I suggest that such a structure or field is unnecessarily wide and could be enforced against lessees in unwarranted circumstances leading to the unit development or quasi-unitization of separate deposits. Whereas quasi-unitization may be desirable for the purpose of securing economy and efficiency I am doubtful that it would [page 27] avoid wasteful and harmful development and practices. Yet, if the Minister is satisfied that this is the case he may compel unit development and even, I submit, quasi-unitization. It is suggested

that Victoria legislate to introduce a similar Act for the on-shore area as already exists for the Victorian off-shore areas.

The South Australian *Petroleum Act* 1940-81, § 80c provides for on-shore unit development in that state in similar terms to the Victorian on-shore legislation considered above. The prerequisite to the Minister's action is that he must be satisfied that the area comprised in a petroleum production licence forms part of a field extending beyond the area of the licence and that it is desirable for the purpose of securing economy and efficiency and the avoidance of waste that the field be worked as a unit. If these requirements are satisfied the Minister may vary the terms of the licence by including in the licence area land to which the field extends if that additional land is not held under another petroleum licence and if it is, the Minister may serve notice on the licensees requiring them to submit a plan for developing the field as one unit within a specified time. Upon the failure of the licensees to furnish the plan within the specified time or if the plan fails to gain the Minister's approval, the Minister may prepare a scheme and the licensees will be bound by the terms of the scheme as if it were a condition of their respective licences. Unlike the Victorian legislation the provision empowering the Minister to prepare a scheme is discretionary and not mandatory. Although § 3 of the South Australian Act defines "pool" the draftsman has [page 28] chosen to make § 80c conditional on a part of a field extending beyond the licence area. "Field" is also defined by § 3 as an area approximately coterminous with a subterranean geological formation within which a pool or a number of pools lie. My previous comments on the power of the Victorian Minister to compel quasi-unitization are equally applicable to this legislation and the desirability of on-shore legislation in a form similar to the *Petroleum (Submerged Lands) Act* of South Australia is, I believe, apparent.

The Tasmanian *Mining Act* 1929 is the relevant legislation for on-shore petroleum recovery. Section 48 which provides for the amalgamation of leases held by the same lessee is of little assistance to the producer who wishes to operate on a unitized basis or the Minister who wishes to compel the producers to operate as a unit. Section 92 provides for encouragement of mining in Tasmania but it is doubtful that this section could be construed as allowing unit development. Major mining developments in Tasmania would appear to be the subject of specialised legislation pursuant to § 28

where, if both Houses of Parliament pass a resolution, there is power to grant a special lease. It is unfortunate that an oil explorer should expend money on a search in Tasmania without a clear set of rules to guide him with regard to his rights and obligations. Tasmania does need new legislation, both for Petroleum and mining and the present shortcoming in its legislation is not restricted to Unit Operations. At the very least that state's off-shore petroleum legislation could serve as a base for new on-shore legislation.

[page 29]

As can be seen all states with the exception of Tasmania have provision for unit development which with the Commonwealth legislation provides an overall cover to Australia and its surrounding sea. It is arguable that without specific sections permitting unitized operations or empowering the particular authority to impose unitization on producers that such provisions are inherent in the legislation. For example, pursuant to § 152 of the Victorian off-shore legislation the Governor in Council is empowered to make regulations regarding the conserving and prevention of waste of natural resources whether petroleum or otherwise. Furthermore, the Minister may give directions to permittees and licensees, the directions being as to any matter with respect to which regulations may be made under § 152.⁶⁴ Thus it follows that a Minister may give directions regarding the conservation and prevention of waste of natural resources, whether petroleum or otherwise. The delegation of legislative authority to enforce conservation has been upheld in the North American industry.⁶⁵ Similarly there are requirements such as those contained in § 97 of the Victorian off-shore legislation where the licensee is required to carry out operations in accordance with good oil-field practice which term is defined to mean "all those things that are generally accepted as good and safe in the carrying on of exploration for petroleum, or in operations for the recovery of petroleum, ..."⁶⁶ Given that the Court in the *Amoco Production Company v Alexander* case⁶⁷ held that the duties of a reasonably prudent operator to protect the lease from field-wide drainage might include the seeking of voluntary unitization it may well be arguable that "good oil-field practice" includes unitization in appropriate cases.

[page 30]

The possibility of jurisdictional problems has largely been eliminated by the recent legislation which countenances the problem of a petroleum pool extending beyond the geographic area of an Act's jurisdiction. With the exception of the South Australian

off-shore legislation^{*} the off-shore legislation foreshadows such pools that may straddle the boundaries between two different adjacent areas, between an adjacent area and a coastal waters region of a State, between a coastal waters region and an on-shore area of a State or any combination of these boundaries. The relevant authority is empowered or even compelled to consult with his counterpart in another jurisdiction⁶⁸ and there are provisions for determining disputes and allocating deemed production from a pool between the areas in which the deposit lies.⁶⁹ It is in the older off-shore legislation that leaves these issues in doubt. It is arguable that the only case that is not covered by the offshore legislation is that of a deposit that straddles an off-shore boundary between two states. In all other cases (except South Australia^{*}) there is an Act that covers the situation where a deposit extends over both an on-shore and an off-shore region. It is submitted that such an on-shore jurisdictional issue should be negotiable between the interested Ministers. A failure to resolve the issue could see resort to the Law of Capture of which the more undesirable effects have largely been eliminated by the concept of unitization.

[page 31]

Legal Status of Participants in Unitized Recovery of Petroleum

The classification of the status and the rights of parties engaged in petroleum exploration and production is beset with difficulty. In Australia rights are conferred on licensees/permittees/lessees by statute. Such rights are without doubt statutory rights. Unfortunately North American case law is not helpful in that they have, in the main, been concerned with the owner in fee simple granting a right to extract minerals to others. Such a grant has been characterised according to the common law *profit à prendre*⁷⁰ although the parties usually describe the grant as a lease. In Australia the grantor of the right is the Crown. It is difficult to characterise the rights granted as a lease as the licensee does not acquire quiet enjoyment nor are the rights conferred freely assignable. There can be no doubt that the right is more than a mere licence as the Crown, having granted a permit or licence cannot revoke such a permit or licence at will. The common law *profit à prendre* which is a licence coupled with a grant is perhaps the best common law classification of the rights of a producer but such a profit is a proprietary interest in land which does not accord with the restrictions and powers delegated to the responsible authority to administer the various petroleum

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^{*} But now see *Petroleum (Submerged Lands) Act 1990 (SA)* [added annotation].

statutes. I am of the opinion that the rights and obligations of a licensee/permittee under the statutes are to be found within those statutes and it is not necessary to go outside the statutes. Thus I would describe the licensees and permittees and lessees as possessing a statutory licence and if forced to describe such a statutory [page 32] licence in common law terms I would choose a description such as “somewhat akin to a *profit à prendre*.” I would do so notwithstanding that the statutes use such terms as “licensee” and “lessee” and in further support of this conclusion the various enactments require approval and registration of the titles acquired pursuant to the statutes and this requirement extends to the transfer of interests in such titles. This requirement also applies in general to the creation of a unitized development.

Again using the Commonwealth legislation as a basis for comparison there is provision for a licensee to enter into an agreement in writing for or in relation to the unit development of a petroleum pool but such an agreement does not have any force or effect unless it has been approved by the Designated Authority.⁷¹ Such an agreement is an instrument to which the approval and registration provisions of the Act apply.⁷² Where the Designated Authority directs a licensee to enter into such an agreement⁷³ that agreement is likewise an instrument to which the approval and registration provisions of the Act apply.⁷² Upon the failure of the licensee to enter into an approved agreement the Designated Authority may serve on the licensee, by an instrument in writing, such directions as the Designated Authority thinks necessary for the purpose of securing the more effective recovery of petroleum from the pool.⁷⁴ Such an instrument affects an existing licence⁷⁵ and is also an instrument to which the approval and registration provisions of the Act apply.

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The approval and registration provisions of the Commonwealth Act are contained in § 81 and sub-section (20) of that section provides that an instrument is of no force until the instrument has been both approved by the Joint Authority and registered in accordance with sub-section (7).

It follows that a unitization scheme voluntarily entered into is of no “force and effect” until it is approved by the Designated Authority⁷¹ and is also of “no force” until it is approved and registered pursuant to § 81.⁷² It may even follow that a unitization scheme entered into pursuant to a direction of the Designated Authority acting under

sub-section (3) is also of “no force or effect” until it is approved by the Designated Authority and of “no force” until it is approved and registered pursuant to § 81 because sub-section 59(2) does not discriminate between those agreements entered into voluntarily and those entered into pursuant to a direction.

Thus under the Commonwealth legislation the legal relationship between the participants will be governed by the terms of the agreement entered into by the participants or the directions served on them by the Designated Authority. The terms governing the relationship must have been approved by the Designated Authority for such terms to be of force or to be of force or effect. There is no indication of the terms that may gain the approval of the Designated Authority but it would seem that at its highest, the relationship between the participants is contractual and not proprietary. If as suggested above a licensee has no proprietary interests in his licence area then it would be impossible for such a [page 34] licensee to confer or grant a proprietary interest in his licence area to a fellow participant in a unitized development. Such an agreement may be capable of assigning an equitable interest⁷⁶ in one licensee’s licence area which is perhaps the closest that in Australia can approach to the cross-conveyancing theory discussed above in relation to community leases in North America. A better characterisation may be that the participants are, at most, cross-assigning their future proprietary interests in the petroleum produced upon production. Such assignments of future property are equitable and must be supported by consideration to be enforceable as such an assignment can hardly be said to be capable of perfecting while the subject matter of the assignment does not exist.⁷⁷ Given the North American experience where participants seek to ensure that their agreement for unitization is strictly contractual and not capable of being characterised as a cross-conveyance⁷⁸ it is envisaged that participants in an Australian unit development would similarly arrange their voluntary agreement.

That states’ off-shore legislation is in similar terms to the Commonwealth Act with the exception of South Australia which Act is in terms of the Commonwealth Act of 1967-1973.* Thus such unitization agreements are not necessarily of “no force and

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* But now see *Petroleum (Submerged Lands) Act* 1990 (SA) [added annotation].

effect” unless approved by the Minister but, pursuant to the approval and registration section they are of “no effect” unless so approved and registered.

With regard to the states of NSW and Western Australia such a unitization agreement must be approved and registered to be of force⁷⁹ although there is no requirement that unless [page 35] they are approved they will be of “no force or effect” as in the Commonwealth legislation. Unitization agreements in Queensland shall be of no force or effect unless approved by the Minister.⁸⁰

The South Australian⁸¹ and Victorian⁸² on-shore legislation is in similar terms and the provision for unit development⁸³ only seems to countenance unit development at the direction of the Minister. Thus there are no requirements that his approval be obtained after a scheme prepared by the licensee at the Minister’s direction must be approved by the Minister. In the event of the Minister not so approving the Minister can cause his own scheme to be prepared and imposed upon the licensees. The requirements for assigning interests in South Australia and Victoria are that such assignments, unless with the consent of the Minister first had and obtained, are void.⁸⁴

As described above the Tasmanian on-shore legislation would appear to be out-dated although transfers of interests in mining leases must have the Minister’s consent⁸⁵ and dealings are subject to registration.⁸⁶

With regard to unitization agreements for the case of a pool extending into two or more areas it would seem to be prudent to have such an agreement approved and registered where necessary to ensure that the agreement is enforceable. Otherwise there is a possibility of litigation ensuing over an agreement that is in compliance with the laws of one jurisdiction and thus enforceable in that jurisdiction while [page 36] at the same time not being enforceable through want of compliance in the other jurisdiction.

Further Considerations

When drawing up a Unitization agreement or proposals for such an agreement for submission to an authority the lawyer should anticipate possible problems which may

only come to light many years after his agreement is accepted by those who will be bound by it.

The extent of the subject area should be carefully considered in the vertical as well as the horizontal bounds of the scheme. In Australia the problem is not readily apparent as it is in those jurisdictions where ownership of minerals in the ground is vested in private fee simple proprietors. Just as land can be sub-divided in the horizontal plane so it can also be vertically sub-divided. In Australia the grantor of licences to explore and produce has not chosen to make different grants in the same area but at different depths.

A cross-section of the Merrimelia oil & gas field in the Cooper Basin
from Wilkinson R, "The Complex Merrimelia field",
the *Australian Financial Review*, page 23 (26 May, 1983)

[page 37]

The figure above shows a cross-section of an oil and gas field in central Australia where up to four different petroleum deposits are located in the same area but at differing depths. For the purposes of unitization only one whole deposit need be subject to one unit development. However it may be advantageous to unitize a number of separate deposits in such a field if only to simplify the working arrangement.

Consider for example a producer (A) whose licence area contains, at a depth of 3000

metres, a petroleum deposit that extends north into the licence area of another producer (N). A's licence area also contains a deeper deposit, at 4500 metres which extends east into the licence area of yet another producer (E). And so on. Is A to participate in four separate unit developments with different sets of co-participants exploiting different deposits or should consideration be given to one comprehensive unit development to exploit the four deposits? Litigation concerning such a field arose in North America with a legal result, if the fact recitations in the opinions are accurate, that was indefensible according to one writer.⁸⁷ The Unit sued to enjoin the defendant from operating the defendant's Bartlesville completions in certain dual completions where the dual completion allowed the exploitation of separate deposits at different depths through one well. The Bartlesville completion was a deposit to which the defendant alone had a right to exploit while the other completion was in the unitized Hunton lime formation. The unit committee had given the defendant permission to operate the upper (Bartlesville) formation but later voted to take over the entire well and directed the defendant to plug off the Bartlesville zone. The defendant refused and presented evidence showing a cost of approximately \$10,000 to plug [page 38] off the upper zone and estimates of \$70,000 for twin well costs to recover \$95,000 worth of oil as against a cost of \$3,000 for facilities to separate the two horizons. The unit contended that pressure differentials between the two deposits required such heavy mud that the unitized deposit would become saturated with drilling mud, impairing and perhaps ruining the unitized deposit. The lower court sustained the defendant's right to exploit the upper deposit but, on appeal, the court refused to decide the question stating that it was not for the court to substitute its judgment for that of the unit's unless the unit's judgment could be shown to be arbitrary and capricious.⁸⁸ The decision is not remarkable given that the unit was a voluntary unit founded on contract between the lessee-operators and authorised by statute permitting such voluntary units. The terms of the agreement included provision for each lessee within the unit area to deliver possession to the unit of all wells within the unit area, one of which was the dually-completed well in dispute in the litigation. Were the unit a compulsory unit one could readily agree with the commentator who suggested the result reached was indefensible. The agreement however was voluntarily entered into.

In the North American context where it is settled law⁸⁹ that production from the unitized deposit keeps the participating leases on foot even when the production is from another tract of land within the unit the reason being that the royalty owner is entitled to a production royalty although production from his tract is not effected, difficulties have arisen with upper and lower formations when only one such deposit is [page 39] unitized.⁹⁰ It is not certain in the various Australian jurisdictions whether production from a licence area that is part of a unit development will count towards production from other licence areas where production is not effected although there is provision for allocation of liability to pay royalties among the unitized licence areas.⁹¹

The other considerations to be kept in mind by the lawyer charged with drafting unit development provisions are the flexibility that will allow re-negotiation and assessment of each participant's right to the produced petroleum in the light of new information gained about the pool's characteristics as production continues and the possible inclusion within the already existing unit of other land tracts as information becomes available that shows the unitized deposit extends into such tracts.

A unit operation requires an allocation of the burden and the benefit of production among the participants. The simplest allocation is related to the licence area contributed to the unit by the participants. In the absence of any other relevant information this has previously been resorted to in early North American cases involving pooling and unitization.⁹² These cases concerned disputes over the proportion of royalty to be paid to different lessors and it could be said that the lessor's only contribution to the development was the necessary acreage to qualify for a well permit. In the light of the more comprehensive engineering and geological information available today it may be preferable to allocate contribution and participation in a unit with regard to the acre-feet (or volume) of oil within each [page 40] participating licence area, the permeability and porosity of the deposit and other factors of which core drilling will provide an estimate. Such factors are in the domain of the petroleum engineers and geologists but the lawyer who is called upon to draw up a document fixing the rights and obligations of the various parties should understand how such information is relevant to the agreement and have an understanding of the theory behind such information as will be provided to him by the technical people when they consult him.

Conclusion

Because the industry in Australia is relatively young and few discoveries have been found, it is possible at this early stage to make use of the acquired experience of petroleum production elsewhere to ensure that Australian deposits are exploited in the most efficient manner. Neither Australia nor the world can afford to squander such a resource as petroleum while there remains no substitute for it.

Australia, with its public ownership of petroleum and its newly-born and unspoiled industry, is in a position to prevent waste before it occurs by ensuring conservation practices are followed from the beginning. Unitization, the antithesis of the wasteful Law of Capture, is an essential conservation method for the efficient exploitation of what is now recognized to be a scarce resource.

[page 41] **Endnotes**

- ¹ Ballem JB, *The Oil and Gas Lease in Canada* (1973) 4 suggests the world's first oil well was drilled in 1858.
  - ² Hawkins W, introduction to *Conservation of Oil and Gas* (1949) xvi described the irreplaceable resource and noted that oil does not produce itself.
  - ³ Lang AG and Crommelin M, *Mining and Petroleum Law in Australia* (1979) 12. A representative example is the *Petroleum Act 1958* (Vic) § 5.
  - ⁴ Hoffman LJ, *Voluntary Pooling and Unitization* (1954) 6-7; Myers RM, *The Law of Pooling and Unitization* (1957) 1; Ballem, *op cit* 211; Williams HR, Maxwell RC and Meyers CJ, *Cases and Materials on the Law of Oil and Gas* (1974) ch 8; see also the entries for **Pooling** and **Unitization** in Williams HR and Meyers CJ, *Manual of Oil and Gas Terms* (4th ed, 1976) 438 and 625.
  - ⁵ Myers, *loc cit*.
  - ⁶ Sullivan RE, *Handbook of Oil and Gas Law* (1955) 308 and 358.
  - ⁷ Ballem, *op cit* 152.
  - ⁸ *Legal History of Conservation of Oil and Gas* (1938) 19-20 and 272; Sullivan, *op cit* ch 14.
  - ⁹ Williams and Meyers, *op cit* 79; see also the entries for **By-passing** and **Fingering**.
  - ¹⁰ Myers, *op cit* 13-16.
  - ¹¹ Williams and Meyers, *op cit* 519; Sullivan, *op cit* 45; Ballem, *op cit* 82; Myers, *op cit* 18-22; Williams, Maxwell and Meyers, *op cit* 57; *Barnard v Monagahela Natural Gas Coy*, 216 Pa 362 (1907).
  - ¹² Sullivan, *op cit* 45; Myers, *op cit* 20.
  - ¹³ Myers, *op cit* 11.
  - ¹⁴ *Legal History of Conservation of Oil and Gas* (1938) 33.
  - ¹⁵ *Ibid* 218.
  - ¹⁶ Williams, Maxwell and Meyers, *op cit* 612.
  - ¹⁷ *Ibid* 614-5; Myers, *op cit* 209.
  - ¹⁸ *Brown v Humble Oil Refining Coy*, 83 SW (2d) 935, 945; *Railroad Commission of Texas v Humble Oil Refining Coy*, 193 SW (2d) 824.
  - ¹⁹ Myers, *op cit* 12.
  - ²⁰ eg *Petroleum (Submerged Lands) Act 1967-80* (C'th) § 100.
- [page 42]
- ²¹ Ballem, *op cit* 211-2.
  - ²² *Barnard v Monagahela Natural Gas*, 216 Pa 362 (1907); *The Trinidad Asphalt Coy v Ambard*, [1899] AC 594 (PC).
  - ²³ Wilkinson R, "The Complex Merrimelia Field", *Australian Financial Review* 23 (26 May, 1983).
  - ²⁴ See note 9 above.
  - ²⁵ Myers, *op cit* 2 and 27-8; Ballem, *op cit* 141 and 216-7.
  - ²⁶ Myers, *op cit* 2 and 6.
  - ²⁷ *Ibid* 24-5.
  - ²⁸ Williams and Meyers, *op cit* 532-3.
  - ²⁹ See note 25 above.
  - ³⁰ Myers, *op cit* 27-8.
  - ³¹ *Ibid* 26.
  - ³² Sullivan, *op cit* 345-6; *Conservation of Oil and Gas* (1958) 7; Williams and Meyers, *op cit* 525-6.

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- ³³ Ballem, *op cit* 211.
- ³⁴ Myers, *op cit* 39-40.
- ³⁵ Hoffman LJ, "Pooling and Unitization: Current status and developments", *33rd Oil and Gas Institute* (1982) 245. 267.
- ³⁶ *Amoco Production Coy v Alexander*, 622 SW(2d) 563, 568.
- ³⁷ *Clifton v Koontz*, 325 SW(2d) 684.
- ³⁸ *Ibid* 695-6.
- ³⁹ eg *Petroleum (Submerged Lands) Act* 1967-80 (C'th) § 5(1).
- ⁴⁰ *Parker v Parker*, 144 SW(2d) 303.
- ⁴¹ Myers, *op cit* 51.
- ⁴² Hoffman, *Voluntary Pooling* (1954) ch 5; Myers, *op cit* 59.
- ⁴³ *Griffith v Gulf Refining Coy*, 60 So(2d) 518.
- ⁴⁴ Myers, *op cit* 217; *Conservation of Oil and Gas* (1958) 5.
- ⁴⁵ 159 SW(2d) 472.
- ⁴⁶ *Kelln v Brownlee*, 517 SW(2d) 568.
- [page 43]
- ⁴⁷ Ballem, *op cit* 224; see also Myers, *op cit* 57.
- ⁴⁸ Williams HR and Meyers CJ, *Oil and Gas Law* (1959) vi, 551.
- ⁴⁹ Hoffman, *Voluntary Pooling* (1954) 159-61.
- ⁵⁰ Ballem, *op cit* 228.
- ⁵¹ Lang and Crommelin, *op cit* 17 note the first commercial production at Moonie in 1962; Thompson AG, "Comment on Petroleum (Submerged Lands) Act" (1979) *2 Australian Mining and Petroleum Law Journal* 160, notes a Western Australian case involving the off-shore exploration for oil in 1902.
- ⁵² Lang and Crommelin, *op cit* 18 note that almost all of the reported Canadian cases involving petroleum deal with the rights acquired from private land owners rather than the Crown.
- ⁵³ Lang and Crommelin, *op cit* 20 and 226.
- ⁵⁴ Consideration of the Northern Territory was inhibited by the unavailability of Northern Territory enactments.
- ⁵⁵ *Petroleum (Submerged Lands) Act* 1967-80 (C'th) § 59; *Petroleum Act* 1958 (Vic) § 63; *Petroleum (Submerged Lands) Act* 1982 (Vic) § 59; *Petroleum (Submerged Lands) Act* 1982 (Tas) § 58; *Petroleum Act* 1955 (NSW) § 68; *Petroleum (Submerged Lands) Act* 1982 (NSW) § 60; *Petroleum Act* 1967-81 (WA) § 69; *Petroleum (Submerged Lands) Act* 1982 (WA) § 59; *Petroleum Act* 1940-77 (SA) § 80c; *Petroleum (Submerged Lands) Act* 1967-74 (SA) § 59; *Petroleum Acts* 1923-83 (Q'land) § 61C and *Petroleum (Submerged Lands) Act* 1982 (Q'land) § 59.
- ⁵⁶ cf *Petroleum Act* 1940-77 (SA) § 80c(1)(a); *Petroleum Acts* 1923-77 (Q'land) § 61C(6).
- ⁵⁷ *Swan Resources Ltd v Southern Pacific Hotel Corp Energy Pty Ltd* (1981) unreported
- ⁵⁸ *Saskatchewan Minerals v Keyes*, [1972] SCR 703 (Canada).
- ⁵⁹ *Petroleum Act* 1955 (NSW) § 68.
- ⁶⁰ *Petroleum Act* 1967-81 (WA) § 69.
- ⁶¹ *Petroleum Acts* 1923-83 (Q'land) § 61C.
- ⁶² sub-section (1).
- ⁶³ sub-section (2).
- ⁶⁴ *Petroleum (Submerged Lands) Act* 1982 (Vic) § 101.

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- ⁶⁵ Myers, *op cit* 7.
- ⁶⁶ *Petroleum (Submerged Lands) Act* 1982 (Vic) § 4(1).
[page 44]
- ⁶⁷ (1981) 622 SW(2d) 563, 568.
- ⁶⁸ eg *Petroleum (Submerged Lands) Act* 1982 (Vic) § 59(11), (12).
- ⁶⁹ eg *Petroleum (Submerged Lands) Act* 1982 (Vic) § 7(8), (9).
- ⁷⁰ *Berkheiser v Berheiser*, [1957] SCR 387.
- ⁷¹ *Petroleum (Submerged Lands) Act* 1967-80 § 59(2).
- ⁷² *Ibid* § 59(10).
- ⁷³ *Ibid* § 59(3).
- ⁷⁴ *Ibid* § 59(5).
- ⁷⁵ *Ibid* § 81(1).
- ⁷⁶ *Swan Resources Ltd v Southern Pacific etc*, (1981 unreported).
- ⁷⁷ *Norman v FCT*, (1963) 109 CLR 9; *Shepherd v FCT* (1965) 113 CLR 385.
- ⁷⁸ Hoffman, *Voluntary Pooling and Unitization* (1954) 167-9.
- ⁷⁹ *Petroleum Act* 1955 (NSW) § 38(4); *Petroleum Act* 1961-81 (WA) § 75(2).
- ⁸⁰ *Petroleum Acts* 1923-67 (Q'land) § 61C(2).
- ⁸¹ *Petroleum Act* 1940-71 (SA).
- ⁸² *Petroleum Act* 1958 (Vic).
- ⁸³ SA § 80c; Vic § 63.
- ⁸⁴ SA § 92; Vic § 39.
- ⁸⁵ *Mining Act* 1929 (Tas) § 49.
- ⁸⁶ *Ibid*.
- ⁸⁷ Niblack WR, "Some consequences of Horizontal Division of Oil and Gas Leases",
8th Annual Rocky Mountains Law Institute (1963) 11.
- ⁸⁸ *West Edmond Hunton Lime Unit v Stanolind Oil & Gas Co*, 193 F(2d) 818.
- ⁸⁹ Ballem, *op cit* 155, 213, and 229.
- ⁹⁰ *Wilcox v Shell Oil Co*, 76 So(2d) 416; *Le Sage v Union Producing Co*, 184 So(2d) 727.
- ⁹¹ eg *Petroleum (Submerged Lands) Act* 1982 (Vic) § 7(9)(b).
- ⁹² *Parker v Parker*, 144 SW(2d) 303; *French v George*, 159 SW(2d) 566; *Griffith v Gulf Refining Co*, 60 SW(2d) 518.

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